Scott White and Hookins

London
Bedford
Winchester

# Sustainability and Energy Statement
# Bridge Point Weybridge
# Weybridge Business Park
# Addlestone Road
# Addlestone
# Surrey
# KT15 2UP

**Prepared for:** BRIDGE

**Prepared by:** .....
**Olivia Beale** BSc (Hons)

**Reviewed by:** .....
**Supriya Kamath** B.Arch; M.Sc

- Structural Engineering
- Civil Engineering
- CDM Consultants
- Sustainability and BREEAM
- Traffic and Transport
- Flood Risk Assessments
- Highway Engineering
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# Contents

# 1.0 Executive Summary

This Sustainability and Energy Statement has been prepared to support a planning application for the development of two new industrial buildings at Addlestone Road, Weybridge. The works involve the demolition of existing buildings and the development of three employment units within Classes E(g)ii, E(g)iii, B2 and B8, with ancillary office accommodation, new vehicular access, associated external yard areas, HGV and car parking, servicing, external lighting, hard and soft landscaping, infrastructure and all associated works. The above site will hereafter be referred to as the 'development'.

This report seeks to outline the approach taken to incorporate and maximise sustainability and energy efficiency within the design to address key policies, and the associated BREEAM pre-assessment provides further evidence of this. Scott White and Hookins have been commissioned by Bridge Industrial (hereafter to be referred to as 'Bridge') to produce the Sustainability and Energy Statement, with input from MBA Consultants for the energy modelling work and findings. This report has been prepared by experienced Sustainability Consultants who are also licensed BREEAM Assessors and BREEAM Accredited Professionals (APs).

Bridge's vision for the development involves a holistic sustainability approach which seeks to satisfy local and regional policies and go beyond the standards set by Building Regulations. Bridge aims to achieve BREEAM 'Very Good', with aspirations of 'Excellent', despite there being no explicit BREEAM target set by the local authority, as well as achieve a 5-star rating under the Global Real Estate Sustainability Benchmark (GRESB). Sustainability is at the core of the design strategy of this development.

The sustainability considerations of the development have been addressed in this report under the following broad sustainability headings, which also seek to address the specific requirements outlined within Policy SD7 Sustainable Design of Runneymede 2030 Local Plan:

- Building Design (including information on opportunities for passive solar gain and cooling, as required by Policy SD7)
- Energy/Carbon Emissions
- Climate Adaptation
- Water Efficiency
- Materials and Waste
- Construction Techniques (including information on sustainable construction and demolition techniques as required by Policy SD7)
- Ecology and Biodiversity (including information on protecting existing biodiversity and achieving net gain as required by Policy SD7)
- Health and Wellbeing
- Pollution Management
- Transport (including information on secure cycle storage and electric car charging as required by Policy SD7)

The energy targets for this development are:

- Comply with Building Regulations Part L2A (2013)

- Comply with Policy SD8 Renewable and Low Carbon Energy of Runneymede 2030 Local Plan, which requires the following:
  - Implementation of the energy hierarchy (Be Lean, Be Clean, Be Green)
  - Development proposals of 1,000m$^2$ or more should incorporate measures to supply a minimum of 10% of the development's energy from renewable and/or low carbon technologies
  - Developments of 10,000m$^2$-50,000m$^2$ should consider whether connection to existing renewable, low carbon or decentralised energy networks is possible

The energy hierarchy has been followed to define the appropriate steps to achieve the requirements set out in by Building Regulations Part L2A and Policy SD8:

- Be Lean: Proposals include for the incorporation of improved building envelope details and enhanced air tightness that seeks to better that of Part L, efficient mechanical plant, and highly efficient lighting to reduce energy demand
- Be Clean: Local heat network sites were reviewed, and the suitability of a community heating network was considered, but the location and lack of constant heat load profile meant these options were not feasible for this development.
- Be Green: The proposed development includes the use of both photovoltaic arrays and air source heat pumps These solutions have been appraised as the most viable for this development.

A combination of a fabric-first approach and renewable energies provides a route to compliance with Approved Document Part L:2013 of the Building Regulations for the proposed development. This approach also demonstrates how the development will comply with the planning criteria for 10% of the development's energy needs to be met by renewable and/or low carbon technologies, in accordance with Policy SD8 of the Runneymede 2030 Local Plan. Table 1 details the total calculated annual $CO_2$ emissions for the proposed development, as well as the percentage of energy demand provided by renewables – demonstrating the 10% requirement has been exceeded.

**Table 1: Building Regulations Part L2a and energy demand met by renewables**

| UNIT | PART L2A (2103) - TARGET EMISSION RATE (TER) $KGCO_2/M^2$ | PART L2A (2013) - BUILDING EMISSION RATE (BER) $KGCO_2/M^2$ | $\%CO_2$ SAVING | % OF ENERGY DEMAND BY RENEWABLE |
|---|---|---|---|---|
| **Unit 100** | 13.7 | 10.4 | 24.1 | 15.0 |
| **Unit 210** | 25.3 | 15.4 | 39.1 | 44.4 |
| **Unit 220** | 23.3 | 14.4 | 38.2 | 42.0 |

The proposed development is being assessed against the BREEAM New Construction 2018 Industrial criteria, which further demonstrates the development's sustainability credentials. The development is currently targeting 64.4%; a 'Very Good' rating. A BREEAM Pre-Assessment workshop was held with the Client and design team on 22nd December 2021 to discuss early-stage actions and highlight further sustainable design opportunities. A copy of the current BREEAM assessment tracker is detailed in **Appendix A**.

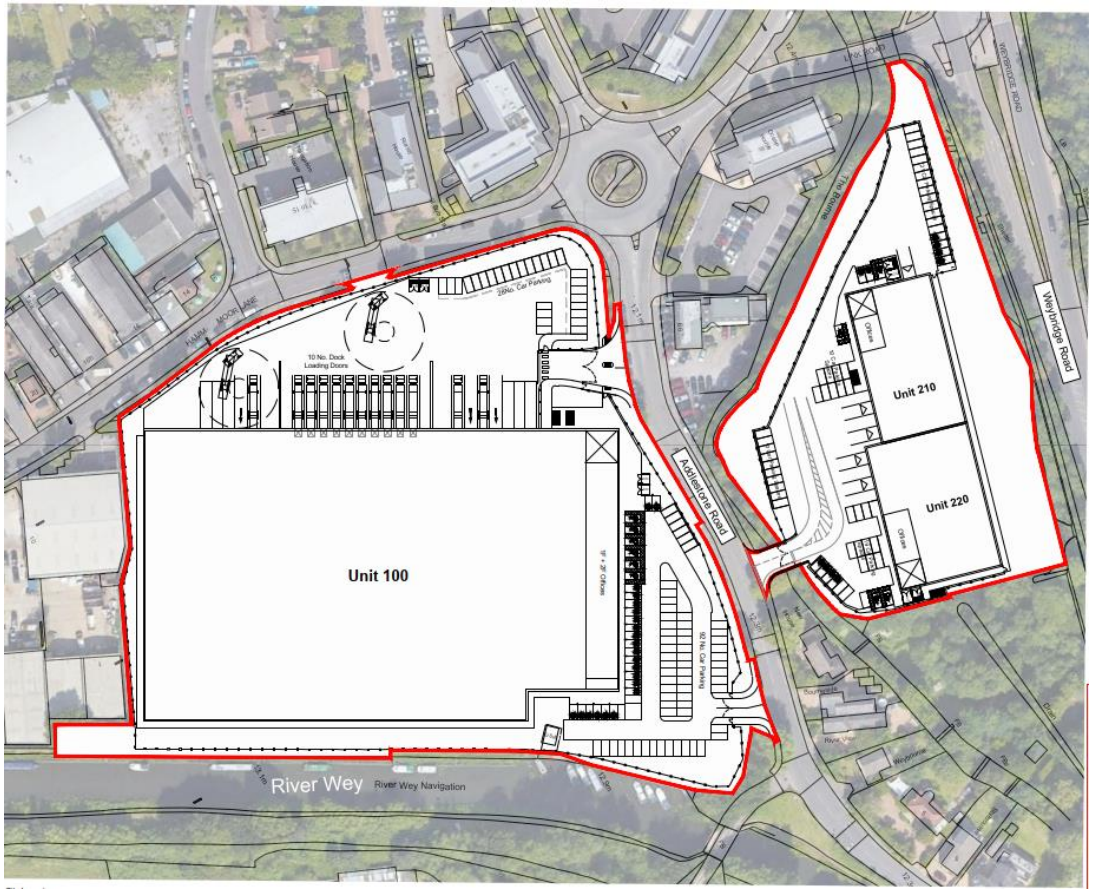
# 2.0 Introduction

This Sustainability and Energy Statement has been prepared by Scott White and Hookins, with input from MBA Consultants on the energy modelling work and results, as instructed by Bridge Industrial, to support a full planning application for the construction of a new industrial development at Addlestone Road, Weybridge.

## 2.1 Proposed Development

The works involve the demolition of existing buildings and the development of three employment units within Classes E(g)ii, E(g)iii, B2 and B8, with ancillary office accommodation, new vehicular access, associated external yard areas, HGV and car parking, servicing, external lighting, hard and soft landscaping, infrastructure and all associated works at Addlestone Road, Weybridge. The proposed developed site plan is detailed in Figure 1, below.

**Figure 1: Proposed site plan (UMC Architects)**




## 2.2 Methodology

This Sustainability Statement is based on desktop studies as well as information and feedback provided by Bridge and the design team. The sustainability policy and context review, covering the Runneymede 2030 Local Plan, was established through an initial desktop study. The local plan has set a background against which the sustainability performance of the development can be reviewed.

Sustainability considerations outlined in this statement have been developed to reflect compliance with the relevant policies and client aspirations. Opportunities to incorporate sustainable development features have been explored from an early design stage to provide flexibility to the design team, compensate for any design constraints, and maximise the development's ongoing sustainability performance.

The energy assessment has been prepared in accordance with Part L2A:2013 of the Building Regulations. A dynamic simulation model using TAS software version 9.5.2 has been used to produce and calculate the development's anticipated energy demand usage. To calculate the regulated energy use associated with the proposed development, NCM internal condition templates are assigned to each distinct internal space to account for the NCM defined energy factors that are unique to each type of space. Figures 2 and 3 show images from the proposed development energy model.

**Figure 2: Dynamic Simulation Model, Unit 100**

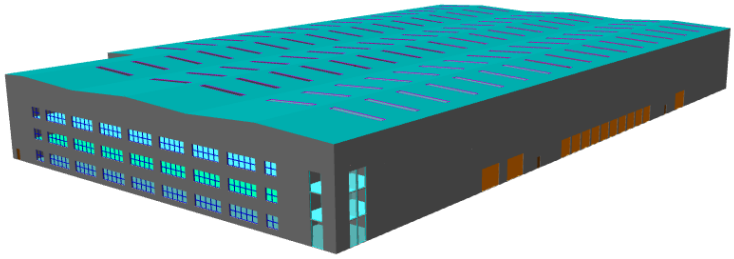
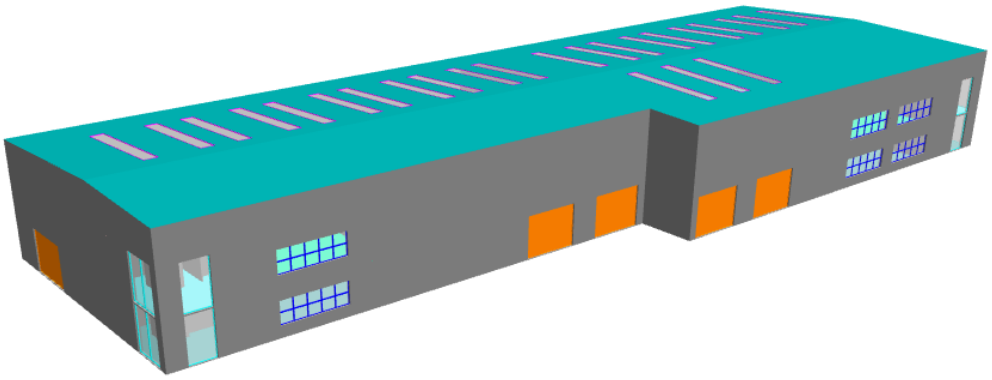


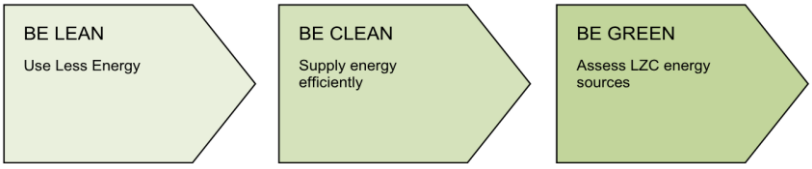
**Figure 3: Dynamic Simulation Model, Units 210 & 220**



The energy calculations detailed in this document are indicative of system size and carbon emissions based on guidance documents, approved software and practical experience. They are not design calculations, but establish the viability and feasibility of various technologies for the proposed development suited to B2/B8/E(g)(iii) building use types.

The energy strategy for the development is in accordance with the Policy SD8 of Runneymede 2030 Local Plan and takes into account the recognised energy hierarchy of 'Be Lean, Be Clean, Be Green', as demonstrated in figure 4.

**Figure 4: Energy hierarchy**




Further work will be required at later stages in the detailed design process to ensure that the requirement to comply with the above targets and that all statutory guidelines and local planning enforcement requirements are met.

## 2.3 Assumptions and Limitations

This report has been prepared for and at the request of Bridge for the purpose of supporting the planning application process. It cannot be copied in whole or in part or relied upon by any other third party for any use without our written permission. Scott White and Hookins has exercised due and customary care in producing this report but has no control over independently verified information provided by others. No other warranty, expressed or implied, is made in relation to the conduct of the contents of this report. Therefore, Scott White and Hookins assume no liability for any loss resulting from errors, omissions or misrepresentations made by others.

# 3.0 Context Review

Climate change is undeniably the biggest challenge that the world has faced and demands urgent action to limit further devastating impacts. The scale of the issue requires action to mitigate; implementing measures to reduce carbon emissions, and adapt; adjusting the way we do things to reduce vulnerability to impacts of climate change that are already being felt or are expected.

Historically, the Earth's average temeprature has fluctuating within a narrow range, however, since the Industrial Revolution, an exponential increase in carbon emissions has led to an increase in average global tempertature and alarming changes in climate. The Kyoto Protocol was enacted in 1997, which committed nations worldwide to adopt policies and measures on climate change mitigation and reporting.

The Climate Change Act 2008 commits the UK to reducing greenhouse gas emissions to net zero by 2050, and subsequently carbon budgets have been set as guidance on the level of emissions that are still permissible on the journey to net zero. The Act defines net zero as offsetting the equivalent amount of greenhouse gases emitted, through tree planting or carbon capture and storage technologies.

In 2015, 196 countries signed the Paris Agreement, with a goal to limiting global warming to well below 2, preferably 1.5, degrees celsius compared to pre-industrial levels. This legally binding agreement is seen as a landmark event in bringing nations across the world together, with the common aim of combatting climate change.

In August 2021, the Intergovernmental Panel on Climate Change (IPCC) released the Sixth Assessment Report, which addresses the current understanding surrounding climate change. The report highlights, with alarming certainty, the reality and threat of climate change, stating: '*It is unequivocal that human influence has warmed the atmosphere, ocean, and land. Widespread and rapid changes in the atmosphere, ocean, cryosphere, and biosphere have occurred*'. The report states that climate change has led to more frequent and intense periods of hot extremes, heavy precipitation events, and droughts – thereby demonstrating that climate change impacts are wide ranging and not linear.

Sustainability in the context of the built environment seeks to address the balance between the demands of the the building and the requirements of the users, with that of the natural world. The built environment is responsible for around 40% of the global carbon emissions. It is therefore essential that serious consideration is given to how new developments plan to reduce their impact on the environment.

The key themeatic issues of sustainable development are summarised by the 17 global Sustainable Development Goals, which were set by the United Nations and define the blueprint to achieve a better and more sustainable future for all. Issues include water, energy, climate, and transport.

# 4.0 Planning Policies

The policies detailed below have been reviewed to define the sustainability performance targets for the proposed development.

**Runneymede 2030 Local Plan**

Policy SD7 Sustainable Design details that development proposals will be supported where they:

a) Incorporate measures for the secure storage of cycles and storage of waste including recyclable waste
b) Protect existing biodiversity and include opportunities to achieve net gains in biodiversity as well as greening of the urban environment
c) Maximises opportunities for passive solar gain and passive cooling through the orientation and layout of development
d) Subject to feasibility, incorporate electric vehicle charging points in accordance with guidance issued by Surrey County Council
e) Item e is only applicable to residential developments
f) Item f is only applicable to major residential developments
g) Incorporate sustainable construction and demolition techniques that provide for the efficient use of minerals including a proportion of recycled or secondary aggregates and encourage the reuse of construction and demolition waste at source or its separation and collection of recycling.

Policy SD8 Renewable/Low Carbon Energy details that major development proposals are required to submit an Energy Statement demonstrating how the following energy hierarchy has been applied and implemented:

1) Be Lean; use less energy
2) Be Clean; supply energy efficiently
3) Be Green; use renewable energy

Policy SD8 also details that, for step 3 of the hierarchy, development proposals of 1,000m$^2$ or more will be expected to incorporate measures to supply a minimum of 10% of the development's energy needs from renewable and/or low carbon technologies, and in addition:

a) Developments proposing 10,000m$^2$-50,000 m$^2$ of net additional floorspace should consider whether connection to existing renewable, low-carbon or decentralised energy networks is possible.

Whilst the Runneymede Local Plan does not stipulate that new developments should be BREEAM assessed, Bridge are keen to maximise the sustainability of this development and are aiming to achieve a 'Very Good' rating, with aspirations of 'Excellent'. The scheme is currently targeting 64.4%.

BREEAM is a world-leading environmental assessment tool, that measures the sustainability of new and refurbished buildings. Under BREEAM, developments are assessed against nine categories covering the following:

- Management
- Health and Wellbeing
- Energy
- Transport
- Water
- Materials
- Waste
- Land Use and Ecology
- Pollution

Bridge and the design team met with the BREEAM Assessor on 22nd December 2021 to carry out the BREEAM pre-assessment workshop to highlight opportunities to maximise sustainable design and subsequently, the targeted score. The development is currently targeting a score of 64.4% (Very Good). A copy of the BREEAM pre-assessment is contained in **Appendix A**.

# 5.0 Sustainability Considerations

This section details site-specific initiatives which demonstrate how the development has been designed to meet the sustainability requirements set out in Policy SD7 Sustainable Design of Runneymede 2030 Local Plan.

## 5.1 Site Layout and Building Design

The proposed site is located in an industrial/commercial area of Weybridge. The scheme provides a great opportunity to transform this brownfield site into a high-quality industrial development. The design intent is to create a contemporary, sustainable industrial development, with new, safe, suitable access and landscaping.

A Passive Design Analysis report will be carried out for the development to outline how to optimise natural ventilation, thermal mass and structure, and solar gain to reduce energy consumption and carbon emissions of the building. Findings from an initial review of passive design measures are detailed within section 6.0 of this report.

The development proposals also include some soft landscaping and amenity spaces, to promote greenspace for building users. The team have worked with a transport consultant to ensure that the site provides sufficient access and space to manoeuvre vehicles safely.

## 5.2 Energy and Climate Change Mitigation

Climate change mitigation means reducing climate change. It involves reducing the flow of heat-trapping greenhouse gases into the atmosphere, either by reducing sources of these gases (for example, the burning of fossil fuels for electricity, heat or transport) or enhancing the 'sinks' that accumulate and store these gases (such as the oceans, forests and soil). The goal of mitigation is to avoid significant human interference with the climate system and stabilize greenhouse gas levels in a timeframe sufficient to allow ecosystems to adapt naturally to climate change, ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.

The energy hierarchy provides a framework to guide sustainable design and mitigating climate change through three steps:

- Be Lean: Use less energy through high levels of insulation, passive design features and efficiencies of equipment
- Be Clean: Supply energy efficiently through local energy sources such as district heat networks
- Be Green: Use renewable energy such as solar PV panels and wind

Further information about how the energy hierarchy has been applied to this development are detailed in section 6.0 of this report.

The development seeks to include the following measures to reduce energy and carbon emissions:

- A fabric-first approach, specifying quality materials that will reduce heat loss, but not at the expense of summertime overheating
- Maximise the potential for natural ventilation and other passive design measures

- Install solar PVs and ASHPs
- Install energy meters and sub meters
- Specify highly efficient LED external lighting, with photocell and timeclock controls
- Include sensors to manage heating and cooling effectively and reduce energy consumption
- Efficient fixed building services
- Lighting controls to include absence and proximity detection
- Demand-led ventilation systems with heat recovery

## 5.3 Climate Change Adaptation

Climate change adaptation is the process of adjusting to current or expected climate change and its effects. It is one of the ways to respond to climate change, along with mitigation. Adaptation seeks to lower the risks posed by the consequences of climatic changes.

Future climate change adaptation strategies have been considered from an early stage of the design of the development, and can be seen to be specifically addressed in the following ways:

- The design team will undertake a climate change risk assessment to consider the impact that future weather conditions will have on the building and building users, to identify solutions within the design to combat these risks
- A thermal model will be produced for this site. The model will also be run with a future weather file to account for climate change, to define whether the materials used and building services specified will provide future thermal comfort.
- Sustainable drainages system (SuDS) proposals have been calculated to include 20% climate change allowance.

## 5.4 Water Efficiency

### 5.4.1 Minimising Water Use

The proposed building will include the following features for minimisation of water use:

- Efficient water components, including dual flush WCs. The current proposals are aiming for a 40% improvement over baseline water consumption
- Flow control devices in WC areas to minimise water leaks and wastage from sanitary fittings
- Water meters and leak detection systems to ensure required water efficiency is monitored and maintained throughout the life of the building
- Native and hardy planting, thereby only relying on precipitation, without reliance on a formal irrigation system

### 5.4.2 Flood Risk

A Flood Risk Assessment and Drainage Stategy has been carried out by HDR. The site is partially located in an Environment Agency-defined fluvial flood zone. The proposed development is being designed to accommodate this flooding, whilst remaining safe for occupiers and not increasing flood risk to adjacent properties. HDR are continuing to engage with the Environment Agency on this item.

### 5.4.3 Drainage Strategy

The SuDS strategy will seek to reduce surface water to runoff to greenfield rates, in accordance with national and local planning requirements. Below-ground attenuation systems and permeable pavements in the car parking areas will be used, prior to runoff being directed into the public sewer system and/or local watercourses subject to applicable consents.

## 5.5 Materials and Waste

### 5.5.1 Materials

The design team are committed to specifying environmentally considerate materials:

- The team will review the pre-demolition audit and identify opportunities for material re-use/recycling
- Materials will be sourced in accordance with the project's Sustainable Procurement Plan and procured locally, wherever possible
- Materials with low environmental impact will be specified, where possible, and the team will seek to verify this through specifying materials with responsible certifications e.g. ISO 14001, BES6001
- All timber and timber-based products will be procured from legal sustainable sources, using third party certification e.g. FSC as verification evidence
- A fabric-first building design approach has been taken, leading to the specification of materials with a high thermal performance
- Protective, durable measures and materials specified to ensure the building is robust
- The glazing to façade ratio has been reviewed and reduced to balance the daylighting benefits and limiting the amount of solar gain
- Use of products with either no formaldehyde or low VOC (meeting the European standards) containing materials to improve indoor air quality
- The development has been designed to be flexible for future building uses to encourage material efficiency and reduce waste

### 5.5.2 Waste

Waste must be considered throughout the whole project to ensure that material efficiency is maximised throughout the design, construction, and operation of the building. The following measures will be taken on this project:

- A pre-demolition audit will be prepared which will detail the material types and quantities, as well as options for reuse
- Where possible, the demolition material will be crushed and reused on site. Where further aggregate is required, the Principal Contractor will procure local recycled and secondary aggregates
- The appointed Principal Contractor will segregate construction waste and process it in accordance with the waste hierarchy, with the aim of maximising waste recovery and diverting waste from landfill
- A Resource Management Plan/Site Waste Management Plan will be produced that details opportunities for reducing waste and maximising recycling and recovery rates
- A suitably sized waste area is included within the design to provide a secure space that will facilitate the segregation of different recycling and waste streams.

- The design team will carry out a climate change risk assessment to ensure the development is adaptable to future impacts, to maximise asset resilience and reduce future waste
- The design team will also review how the building will include measures that facilitate flexibility and disassembly to minimise the creation of waste in the future.

## 5.6 Construction Techniques

The appointed Principal Contractor will be required to implement the following to maximise the sustainability of the construction works:

- Set energy and water targets for construction plant and equipment, and monitor and report findings throughout the construction period
- Set targets for the transport of material and waste, and monitor and report findings throughout the construction period
- Segregate construction waste and process it in accordance with the waste hierarchy, with the aim of maximising waste recovery and diverting waste from landfill
- Produce a Resource Management Plan/Site Waste Management Plan that details opportunities for reducing waste and maximising recycling and recovery rates
- Construct the building to have enhanced air tightness
- Commission building systems in accordance with relevant standards to ensure optimum performance
- In accordance with the targeted Wst 01 BREEAM credits, produce ≤6.5 tonnes of non-hazardous construction waste (excluding demolition and excavation waste) and divert 80% non-demolition and 90% of demolition waste away from landfill.

## 5.7 Ecology and Biodiversity

An ecologist has been appointed at an early stage of the project and has actively collaborated with the rest of the team with the aim of optimising the ecological value of the site post-development.

- Ecological surveys have confirmed that the site currently has limited ecological value, with the vast majority of the site comprising of buildings and hard landscaping. However, there are woodland and hedgerow habitats present on site which hold ecological value. The ecologist has therefore recommended that these habitats should be retained and enhanced post-development through additional planting. It has also been advised that scattered trees should be retained where possible.
- Mitigation measures have also been proposed to minimise impacts from pollutants and protect waterways during construction. A Construction Environmental Management Plan (CEMP) will be produced to detail these measures to the team.
- The ecologist has recommended the following enhancement measures; improve the woodland, create new wetland features, provide diverse grassland habitats, provide an orchard habitat, include dead wood features, hedgehog domes, bird and bat boxes, and include green roofs and walls. All of these enhancements will be reviewed and discussed with the client.

## 5.8 Health and Wellbeing

The development has been designed with the end-users health and wellbeing in mind:

- Daylighting will be optimised throughout the offices and roof lights will be installed in the warehouse space to provide natural light
- Openable windows will be provided

- An outside amenity space will be created as part of the development, to provide a pleasant seating area for building users.
- Cycle storage will be provided to promote sustainable transport
- The proposed development will benefit from being located next to a canal which provides pleasant walking opportunities.

## 5.9 Pollution

The design team is committed to achieving low pollution levels by employing best practice measures:

### 5.9.1 Air pollution

- Air source heat pumps (ASHP) will be installed to generate heating, cooling, and hot water for the treated areas of the building. With the building being powered by electricity, there will be no flue gasses from the development
- The building will be designed to minimise the concentration and recirculation of pollutants in the building
- The development will include sustainable transport measures which will encourage building users to reduce reliance on single occupancy vehicles and help reduce negative air quality impacts
- The proposed planting will act to clean and improve the local air quality
- The appointed Principal Contractor will be required to employ best practice measures during the construction process, in line with the GLA Best Practice Guidance. These will include use of dustsheets, regular sweeping of construction dust, damping down of the site during dry weather, wheel washes and covers to skips
- The appointed demolition and principal contractor will be required to implement best practice pollution prevention policies and produces in accordance with PPG6: Pollution Prevention Guidelines.

### 5.9.2 Light Pollution

- Automatic external lighting will be controlled by photocells and timers to ensure that lights do not operate during daylight hours. Where safety or security lighting is provided, this part of the lighting system will comply with the lower levels of lighting, recommended by the Institute of Lighting Professionals (ILP) guidance notes
- All external lights will be specified to have an efficacy of >70 lm/W.

## 5.10 Transport

The site benefits excellent accessibility, given its location off the M25. The existing site offers established public transport links and footpaths and cycle routes. A Travel Plan will be produced to support the planning application. The intent of the Travel Plan is to review the existing local transport and identify opportunities for sustainable transport measures. The development will seek to include the following measures:

- Cycle parking will be provided and will be located near to the building entrance, covered, and lit to provide safe and convenient access
- The building will be designed to facilitate the inclusion of cyclist facilities during the tenant fit out, such as lockers and showers, to promote the use of sustainable transport modes
- Electric car charging points will be installed to meet 10% active provision and 10% passive provision for all staff car parking.

- 5% of the car parking spaces will be allocated to car sharers and will be located as close as possible to the building entrance to reward those who share transport.

# 6.0 Energy

Policy SD8 of the Runneymede 2030 Local Plan details that developments between 10,000m2-50,000m2 to apply the energy hierarchy and demonstrate that 10% of energy needs are to be provided by renewable and/or low carbon energy sources.

## 6.1 Be Lean

In accordance with the energy hierarchy, a range of energy efficiency measures are implemented at the Be Lean stage, which requires adoption of a fabric first approach (passive design measures) and energy efficient building servicing (active design measures).

### 6.1.1 Passive Design Measures

In order to achieve a building that complies with 2010 Building regulations Part L2A (2013 edition) and improve upon the baseline Target Emission Rate (TER), the following passive design measures are incorporated into the design:

- Efficient building envelope with enhanced U-values beyond the Part L2A (2013) limiting values (as shown in Table 2 and 3).
- Enhanced air permeability to reduce heating demand in the winter months.
- Glazing incorporated, where design and structural considerations allow to provide natural daylighting and reduce reliance on artificial lighting.
- Balanced g-values to ensure optimised internal conditions in the winter and summer months.

The current Building Regulations Part L2A (2013) specify that all non-domestic developments achieve at least the U-Values shown in Table 2, and the proposed u-values for this development are detailed in the right-hand column to demonstrate a betterment upon this:

**Table 2: U-value limits as per Building Regulations 2013 compared to the proposed development**

| ELEMENT | BUILDING REGULATON U-VALUE ($W/M^2.K$) | PROPOSED DEVELOPMENT U-VALUE ($W/M^2.K$) |
|---|---|---|
| Walls (external) | 0.35 | 0.26 |
| Ground floors | 0.25 | 0.18 |
| Roofs | 0.25 | 0.16 |
| Windows | 2.2 | 1.6 (g-value 0.40, VLT 0.65) |
| Rooflights | 2.2 | 1.3 (g-value 0.45, VLT 0.43) |
| Personnel Doors | 2.2 | 1.6 |
| Vehicle access & similar large doors | 1.5 | 1.3 |
| High usage entrance doors | 3.5 | n/a |

### 6.1.2 Air Permeability

The development will have an improved air permeability to a maximum of $3m^3/h.m^2$ @50Pa, which is an improvement upon the standard Part L2A (2103) value of 10 $m^3/h.m^2$ @50Pa.

### 6.1.3 Active Design Measures (Energy Efficient Services)

To ensure that planning targets and Building Regulations are met and exceeded, the development will be designed and constructed to operate with a very high level of energy efficiency, and consequently a low level of carbon emissions. The design and installation of the mechanical and electrical services will make a significant contribution towards this.

The following active design measures are incorporated into the design:

- Dedicated high efficiency mechanical ventilation heat recovery (MVHR) systems to office accommodation.
- High efficiency LED lighting to reduce electrical consumption and heat gains from lighting.
- Energy sub-metering to BREEAM standards to enable monitoring of energy usage.

To this end, the proposed design promotes reducing the $CO_2$ emissions from delivered energy consumption by minimising operational energy demand through passive and best-practice measures. With these measures incorporated, the addition of a renewable energy system will have a greater impact. Renewable energy sources should not be used as an alternative to a well-designed building, which is why this development has taken a fabric-first approach.

## 6.2 Be Clean

The second stage of the recognised energy hierarchy is 'Be Clean', which requires consideration of the most appropriate approach for building energy systems to supply energy efficiently and reduce $CO_2$ emissions.

It is best practice that development proposals should consider the following energy systems:

- Connection to existing community heating or cooling network
- Communal Combined Heat and Power [CHP] network
- Communal Combined Cooling Heat and Power [CCHP tri-generation]

### 6.2.1 Community Energy Networks

Following a review of the site and surrounding areas, there are currently no existing or proposed community energy networks within connectable distance of the proposed development site.

### 6.2.2 Communal Combined Heat and Power (CHP Network)

A CHP plant is sized for a base heating load which is typically 10-12% of the total heat demand. As heating to the operational areas of the warehouse units may not be required by the end users, the base heat load would be from core and ancillary areas, which would not be of sufficient magnitude for efficient operation of CHP at the recommended 5,000 hours annually.

Heat energy produced from a CHP in the form of Low Temperature Hot Water [LTHW] is also not a suitable medium heating warehouse spaces due to the differing temperature gradients between the floor and roof space. Direct gas fired unit heaters or high-temperature radiant heaters are most suitable and typically installed by tenants.

CHP additionally can be considered for warehouse ancillary electrical loads and production equipment. However electrical loads from these uses tend to heavily fluctuate, which would again not be suitable for CHP operation as this requires a constant electrical and heating base load.

### 6.2.3 Communal Combined Cooling Heat and Power (CCHP)

Similar to heat demand, there is not typically sufficient cooling demand associated with the expected end uses (ambient storage, workshop space etc.) of the proposed development for a CCHP systems to be operation efficiently and economically. CCHP is therefore not considered to be a viable option for the proposed development.

### 6.2.4 Proposed Design

As demonstrated above, the community and communal energy networks options are not considered to be most efficient or economical for the proposed development. The preferred space heating and domestic hot water design options for the proposed development are therefore zonal and local level systems, as follows:

Space heating:

- Offices- Air source heat pumps (ASHP)
- Ancillary area (WC's, shower, changing etc.)- Electric panel heaters
- Warehouse- Unheated

Domestic hot water

- Electric water heaters throughout the proposed development.

Electric heat generation is the preferred form of heat supply, given the lower carbon emissions as the electricity grid continues to decarbonise.

In terms of the future proofing, should the possibility of connection to a suitable community or site wide energy system arise in future, the proposed development has sufficient plant, riser and access space to accommodate retrofit measures.

The inclusion of air to water source heat pumps will allow for 'wet' system to be designed for the domestic hot water and future proofing for space heating includes for the provision of suitable plant space for installation of heat interface units, and an identified single point of connection.

## 6.3 Be Green

In accordance with Policy SD8, renewable and low carbon technologies have been included within the proposals following a feasibility assessment, which evaluation the appropriate low and zero carbon technologies for the site. Detailed site-specific analysis is only provided within the main body of the energy assessment for those renewable energy technologies considered feasible. Site specific analysis for those technologies not considered feasible are included in the **Appendix B** for information.

As an outcome of the feasibility assessment, solar photovoltaic (PV) panels will be mounted at roof level of the proposed development. Adding to this, air source heat pumps (ASHP) have been identified as appropriate for the main office accommodation. Further details about why these technologies have been proposed are noted below.

### 6.3.1 Photovoltaic Array

Solar PVs generate electricity through photon-to-electron energy transfer, which takes place in the dielectric materials that make up the cells. The cells are made up from layers of semi-conducting silicon material which, when illuminated by the sun, produces an electrical field which generates an electrical current. PVs can generate electricity even on overcast days, requiring daylight, rather than direct sunlight. This makes them viable even in the UK, although peak output is obtained at midday on a sunny summer's day. PVs offer a simple, proven solution to generating renewable electricity.

The main types of commercially available PV panels on offer in the UK are constructed from crystalline cells as described below.

Crystalline silicon cells are the most efficient of the PV technologies with conversion efficiencies of between 15-18% (available solar energy to electricity produced). They are cut from single ingots of silicon, have an unbroken crystal lattice and are the most expensive of PV systems.

Thin film cells have a conversion efficiency of between 5-10%. These are less efficient than silicone derived cells. Thin films can be mounted on folded or curved surfaces and are used extensively in Building Integrated PV products.

The proposed development has unshaded roof areas which are suitable for mounting solar PV panels. PVs arrays are proposed for the development for generation of partial power of the buildings. This would be to typically offset the energy used in the energising of equipment and lighting.

PV panels will be incorporated on the roof space to generate renewable energy for the site.

The estimated PV array proposed for the development, subject to detailed design, is presented within table 3 which shows the required annual output in kWh, estimated kWp and panel area, and target annual generation output in kWh. The final area of the PV array required to meet the generation target is dependent upon a number of factors, including types of panels selected, panel efficiency and orientation. The final specification of PV arrays would therefore be confirmed at a detailed design stage and verified by subsequent BRUKL calculations.

A life-cycle cost exercise has been carried out based upon the results from the initial energy modelling. The associated estimated costs and payback periods for this LZC technology are outlined in Table 3, below.

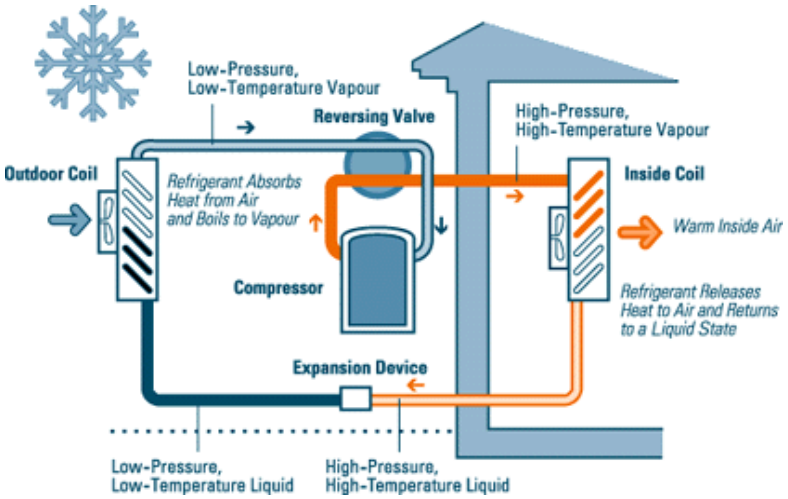
**Table 3: Life Cycle Cost of Photovoltaic Array**

| Unit | Est'd PV output (kWp) | Est'd Total PV area (m2) | Target PV Generation (kWh/yr) | $CO_2$ saving (KG/yr) | Capital cost est'd. (£) | Maintenance (£/yr) | Annual saving (£) | Simple payback (yrs) |
|---|---|---|---|---|---|---|---|---|
| PV Unit 100 | 53.5 | 300 | 47,592 | 24,700 | 34,758 | 267 | 5,711 | 6.4 |
| PV Unit 210 | 35.5 | 200 | 31,683 | 16,443 | 23,061 | 177 | 3,802 | 6.4 |
| PV Unit 220 | 35.5 | 200 | 31,683 | 16,443 | 23,061 | 177 | 3,802 | 6.4 |

### 6.3.2 Air Source Heat Pumps

ASHPs work on the same principle as ground source heat pumps (GSHP). The difference is the medium in which the heat is extracted is the external air rather than the ground. An ASHP can be used for both heating and cooling and can also be used to provide simultaneous heating and cooling to different rooms as required.

**Figure 1: Air Source Heat Pump diagram**




The calculation below demonstrates that an electric air source heat pump system becomes more efficient than a 90% gas boiler system when the co-efficient of performance is above 2.35.

$$\frac{CO2\ Emissions\ from\ Electricity\ x\ Boiler\ Efficiency}{CO2\ Emissions\ from\ Gas\ per\ unit} = \text{Break Even COP}$$

$$\frac{0.517kgCO2\ x\ 0.9\%}{0.198kgCO2} = 2.35$$

ASHPs can be considered as an efficient way to generate heating, hot water and cooling for the occupied areas of the proposed development, which include the main office accommodation.

The SCOP and SEER calculations have been calculated according to the part load presets of Part L. As such, the efficiency calculation is based on the chiller/office application in the Non Domestic Building Services Compliance guide and are based on performance testing according to EN14511 for cooling and EN14825 in heating.

### 6.3.3 Energy Demand by Renewables

Table 4 details the calculated percentage of energy demand provided by renewables following the incorporation of the Be Green stage measures, which demonstrate compliance with Policy SD8:

**Table 4: Building Regulations Part L2a and Energy Demand by Renewables**

| UNIT | ENERGY CONSUMPTION (KWH/YR) | ENERGY FROM RENEWABLES (KWH/YR) | % OF ENERGY DEMAND BY RENEWABLE |
|---|---|---|---|
| **Unit 100** | 13.70 | 10.40 | 15.0 |
| **Unit 210** | 25.3 | 15.4 | 44.4 |
| **Unit 220** | 23.3 | 14.4 | 42.0 |

The BRUKL output documents for each unit are detailed in **Appendix C**.

# 7.0 BREEAM

The Building Research Establishment Environmental Assessment Method (BREEAM) is the world's leading sustainability assessment method for buildings. The construction industry is responsible for around 40% of the total UK carbon emissions and therefore presents an opportunity for positive change and innovation. BREEAM assesses the following issues:

- Management: Management of the design and construction
- Health and well-being: Optimising visual comfort, ventilation, indoor air quality, daylight
- Energy: Reduction of carbon emissions, energy monitoring, low carbon design
- Transport: Accessibility, public transport links, sustainable transport measures
- Water: Water efficient components, leak detection
- Material: Responsible sourcing, material efficiency
- Waste: Designing suitable waste storage areas, reducing waste produced, diverting from landfill
- Land Use and Ecology: Mitigating ecological impact, enhancing ecological value
- Pollution: Pollution control, flood risk

Whilst it is not required that the development achieves a BREEAM rating for planning, Bridge are keen to demonstrate their commitment to sustainability and have engaged with a BREEAM Assessor from the outset of the design to maximise the benefit BREEAM can offer. The development is currently targeting 64.4%; a 'Very Good' rating. A BREEAM Pre-Assessment workshop was held with the Client and design team on 22nd December 2021 to discuss early-stage actions and highlight further sustainable design opportunities. A copy of the current BREEAM assessment tracker is detailed in **Appendix A**.

# 8.0 Conclusion

This report has been prepared by experienced Sustainability Consultants who are also licensed BREEAM Assessors and BREEAM Accredited Professionals (APs), with input from MBA Consultants on the energy modelling and findings, to support the planning application for the construction of the new industrial development at Addlestone Road, Weybridge. This statement outlines the approach taken to incorporate and maximise sustainability and energy efficiency within the design of the scheme.

A review of the Runneymede 2030 Local Plan has been carried out and has set a background against which the sustainability performance of the proposed development can be reviewed.

Bridge's vision for the development involves a holistic sustainability approach which seeks to satisfy the local policies and go beyond the standards set by Building Regulations. The design team have been exploring ways to embed sustainability within the design, within the constraints of the existing development. The report summarises measures that address a broad range of sustainability issues proposed as part of this development, and below is a summary of the measures that specifically address the requirements detailed in Policy SD7 of the Runneymede 2030 Local Plan including:

a) Incorporate measures for the secure storage of cycles and storage of waste including recyclable waste: Cycle parking will be provided and will be located near to the building entrance, be covered, and lit to provide safe and convenient access. The building will be designed to facilitate the inclusion of cyclist facilities during the tenant fit out, such as lockers and showers, to promote the use of sustainable transport modes. A suitably sized waste area is included within the design to provide a secure space that will facilitate the segregation of different recycling and waste streams.

b) Protect existing biodiversity and include opportunities to achieve net gains in biodiversity as well as greening of the urban environment: The design team have engaged with an ecologist from an early stage. The site is of low ecological value and an ecologist has provided a report which outlines the mitigation measures and enhancement opportunities that the team are to implement to improve green infrastructure and botanical diversity.

c) Maximises opportunities for passive solar gain and passive cooling through the orientation and layout of development: The team have worked to optimise passive measures through building orientation, glazing, and fabric.

d) Subject to feasibility, incorporate electric vehicle charging points in accordance with guidance issued by Surrey County Council: Electric car charging points will be installed to meet 10% active provision and 10% passive provision for all staff car parking.

e) Item e is only applicable to residential developments

f) Item f is only applicable to major residential developments

g) Incorporate sustainable construction and demolition techniques that provide for the efficient use of minerals including a proportion of recycled or secondary aggregates and

encourage the reuse of construction and demolition waste at source or its separation and collection of recycling: Where possible, the demolition material will be crushed and reused on site. Where further aggregate is required, the Principal Contractor will procure local recycled and secondary aggregates. The Principal Contractor will be required to implement a Sustainable Procurement Plan, which requires responsible and local sourcing of materials where possible. The appointed Principal Contractor will be required to follow Pollution Prevention Guidelines, monitor energy, waste, water, and transport from site activities, and construct the building to have enhanced air tightness.

Whilst the Runneymede Local Plan does not stipulate that new developments need to be BREEAM assessed, Bridge are keen to maximise the sustainability of this development and are aiming to achieve a 'Very Good' rating, with aspirations of 'Excellent'. A BREEAM Pre-Assessment workshop was held with the Client and design team on 22nd December 2021, and since then the team have continued to discuss sustainable design opportunities. The current targeted score is 64.4% (Very Good). A copy of the current BREEAM assessment tracker is detailed in **Appendix A**.

The energy strategy demonstrates that the proposed development seeks to comply with Policy SD8 of Runneymede 2030 Local Plan, which requires developments between 10,000sqm-50,000sqm to apply the energy hierarchy (Be Lean, Be Clean and Be Green), demonstrate that 10% of energy needs are provided by renewable and low carbon energy sources, and connect to existing renewable, low carbon, or decentralised energy sources.

- Be Lean: The following site wide measures for the development have been incorporated into the design:
  - Improved building envelope details against Part L (2013)
  - Enhanced air tightness better than Part L (2013)
  - Efficient mechanical plant systems
  - High efficiency lighting
- Be Clean: The hierarchy for selecting an energy system as part of the Be Clean stage has been adopted, the application of which has resulted in the selection of efficient building level and localised electrically powered heating systems, appropriate to the particular building specification, uses and requirements for planning policy compliance. An expected lack of a continuous demand for heat in the warehouse spaces makes the proposed development unsuitable as a site for connection to community and site-wide energy networks.
- Be Green: Solar PVs and ASHP have been incorporated. Following a feasibility assessment, these technologies were deemed the most appropriate for the development.

Calculations indicate that the development's energy strategy can achieve carbon and energy reductions through the inclusion of energy efficient measures and low and zero carbon technologies in the form of PVs and ASHPs. Table 5 demonstrates that the calculations indicate that all three proposed units can achieve and exceed the requirements set out in Building Regulations Part L2A as well as Policy SD8 of the Runneymede 2030 Local Plan, to achieve 10% of the energy demand from renewables.

**Table 5: Building Regulations Part L2a and Energy Demand from Renewables**

| UNIT | PART L2A (2103) - TARGET EMISSION RATE (TER) KGCO2/M2 | PART L2A (2013) - BUILDING EMISSION RATE (BER) KGCO2/M2 | %CO2 SAVING | % OF ENERGY DEMAND BY RENEWABLE |
|---|---|---|---|---|
| **Unit 100** | 13.7 | 10.4 | 24.1 | 15.0 |
| **Unit 210** | 25.3 | 15.4 | 39.1 | 44.4 |
| **Unit 220** | 23.3 | 14.4 | 38.2 | 42.0 |

# 9.0 Appendices

**A. BREEAM Pre-Assessment Tracker**
**B. Low Zero Carbon Feasibility Study**
**C. BRUKL Outputs**

# Appendix A
## BREEAM Pre-Assessment Tracker

Scott White and Hookins

| | |
|---|---|
| Project: | **New Industrial Development - Weybridge** |
| Scheme: | **BREEAM UK New construction 2018** |
| Target level: | Very Good with aspirations of **Excellent** |
| Stage: | **Pre-Assessment** |
| Date: | **01/04/2022** |
| Revision: | **1.0** |

| | |
|---|---|
| **Pass** | **30%** |
| **Good** | **45%** |
| **Very Good** | **55%** |
| **Excellent** | **70%** |
| **Outstanding** | **85%** |

**Pre-assessment RAG rating key:**

- It is anticipated that the credit/pre-requisite will be targeted/met.
- It is anticipated that this credit will not be targeted.
- Potential credit.

| | | |
|---|---|---|
| **Current Targeted' Rating Total:** | **64.40%** | |
| **Equating to BREEAM:** | **Very Good** | (Provided all "minimum standard" issues are met) |
| **Total if all 'Additional Potential' Credits are also achieved:** | **72.40%** | |
| **Equating to BREEAM:** | **Excellent** | (Provided all "minimum standard" issues are met) |

# BREEAM 2018 Assumptions

| | |
|---|---|
| Project scope | **Shell & core** |
| Building type (main description) | **Industrial** |
| Sub-group | **Warehouse** |
| Assessment stage | **Pre-assessment** |
| Building floor area (GIA) | **18,177 m2** |
| Building floor area (NIFA) | **TBC** |
| Is the building designed to be untreated? | **Warehouse areas** |
| Building services - heating system type | **TBC** |
| Building services - cooling system type | **TBC** |
| Are commercial or industrial-sized refrigeration and storage systems specified? | **No** |
| Are building user lifts present? | **Yes** |
| Are building user escalators or moving walks present? | **No** |
| Are laboratories present? | **No** |
| Are there fume cupboard(s) and/or other containment devices present? | **No** |
| Does the building have external areas within the boundary of the assessment development? | **Yes** |
| Are there statutory requirements, or other issues outside of the control of the project, that impact the ability to provide outdoor space? | **No** |
| Are there any systems specified that contribute to the unregulated energy load? | **Yes** |
| Are the post-occupancy stage credits targeted in Ene 01 issue? | **No** |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| **Man 01 Project Brief and Design** | | | | | | | |
| Man 01a Project delivery planning | **One credit - Project delivery planning**<br>1. Prior to completion of the Concept Design, the project delivery stakeholders (see Definitions on page 37) meet to identify and define for each phase of project delivery:<br>1.a Roles<br>1.b Responsibilities<br>1.c Contributions.<br>2. Consider each one of the following items when defining roles, responsibilities and contributions for each key phase of the project:<br>2.a End user requirements<br>2.b Aims of the design and design strategy<br>2.c Particular installation and construction requirements of limitations<br>2.d Occupiers' budgets and technical expertise in maintaining any proposed systems<br>2.e Maintainability and adaptability of the proposals<br>2.f Operational energy (see Assessment scope on page 120)<br>2.g Requirements for the production of project and end user documentation<br>2.h Requirements for commissioning, training and aftercare support.<br>Where the building occupants are not known, the list of considerations above still applies. The appropriate project delivery stakeholder considers each item, based on likely scenarios of building occupancy.<br>3. The project team demonstrates how the project delivery stakeholders' contributions and the consultation process outcomes influence the following:<br>3.a Initial Project Brief<br>3.b Project Execution Plan (see Definitions on page 37)<br>3.c Communication Strategy (see Definitions on page 37)<br>3.d Concept Design | Meeting minutes. Summary document of roles and responsibilities. | **1** | **1** | **0** | Design Team | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Man 01b Stakeholder consultation (interested parties) | **One credit - Stakeholder consultation (interested parties)**<br>4. Prior to completion of the Concept Design, the design team consult with all interested parties (see Definitions on page 37) on matters that cover the minimum consultation content (see Methodology).<br>5. Demonstrate how the stakeholder contributions and consultation exercise outcomes influence the Initial Project Brief and Concept Design.<br>6. Prior to completion of the detailed design (RIBA Stage 4, Technical Design or equivalent), all interested parties (see Definitions on page 37) give and receive consultation feedback. | A list of interested parties consulted.<br><br>A consultation plan setting out the process and the scope of the consultation.<br><br>Agenda/minutes from the consultation meetings.<br><br>Documentation demonstrating consultation feedback and subsequent actions.<br><br>Additional information on page 40. | **1** | **1** | **0** | Design Team | Feedback from the team is that one credit will be targeted.<br><br>Pre-app response should be issued shortly. Public consultation to be carried out. Mention of consultation with canals and rivers trust - statement of community involvement required for planning.<br><br>**One credit targeted.** |
| Man 01c Prerequisite | **Prerequisite for BREEAM Advisory Professional (Concept and Developed Design)**<br>8. The project team, including the client, formally agree strategic performance targets (see Definitions on page 37) early in the design process, see Definitions on page 37, (with the support of the BREEAM AP where appointed). | Appointment letter. | **-** | **MET** | **-** | SWH | Required for Man01c or d credits to be achieved. |
| Man 01c BREEAM AP (Concept Design) | **One credit - BREEAM AP (Concept Design)**<br>9. Involve a BREEAM AP in the project at an appropriate time and level to:<br>9.a Work with the project team, including the client, to consider the links between BREEAM issues and assist them in maximising the project's overall performance against BREEAM, from their appointment and throughout Concept Design.<br>9.b Monitor progress against the performance targets (see Definitions on page 37) agreed under criterion 8 above throughout all stages after their appointment where decisions critically impact BREEAM performance.<br>9.c Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8.<br>9.d Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.<br>9.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team. | Relevant section/clauses of the building specification or contract.<br>Project programme, indicating the dates by which the key work stages (Preparation and Design) are to be completed.<br>Meeting notes/minutes, recorded correspondence or schedules that can demonstrate BREEAM issues are a regular agenda item and AP attendance.<br>The AP progress report (for each work stage). | **1** | **1** | **0** | SWH | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Man 01d BREEAM AP (Developed Design) | **One credit - BREEAM AP (Developed Design)**<br>10. Criteria 8 and 9 has been achieved.<br>11. Involve the BREEAM AP in the project at an appropriate time and level to:<br>11.a Work with the project team, including the client, to consider the links between BREEAM issues and to assist them in maximising the project's overall performance against BREEAM throughout Developed Design.<br>11.b Monitor progress against the performance targets agreed under criterion 8 on the previous page throughout all stages where decisions critically impact the specification and tendering process and the BREEAM performance.<br>11.c Proactively identify risks and opportunities related to the achievement of the targets agreed under criterion 8.<br>11.d Provide feedback to the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.<br>11.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team. | Relevant section/clauses of the building specification or contract.<br>Project programme, indicating the dates by which the key work stages (Preparation and Design) are to be completed.<br>Meeting notes/minutes, recorded correspondence or schedules that can demonstrate BREEAM issues are a regular agenda item and AP attendance.<br>The AP progress report (for each work stage). | **1** | **1** | **0** | SWH | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Man 02 Life cycle cost and service life planning - Credits for each one of the three parts are awarded independently from one another** | | | | | | | |
| Man 02a Elemental life cycle cost | **Two credits - Elemental life cycle cost**<br>1. A competent person (see Definitions on page 43) carries out an outline, entire asset LCC plan at process Stage 2 (equivalent to Concept Design - RIBA Stage 2) together with any design options appraisals in line with 'Standardised method of life cycle costing for construction procurement' PD 156865:2008(6).<br>2. The elemental LCC plan:<br>2.a Provides an indication of future replacement costs over a period of analysis as required by the client (e.g.20,30,50 or 60 years);<br>2.b Includes service life, maintenance and operation cost estimates.<br>The study period should ideally be agreed by the client, in line with the design life expectancy of the building. However, where the life expectancy of the building is not yet formally agreed (due to very early design stages), the default design life of 60 years should be used for modelling purposes (in line with the UK default).<br>3. Demonstrate, using appropriate examples provided by the design team, how the elemental LCC plan has been used to influence building and systems design and specification for minimise life cycle costs and maximise critical value. | Relevant sections of the feasibility stage life cycle cost analysis report / documentation.<br><br>Relevant sections of the feasibility stage appraisal documentation.<br><br>Elemental LCC plan. | **2** | **0** | **2** | ADW | Two potential credits. |
| Man 02b Component level LCC options appraisal | **One credit - Component level LCC options appraisal**<br>4. A competent person develops a component level LCC options appraisal by the end of Process Stage 4 (equivalent to Technical Design - RIBA Stage 4) in line with PD 456865:2008. The component level LCC includes (where present):<br>4.a Envelope, e.g. classing, windows, or roofing<br>4.b Services, e.g. heat source, cooling source or controls<br>4.c Finishes, e.g. walls, floors or ceilings<br>4.d External spaces, e.g. alternative hard landscaping, boundary protection.<br>The Component level LCC option appraisal should review all of the above component types (where present). However, you do not need to consider every single example cited under each component; only a selection of those most likely to draw valued comparisons. This is to ensure that a wide range of options are considered and help focus the analysis on components which would benefit the most from appraisal.<br>5. Demonstrate, using appropriate examples provided by the design team, how the component level LCC options have been used to influence building and systems design and specification to minimise life cycle costs and maximise critical value.<br>**Note:**<br>1.0 Component level LCC plan must include all component types installed by the developer. | Relevant sections of the component level life cycle cost analysis report / documentation.<br><br>Evidence of how this has influenced building and systems specification/design.<br><br>Component level LCC options appraisal plan. | **1** | **0** | **1** | ADW | One potential credit. |
| Man 02c Capital cost reporting | **One credit - Capital cost reporting**<br>6. Report the capital cost for the building in pounds per square meter of gross internal floor area (£k/m²) as part of the submission to BRE. See also Methodology and Additional information on page 44. | Provide capital cost report. | **1** | **1** | **0** | Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Man 03 Responsible construction practices - Minimum standards one credit RCM for Excellent, two credits RCM for Outstanding** | | | | | | | |
| Man 03a Prerequisite | **Prerequisite - Legally harvested and traded timber**<br>1. All timber and timber-based products used during he construction process of the project are 'legally harvested and traded timber' (see Definitions page 50).<br>For other materials there are no prerequisite requirements at this stage. | Relevant section/clauses of the building specification or contract<br>OR<br>A signed and dated letter of commitment to meet the relevant criteria<br>OR<br>Timber Policy | **-** | **MET** | **-** | Principal Contractor | Required for Man03 credits to be achieved.<br><br>Pre-requisite will need to be met for any of the Man 03 credits to be achieved. |
| Man 03b Environmental management | **One credit - Environmental management**<br>3. 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.<br>The EMS must:<br>3.a Be third party certified, to ISO 14001:2015(10), EMAS (EU Eco-Management and Audit Scheme) or equivalent standard; OR<br>3.b In compliance with BS 8555:2016(11) have:<br>3.b.i Appropriate structure<br>3.b.ii Reached implementation stage phase four 'implementation and operation of the environmental management system'<br>3.b.ii Completed the defined phase audits one to four.<br>4. All parties who at any point manage the construction site (e.g. the principal contractor, the demolition contractor) implement best practice pollution prevention policies and procedures on site in accordance with Working at construction and demolition sites: PPG6, Pollution Prevention Guidelines(12). | Relevant section/clauses of the building specification or contract<br>OR<br>A signed and dated letter of commitment to meet the relevant criteria<br>OR<br>3rd party certified EMS certificate | **1** | **0** | **1** | Principal Contractor | One potential credit. |
| Man 03c Prerequisite | **Prerequisite - BREEAM AP**<br>5. The client and the contractor formally agree performance targets. | Letter confirming targets have been agreed. | **-** | **-** | **-** | BREEAM AP | Required for Man03d credit to be achieved. |
| Man 03d BREEAM AP (site) | **One credit - BREEAM AP (site)**<br>6. Involve a BREEAM AP in the project at an appropriate time and level to:<br>6.a Work with the project team, including the client, to consider the links between BREEAM issues and assist them in achieving, and if possible, going beyond the design intent, to maximise the project's performance against the agreed performance targets throughout the Construction, Handover and Close Out stages.<br>6.b Monitor construction progress against the performance targets agreed under criterion 5 above throughout all stages where decisions critically impact BREEAM performance.<br>6.c Proactively identify risks and opportunities related to the procurement and construction process and the achievement of the targets agreed under criterion 5.<br>6.d Provide feedback to the constructors and the project team as appropriate, to support them in taking corrective actions and achieving their agreed performance targets.<br>6.e Monitor and, where relevant, coordinate the generation of appropriate evidence by the project team and the provision to the assessor. | The AP appointment letter.<br>Relevant section/clauses of the building specification or contract<br>Project programme indicating the dates by which the key work stages (Preparation and Design) are to be completed.<br>Meeting notes/minutes, recorded correspondence or schedules that can demonstrate BREEAM issues are a regular agenda item and AP attendance.<br>The AP progress report (for each work stage).<br><br>Additional information on page 52. | **1** | **0** | **1** | BREEAM AP | One potential credit. |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Man 03e Responsible construction management | **Up to two credits - Responsible construction management**<br>7. One credit: Achieve items listed as required for one credit in table 4.1.<br>8. Two credits: Achieve criterion 7.<br>9. Achieve 6 additional items in table 4.1. | Use BREEAM recognised responsible construction management scheme to support in this process e.g. Considerate Construction Scheme and Fleet Operator Recognition Scheme. | **2** | **2** | **0** | Principal Contractor | Two credits requires a CCS score or at least 35 points and committing to ensuring a clear site and access prior to handover.<br><br>It is anticipated that two credits will be targeted.<br><br>**Two credits targeted.** |
| Man 03f Monitoring of construction site impacts | **Up to two credits - Monitoring of construction site impacts**<br>10. Assign responsibility to an individual for monitoring, recording and reporting energy usage, water consumption and transportation data (where measured) resulting from all on-site construction processes (and dedicated off-site manufacturing) throughout the build programme. To ensure the robust collection of information, this individual must have the appropriate authority and responsibility to request and access the data required. Where appointed, the BREEAM AP could perform this role. | Relevant section/clauses of the building specification or contract<br>OR<br>A formal letter of commitment from the client/developer | **-** | **MET** | **-** | Principal Contractor / BREEAM AP | Required for Man03g and h credits to be achieved. |
| Man 03g Utility consumption | **First monitoring credit - Utility consumption**<br>**Energy consumption**<br>11. Achieve criterion 10.<br>12. Set targets for the site energy consumption to kWh (and where relevant, litres of fuel used) as a result of the use of construction plant, equipment (mobile and fixed) and site accommodation.<br>13. Monitor and record data for the energy consumption described in criterion 12.<br>14. Report the total carbon dioxide emissions (total kgCO2/project value) from the construction process via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking).<br><br>**Water consumption**<br>15. Achieve criterion 10.<br>16. Set targets for the potable water consumption ($m^3$) arising from the use of construction plant, equipment (mobile and fixed) and site accommodation.<br>17. Monitor and record data for the potable water consumption described in criterion 16.<br>18. Use the collated data to report the total net water consumption ($m^3$), i.e. consumption minus any recycled water use from the construction process via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking). | Relevant section/clauses of the building specification or contract<br>OR<br>A formal letter of commitment from the client/developer | **1** | **1** | **0** | Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Man 03h Transportation of construction materials and waste | **Second monitoring credit - transportation of construction materials and waste**<br>19. Achieve criterion 10.<br>20. Set targets for transportation movements and impacts resulting from delivery of the majority of construction materials to site and construction waste from site. As a minimum cover:<br>20.a Transportation of materials from the point of supply to the building site, including any transport, intermediate storage and point of supply (see Definitions on page 50). Monitor as a minimum:<br>20.a.i Materials used in major building elements (i.e. those defined in BREEAM issue Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA_ on page 208).<br>20.a.ii Ground works and landscaping materials.<br>20.b Transportation of construction waste from the construction gate to the waste disposal processing or recovery centre gate. This monitoring must cover the construction waste groups outlined in the projects resource management plan.<br>21. Monitor and record data from the transportation movements as described in criterion 20.<br>22. Using the collated data, report separately for materials and waste, the total transport-related carbon dioxide emissions (kgCO2-eq), plus total distance travelled (km) via BREEAM Projects (for the purposes of potential future BREEAM performance benchmarking). | Relevant section/clauses of the building specification or contract<br>OR<br>A formal letter of commitment from the client/developer | **1** | **1** | **0** | Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Man 04 Commissioning and handover - Minimum standards one credit commissioning schedule & responsibilities for Very Good, Excellent & Outstanding Criterion 11 BUG for Very Good, Excellent & Outstanding** | | | | | | | |
| Man 04a Commissioning - testing schedule and responsibilities | **One credit - Commissioning - testing schedule and responsibilities**<br>1. 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.<br>2. The schedule identifies the appropriate standards for all commissioning activities to be conducted, where applicable, in accordance with:<br>2.a Current Building Regulations<br>2.b BSRIA guidelines (16)<br>2.c CIBSE guidelines (17)<br>2.d Other appropriate standards (see Methodology).<br>Exclude from the assessment any process of manufacture-related equipment specified as part of the project. However, include such equipment in cases where they form an integral part of the building HVAC services, such as heat recovery systems.<br>3. Where a BMS is specified:<br>3.a Carry out commissioning of air and water systems when all control devices are installed, wired and functional.<br>3.b Include physical measurements of room temperatures, off-coil temperatures and other key parameters, as appropriate, in commissioning results.<br>3.c The BMS or controls installation should be running in auto with satisfactory internal conditions prior to handover.<br>3.d All BMS schematics and graphics (if BMS is present) are fully installed and functional to user interface prior to handover.<br>3.e Fully train the occupier or facilities team in the operation of the system.<br>4. Appoint an appropriate project team member to monitor and programme pre-commissioning, commissioning and testing. Where necessary include re-commissioning activities on behalf of the client.<br>5. The principal contractor accounts for the commissioning and testing programme, responsibilities and criteria within their budget and main programme of works. Allow the required time to complete all commissioning and testing activities prior to handover.<br>**Note:**<br>1.0 Commissioning testing schedule and responsibilities and design and preparation is applicable according to the scope of services being specified or installed. | Appointment letter or commissioning responsibilities schedules<br>Relevant section/clauses of the building specification or contract<br>Principal Contractors programme Commissioning schedule | **1** | **1** | **0** | MBA / Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Man 04b Commissioning - design and preparation | **One credit - Commissioning - design and preparation**<br>6. Achieve criteria 1 to 5.<br>7. During the design stage, the client or the principal contactor appoints an appropriate project team member (see criterion 4), provided they are not involved in the general installation works for the building services systems, with responsibility for:<br>7.a Undertaking design reviews and giving advise on suitability for ease of commissioning.<br>7.b Providing commissioning management input to construction programming and during installation stages.<br>7.c Management of commissioning, performance testing and handover or post-handover stages. For buildings with complex building services and systems, this role needs to be carried out by a specialist commissioning manager (see Definitions on page 58). | Appointment letter or commissioning responsibilities schedules<br>Relevant section/clauses of the building specification or contract<br>Principal Contractors programme Commissioning schedule | **1** | **1** | **0** | Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Man 04c Testing and inspecting building fabric | **One credit - Testing and inspection building fabric**<br>8.Achieve criteria 1 to 5.<br>9. 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 air tightness testing and thermographic survey). A suitably qualified professional (see Definitions on page 58) undertakes the survey and testing in accordance with the appropriate standard.<br>10. Rectify any defects identified during post-construction testing and inspection prior to building handover and close out. Any remedial work must meet the required performance characteristics for the building or element as defined at design stage (see Methodology). | Appointment letter or commissioning responsibilities schedules<br>Relevant section/clauses of the building specification or contract<br>Principal Contractors programme Commissioning schedule | **1** | **0** | **0** | Principal Contractor | Credit not currently targeted. |
| Man 04d Rating Min Standard | **Rating Related Min Standard- Very Good Rating and Above**<br>BUG criteria as outlined in 11 below is fully met. | Building User Guide | **-** | **MET** | **-** | Principal Contractor | Required for Good rating or above to be achieved. |

| | BREEAM NC 2018 Criteria | | | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Man 04d Handover | **One credit - Handover**<br>11. Prior to handover, develop two building user guides (see Methodology) for the following users:<br>11.a A non-technical user guide for distribution to the building occupiers.<br>11.b A technical user guide for the premises facilities managers.<br>A draft copy is developed and discussed with users first (where the building occupants are known) to ensure the guide is most appropriate and useful to potential users.<br>12. Prepare two training schedules timed appropriately around handover and proposed occupation plans for the following users:<br>12.a A non-technical training schedule for the building occupants.<br>12.b A technical training schedule for the premises facilities managers.<br>**Note**<br>1.1 The guides and training schedules include, as far as possible, all relevant sections regarding the services and fabric installed. On completion of works the building owner, agent or user, hands it over to the fit-out contractor, who can then complete the relevant sections based on the fit-out strategy. | | | Building User Guide<br>Training schedule | **1** | **1** | **0** | Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | | | **18** | **12** | **5** | **0** | |
| | | | | 11% | **11.00** | **7.33** | **3.05** | **0.00** | |
| **Hea 01 Visual Comfort** | | | | | | | | | |
| Hea 01b Daylighting (building type dependent) | **Up to two credits - Daylighting (building type dependent)**<br>4 Daylighting criteria have been met using either of the following options:<br>4.a The relevant building areas meet good practice daylight factors and other criteria as outlined in Table 5.1 and Table 5.2<br>OR<br>4.b The relevant building areas meet good practice average and minimum point daylight illuminance criteria as outlined in Table 5.3 on the next page. | | | Daylighting calculations. | **1** | **0** | **1** | Daylighting Consultant | 2% av daylighting factor, 80%. Office areas are deep.<br><br>One potential credit. |
| Hea 01c View Out | **One credit - View out**<br>5. 95% of the floor area in 95% of spaces for each relevant building area provides an adequate view out (see Adequate View Out definition on page 84*).<br>6. In addition, the building type criteria for Prisons, multi-residential and healthcare are outlined in Table 5.6.<br><br>*Where relevant building areas are within 8m of an external wall which as a window or permanent opening, and the window/opening is ≥20% of the surrounding wall area. Where the room depth is greater than 8m, the percentage of window or opening must instead be the same as, or greater than, than values in Table 1.0 BS8206:Part 2. The view out must be a view of a landscape or buildings (rather than just sky) at seated level (1.2-1.3m) with the relevant building areas and should ideally be through an external window. A view into an internal courtyard or atrium will comply provided the distance from the opening to the back wall of the courtyard/atrium is at least 10m. The view cannot be an internal view across the room, as this is likely to become obstructed by partitions, filing cabinets etc. An internal view cannot offer the additional benefits of an external view.<br>**Note:**<br>1.0 If it is not possible to confirm which areas of the building will contain workstations, benches or desks, all areas of the building designed for or likely to be occupied by workstations, benches or desks, must comply with the relevant criteria. | | | Design drawings<br>Relevant section/clauses of the building specification or contract<br>Window schedule | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Hea 01d Internal and external lighting levels, zoning and control | **One credit - External lighting**<br><br>10. All external lighting located within the construction zone is specified in accordance with BS5489-1:2013 Code for the practice for the design of road lighting. Lighting of roads and public amenity areas(35) and BS EN 12464-2:2014(36) Light and lighting - Lighting of workplaces- Part 2:Outdoor workplaces. External lighting should provide illuminance levels that enable users to perform outdoor visual tasks efficiently and accurately, especially during the night.<br>11. Where no external light fittings are specified (either separate from or mounted on the external building façade or roof), the criteria relating to external lighting do not apply and the credit can be awarded on the basis of compliance with criteria 8–9.c above. | | | Design drawings and/or room data sheets/schedules<br><br>Relevant section/clauses of the building specification or contract<br>OR<br>A letter of formal confirmation of compliance from the relevant design team member.<br>Further information on page 40 'Additional Information' | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Hea 02 Indoor Air Quality** | | | | | | | | | |
| Hea 02a Prerequisite | **Note:**<br>2.0 If the industrial building does not contain an office or other occupied areas, this issue is not applicable<br><br>**Prerequisite - Indoor Air Quality (IAQ) Plan**<br>1. A site-specific indoor air quality plan has been produced and implemented in accordance with the Guidance Note GN06. The objective of the plan is to facilitate a process that leads to design, specification and installation decisions and actions, which minimise indoor air pollution during occupation of the building. The indoor air quality plan must consider the following:<br>1.a Removal of contaminant sources<br>1.b Dilution and control of contaminant sources:<br>1.b.i Where present, consideration is given to the air quality requirements of specialist areas such as laboratories<br>1.c Procedures for pre-occupancy flush out<br>1.d Third party testing and analysis<br>1.e Maintaining good indoor air quality in-use. | | | Indoor air quality plan | **-** | **-** | **-** | M&E | Pre-requisite will need to be met if Hea 04b is targeted. |
| Hea 02b Ventilation | **One credit - Ventilation**<br>2. The building has been designed to minimise the indoor concentration and recirculation of pollutants in the building as follows:<br>2.a Provide fresh air into the building in accordance with the criteria of the relevant standard for ventilation<br>**Note:**<br>1.0 If ventilation systems are not within the remit of the shell and core developer, compliance can be demonstrated through the building servicing strategy where this is predetermined by the built form or core service provision. | | | Relevant section/clauses of the building specification or contract<br>Design drawings | **1** | **0** | **1** | M&E | One potential credit. |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| **Hea 04 Thermal comfort** | | | | | | | |
| Hea 04a - Thermal modelling | **Note:** 2.0 The issue is not applicable to industrial units that only contain an operational or storage area and are without office space or other occupied spaces.<br><br>**One credit - Thermal modelling**<br>1. Thermal modelling has been carried out using software in accordance withCIBSEAM11(78) Building Energy and Performance Modelling.<br>2. 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 CIBSEAM11).<br>3. The modelling demonstrates that:<br>3.a For air-conditioned buildings, summer and winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design(79), Table 1.5;or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type)<br>3.b For naturally ventilated buildings:<br>3.b.i Winter operative temperature ranges in occupied spaces are in accordance with the criteria set out in CIBSE Guide A Environmental design, Table 1.5. Or other appropriate industry standard (where this sets a higher or more appropriate requirement or level for the building type)<br>3.b.ii The building is designed to limit the risk of overheating, in accordance with the adaptive comfort methodology outlined in either of the following standards as appropriate; CIBSE TM52: The limits of thermal comfort: avoiding overheating in European buildings(80) or CIBSE TM59:Design methodology for the assessment of overheating risk in homes(81)<br>4. For air-conditioned buildings, the PMV(predicted mean vote) and PPD (predicted percentage of dissatisfied) indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool.<br><br>**Note:**<br>1.1 Thermal modelling assumptions must be reasonable and represent typical use patterns and loads given the parameters and function of the building. Thermal modelling may need to be completed on the basis of a typical notional layout. | Relevant section/clauses of the building specification or contract or correspondence (e.g. letter, email or meeting minutes) from the design team<br>Thermal modelling results<br>TOR data from the design team | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Hea 04b - Design for future thermal comfort | **One credit - Design for future thermal comfort**<br>5. Criteria 1 to 4 are achieved.<br>6. The thermal modelling demonstrates that the relevant requirements set out in criterion 3 above are achieved for a projected climate change environment (see Definitions on the next page).<br>7. Where criterion 6 above is not met, 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 under criterion 6 above<br>8. For air-conditioned buildings, the PMV and PPD indices based on the above modelling are reported via the BREEAM assessment scoring and reporting tool. | | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Hea 05 Acoustic performance** | | | | | | | |
| Hea 05a Acoustic performance | **One credit - Acoustic performance**<br>1. The building meets the appropriate acoustic performance standards and testing requirements defined in the relevant table within the technical manual:<br>1.b Indoor ambient noise level.<br>OR<br>2. A Suitably qualified acoustician (SQA) is appointed to define a bespoke set of performance requirements for all function areas in the building. The bespoke performance requirements use the three acoustic principles defined in criterion Hea 05 Acoustic performance - Criterion 1, above, setting out the performance requirements for each and the testing regime required.<br>**Note:**<br>1.0 Alternative means of compliance: The basic built form has a large impact on the acoustic performance of the building and would be outside the control of the tenant. A suitably qualified acoustician (SQA) must carry out a quantifiable assessment of the specification of the build form, construction and any external factors likely to affect the indoor ambient noise levels. The SQA must then confirm the developer's works will enable a future tenant utilising a typical fit-out and specification to meet the levels required to demonstrate compliance.<br>1.1 Bespoke performance requirements: When assessing criteria 2 below for a shell and core or shell only building, only Indoor ambient noise level below should be assessed. | Professional report / study and calculations from the acoustician.<br>Letter of appointment or other confirmation demonstrating when the acoustician was appointed.<br>Relevant section/clauses of the building specification or contract and/or formal letter from the project team regarding commitments | **1** | **1** | **0** | Acoustic / UMC / Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Hea 06 Security** | | | | | | | |
| Hea 06a Security of site and building | **One credit - Security of site and building**<br>1. A Suitably Qualified Security Specialist (SQSS) conducts an evidence-based Security Needs Assessment (SNA) during or prior to Concept Design (RIBA Stage 2 or equivalent). The purpose of the SNA will be to identify attributes of the proposal, site and surroundings which may influence the approach to security for the development .<br>2. The SQSS 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 SNA.<br>3. The controls and recommendations shall be incorporated into proposals and implemented in the as-built develop.<br>**Note**:<br>1.0 If the SQSS is unable to make complete recommendations due to the speculative nature of the assessment, then the credit may still be available. The SQSS must confirm that they have addressed all parts of the project where it is feasible to do so, based on the information available to them at the time of assessment. In relation to the influence of the occupiers on security, the SQSS shall clearly document their assumptions in the SNA. | Design drawings (including a scaled site plan), AND/OR relevant sections of the specification highlighting all necessary compliant features and dimensions.<br>Security Needs Assessment. | **1** | **0** | **1** | SQSS | One potential credit - to be reviewed going forward. |
| **Hea 07 Safe and healthy surroundings** | | | | | | | |
| Hea 07a Safe access | **One credit - Safe access**<br>Where external site areas form part of the assessed development the following apply:<br>1. Dedicated and safe cycle paths are provided from the site entrance to any cycle storage, and connect to offsite cycle paths where applicable.<br>2. Dedicated and safe footpaths are provided on and around the site providing suitable links for the following:<br>2.a The site entrance to the building entrance,<br>2.b Car parks(where present)to the building entrance<br>2.c The building to outdoor space<br>2.d Connecting to off-site paths where applicable.<br>3 Pedestrian drop-off areas are designed off, or adjoining to, the access road and should provide direct access to other footpaths.<br>Where vehicle delivery access and drop-off areas form part of the assessed development, the following apply:<br>4. Delivery areas are not accessed through general parking areas and do not cross or share the following:<br>4.a pedestrian and cyclist paths<br>4.b outside amenity areas accessible to building users and general public.<br>5. There is a dedicated parking or waiting area for goods vehicles with appropriate separation from the manoeuvring area and staff and visitor car parking.<br>6. Parking and turning areas are designed for simple manoeuvring according t other type of delivery vehicle likely to access the site, thus avoiding he need for repeated shunting. | Correspondence from or a copy of the report/feedback from the ALO/CPDA/Security Consultant confirming:<br>• Scope of their advice/involvement<br>• The stage of design in which their advice was sought<br>• Summary of their recommendations<br><br>Design drawings AND/OR relevant sections of the specification or contract | **1** | **0** | **0** | UMC | Credit not currently targeted. |
| Hea 07b Outside space | **One credit - Outside space**<br>7. There is an outside space providing building users with an external amenity area. | Design drawings | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | **10** | **6** | **3** | **0** | |
| | | 8% | **8.00** | **4.80** | **2.40** | **0.00** | |

<table>
<tr><th>BREEAM NC 2018 Criteria</th><th>Potential Design stage Evidence Approach</th><th>Credits Available</th><th>Current Targeted</th><th>Additional Potential</th><th>Resp.</th><th>Comments</th></tr>
<tr><td colspan="7">Ene 01 Reduction of energy use and carbon emissions - Minimum standards for four credits for Energy Performance for Excellent and six credits for Energy Performance & four credits for Energy Modelling and Reporting for Outstanding</td></tr>
<tr><td>Ene 01a Energy performance</td><td>Up to nine credits - Energy performance<br>1 Calculate an Energy Performance Ratio for New Construction (EPR NC). Compare the EPR NC achieved with the benchmarks in Table 6.1 and award the corresponding number of BREEAM credits.<br>See notes 1.1 and 1.2 on page 121 of the manual.<br>Table 6.1 Ene 01 $EPR_{NC}$ benchmark scale<br><table><tr><th></th><th></th><th colspan="2">Minimum standards</th></tr><tr><th>BREEAM credits</th><th>$EPR_{NC}$</th><th>Rating</th><th>Minimum requirements</th></tr><tr><td>1</td><td>0.1</td><td rowspan="3"></td><td rowspan="3">Requires a performance improvement progressively better than the relevant national building regulations compliant standard (see Energy performance on the facing page).</td></tr><tr><td>2</td><td>0.2</td></tr><tr><td>3</td><td>0.3</td></tr><tr><td>4</td><td>0.4</td><td rowspan="2">Excellent</td><td rowspan="2">Requires 4 credits to be achieved (equivalent to an $EPR_{NC}$ of at least 0.4).</td></tr><tr><td>5</td><td>0.5</td></tr><tr><td>6</td><td>0.6</td><td rowspan="4">Outstanding</td><td rowspan="4">Requires 6 credits to be achieved (equivalent to an $EPR_{NC}$ of at least 0.6) and 4 credits for Energy modelling and reporting.</td></tr><tr><td>7</td><td>0.7</td></tr><tr><td>8</td><td>0.8</td></tr><tr><td>9</td><td>0.9 AND zero net regulated $CO_2$ emissions*.</td></tr></table></td><td>A copy of the Building Regulations Output Document from the approved software, as follows:<br>1. England Wales (Part L): Approved Documents checks (BRUKL Output Document)<br>2. Scotland (Section 6): Specification checks<br>3. N. Ireland (Part F): Approved Documents checks (BRUKL Output Document)<br>4. Where relevant for multi-residential buildings, a copy of the calculations based on design stage SAP outputs.<br>The output documents must be based on the “As designed” stage of analysis.<br>output documents from the approved software reflecting performance at the as-built stage of analysis. This must account for any changes to the specification during construction and the measured air leakage rate, ductwork leakage and fan performances(as required by building regulations).</td><td>9</td><td>4</td><td>0</td><td>MBA</td><td>It is anticipated that seven credits will be targeted. PVs, ASHP .<br><br>Four credits targeted.</td></tr>
<tr><td>Ene 01b Energy modelling and reporting</td><td>Four credits – Energy modelling and reporting<br>2. Involve relevant members of the design team in an energy workshop, focusing on operational energy performance.<br>3. Undertake additional energy modelling during the design and post-construction stage to generate predicted operational energy consumption figures(see Prediction of operational energy consumption on page 124).<br>4. Report predicted energy consumption targets by end use, design assumptions and input data (with justifications).<br>5. Carry out a risk assessment to highlight any significant design, technical, and process risks that should be monitored and managed throughout the construction and commissioning process.<br>Note:<br>1.1 For the energy modelling, if the building services efficiencies and performance specifications are not known (i.e. they are not within the remit of the shell and core developer and will be provided as part of the fit-out works), services complying with the minimum energy efficiency standards or backstop levels required by the relevant notional building regulations should be used.<br>1.2 For the energy modelling, the design team can use the performance specifications confirmed within a green fit-out agreement that is contractually required from the tenants in their fit-out works. This rule applies only to those areas of the building that the scope of the green fit-out agreement covers. Speculative areas of the assessed building not fitted out or covered by the scope of such agreement must follow the note 1.1.</td><td>Predicted energy consumption values, design assumptions, input data and risk assessments reported as detailed in the Energy Prediction and Post-occupancy guidance available from the BREEAM website. Confirmation of suitably qualified energy modeller’s qualifications<br>Where changes to design assumptions and input data have occurred at post construction stage, the energy modelling should be re-run to take into account those changes.</td><td>4</td><td>0</td><td>0</td><td>M&E</td><td>Credits not currently targeted.</td></tr>
<tr><td colspan="7">Ene 02 Energy monitoring - Minimum standards one credit for first sub-metering credit for Very Good, Excellent & Outstanding</td></tr>
<tr><td>Ene 02a Sub metering of end-use categories</td><td>One credit - Sub-metering of end-use categories<br>1. 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 below).<br>2. Meter the energy consumption in buildings according to the total useful floor area:<br>2.a If the area is greater than 1,000 m², by end-use category with an appropriate energy monitoring and management system.<br>2.b If the area is less than 1,000 m², use either:<br>2.b.i an energy monitoring and management system or<br>2.b.ii 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 on page 135).<br>3. Building users can identify the energy consuming end uses, for example through labelling or data outputs.</td><td>Relevant section/clauses of the building specification or contract.<br>Design drawings</td><td>1</td><td>1</td><td>0</td><td>MBA</td><td>BMS/AMR should be included in the development if the 'useful space' of the building is more than 1,000m2 as per KBCN00069 - useful floor area to be reviewed going forward to determine whether BMS will be required or not.<br><br>At this moment, racking/storage anticipated for warehouse space. To continue to be reviewed.<br><br>Feedback from the team is that one credit will be targeted.<br><br>One credit targeted.</td></tr>
<tr><td>Ene 02b Sub metering of high energy load and tenancy areas</td><td>One credit - Sub-metering of high energy load and tenancy areas<br>4. Monitor a significant majority of the energy supply with:<br>4.a An accessible energy monitoring and management system for:<br>4.a.i tenanted areas or<br>4.a.ii relevant function areas or departments in single occupancy buildings.<br>OR<br>4.b Separate accessible energy sub-meters with pulsed or other open protocol communication outputs for future connection to an energy monitoring and management system for:<br>4.b.i tenanted areas or<br>4.b.ii relevant function areas or departments in single occupancy buildings.<br>5. Sub-meter per floor plate in large single occupancy or single-tenancy buildings with one homogeneous function, for example hotel bedrooms, offices.<br>Note:<br>1.1 Criteria 4 and 5, meters must be installed on the energy supply to each separate tenanted unit or floor plate within the assessed development.</td><td>Relevant section/clauses of the building specification or contract.<br>Design drawings</td><td>1</td><td>1</td><td>0</td><td>MBA</td><td>Feedback from the team is that one credit will be targeted.<br><br>One credit targeted.</td></tr>
<tr><td colspan="7">Ene 03 External lighting</td></tr>
<tr><td>Ene 03a External lighting</td><td>One credit - External lighting<br>1. No external lighting (which includes lighting on the building, at entrances and signs).<br>OR<br>2. External light fittings within the construction zone with:<br>2.a Average initial luminous efficacy of not less than 70 luminaire lumens per circuit Watt<br>2.b Automatic control to prevent operation during daylight hours<br>2.c Presence detection in areas of intermittent pedestrian traffic</td><td>Relevant section/clauses of the building specification or contract - Evidence received<br>Design drawings</td><td>1</td><td>1</td><td>0</td><td>MBA</td><td>Feedback from the team is that one credit will be targeted.<br><br>One credit targeted.</td></tr>
<tr><td colspan="7">Ene 04 Low carbon design</td></tr>
<tr><td>Ene 04a Passive design analysis</td><td>One credit - Passive design analysis<br>1. Achieve the first credit Hea 04 Thermal comfort: One credit - Thermal modelling on page 102 to demonstrate that the building design delivers appropriate thermal comfort levels in occupied spaces.<br>2. The project team analyses the proposed building design and development during Concept Design to identify opportunities for the implementation of passive design measures (see Passive design analysis on page 152).<br>3. Implement passive design measures to reduce the total heating, cooling, mechanical ventilation, lighting loads and energy consumption in line with the passive design analysis findings.<br>4. Quantify the reduced total energy demand and carbon dioxide ($CO_2$-eq) emissions resulting from the passive design measures.</td><td>Copy of Passive Design Analysis<br><br>Results from a dynamic simulation model demonstrating the reduced energy demand and $CO_2$ emissions from the specified passive design measures.</td><td>1</td><td>1</td><td>0</td><td>MBA</td><td>Feedback from the team is that one credit will be targeted.<br><br>One credit awarded.</td></tr>
<tr><td>Ene 04b Free cooling</td><td>One credit - Free cooling<br>5. Achieve the passive design analysis credit.<br>6. Include a free cooling analysis (see Free cooling analysis on page 153) in the passive design analysis carried out under criterion 2.<br>7. Identify opportunities for the implementation of free cooling solutions.<br>8. The building is naturally ventilated or uses any combination of the free cooling strategies listed in Free cooling analysis</td><td>Results from a dynamic simulation model and other used methods demonstrating that the free cooling strategy can meet the building's cooling demand.</td><td>1</td><td>0</td><td>0</td><td>M&E</td><td>Credit not currently targeted.</td></tr>
</table>

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Ene 04c Low and zero carbon technologies | **One credit - Low zero carbon feasibility study**<br>9. An energy specialist (see Definitions on page 156) completes a feasibility study (see Low and zero carbon feasibility study on page 153) by the end of Concept Design.<br>10. Establish the most appropriate recognised local (on-site or near-site) low or zero carbon (LZC) energy sources for the building or development (see Scope of LZC systems and how they are assessed on page 154), based on the feasibility study.<br>11. Specify local LZC technologies for the building or development in line with the feasibility study recommendations.<br>12. Quantify the reduced regulated carbon dioxide ($CO_2$-eq) emissions resulting from the feasibility study | Results from a dynamic simulation model demonstrating reductions in $CO_2$ emissions from the specified low zero carbon technology. | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>**One credit awarded.** |
| **Ene 06 Energy efficient transportation systems** | | | | | | | |
| Ene 06a Energy consumption | **One credit - Energy consumption**<br>1. For specified lifts, escalators or moving walks (transportation types):<br>1.a Analyse the transportation demand and usage patterns for the building to determine the optimum number and size of lifts, escalators or moving walks<br>1.b Calculate the energy consumption in accordance with BS EN ISO 2574 Part 2 (131) or Part 3 (132) for one of the following:<br>1.b.i At least two systems for each transportation type OR<br>1.b.ii At least two arrangements of systems with 'fit for purpose' system strategies. For example for lift systems, different options could be hydraulic, traction or machine room-less lift (MRL).<br>1.c Consider the use of regenerative drives, subject to the requirements in Regenerative drives below<br>1.d Specify the transportation system with the lowest energy consumption. | For 1 to 2:<br>Professional report / study of transportation analysis AND/OR<br>Calculations | **1** | **1** | **0** | Lift Manufacturer | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Ene 06b Energy efficient features | **One credit - Energy efficient features**<br>2. Achieve criterion 1 on the previous page.<br>One credit - Lifts<br>3. Specify the following three energy efficient features for each lift:<br>3.a A standby condition for off-peak periods<br>3.b The lift car lighting and display lighting provides an average luminous efficacy across all fittings in the car of >70 luminaire lumens per circuit Watt<br>3.c Use of a drive controller capable of variable speed, variable-voltage, and variable-frequency (VVVF) control of the drive motor.<br>4. Specify regenerative drives where their use is demonstrated to save energy.<br>One credit - Escalators or moving walks<br>5. Specify at least one of the following for each escalator or moving walk:<br>5.a A load-sensing device that synchronises motor output to passenger demand through a variable speed drive OR<br>5.b A passenger-sensing device for automated operation (auto walk),so the escalator operates in auto start mode when there is no passenger demand. | For 3 to 4:<br>Relevant section/clauses of the building specification or contract - Evidence received AND EITHER<br>Manufacturers products details<br>OR<br>Formal letter of commitment from the system(s) manufacturer/sup | **1** | **1** | **0** | Lift Manufacturer | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | **21** | **11** | **0** | **0** | |
| | | 14% | **14.00** | **7.33** | **0.00** | **0.00** | |
| **Tra 01 Transport assessment and travel plan** | | | | | | | |
| Tra 01a Travel plan | **Two credits – Travel plan**<br>1. No later than Concept Design stage, undertake a site-specific transport assessment (or statement) and a draft travel plan, which can demonstrably be used to influence the site layout and built form; see Methodology.<br>2. The site-specific travel assessment or statement covers as a minimum:<br>2.a Existing travel patterns and opinions of existing building or site users towards cycling and walking, identifying constraints and opportunities, if relevant<br>2.b Travel patterns and transport impact of future building users<br>2.c Current local environment for walkers and cyclists(accounting for visitors who may be accompanied by young children)<br>2.d Reporting of the number and type of existing accessible amenities, see Table 7.1 below, within 500m of the site<br>2.e Disabled access(accounting for varying levels of disability and visual impairment)<br>2.f Calculation of the existing public transport Accessibility Index (AI),see Methodology on the next page<br>2.g Current facilities for cyclists<br>3. Following a transport assessment (in accordance with the requirements set out in criteria 2a-2g) 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.<br>4. If the occupier is known, involve them in the development of the travel plan.<br>5. Demonstrate that the travel plan will be implemented post construction and be supported by the building's management in operation. | A copy of the Travel Plan.<br>A copy of the site-specific transport survey/assessment.<br><br>Design drawings demonstrating examples of design measures implemented in support the travel plan's findings.<br>OR<br>Where a detailed site plan is not available, a formal letter from the client confirming that measures will be implemented into the final design in support the travel plan's findings.<br><br>A letter of confirmation from either the building's occupier, or in the case of a speculative development, the developer. | **2** | **2** | **0** | TBC | Feedback from the team is that two credits will be targeted. TA and TP to be produced.<br><br>**Two credits targeted.** |
| **Tra 02 Sustainable transport measures - Only assess against criteria that applies to the AI of the project. Ensure the issue total sums the 'available credits' for the correct AI** | | | | | | | |
| Tra 02 Prerequisite | **Prerequisite**<br>1. Achieve criteria 3-5 in the Tra 01 Transport assessment and travel plan issue. | | **-** | **MET** | **-** | TBC | Required for Tra02 credits to be achieved. |
| Tra 02a Transport options implementation <25 | **Ten credits – Transport options implementation AI<25**<br>2. Identify the sustainable transport measures, in Table 7.4 page 174.<br>3. Award credits according to the existing Accessible Index (AI) of the project, and the total number of points achieved for the options implemented, see Table 7.3.<br><br>AI< 25 \| 1 \| 2 \| 3 \| 4 \| 5 \| 6 \| 7 \| 8 \| 9 \| 10<br>Credits \| 1 \| 2 \| 3 \| 4 \| 5 \| 6 \| 7 \| 8 \| 9 \| 10 | Identify sustainable transport measures.<br>Scale map highlighting the location of the building and all public transport nodes in proximity of the building.<br>Timetables for each service at each public transport node considered.<br>The calculated Accessibility Index for the building.<br>A formal letter from the future building occupier confirming provision of and details for the dedicated bus service(s). | **10** | **7** | **1** | TBC / UMC | AI is anticipated to be <25.<br><br>Feedback from the team is that seven credits will be targeted.<br><br>**Seven credits targeted.** |

| | BREEAM NC 2018 Criteria | | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|---|
| Assessment option | **Public transport measures** | | | | | | | |
| 1 | 1. The existing AI calculated in Tra 01 achieves the following:<br>≥ 4 for prison or MOD sites, rural location sensitive buildings, and other building group 3 ≥ 8 for all other building types | | | **1** | **0** | **0** | | Point not targeted. |
| 2 | 2. Demonstrate an increase over the existing Accessibility Index through negotiation with local bus, train or tram companies to increase the frequency of the local service provision for the development;<br>**OR** | | | **2** | **0** | **0** | | Point not targeted. |
| | 3. Demonstrate an increase over the existing Accessibility Index. This could be through provision of a diverted bus route, a new or enhanced bus stop, or other similar solutions<br>**OR** | | | **3** | **0** | **0** | | Point not targeted. |
| | 4. Provide a dedicated service, such as a bus route or service (See Methodology on page 178). | | | **3** | **0** | **0** | | Point not targeted. |
| 3 | 5. 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. | | | **1** | **0** | **0** | | One potential. |
| Assessment options | **Private transport measures** | | | | | | | |
| 4 | 6. Provide electric recharging stations of a minimum of 3kw for at least 10% of the total car parking capacity for the development. | | | **1** | **1** | **0** | | **One point targeted.** |
| 5 | 7. Set up a car sharing group or facility to facilitate and encourage building users to car share.<br>8. Raise awareness of the sharing scheme with marketing and communication materials.<br>9. Provide priority spaces for car sharers for at least 5% of the total car parking capacity for the development.<br>10. Locate priority parking spaces nearest the development entrance used by the sharing scheme participants | | | **1** | **1** | **0** | | One point targeted. |
| Assessment options | **Active travel measures** | | | | | | | |
| 6 | 11. During preparation of the brief, the design team consults with the local authority (LA) on the state of the local cycling network and public accessible pedestrian routes, to focus on whichever the LA deems most relevant to the project, and how to improve it.<br>12. Agree and implement one proposition chosen with the local authority. The proposition supported by the development is additional to existing local plans and has a significant impact on the local cycling network or on pedestrian routes open to the public. | | | **2** | **0** | **0** | | Point not currently targeted. |
| 7 | 13. Install compliant cycle storage spaces to meet the minimum levels set out in Table 7.5 on page 176. | | | **1** | **1** | **0** | | Default occupancy to be checked.<br>**One point targeted.** |
| 8 | 14. Option 7 has been achieved.<br>15. Provide at least two compliant cyclists' facilities for the building users, (including pupils where appropriate to the building type) – see Definitions for the scope of each compliant facility:<br>– Showers<br>– Changing facilities<br>– Lockers<br>– Drying spaces. | | | **1** | **1** | **0** | | For shell & core assessments, if additional facilities, such as showers and drying space, are not provided in core areas and internal walls are not provided to tenanted areas, these must be indicated on design drawings and all relevant services provided. This would include capped-off supplies and electrical points as necessary in order to facilitate the completion of the compliant facilities by the tenant.<br>**One point targeted.** |
| 9 | Existing amenities:<br>16. At least three existing accessible amenities are present, see Table 7.6 on page 177, where relevant for a Building Group | | | **1** | **1** | **0** | | Post box, café, and gym within 500m.<br>**One credit targeted.** |
| 10a | 17. Ensure a minimum of one new accessible amenity, in accordance with Table 7.6 on page 177, for the relevant Building Group, is provided.<br>OR | | | **2** | **2** | **0** | | **Two points targeted.** |
| 10b | 18. Ensure more than one new accessible amenity, in accordance with Table 7.6 on page 177 for the relevant Building Group, is provided. | | | **3** | **0** | **0** | | Points not currently targeted. |
| 11 | 19. Implement one site-specific improvement measure, not covered by the options already listed in this issue, in line with the recommendations of the travel plan. Submit these for review by BRE. | | | **1-3** | **0** | **0** | | Points not currently targeted. |
| | | | | **12** | **9** | **0** | **0** | |
| | | | 12% | **11.5** | **8.62** | **0** | **0** | |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| **Wat 01 Water consumption - Minimum standards one credit for Good, Very Good, Excellent & two credits for Outstanding** | | | | | | | |
| Wat 01 Water consumption | **Up to five credits - Water consumption**<br>1. Use the BREEAM Wat 01 calculator to assess the efficiency of the domestic water-consuming components.<br>2. Use the standard Wat 01 method (see Methodology on the facing page)to compare the water consumption (litres/person/day)for the assessed building against a baseline performance. Award BREEAM credits based upon Table 8.1 below. Where it is not possible to use the standard method, complete the assessment using the alternative Wat 01 method (see Methodology).<br>3. If a greywater or rainwater system (see Definitions on page 195) is specified, use its yield in L/person/day to offset potable water demand from components.<br>4. If a greywater or rainwater system is specified and installed:<br>4.a Greywater systems in compliance with BS8525-1:2010 Greywater systems- Part 1 Code of Practice (153)<br>4.b Rainwater systems in compliance with BS8515:2009+A1:2013 Rainwater harvesting systems- Code of practice(154)<br>Achieve Assessment scope - Criterion 6 on page 199, if you intend to pursue a post occupancy stage certification.<br>Additionally for Healthcare building types only:<br>5 If applicable, the flushing control for each WC or urinal must be suitable for operation by patients with frail or infirm hands or activated by electronic sensors.<br>Additionally for Prison building types only:<br>6 Sanitary components specified within a prison cell have a volume controller specified on the individual fittings or water supply to each cell (see Definitions on page 195).<br>**Note**:<br>1.0 Components to be included as a minimum:<br>WCs, wash-hand basin taps, showers, urinals, kitchen taps: kitchenette.<br>If the developer is not installing some of these, use the baseline values for any unknown components. All water-consuming components and greywater or rainwater systems specified and installed by the developer are assessed. Components not listed above and located within tenant areas that are not specified by the developer, but will be specified by the tenant do not need to be assessed. In cases where the end client is known and they make a commitment to specify and install specific water-consuming components, assess the issue based on the relevant information.<br>1.1 Where components are not specified and installed by the developer but by the tenant, the minimum standard will not prevent the assessment from achieving a BREEAM rating. | A completed copy of the BREEAM Wat 01 calculator<br><br>Documentary evidence supporting the data used to complete the calculator tool.<br><br>Relevant section/clauses of the building specification/ design drawings confirming technical details of<br>1. Sanitary components<br>2.Rainwater and greywater collection system<br>OR where detailed documentary evidence is not available at this stage;<br>Completed BREEAM Wat 01 calculator<br>A letter of instruction to a contractor/supplier or a formal letter from the developer giving a specific undertaking, providing sufficient information to allow the water calculations to be completed. | **5** | **3** | **1** | MBA / UMC | Feedback from the team is that three credits will be targeted.<br><br>**Three credits targeted.** |
| **Wat 02 Water monitoring - Minimum standards criterion one only for all ratings except Pass** | | | | | | | |
| Wat 02a Rating Min Standard | **Rating Related Min Standard- Good Rating and Above**<br>1 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. | Relevant section/clauses of the building specification or contract<br>Design drawings | **-** | **MET** | **-** | MBA | Required for Good rating or above to be achieved. |
| Wat 02a Water monitoring | **One credit - Water monitoring**<br>1 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.<br>2 For water-consuming plant or building areas consuming 10% or more of the building's total water demand:<br>2.a Fit easily accessible sub-meters **OR**<br>2.b Install water monitoring equipment integral to the plant or area.<br>3 For each meter (main and sub):<br>3.a Install a pulsed or other open protocol communication output AND<br>3.b Connect it to an appropriate utility monitoring and management system, e.g. a building management system (BMS), for the monitoring of water consumption. If there is no BMS system in operation at Post Construction stage, award credits provided that the system used enables connection when the BMS becomes operational.<br>4 In buildings with swimming pools, or large water tanks and aquariums, fit separate sub-meters on the water supply of the above and any associated changing facilities(toilets, showers etc.) irrespective of their water consumption levels.<br>5 In buildings containing laboratories, fit a separate water meter on the water supply to any process or cooling loop for 'plumbed-in' laboratory process equipment, irrespective of their water consumption levels.<br>Additionally for those pursuing a post occupancy stage certification:<br>6 The water monitoring strategy used enables the identification of all water consumption for sanitary uses as assessed under Wat 01 (litres/person/day), if a post occupancy stage certification is sought.<br>**Note**:<br>1.0 Demonstrate compliance with criterion 2 on page 199 for water-consuming plant or building areas identifiable by the developer. Do not assess water-consuming plant or building areas to be added or installed by the tenant. Where no water-consuming plants are installed by the developer, the credit is awarded based on the rest of the criteria.<br>1.1 Minimum standard is applicable, however the assessor may, for speculative assessments, subject to their justification and evidence from the design team, seek review by BRE. | Relevant section/clauses of the building specification or contract<br>Design drawings | **1** | **1** | **0** | MBA | BMS/AMR to be included in developments where the 'useful space' of the building is more than 1,000m2 as per KBCN00069.<br><br>Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Wat 03 Leak detection** | | | | | | | |
| Wat 03a Leak detection | **One credit - Leak detection system**<br>1. Install a leak detection system capable of detecting a major water leak:<br>1.a On the utilities water supply within the buildings, to detect any major leaks within the buildings<br>AND<br>1.b Between the buildings and the utilities water supply, to detect any major leaks between the utilities supply and the buildings under assessment.<br>2. The leak detection system is:<br>2.a A permanent automated water leak detection system that alerts the building occupants to the leak OR an inbuilt automated diagnostic procedure for detecting leaks<br>2.b Activated when the flow of water passing through the water meter or data logger is at a flowrate above a pre-set maximum for a pre-set period of time. This usually involves installing a system which detects higher than normal flowrates at meters or sub-meters. It does not necessarily require a system that directly detects water leakage along part or the whole length of the water supply system<br>2.c Able to identify different flow and therefore leakage rates, e.g. continuous, high or low-level, over set time periods. Although high and low-level leakage rates are not specified, the leak detection equipment installed must have the flexibility to distinguish between different flowrates to enable it to be programmed to suit the building type and owner's or occupier's usage patterns.<br>2.d Programmable to suit the owner's or occupier's water consumption criteria<br>2.e Where applicable, designed to avoid false alarms caused by normal operation of large water consuming plant such as chillers.<br>Where there is physically no space for a leak detection system between the utilities water meter and the building, alternative solutions can be used, provided that a major leak can still be detected. | Relevant section/clauses of the building specification or contract<br>Design drawings<br>Manufacturers product details | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Wat 03b Flow control devices | **One credit - Flow control devices**<br>3. Install flow control devices that regulate the water supply to each WC area or sanitary facility according to demand, in order to minimise undetected wastage and leaks from sanitary fittings and supply pipework.<br>**Note:**<br>1.2 Assess the water supplies to WC areas or facilities as per criterion 3 regardless of whether the WC areas of facilities are fitted out or not. | Relevant section/clauses of the building specification or contract -<br>Design drawings<br>Manufacturers product details | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |

| | BREEAM NC 2018 Criteria | | | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|---|---|
| **Wat 04 Water efficient equipment** | | | | | | | | | |
| Wat 04a Water efficient equipment | **One credit - Water efficient equipment**<br>1. Identify all water demands from uses other than those listed under Table 8.4 on page 206 that could be realistically mitigated or reduced. Where there is no water demand from uses other than domestic-scale, sanitary use components in the building, this issue is not applicable.<br>2. Identify systems or processes to reduce the relevant water demand (criterion 1 above), and establish, through either good practice design or specification, a demonstrable reduction in the total water demand of the building.<br>**Note:**<br>1.0 Where the only non-domestic scale, non-sanitary water demand comes from an irrigation system specified or installed by the developer, then use this system to assess compliance.<br>1.1 Where there are no water demands beyond those of Wat 01, the issue will be filtered out. | | | Documentation detailing the planting and irrigation strategy<br>Relevant section/clauses of the building specification or contract AND/OR design drawings (where necessary)<br>Manufacturers product details | **1** | **1** | **0** | Design Team | Anticipated that planting will solely rely on rainfall. Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | | | **9** | **7** | **1** | **0** | |
| | | | | 7% | **7** | **5.44** | **0.77** | **0** | |
| **Mat 01 Environmental impacts from construction products - Building life cycle assessment (LCA)** | | | | | | | | | |
| Mat 01a Superstructure | **Up to six credits – Superstructure**<br>**Comparison with the BREEAM benchmark during Concept Design (offices, industrial and retail buildings only)**<br>**Superstructure (offices, industrial and retail buildings (except for Simple Buildings and where Notes 1.1 and 1.2 above apply)**<br>1. During the Concept Design, demonstrate the environmental performance of the building as follows:<br>1.a Carry out a building LCA on of the superstructure design using either the BREEAM Simplified Building LCA tool or an IMPACT Compliant LCA tool according to the methodology (see Methodology).<br>1.b Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications). Comparison with the BREEAM benchmark during Technical Design (offices, industrial and retail buildings only)<br>2. During Technical Design, demonstrate the environmental performance of the building as follows:<br>2.a As criterion 1.a<br>2.b Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved criterion 1, criterion 2 may still be achieved. Option appraisal during Concept Design (all building types)<br><br>3 For offices, industrial and retail building types, achieve criterion 1 (except where Notes 1.0, 1.1 and 1.2 above apply).<br>4. During Concept Design, identify opportunities for reducing environmental impacts as follows:<br>4.a Carry out building LCA options appraisal of 2 to 4 significantly different superstructure design options (applicable to the Concept Design stage, see Methodology).<br>4.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Concept Design) according to the methodology (see Methodology).<br>4.c For each design option, fulfil the same functional requirements specified by the client and all statutory requirements(to ensure functional equivalency).<br>4.d Integrate the LCA options appraisal activity within the wider design decision-making process. Record this in an options appraisal summary document.<br>4.e Record the following in the Mat 01/02 Results Submission Tool: The differences between the design options; the design option selected by the client to be progressed beyond Concept Design; the reasons for selecting it and the reasons for not selecting the other design options.<br>4.f Submit the Mat 01/02 Results Submission Tool to BRE at the end of Concept Design, and before planning permission is applied for (that includes external material or product specifications).<br>If the building LCA tool recognised by BREEAM and used for criteria 3 to 5 (and 6 to 9, if pursued) is not an IMPACT Compliant LCA tool and criteria 1 to 2 are applicable, then the BREEAM Simplified Building LCA tool (or an IMPACT Compliant LCA tool) shall be used for criteria 1 to 2.<br>**Options appraisal during Technical Design (all building types)**<br>5 During Technical Design identify opportunities for reducing environmental impacts as follows:<br>5.a Carry out building LCA options appraisal of 2 to 3 significantly different superstructure design options (based on the selected Concept Design option and as applicable to the Technical Design stage, see Methodology).<br>5.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing superstructure during Technical Design) according to the methodology (see Methodology).<br>5.c As criteria 4.c to 4.e above. Where an options appraisal summary document was produced during Concept Design, update it to include the Technical Design options.<br>5.d Submit the Mat 01/02 Results Submission Tool to BRE at the end of Technical Design. Where a project has not achieved criteria 3 and 4, criterion 5 may still be achieved. | | | Copy of LCA. | **6** | **0** | **0** | LCA Consultant | Credit not targeted. |
| Mat 01b Substructure and hard landscaping options appraisal during Concept Design | **One credit – Substructure and hard landscaping options appraisal during Concept Design (all building types)**<br>6. Criteria 3 and 4 are achieved.<br>7. During Concept Design identify opportunities for reducing environmental impacts as follows:<br>7.a Carry out building LCA options appraisal of a combined total of at least six significantly different substructure or hard landscaping design options(at least two shall be substructure and at least two shall be hard landscaping).<br>7.b Using a building LCA tool that is recognised by BREEAM (as suitable for assessing substructure and hard landscaping during Concept Design) according to the methodology (see Methodology on page 211).<br>7.c As criteria 4.c to 4.f. | | | The LCA options appraisal summary document includes substructure and hard landscaping according to the criteria. | **1** | **0** | **0** | LCA Consultant | Credit not targeted. |
| **Mat 02 Environmental impacts from construction products - Environmental Product Declarations (EPD)** | | | | | | | | | |
| Mat 02a Specification of products with a recognised EPD | **One credit - Specification of products with a recognised environmental product declaration (EPD)**<br>1. Specify construction products with EPD that achieve a total EPD points score of at least 20, according to the Methodology on page 221.<br>2. Enter the details of each EPD into the Mat 01/02 Results Submission Tool, including the material category classification. The Mat 01/02 Results Submission Tool will verify the EPD points score and credit award. | | | Copies of Environmental Product Declarations<br>A link/reference to the EPD's Product Category Rules<br><br>Mat 01/02 Results Submission Tool | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Mat 03 Responsible sourcing of construction products - Minimum standards for criterion 1 only for all ratings** | | | | | | | | | |
| Mat 03a Pre requisite | **Prerequisite - Legally harvested and traded timber**<br>1. All timber and timber-based products used on the project are legally harvested and traded timber as per the UK Government's Timber Procurement Policy (TPP) (see Definitions on page 228).<br>Compliance with criterion 1 is a minimum requirement for achieving any BREEAM rating. There are no prerequisite requirements for other materials. | | | Relevant section/clauses of the building specification or contract<br>OR<br>A signed and dated letter of commitment to meet the relevant criteria<br>OR<br>Timber Policy | **-** | **MET** | **-** | Principal Contractor | Required for any Mat03 credits to be achieved. |
| Mat 03b Enabling sustainable procurement | **One credit - Enabling sustainable procurement**<br>2. A sustainable procurement plan must be used by the design team to guide specification towards sustainable construction products. The plan must:<br>2.a Be in place before Concept Design.<br>2.b Include sustainability aims, objectives and strategic targets to guide procurement activities. Note: targets do not need to be achieved for the credit to be awarded but justification must be provided for targets that are not achieved.<br>2.c Include a requirement for assessing the potential to procure construction products locally. There must be a policy to procure construction products locally where possible.<br>2.d Include details of procedures in place to check and verify the effective implementation of the sustainable procurement plan.<br><br>In addition, if the plan is applied to several sites or adopted at an organisational level it must:<br>2.e Identify the risks and opportunities of procurement against a broad range of social, environmental and economic issues following the process set out in BS ISO20400:2017(166) | | | Evidence of level of responsible sourcing achieved for<br>each construction product. For example, certificates.<br>Completed copy of the Mat 03 Calculator tool.<br>Evidence to show how the Mat 03 calculator tool has been completed. | **1** | **1** | **0** | Design Team | It is proposed that the SPP is made a project-wide document. If the SPP is for multiple sites: Identify the risks and opportunities of procurement against a broad range of social, environmental and economic issues following the process set out in BS ISO 20400:2017.<br><br>Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Mat 03c Measuring responsible sourcing | **Up to 3 credits - Measuring responsible sourcing**<br>3. Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Credits are awarded in proportion to the scope of the assessment and the number of points achieved, asset out in Table 9.10. | | **3** | **2** | **0** | Principal Contractor | Feedback from the team is that two credits will be targeted.<br><br>**Two credits targeted.** |
| **Mat 05 Designing for durability and resilience** | | | | | | | |
| Mat 05a Protecting vulnerable parts of the building from damage | **One credit**<br>**Protecting vulnerable parts of the building from damage**<br>1. Protection measures are incorporated into the building's design and construction to reduce damage to the building's fabric or materials in case of accidental or malicious damage occurring. These measures must provide protection against:<br>1.a Negative impacts of high user numbers in relevant areas of the building (e.g. corridors, lifts, stairs, doors etc.).<br>1.b Damage from any vehicle or trolley movements within 1m of the internal building fabric in storage, delivery, corridor and kitchen areas.<br>1.c External building fabric damage by a vehicle. Protection where parking or manoeuvring areas are within 1 metre of the building façade and where delivery areas or routes are within 2 metres of the façade, i.e. specifying bollards or protection rails.<br>1.d Potential malicious damage to building materials and finishes, in public and common areas where appropriate.<br><br>**Protecting exposed parts of the building from material degradation**<br>2. Key exposed building elements have been designed and specified to limit long and short term degradation due to environmental factors. This can be demonstrated through one of the following:<br>2.a The element or product achieving an appropriate quality or durability standard or design guide, see Table 9.14 on the next page. If none are available, use BS7543:2015(168) as the default appropriate standard<br>**OR**<br>2.b A detailed assessment of the element's resilience when exposed to the applicable material degradation and environmental factors.<br>3. Include convenient access to the roof and façade for cost-effective cleaning, replacement and repair in the building's design.<br>4. Design the roof and façade to prevent water damage, ingress and detrimental ponding.<br>See Table 9.14 on the next page for an example list of relevant industry durability and quality standards. | Design drawings illustrating vulnerable areas/parts of the building.<br>Design drawings and/or relevant section/clauses of the building specification or contract confirming the durability measures specified. | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Mat 06 Material efficiency** | | | | | | | |
| Mat 06a Material efficiency | **One credit - Material efficiency**<br>1. At the Preparation and Brief and Concept Design stages, set targets and report on opportunities and methods to optimise the use of materials. These must be done for each of the following stages. See Table 9.15 on page 237:<br>1.a Preparation and Brief<br>1.b Concept Design<br>1.c Developed Design<br>1.d Technical Design<br>1.e Construction<br>2. Develop and record the implementation of material efficiency, see Table 9.15 below, during:<br>2.a Developed Design<br>2.b Technical Design<br>2.c Construction<br>3. Report the targets and actual material efficiencies achieved. | A copy of the report. | **1** | **1** | **0** | UMC / Principal Contractor | Discussions on going re the reuse of block paving.<br><br>Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | **14** | **6** | **0** | | **0** |
| | | 18% | **17.5** | **7.5** | **0** | | **0** |
| **Wst 01 Construction waste management - Minimum standards one credit for Outstanding** | | | | | | | |
| Wst 01a Pre-demolition audit | **One credit - Pre-demolition audit**<br>1. 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. The audit must cover the content of Pre-demolition audit scope on page 244 and:<br>1.a Be carried out at Concept Design stage (RIBA Stage 2) by a competent person (see Definitions on page 245) prior to strip-out or demolition works<br>1.b Guide the design, consider materials for reuse and set targets for waste management<br>1.c Engage all contractors in the process of maximising high grade reuse and recycling opportunities<br>1.d Compare actual waste arisings and waste management routes used with those forecast and investigate significant deviations from planned targets.<br>2. Make reference to the audit in the resource management plan (RMP) (see Definitions on page 245).<br>**Note:**<br>1.0 Where, under the developer's ownership, no demolition will be undertaken to enable the assessed development, the pre-demolition audit credit is not applicable and therefore filtered out of the assessment. | A copy of the Resource Management Plan and, where relevant, the pre-demolition audit<br>Relevant section/clauses of the building specification or contract AND/OR<br>A letter from the client or their representative | **1** | **1** | **0** | Demolition Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Wst 01b Construction resource efficiency | **Up to three credits - Construction resource efficiency**<br>3. Prepare a compliant Resource Management Plan (RMP) covering:<br>3.a Non-hazardous waste materials (from on-site construction and dedicated off-site manufacture or fabrication, see Definitions on page 245), including demolition and excavation waste.<br>3.b Accurate data records on waste arisings and waste management routes.<br>4. Meet or improve upon the benchmarks in Table 10.1 for non-hazardous construction waste, excluding demolition and excavation waste.<br><br>Table 10.1 Construction waste resource efficiency benchmarks<br>BREEAM credits \| Amount of waste generated per 100 m²(gross internal floor area) \| m³(actual, not bulk volume) \| tonnes<br>One credit \| ≤ 13.3 \| ≤ 11.1<br>Two credits \| ≤ 7.5 \| ≤ 6.5<br>Three credits \| ≤ 3.4 \| ≤ 3.2<br>Exemplary level \| ≤ 1.6 \| ≤ 1.9 | | **3** | **2** | **0** | Principal Contractor | Feedback from the team is that two credits will be targeted.<br><br>**Two credits targeted.** |
| Wst 01c Diversion of resources from landfill | **One credit - Diversion of resources from landfill**<br>5. Meet, where applicable, the diversion from landfill benchmarks in Table 10.2 for non-hazardous construction waste and demolition and excavation waste generated.<br>6. Sort waste materials into separate key waste groups as per Table 10.3 on page 247, either on-site or through a licensed contractor for recovery.<br><br>Table 10.2 Diversion from landfill benchmarks<br>BREEAM credits \| Type of waste \| Volume \| Tonnage<br>One credit \| Non-demolition \| 70% \| 80%<br>Demolition \| 80% \| 90%<br>Excavation \| N/A \| N/A<br>Exemplary level \| Non-demolition \| 85% \| 90%<br>Demolition \| 85% \| 95%<br>Excavation \| 95% \| 95% | | **1** | **1** | **0** | Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Wst 02 Use of recycled and sustainably sourced aggregates** | | | | | | | |
| Prerequisite | **Prerequisite - Pre-demolition audit**<br><br>1. If demolition occurs on site, to encourage the reuse of site-won material on site, complete a pre-demolition audit of any existing buildings, structures or hard surfaces in accordance with Assessment Scope - Criterion 1. | | **-** | **MET** | **-** | Demolition Contractor | Pre-demolition audit must be produced for the following credit to be achieved. |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Wst 02a Project sustainable aggregate points | **One credit - Project Sustainable Aggregate Points**<br>2. Identify all aggregate uses and types on the project Table 10.5 and Table 10.6 on the next page<br>3. Determine the quantity in tonnes for each identified use and aggregate type.<br>4. Identify the region in which the aggregate source is located.<br>5. Calculate the distance in kilometres travelled by all aggregates by transport type.<br>6. Enter the information into the BREEAM Wst 02 calculator to calculate the Project Sustainable Aggregate points.<br>The corresponding number of BREEAM credits will be awarded as shown in Table 10.4<br><br>Table 10.4 Credits available relating to the Project Sustainable Aggregate points<br>Project Sustainable Aggregate Credits: Project Sustainable Aggregate points<br>1: 3.5–6<br>1 exemplary performance credit: >6 | Completed copy of Wst 02 calculator<br>Documentary evidence supporting the data used to complete the Calculator tool.<br>Documentation confirming the source of recycled/secondary aggregates and that the required amount can be provided | **1** | **1** | **0** | Design Team | Some to come from demo, the rest would need to be brought onto site.<br><br>Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Wst 03 Operational waste - Minimum of one credit for Excellent & Outstanding** | | | | | | | |
| Wst 03a Operational waste | **One credit - Operational waste**<br>1. Provide a dedicated space for the segregation and storage of operational recyclable waste generated. The space is:<br>1.a Clearly labelled, to assist with segregation, storage and collection of the recyclable waste streams<br>1.b Accessible to building occupants or facilities operators for the deposit of materials and collections by waste management contractors<br>1.c 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.<br>2. For consistent and large amounts of operational waste generated, provide:<br>2.a Static waste compactors or balers; situated in a service area or dedicated waste management space<br>2.b 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<br>2.c 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.<br>**Note:**<br>2.0 Small industrial units: For an industrial building or development site consisting of a number of smaller units, each ≤200m² floor area, shared facilities that meet the above criteria for the building or site as a whole are sufficient to achieve this credit. | Design drawings and/or relevant section/clauses of the building specification or contract confirming provision and scope of dedicated facilities.<br>Project team meeting minutes / letter confirming likely building waste streams and indicative volumes. | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Wst 05 Adaptation to climate change** | | | | | | | |
| Wst 05a Resilience of structure, fabric, building services and renewables installation | **One credit - Resilience of structure, fabric, building services and renewables installation**<br>1. Conduct a climate change adaptation strategy appraisal using:<br>1.a 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 and includes(see Methodology below):<br>1.a.i Hazard identification<br>1.a.ii Hazard assessment<br>1.a.iii Risk estimation<br>1.a.iv Risk evaluation<br>1.a.v Risk management.<br>2. Develop recommendations or solutions based on the climate change adaptation strategy appraisal, before or during Concept Design, that aim to mitigate the identified impact.<br>3. Provide an update during Technical Design demonstrating how the recommendations or solutions proposed at Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing by the assessor. | Relevant section/clauses of the building specification or contract.<br>Design drawings.<br>Report/study. | **1** | **1** | **0** | UMC & Burrows Graham with input from Design Team | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Wst 06 Design for disassembly and adaptability** | | | | | | | |
| Wst 06a Design for disassembly and adaptability - recommendations | **One credit - Design for disassembly and functional adaptability - recommendations**<br>1. Conduct a study to explore the ease of disassembly and the functional adaptation potential of different design scenarios (see Methodology on page 269) by the end of Concept Design.<br>2. Develop recommendations or solutions (see Methodology on page 269) based on the study (criterion 1 above), during or prior to Concept Design, that aim to enable and facilitate disassembly and functional adaptation. | Disassembly and functional adaptability study, implementation plan report, building adaptability and disassembly guide. | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Wst 06b Disassembly and functional adaptability - implementation | **One credit - Disassembly and functional adaptability – implementation**<br>3. Achieve criteria 1 and 2<br>4. Provide an update, during Technical Design, on:<br>4.a How the recommendations or solutions proposed by Concept Design have been implemented where practical and cost effective. Omissions have been justified in writing to the assessor.<br>4.b Changes to the recommendations and solutions during the development of the Technical Design.<br>5. Produce a building adaptability and disassembly guide to communicate the characteristics allowing functional adaptability and disassembly to prospective tenants. | Disassembly and functional adaptability study, implementation plan report, building adaptability and disassembly guide. | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | **10** | **9** | **0** | **0** | |
| | | 7% | **7** | **6.3** | **0** | **0** | |
| **Le 01 Site selection** | | | | | | | |
| Le 01a Previously occupied land | **One credit - Previously occupied land**<br>1 At least 75% of the proposed development's footprint is on an area of land which has previously been occupied (see Definitions below). | Design drawings (including existing site plan), report or site photographs confirming:<br>Type and duration of previous land use.<br>Area (m2) of previous land use.<br>Proposed site plan showing:<br>Location and footprint (m2) of proposed development and temporary works. | **1** | **1** | **0** | UMC | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Le 01b Contaminated land | **One credit - Contaminated land**<br>2. A contaminated land professional's site investigation, risk assessment and appraisal has deemed land within the site to be affected by contamination. The site investigation, risk assessment and appraisal have identified:<br>2.a The degree of contamination<br>2.b The contaminant sources or types<br>2.c The options for remediating sources of contamination which present an unacceptable risk.<br>3. The client or principal contractor confirms that remediation of the site will be carried out in accordance with the remediation strategy and its implementation plan as recommended by the contaminated land professional (see Definitions). | A copy of the remediation strategy and implementation plan.<br>Evidence to demonstrate the recommendations set out in the remediation strategy plan have been implemented. | **1** | **0** | **0** | Contaminated Land Specialist | GI report has been instructed. |

<table>
<tr><th colspan="2">BREEAM NC 2018 Criteria</th><th>Potential Design stage Evidence Approach</th><th>Credits Available</th><th>Current Targeted</th><th>Additional Potential</th><th>Resp.</th><th>Comments</th></tr>
<tr><td colspan="8">Le 02 Identifying and understanding the risks and opportunities for the project - number of credits available depend on route</td></tr>
<tr><td>Le 02a Prerequisite</td><td>Prerequisite - Assessment route selection<br>1. The client or contractor confirms compliance is monitored against all relevant UK and EU or international legislation relating to the ecology of the site.<br><br>Table 11.1 Credits awarded for each assessment route<table><tr><th></th><th>Foundation route (Route 1)</th><th>Comprehensive route (Route 2)</th></tr><tr><td>Survey and evaluation</td><td>1 credit</td><td>1 credit</td></tr><tr><td>Determining ecological outcomes</td><td></td><td>1 credit</td></tr><tr><td>Exemplary criteria</td><td>1 credit</td><td>1 credit</td></tr></table></td><td>Completed Guidance Note 34: BREEAM Ecology Risk Evaluation Checklist.</td><td>-</td><td>MET</td><td>-</td><td>MKA Ecology / Principal Contractor</td><td>Route 2 will be taken.<br><br>Ecologist has been appointed.</td></tr>
<tr><td>Le 02b Survey and evaluation</td><td>One or up to two credits depending on route -Survey and evaluation<br><br>Foundation route (Route 1)<br>2. The site is evaluated using the BREEAM Ecological Risk Evaluation Checklist (Guidance Note 34) confirming that the Foundation route can be used (see Methodology and Definitions).<br><br>OR<br><br>Comprehensive route (Route 2)<br>3. A Suitably Qualified Ecologist (SQE) carried out a survey and evaluation (see Methodology) for the site early enough to influence site preparation works, layout and, where necessary, strategic planning decisions (typically Preparation and brief stage) (see Definitions).<br>4. The SQE's survey and evaluation determines the site's ecological baseline (see Definitions), including:<br>a. Current and potential ecological value and condition of the site, and related areas within the zone of influence.<br>b. Direct and indirect risks to current ecological value from the project<br>c. Capacity and feasibility for enhancement of the site's ecological value of the site and, where relevant, areas within the zone of influence.<br>5. Recommendations and data collected from the survey and evaluation are shared with appropriate project team members to influence decisions made for activities during site preparation, design and construction works, which can support ecological features (see Methodology and Definitions).<br><br>Determining ecological outcomes<br>Foundation and Comprehensive routes (Routes 1 and 2)<br>6. Survey and evaluation criteria relevant to the chosen route (criterion 2 if following the Foundation route or Criteria 3-5 above for the Comprehensive route).<br>7. The project team liaise and collaborate with representative stakeholders (see Methodology) early enough to influence key planning decisions (typically Concept Design stage) to:<br>7.a Identify the optimal ecological outcomes for the site.<br>7.b Identify, appraise and select measures to meet the optimal ecological outcomes for the site (criterion 7.a), in line with the mitigation hierarchy of action, according to the route being used (see Definitions):<br><table><tr><th>Foundation route</th><th>Comprehensive route</th></tr><tr><td>1. Avoidance<br>2. Protection</td><td>1. Avoidance<br>2. Protection<br>3. Reduction or limitation of negative impacts<br>4. On site compensation and<br>5. Enhancement, considering the capacity and feasibility within the site, or where viable, off-site.</td></tr></table></td><td>A copy of the Ecological Survey and Evaluation document. Note: A phase 1 habitat assessment or other equivalent type of assessment can act as acceptable evidence as long as it can be shown that they cover the content of the assessment criteria.</td><td>2</td><td>2</td><td>0</td><td>MKA Ecology/ Solutions / Principal Contractor</td><td>Tree Survey has been carried out and the report has been provided.<br><br>Feedback from the team is that two credits will be targeted.<br><br>Two credits targeted.</td></tr>
<tr><td colspan="8">Le 03 Managing negative impacts on ecology - credits available depend on route</td></tr>
<tr><td>Le 03a Prerequisite</td><td>Prerequisite – Ecological risks and opportunities<br>1. LE02's 'Survey and evaluation and Determining ecological outcomes' criteria have been achieved using the Foundation route (Route 1) or the Comprehensive route (Route 2)<br><br>Table 11.2 Credits awarded according to assessment route<table><tr><th></th><th>Foundation route (Route 1)</th><th>Comprehensive route (Route 2)</th></tr><tr><td>Planning and measures on-site</td><td>1 credit</td><td>1 credit</td></tr><tr><td>Managing negative impacts</td><td>1 credit</td><td>1 or 2 credits</td></tr></table></td><td></td><td>-</td><td>MET</td><td>-</td><td>MKA Ecology / Principal Contractor</td><td>Pre-requisite will need to be met.</td></tr>
<tr><td>Le 03b Planning liaison, implementation and data</td><td>One credit – Planning and measures on-site<br>Routes 1 and 2<br>2. Further planning to avoid and manage negative ecological impacts on-site is carried out (see Methodology) early enough to influence the concept design and design brief as well as site preparation planning (typically Concept Design stage).<br>3. On-site measures for managing negative ecological impacts during site preparation and construction are implemented in-practice (e.g. mitigation measures to protect existing ecological features) (see Methodology).<br>4. Criteria 2-3 are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in Le02 Ecological risks and opportunities (see Methodology).</td><td></td><td>1</td><td>1</td><td>0</td><td>Ecologist / Principal Contractor</td><td>Feedback from the team is that one credit will be targeted.<br><br>One credit targeted.</td></tr>
</table>

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Le 03b Planning liaison, implementation and data | **Up to two credits – Managing negative impacts of the project**<br>**Foundation route (Route 1) (one credit)**<br>5. Criteria 2 and 3 are achieved.<br>6. Negative impacts from site preparation and construction works have been managed according to the hierarchy (see Methodology) and no overall loss of ecological value has occurred.<br><br>**Comprehensive route (Route 2) (up to two credits)**<br>7. Criteria 2-4 have been achieved.<br>8. Negative impacts from site preparation and construction works have been managed according to the mitigation hierarchy, in line with the SQE's recommendations (see Methodology) and, either:<br>a. No overall loss of (see Definitions) ecological value has occurred (2 credits)<br>OR where criterion 8a is not possible:<br>b. The loss of ecological value has been minimised (Minimising Loss) (1 credit) | | **2** | **1** | **0** | MKA Ecology / Principal Contractor | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Le 04 Change and enhancement of ecological value - credits available depends on route** | | | | | | | |
| Le 04a Prerequisite | **Prerequisite - Managing negative impacts on ecology**<br>1. Criterion 6 (for Foundation route) or 8 (for Comprehensive route) in Le03 has been achieved.<br>2. The client or contractor confirms compliance is monitored against all relevant UK, EU or international legislation relating to the ecology of the site.<br><br>Table 11.3 Credits awarded by ecological assessment route<br>Ecological enhancement: N/A / 1 credit<br>Change and enhancement of ecology: 1 credit / up to 3 credits | | **-** | **MET** | **-** | MKA Ecology / Principal Contractor | Pre-requisite will need to be met. |
| Le 04b Enhancement of ecology, liaison, implementation and data collection | **One credit - Change and enhancement of ecology**<br>**Foundation route (Route 1) only**<br>3. Locally relevant ecological measures have been implemented that enhance the site's ecological value. The measures adopted are based on (see Methodology).<br>3.a Recommendations from recognised 'local' ecological expertise and specialist input and guidance.<br>3.b Input from the project team in collaboration with representative stakeholders and data collated as part of 'Determining ecological outcomes' in Le02.<br><br>**One credit - Ecological enhancement**<br>**Comprehensive route (Route 2) only**<br>4. Measures have been implemented that enhance ecological value, which are based on input from the project team and SQE in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in Le02 (see Methodology). Measures are implemented in the following order:<br>a. On site, and where this is not feasible,<br>b. Off site within the zone of influence.<br>5. Data collated are analysed and where potentially valuable, provided to the local environmental records centres nearest to, or relevant for, the site.<br><br>**Up to three credits - Change and enhancement of ecology**<br>**Comprehensive route (Route 2) only**<br>6. Up to three credits are awarded based on the change in ecological value occurring as a result of the project. This must be calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology - Route 2. Credits are awarded in line with the Reward Scale table in GN36 where there are no residual impacts on protected sites or irreplaceable habitats. | Ecologist's report<br><br>Design drawings including proposed and existing (pre-development) site plan/survey<br><br>Written confirmation from the client/design team confirming how the ecologist's recommendations will be implemented. | **4** | **2** | **0** | MKA Ecology / Principal Contractor | Feedback from the team is that two credits will be targeted.<br><br>**Two credits targeted.** |
| **Le 05 Long term ecology management and maintenance - number of credits available depends on route** | | | | | | | |
| Le 05a Perquisite | **Prerequisite - Statutory obligations, planning and site implementation**<br>1. The client or contractor has confirmed that compliance is being monitored against all relevant UK, EU and international standards relating to the ecology of the site.<br>2. The following must be achieved, according to the route being assessed:<br>a. Foundation route (Route 1) - criterion 6 in Le03 has been achieved .<br>b. Comprehensive route (Route 2) - criterion 8 in Le03 has been achieved, and at least one credit under Le 04 for 'Change and Enhancement of Ecology' has been awarded.<br><br>Table 11.4 Credits awarded by ecological assessment route<br>Management and maintenance throughout the project: 1 credit / 1 credit<br>Landscape and ecology management plan: 1 credit | | **-** | **MET** | **-** | MKA Ecology / Project Team | Pre-requisite will need to be met. |
| Le 05b Ecology management and maintenance | **One credit - Management and maintenance throughout the project - Foundation and Comprehensive routes (Route 1 and Route 2)**<br>3. Measures have been implemented to manage and maintain ecology throughout the project. These measures are based on input from the project team in collaboration with representative stakeholders and data collated as part of the 'Determining ecological outcomes' in Le02 (see Methodology). To ensure the optimal ecological outcomes agreed in Le02 are met in-practice, these measures must monitor and review the effectiveness of the mitigation and enhancement measures in place for Le03 and Le04 to ensure they are implemented.<br>4. A section on Ecology and Biodiversity has been included as part of the tenant or building owner information supplied, to inform the owner or occupant of local ecological features, value and biodiversity on or near the site (see Methodology). This should include detailed management and maintenance plans as required by landscape and asset managers as well as relevant parts of the handover information for occupiers written in a format that encourages understanding and supportive behaviours.<br><br>**One credit - Landscape and ecology management plan (or similar) development - One credit for Route 2, to be included as part of Route 1 evidence, but no additional credit given**<br>5. A Landscape and Ecology Management Plan, or equivalent, has been developed in accordance with BS42020:2013 Section 11.1 covering at least the first five years after project completion as a minimum and including:<br>a. Actions and responsibilities of relevant individuals, prior to handover<br>b. The ecological value and condition of the site at handover and how this is expected to develop and change over time<br>c. Identification of opportunities for ongoing alignment with activities beyond the development project, which supports the aims of BREEAM's Strategic Ecology Framework<br>d. Identification and guidance to trigger appropriate remedial actions to address previously unforeseen impacts<br>e. Clearly defined and allocated roles and responsibilities for delivering the plan<br>6. The landscape and management plan or similar will be updated to support maintenance of the ecological value of the site (see sections relating to Maintenance and Monitoring in CIEEM, CIRIA, IEMA, for helpful guidance). | Ecologist's report<br><br>Design drawings including proposed and existing (pre-development) site plan/survey<br><br>Written confirmation from the client/design team confirming how the ecologist's recommendations will be implemented. | **2** | **2** | **0** | MKA Ecology / Project Team | Feedback from the team is that two credits will be targeted.<br><br>**Two credits targeted.** |
| | | | **13** | **9** | **0** | **0** | |
| | | 15% | **15** | **10.38** | **0** | **0.00** | |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| **Pol 01 Impacts of refrigerants** | | | | | | | |
| Pol 01a No refrigerant use | **Three credits - No refrigerant use**<br>1. No refrigerant use within the installed plant or systems.<br>**OR** alternatively, where the building does use refrigerants, the three credits can be awarded as follows:<br>**Prerequisite**<br>2. All systems with electric compressors comply with the requirements of BS EN378:2016 (207) (parts 2 and 3). Refrigeration systems containing ammonia comply with the Institute of Refrigeration Ammonia Refrigeration Systems code of practice(208)<br>**Two credits - Impact of refrigerant**<br>3. The direct effect life cycle $CO_2$ equivalent emissions (DELC) of ≤ 100 $CO_2$-eq/kW. For systems which provide cooling and heating, the worst performing output based on the lower of kW cooling output and kW heating output is used to complete the calculation. To calculate the DELC, refer to the relevant definitions in Methodology below and Additional information on page 303.<br>**OR**<br>4. All refrigerants used have a global warming potential (GWP) ≤ 10.<br>**OR**<br>One credit - Impact of refrigerant<br>5. Systems using refrigerants have a DELC of ≤ 1000 kg$CO_2$-eq/kW cooling and heating capacity.<br>**One credit - Leak detection**<br>6. All systems are hermetically sealed or only use environmentally benign refrigerants(see Leak detection and Hermetically sealed systems on page 301).<br>**OR**<br>7.Where the systems are not hermetically sealed:<br>7.a Systems have:<br>7.a.i A permanent automated refrigerant leak detection system, that is robust and tested, and capable of continuously monitoring for leaks.<br>**OR**<br>7.a.ii An inbuilt automated diagnostic procedure for detecting leakage is enabled.<br>7.b In the event of a leak, the system must be capable of automatically responding and managing the remaining refrigerant charge to limit loss of refrigerant (see Automatic isolation and containment of refrigerant on page 303)**.**<br>**Note**<br>1.0 If the building is designed to avoid the need for refrigerant-containing building services, so no refrigerant use will be specified for the fit-out, the available credits can be awarded by default. | Completed copy of Pol 01 calculator tool.<br>Documentary evidence supporting the data used to complete the calculator tool.<br><br>A copy of the specification clause or letter from the M&E engineer / system manufacturer confirming relevant refrigeration type and system information. | **3** | **1** | **1** | MBA | Feedback from the team is that one credit will be targeted and one potential credit.<br><br>**One credit targeted.** |
| **Pol 02 Local air quality** | | | | | | | |
| Pol 02a Local air quality | **Up to two credits - Local air quality**<br>1. All heating and hot water is supplied by non-combustion systems. For example, only powered by electricity.<br>**OR alternatively;**<br>2. Emissions from all installed combustion plant that provide space heating and domestic hot water do not exceed the levels set in Table 12.4 and Table 12.5 on page 328. The measurements must be provided by manufacturers. Must determine whether the development is in a high or low pollution zone (methodology). | | **2** | **2** | **0** | MBA | Non-combustion system.<br>Feedback from the team is that two credits will be targeted.<br><br>**Two credits targeted.** |
| **Pol 03 Flood and surface water management** | | | | | | | |
| Pol 03a Prerequisite | **Prerequisite**<br>1. An appropriate consultant is appointed to carry out and demonstrate the development's compliance with all criteria. | | **-** | **MET** | **-** | HDR | Required for Any Pol03 credits to be achieved. |
| Pol 03b Flood resilience | **Up to two credits - Flood resilience**<br>**Two credits - Low flood risk**<br>2. A site-specific flood risk assessment (FRA) confirms the development is in a flood zone that is defined as having a low annual probability of flooding. The FRA takes all current and future sources of flooding into consideration (see Sources of flooding on page 312).<br>**One credit - Medium or high flood risk**<br>3. A site-specific FRA confirms the development is in a flood zone that is defined as having a medium or high annual probability of flooding and is not in a functional floodplain. The FRA must take all current and future sources of flooding into consideration (see Sources of flooding on page 312). For smaller sites refer to Level of detail required in the FRA for smaller sites on page 312, which overrides criterion 2 above.<br>4. To increase the resilience and resistance of the development to flooding, one of the following must be achieved:<br>4.a The ground level of the building and access to both the building and the site, are designed (or zoned) so they are at least 600 mm above the design flood level of the site's flood zone (see 600 mm threshold on page 312).<br>4.b The final design of the building and the wider site reflects the recommendations made by an appropriate consultant in accordance with the hierarchy approach outlined in section 5 of BS 8533:2017 (214) | | **2** | **1** | **0** | HDR | Flood map indicates that the site is in flood zone 2 or 3.<br><br>HDR:<br>The main risk item is agreeing within the FRA a flood level and possible flood compensation requirements with the Environment Agency, given the site is located in an area at risk of flooding. This process will inform development levels (the building FFLs and the external areas), and may have some influence on the final development layout.<br><br>Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Pol 03c Prerequisite | **Prerequisite for surface water run-off credits**<br>5. Surface water run-off design solutions must be bespoke, i.e. they must take account of the specific site requirements and natural or man-made environment of and surrounding the site. The priority levels detailed in the Methodology must be followed, with justification given by the appropriate consultant where water is allowed to leave the site. | | **-** | **MET** | **-** | HDR | Required for Pol03d or Pol03e credits to be achieved. |
| Pol 03d Surface water run off - rate | **One credit - Surface Water Run-Off - Rate**<br>6. For brownfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) shows a 30% improvement for the developed site compared with the pre-developed site. This should comply at the 1-year and 100-year return period events.<br>7. For greenfield sites, drainage measures are specified so that the peak rate of run-off from the site to the watercourses (natural or municipal) is no greater for the developed site than it was for the pre-development site. This should comply at the 1-year and 100-year return period events.<br>8. Relevant maintenance agreements for ownership, long term operation and maintenance of all specified SuDS are in place.<br>9. Calculations include an allowance for climate change. This should be made in accordance with current best practice planning guidance (definitions on page 338). | Calculation results for the pre-and post-development peak rate of run-off. | **1** | **1** | **0** | HDR | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Pol 03e Surface water run off - volume | **One credit - Surface Water Run-Off - Volume**<br>9. Flooding of property will not occur in the event of local drainage system failure (caused either by extreme rainfall or a lack of maintenance);**AND EITHER**<br>10. Drainage design measures are specified so that the post-development run-off volume, over the development lifetime, is no greater than it would have been prior to the assessed site's development. This must be for the 100-year 6-hour event, including an allowance for climate change (see criterion 14).<br>1.1 Any additional predicted volume of run-off for this event is prevented from leaving the site by using infiltration or other SuDS techniques. **OR** (only where criteria 10 and 11 cannot be achieved):<br>12. Justification from the appropriate consultant indicating why the above criteria cannot be achieved, i.e. where infiltration or other SuDS techniques are not technically viable options.<br>13. Drainage design measures are specified so that the post-development peak rate of run-off is reduced to the limiting discharge. The limiting discharge is defined as the highest flowrate from the following options:<br>13.a The pre-development one-year peak flowrate<br>13.b The mean annual flowrate (Qbar)<br>13.c 2L/s/ha.<br>For the one-year peak flowrate, the one-year return period event criterion applies.<br>14. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS are in place.<br>15. For either option, above calculations must include an allowance for climate change; this should be made in accordance with current best practice planning guidance | Information showing the proposed drainage solution, system failure flood flow routes, potential flood ponding levels and ground floor levels.<br>Calculation results for the pre-and post-development volume of run-off.<br>Calculation results of the limiting discharge. | **1** | **1** | **0** | HDR | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| Pol 03f Minimising watercourse pollution | **One credit - Minimising watercourse pollution**<br>16. There is no discharge from the developed site for rainfall up to 5 mm (confirmed by the appropriate consultant).<br>17. Areas with a low risk source of watercourse pollution, an appropriate level of pollution prevention treatment is provided, using appropriate SuDS techniques.<br>18. Areas with a high risk of contamination or spillage of substances, such as petrol and oil, have separators(or an equivalent system) are installed in surface water drainage systems.<br>19. Chemical or liquid gas storage areas have a means of containment fitted to the site drainage system (i.e. Shutoff valves). This is to prevent the escape of chemicals to natural water courses in the event of a spillage or bunding failure.<br>20. All water pollution prevention systems have been designed and installed in accordance with the recommendations of documents such as the SuDS manual(215) and other relevant industry best practice. They must be bespoke solutions taking account of the specific site requirements and natural or man-made environment of and surrounding the site.<br>21.A comprehensive and up to date drainage plan of the site will be made available for the building or site occupiers.<br>22. Relevant maintenance agreements for the ownership, long term operation and maintenance of all specified SuDS must be in place. | The consultants report detailing the design specifications, calculations and drawings to support the 5mm rainfall discharge criteria.<br>Design drawings and/or relevant section/clauses of the building specification or contract indicating<br>1. High and low risk areas of the site<br>2. Specification of SUDS, source control systems, oil/petrol separators and shut-off valves as appropriate<br>A letter or other formal correspondence from the project team:<br>1. Confirming water pollution prevention systems are designed in accordance with PPG3 and the SUDS manual (where appropriate)<br>2. Outlining indicative examples of compliance with PPG3 and the SUDS manual<br>3. Confirming a copy of the drainage plan will be produced and handed over to the building occupier.<br>4. Confirming design of all external storage and delivery areas is in compliance with relevant Pollution Prevention Guidance<br>5. Outlining indicative examples of compliance with the PPG. | **1** | **1** | **0** | HDR | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| **Pol 04 Reduction of night time light pollution** | | | | | | | |
| Pol 04a Reduction of night time light pollution | **One credit - Reduction of night time light pollution**<br>1. External lighting pollution has been eliminated through effective design that removes the need for external lighting. This does not adversely affect the safety and security of the site and its users.<br>**OR**<br>alternatively, where the building does have external lighting, one credit can be awarded as follows:<br>2. The external lighting strategy has been designed in compliance with Table 2 (and its accompanying notes) of the Institution of Lighting Professionals (ILP) Guidance notes for the reduction of obtrusive light, 2011(221).<br>3. All external lighting (except for safety and security lighting) can be automatically switched off between 23:00 and 07:00.<br>4. 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.<br>5. Illuminated advertisements are designed in compliance with ILP PLG05 The Brightness of Illuminated Advertisements.(221) | Design drawings<br>Relevant section/clauses of the building specification or contract or external lighting design data/calculations<br>In the case of the external lighting design, the M&E engineer or lighting designer must provide indicative examples of where and how the strategy complies with the assessment criteria. | **1** | **1** | **0** | MBA | Feedback from the team is that one credit will be targeted.<br><br>During hours of operation between 23:00 and 07:00, lighting required for operational reasons does not have to be modified for BREEAM compliance.<br><br>**One credit targeted.** |
| **Pol 05 Reduction of noise pollution** | | | | | | | |
| Pol 05a Reduction of noise pollution | **One credit - Reduction of noise pollution**<br>1. There are no noise-sensitive areas within the assessed building or within 800 m radius of the assessed site.<br>**OR**<br>2. 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 BS4142:2014(222) is commissioned. Noise levels must be measured or determined for:<br>2.a Existing background noise levels:<br>2.a.i at the nearest or most exposed noise-sensitive development to the proposed assessed site.<br>2.a.ii including existing plant on a building, where the assessed development is an extension to the building<br>2.b Noise rating level from the assessed building.<br>3. The noise impact assessment must be carried out by a suitably qualified acoustic consultant.<br>4. 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.<br>5. 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 | For 1:<br>Design drawings highlighting:<br>1. All existing and proposed noise-sensitive buildings local to, and within, the site boundary<br>2. Proposed sources of noise from the new development<br>3. Distance (m) from these buildings to the assessed development.<br>For 2 to 3:<br>The acoustician's report, acoustician's qualifications and professional status.<br>**OR**<br>Relevant section/clauses of the building specification or contract requiring a noise assessment by a suitably qualified acoustician in compliance with BS 4142:1997.<br>**OR**<br>A letter from the client or design team confirming that they will appoint an acoustician to carry out a noise assessment in compliance with BS 4142:1997<br>For 4:<br>Acoustician's report with recommendations for noise attenuation measures.<br>**AND EITHER**<br>A marked-up design plan highlighting the specification of the acoustician's attenuation measures<br>**OR**<br>A formal letter from the client or design team confirming where relevant, that attenuation measures recommended by an appointed suitably qualified acoustician will be installed | **1** | **1** | **0** | Acoustic Consultant | Feedback from the team is that one credit will be targeted.<br><br>**One credit targeted.** |
| | | | **12** | **9** | **1** | **0** | |
| | | 9% | **9** | **6.75** | **0.75** | **0** | |
| **Innovation - Exemplary Level Criteria** | | | | | | | |
| Man 03i Responsible Construction Management | 23. Achieve all items in Table 4.1 on page 47. | As Man 03 evidence. | **1** | **0** | **1** | Principal Contractor | One potential credit. |

| | BREEAM NC 2018 Criteria | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|
| Hea 01i Daylighting | 14. Daylighting criteria have been met using either of the following options:<br>14.a Relevant building areas meet exemplary daylight factors and the relevant criteria in Table 5.8 on the facing page.<br>14.b Relevant building areas meet exemplary average and minimum point daylight illuminance criteria in Table 5.9 on page 81. | As Hea 01 evidence. | **1** | **0** | **0** | Architect | Credit not currently targeted. |
| Hea 06i Security of site and building | 4. A compliant risk based security rating scheme has been used. The performance against the scheme has been confirmed by independent assessment and verification. | As Hea 06 evidence. | **1** | **0** | **0** | SQSS | Credit not currently targeted. |
| Ene 01i Beyond zero net regulated carbon and carbon negative | Up to two credits - Beyond zero net regulated carbon<br>6. The building achieves an EPR NC ≥ 0.9 and zero net regulated $CO_2$ emissions(see Definitions on page 134).<br>7. Energy generation from on-site and near-site LZC sources is sufficient to offset carbon emissions from regulated energy use plus a percentage of emissions from unregulated energy use.<br>8. Award the exemplary credits based on the percentage of additional emissions from unregulated energy that are offset by LZC sources(see Table 6.2).<br><br>Three credits - Carbon negative<br>9. The building is deemed carbon negative where>100% (see Table 6.2 below) of carbon emissions from unregulated (and regulated) energy use are offset by energy generated from on-site and near-site LZC sources(see Definitions on page 126) | As above, plus evidence confirming:<br>1. The total carbon neutral energy generation (kWh/yr)<br>2. The source of the carbon neutral energy<br>3. Calculated estimate of energy consumption from unregulated systems or process(kWh/yr) (only required if confirming zero regulated carbon or carbon negative exemplary credits)<br>4. Calculated estimate of exported energy surplus(only required if confirming carbon negative status). | **3** | **0** | **0** | M&E | Credit not currently targeted. |
| Ene 01iii Post occupancy stage | 10. Achieve maximum available credits in Ene 02 Energy monitoring on page 139. In addition, preschools, primary schools, law courts, prisons and multi-residential buildings must meet the requirements of the second credit for sub-metering of high energy load and tenancy areas.<br>11. The client or building occupier commits funds to pay for the post occupancy stage. This requires an assessor to be appointed and to report on the actual energy consumption compared with the targets set in criterion 4 on page 383.<br>12. The energy model (criterion 3 on page 381) is:<br>12.a Submitted to BRE and<br>12.b Retained by the building owner. | | **2** | **0** | **0** | M&E | Credit not currently targeted. |
| Wat 01i Water consumption | 7. Achieve criteria 1 to 4 on the previous page (and if applicable 5 or 6 above).<br>8. The water consumption (litres/person/day)for the assessed building achieves the 65% improvement described as exemplary performance in Table 8.1 on the previous page | | **1** | **0** | **0** | M&E | Credit not currently targeted. |
| Mat 01i Core building services options appraisal during Concept Design | 8. Criteria 3 to 4 are achieved.<br>9. During Concept Design identify opportunities for reducing environmental impacts as follows:<br>9.a Carry out building LCA options appraisal of at least 3 significantly different core building services design options.<br>9.b Use a building LCA tool that is recognised by BREEAM (as suitable for assessing core building services during Concept Design) according to the methodology (see Methodology on the next page).<br>9.c As criteria 4.c to 4.f. | As Mat 01 evidence. | **1** | **0** | **0** | Architect | Credit not currently targeted. |
| Mat 01ii LCA and LCC alignment | One credit – LCA and LCC alignment (all building types)<br>10. Achieve criteria 3 to 5.<br>11. Achieve Elemental LCC plan and Component Level LCC options appraisal credits(Man 02 Life cycle cost and service life planning on page 41).<br>12. Include design options appraised for criteria 3 to 4 (and 6 to 7 and 8 to 9, if pursued) during Concept Design in Assessment scope - The elemental LCC plan: on page 42.<br>13. Include the design options appraised for criterion 5 during Concept Design in the 'Component level LCC option appraisal' (in Man 02 Life cycle cost and service life planning on page 41).<br>14. Integrate the aligned LCA and LCC options appraisal activity within the wider design decision-making process. Record this in an options appraisal summary document including the relevant cost information from the 'elemental LCC plan' and 'Component level LCC option appraisal'. | As Mat 01 evidence. | **1** | **0** | **0** | Architect | Credit not currently targeted. |
| Mat 01iii Third party verification | 15. Criteria 1 to 7 (as applicable to the building type) are achieved.<br>16. A suitably qualified third party (see Definitions on page 228) either carries out the building LCA work or verifies the building LCA work (if by others), and produces a report describing how they have checked the building LCA work accurately represent the designs under consideration during Concept Design and Technical Design with reference to the requirements of criteria 1 to 7 (and 8 to 14 if pursued).<br>17. For each LCA option, itemise in the report the checks made by the suitably qualified third party including, as a minimum, the quality requirements shown in Table 9.4 on page 231.<br>18. Include details of the suitably qualified third party's relevant skills and experience and a declaration of their third party independence from the project client and design team in the report | | **1** | **0** | **0** | Architect | Credit not currently targeted. |
| Mat03i Measuring responsible sourcing | 3 Use the Mat 03 calculator tool and methodology to determine the number of credits achieved for the construction products specified or procured. Credits are awarded in proportion to the scope of the assessment and the number of points achieved, asset out in Table 9.10.<br><br>Table 9.10 BREEAM credits available for each scope level and percentage of points achieved<br>**Credits achieved** / **Mat 03 scope level** / **% of available points achieved**<br>1 / Superstructure / ≥ 10%<br>2 / As above, plus – Internal finishes – Substructure and hard landscaping / ≥ 20%<br>3 / ≥ 30%<br>1 exemplary performance credit / As above, plus core building services / ≥ 50% | | **1** | **0** | **0** | Principal Contractor | Credit not currently targeted. |

| | BREEAM NC 2018 Criteria | | | Potential Design stage Evidence Approach | Credits Available | Current Targeted | Additional Potential | Resp. | Comments |
|---|---|---|---|---|---|---|---|---|---|
| Wst 01i Construction resource efficiency and diversion from landfill | 7. Non-hazardous construction waste generated, excluding demolition and excavation waste, is less than or equal to the exemplary level resource efficiency benchmarks(see Table 10.1).<br>8. The percentage of non-hazardous construction, demolition and excavation waste (if relevant) diverted from landfill meets or exceeds the exemplary level percentage benchmarks in Table 10.2.<br>9. All key waste groups in Table 10.3 for diversion from landfill are covered in the RMP.<br>10. Waste data obtained from licensed external waste contractors is reliable and verifiable, by using data from EA/SEPA/EA Wales/NIEA Waste Return Forms or from a PAS402:2013 compliant company (see Definitions on page 245).<br><br>Table 10.2 Diversion from landfill benchmarks<br>BREEAM credits / Type of waste / Volume / Tonnage<br>One credit / Non-demolition / 70% / 80%<br>Demolition / 80% / 90%<br>Excavation / N/A / N/A<br>Exemplary level / Non-demolition / 85% / 90%<br>Demolition / 85% / 95%<br>Excavation / 95% / 95% | | | | 1 | 0 | 0 | Project Team | Credit not currently targeted. |
| Wst 02i | 7. The Project Sustainable Aggregate Points score meets or exceeds the exemplary level performance benchmark in Table 10.4.<br><br>Table 10.4 Credits available relating to the Project Sustainable Aggregate points<br>Project Sustainable Aggregate Credits / Project Sustainable Aggregate points<br>1 / 3.5–6<br>1 exemplary performance credit / >6 | | | | 1 | 0 | 0 | Principal Contractor | Credit not currently targeted. |
| Wst 05i Responding to climate change | Achievement of the following criteria demonstrates a holistic approach to the design and construction of the building's life cycle to mitigate against the impacts of climate change.<br>To achieve an exemplary performance credit:<br>4. Meet criteria 1 to 3 above.<br>5. Meet the criteria or achieve credits of the assessment issues given in Table 10.11 below | | | | 1 | 0 | 0 | Architect | Credit not currently targeted. |
| Le 02i Ecological outcomes for the site | Determine the ecological outcomes for the site (sustainability-related activities)<br>11. Achieve criteria 8 to 10 on page 278.<br>12. When determining the optimal ecological outcome for the site consider, in addition to those outlined in criteria 8 to 10 on page 278, the wider site sustainability-related activities and the potential for ecosystem service related benefits. See Methodology on page 279 - a list of the minimum areas for consideration.<br>13. Achieve the credits of the assessment issues outlined below:<br>13.a Assessment scope on page 114 - Both credits<br>13.b Assessment scope on page 309 - Achieve credits for 'Surface water run-off' and 'Minimising watercourse pollution'<br>13.c Assessment scope on page 324. | | | | 1 | 0 | 0 | Ecologist | Credit not currently targeted. |
| Le 04i Change and enhancement of ecology | 7. The change in ecological value occurring is calculated in accordance with the process set out in GN36 - BREEAM, CEEQUAL and HQM Ecology Calculation Methodology - Route 2. The credit is awarded as follows:<br>7.a Significant net gain in ecological value (percentage score of 110 or above). | | | | 1 | 0 | 0 | Ecologist | Credit not currently targeted. |
| **Section Total** | | | | **Note: Maximum available is 10 credits** | **10** | **0** | **1** | **0** | |
| | **Currently no innovation credits are targeted.<br>Innovation credit information available at team's request.** | | | | | | | | |
| **Weighted Section Total** | | | | 10.0% | **10.00** | **0.00** | **1.00** | **0.00** | |
| | | | | | | | | | |
| | | | | **Overall Total** | **110.00** | **64.45** | **7.97** | **0.00** | |

# Appendix B
# Low Zero Carbon Feasibility Study

### *1.1 Wind Generation*

#### *1.1.1 Technology Description*

1. Wind turbines are an established means of capturing wind energy and converting it into usable electricity. Wind turbines come in various sizes depending on the location and electrical requirements. A wind turbine usually consists of a nacelle containing a generator connected, sometimes via a gearbox, to a rotor consisting of three blades.

2. The two main types of commercially available wind turbines on offer in the UK are described below:

- Horizontal axis wind turbines (HAWT) are traditionally the most common form of wind turbines installed in the UK. They are usually formed of three blades and work best when provided with a constant laminar air flow.
- Vertical axis wind turbines (VAWT) are less efficient compared to HAWTs but have the advantage that they can cope with variable wind flows as they do not have to 'face' the wind.

3. Wind turbines can also be classified according to their size:

- Micro-wind: under 15kW rated capacity;
- Small-scale wind: between 15kW to 100kW rated capacity;
- Medium-scale wind: between 100kW to 500kW rated capacity; and
- Large-scale wind: greater than 500kW rated capacity.

#### *1.1.2 Feasibility for Site*

1. Referring to the NOABL (Numerical Objective Analysis of Boundary Layer) wind speed database as adopted by the Department of Energy & Climate Change (DECC), the site experiences an average wind speed of 5.6 m/s assuming a rotor height at around 25m above ground level, but it is unlikely that average speeds will meet this estimate.

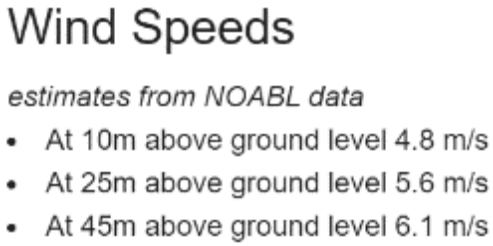



**Figure 1 - Average Monthly Wind Speeds**

2. Freestanding horizontal axis wind turbines require a large area of land, which would affect the viability of the site.

3. Smaller freestanding vertical axis wind turbines do not need to change direction to suit wind direction and have smaller operational footprints. However, anticipated wind turbulence at low level also rules out their application.

4. Roof mounted turbines have a significant effect on the total height of the building, and is not considered appropriate.

5. This technology shall therefore not be considered further.

### *1.2 Geothermal Heat Pump*

#### *1.2.1 Technology Description*

1. Ground source heat pumps (GSHP) extract heat from the ground. GSHPs work on the principle that the below ground temperature is more constant compared to above ground. In the winter months, the below-ground temperature is warmer than above ground and the heat carrier fluid circulating within the absorber pipes absorbs the heat. This heat energy is then raised by a compressor (using the compression cycle) and through a heat exchanger, distributed via a low temperature distribution system such as under floor heating, to satisfy a proportion of space heating requirements. GSHP systems are not suitable for satisfying high temperature hot water demands.

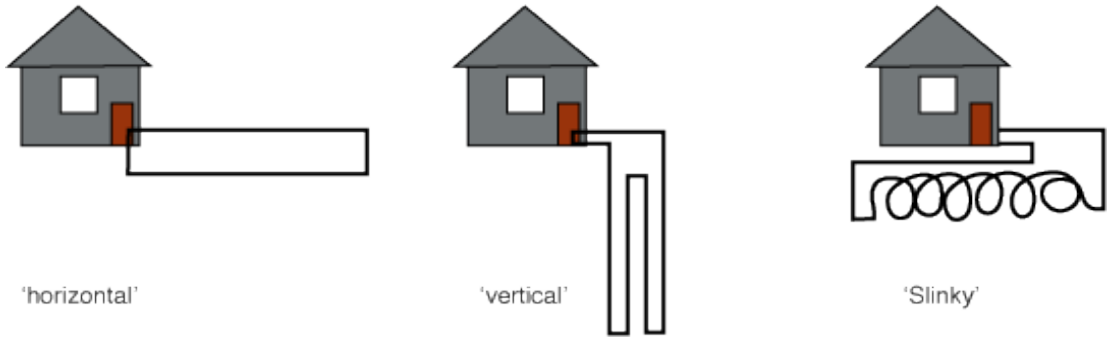



**Figure 2 - Ground Source Heat Pump Loop Arrangements**

2. In the summer months, the below-ground temperature is colder than above ground and the heat carrier fluid circulating within the absorber pipes rejects building's heat. This heat rejecting capacity is then raised by a compressor (using the compression cycle) and through a heat exchanger, distributed via a chilled water distribution system to satisfy a proportion of space cooling requirements.

3. As Figure 2 indicates, there are a number of configurations for GSHP systems. A vertical collector system is considered the most appropriate in the context of the proposed development given the scale of the system and limited area available for horizontal collectors. Vertical collectors can be between 15–180m deep with minimum spacing between adjacent boreholes should be maintained at 5-15m to prevent thermal interference.

### *1.2.2 Feasibility for Site*

1. As outlined previously, a typical warehouse building has little requirement for heat, much of the building will be likely be designed to be maintained at ambient temperature or refrigerated. This technology would therefore not be suitable.

2. Costs involved in installing a GSHP, particularly the drilling of boreholes would make this technology economically unviable for this application.

3. Due to the reasons above this technology is not considered further.

## *1.3 Biomass Boiler and Heating*

### *1.3.1 Technology Description*

1. Biomass boilers can replace conventionally powered boilers with an almost carbon neutral fuel such as wood pellets or wood chips. The $CO_2$ released during the burning of biomass is balanced by that absorbed by the plants during their growth, making the technology almost carbon neutral. However, fossil fuels are utilised in the production, processing and transportation of biomass fuels. Therefore, a key issue when choosing the biomass fuel supplier is the distance between the grower and the boilers as well as the method of transportation.

2. Biomass energy can be derived from a number of sources, but are principally divided into three main types: first, second and third generation:

- Traditional first-generation woody biomass, which can be a by-product of forest industries or agriculture.
- Second generation biomass consists of residual food parts of crops (e.g. stems, leaves) as well as other crops that are not used for food purposes, and also industry waste.
- Third generation biofuel whereby algae culture, which is farmed at low cost, produces biofuels at high yield, is and considered to be further efficient to the other generations.

### *1.3.2 Feasibility for Site*

1. Combustion of wood biomass releases higher quantities of NOx, SOx and particulates (PM10 and PM2.5) compared to a comparable system fuelled by natural gas. This would have a negative impact upon the air quality in the vicinity of the area.

2. Biomass boilers typically have a high maintenance cost when compared to traditional gas fired boilers, which can make the technology economically unviable.

3. There are associated logistical issues associated with Biomass Boilers. The system requires significant space for both the Biomass boiler and fuel storage required.

4. Biomass Boilers are not considered appropriate due to reasons detailed above.

### *1.4 Solar Thermal Domestic Hot Water*

#### *1.4.1 Technology Description*

1. Solar thermal panels are used to produce hot water for domestic use and consist of roof mounted collector panels that make use of heat energy from the sun and use it to heat water circulating in a closed loop. This heat is transferred via a heat exchanger into a hot water storage tank that is also heated by a gas or other boiler.

**Figure 3 - Evacuated Tube Solar Collector**

2. Two main types of solar water heating system are used in the UK; flat plate collectors and evacuated glass heat tubes. Flat plate collectors circulate water around a black colored receiver plate that is heated by direct sunlight and to some extent by indirect light; heat being retained by a thermally glazed panel above. Evacuated glass heat tubes are more efficient, particularly in the UK, as they can work more effectively at low solar radiation levels. They are however, more expensive than flat plate collectors. They consist of rows of parallel transparent glass tubes, each containing an absorber tube which converts the sunlight into heat energy.

#### *1.4.2 Feasibility for Site*

1. There is little domestic hot water demand for the site therefore priority on the roof area has been given to photovoltaic panels.

2. This technology has not been considered further.

### *1.5 Energy Storage*

#### *1.5.1 Technology Description*

1. Energy storage works by capturing energy produced by both renewable and non-renewable resources and storing it for discharge when required. The solution allows users to come off the grid and switch to stored energy, at a time most beneficial, giving greater flexibility and control of electrical usage.

2. At times of low demand, when there is excess supply energy it can be stored for use at times of high demand, with low supply, thus adjusting to provide the required balance between supply and demand. This approach is especially effective with renewable generation, which

is intermittent by its nature. Solar and wind, for example, generate little amounts of power in the absence of sunshine or wind. Energy storage is able to smooth out the supply from these sources to provide a more reliable supply that matches demand.

3. Energy storage systems provide a wide array of technological approaches to managing power supplies in order to create a more resilient energy infrastructure and bring cost savings to utilities and consumers. The diverse approaches currently being deployed around the world can be divided into six main categories:

- Solid State Batteries - a range of electrochemical storage solutions, including advanced chemistry batteries and capacitors.
- Flow Batteries - batteries where the energy is stored directly in the electrolyte solution for longer cycle life, and quick response times.
- Flywheels - mechanical devices that harness rotational energy to deliver instantaneous electricity.
- Compressed Air Energy Storage - utilising compressed air to create an energy reserve.
- Thermal - capturing heat and cold to create energy on demand.
- Pumped Hydro-Power - creating large-scale reservoirs of energy with water.

### *1.5.2 Feasibility for Site*

1. Energy storage could be considered as part of the design to utilise the energy generated by the photovoltaic panel installation.

# Appendix C
## BRUKL Outputs