



Thirkill Park, Pannal, Harrogate

Energy Statement

For Echo Green Developments Limited

Date: 22 June 2021

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DOCUMENT CONTROL SHEET

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1. EXECUTIVE SUMMARY

1.1 General

The statement addresses the energy requirements for Thirkill Park, Pannal, Harrogate. The proposed development consists of 8no. industrial units comprising of 4 blocks of 2 units. The units contain a large warehouse space, offices and ancillary areas.

The energy statement has been prepared to address planning policy CC4 'Sustainable Design' of the 'Harrogate District Local Plan 2014 -2035'.

Prioritising a reduction in overall energy demand is the most effective way in which to minimise environmental impacts associated with energy use. The use of energy efficient technologies, in addition to renewables to supply the remaining load results in lower greenhouse gas emissions as compared with the use of conventional alternatives.

In accordance with Building Regulations Part L2A as the building is a shell building, compliance is demonstrated by assuming services and efficiencies that would be installed as part of the first fit-out work.

Based on an assumed fit out it is predicted that 27,360kgCO₂/annum will be saved for the proposed development which represents an improvement of 36.1% beyond the requirements of the Building Regulations.

A low carbon energy contribution is proposed from air source heat pumps to provide the hot water and underfloor heating to the warehouse, and VRF air source heat pumps to provide heating and cooling contributing 22,709kWh per annum which represents 24.45% of the sites total energy consumption of 92,872kWh.

PV generating electricity contributing 89,437kWh per annum which represents 96.30% of the sites total energy consumption of 92,872kWh.

A BREEAM pre-assessment has been produced following a discussions with the design team and desktop assessment of the proposed building. It was concluded that due to the nature of the proposed building, shell only fit-out and site location the target of Excellent is deemed unachievable for the proposed development.

2. INTRODUCTION

2.1 General

The statement addresses the energy requirements for Thirkill Park, Pannal, Harrogate. The proposed development consists of 8no. industrial units comprising of 4 blocks of 2 units. The units contain a large warehouse space, offices and ancillary areas.

The energy statement has been prepared to address planning policy CC4 'Sustainable Design' of the 'Harrogate District Local Plan 2014 -2035'.

3. POLICY REVIEW

3.1 National Planning Policy Framework

The National Planning Policy Framework (February 2019) sets out the Government’s planning policies for England and how these are expected to be applied. It sets out the Government’s requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own local and neighbourhood plans and as a material consideration in the determination of planning applications.

At the heart of the National Planning Policy Framework is a ‘presumption in favour of sustainable development’. Within this context National Guidance says that:

- a. The purpose of the planning system is to contribute towards achieving sustainable development.
- b. Sustainable development comprises of economic, social and environmental dimensions. These are interdependent and need to be pursued in mutually supportive ways:
 - Economic- contributing to building a strong, responsive and competitive economy.
 - Social- supporting strong, vibrant and healthy communities.
 - Environmental- contributing to protecting and enhancing the natural, built and historic environment.
- c. These objectives are not criteria against which every decision can or should be judged. Plans and decisions must take into account local circumstances to ensure sustainable development is responded to appropriately in different areas.
- d. At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-taking. For decision-making this means that:
 - Approving development proposals that accord with the development plan without delay; and
 - Where the development plan is absent, silent or relevant policies are out-of-date, granting permission unless:
 - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole; or
 - specific policies in this Framework indicate development should be restricted.

Planning policies should follow the presumption in favour of sustainable development approach so development which is sustainable can be approved without delay. All plans should set clear policies that will guide how the presumption should be applied locally.

3.2 Local Sustainability Policy

3.2.1 Harrogate District Local Plan 2014 -2035

Planning policy CC4 ‘Sustainable Design’ states:

The council requires all developments to be designed to reduce both the extent and the impacts of climate change; it will promote zero carbon development and encourage all developments to meet the highest technically feasible and financially viable environmental standards during construction and occupation:

- a. All developments are required to reduce carbon dioxide emissions through the following sequence of priorities, as set out in the energy hierarchy:
 - » i. Energy reduction; then
 - » ii. Energy efficiency; then
 - » iii. Renewable energy; then
 - » iv. Low carbon energy; then
 - » v. Conventional energy.
- b. The council:
 1. Expects new developments to incorporate passive design measures that reduce the need for artificial lighting and heating, cooling and ventilation systems through siting, design, layout and building orientation.
 2. Will support proposals to improve the energy efficiency of existing buildings that comply with all relevant aspects of this policy and other relevant policies in the plan.
- c. All developments of ten dwellings or more, or 1000 sq m or above of gross floorspace, will be required to submit an energy statement demonstrating how the energy hierarchy has been applied to make the fullest contribution to reducing greenhouse gas emissions in support of the Harrogate Borough Council: Carbon Reduction Strategy (2018) (or any future relevant strategies) and the Climate Change Act (2008)

Non-domestic Development

- d. New non-domestic developments, excluding conversions and extensions of less than 500 sq m, will be required to achieve a minimum standard of BREEAM(24) 'Excellent' (or any future national equivalent).

4. THE BUILDING REGULATIONS APPROVED DOCUMENT L (2013)

4.1 General

In order to demonstrate compliance with the requirements for Approved Document L2A (2013) there are five separate criteria that must be met which are outlined below.

4.2 Criterion 1 - Achieving the Target Emission Rate (TER)

To demonstrate compliance with Criterion 1 the actual buildings emission rate is compared to the notional buildings emission rate and has to be at least equal.

The actual buildings emission rate is calculated when the building is modelled using approved software and the proposed construction values are detailed, for example, u-values, efficiency of M&E plant etc. Following this exercise the software will generate a notional building, the notional building has the same layout as the actual building but the construction values and energy performance of the M&E equipment is pre-set, this allows the software to generate a target emission rate (TER) for the actual building, the TER is the anticipated emission rate from the notional building.

The BER is then compared to the TER and if it is equal to or lower than then the building is deemed to comply with Criterion 1.

This process needs to be completed and issued to Building Control at the “As-Designed” stage to demonstrate to Building Control that the proposals for the building comply with the criteria.

4.3 Criterion 2 - Limits on Design Flexibility

Each element of the construction has pre-set performance limits within the document; these are generally split into 2 categories, an average value and an upper limit value which cannot be exceeded.

To demonstrate compliance with criterion 2 then criterion 1 must be achieved with no individual element exceeding the upper limit set for performance.

4.4 Criterion 3 - Limiting the Effects of Solar Gains in Summer

It is a requirement to demonstrate that solar gains have been limited during the summer period to either reduce the need for air conditioning; or to reduce the installed capacity of any air conditioning system that is installed.

To demonstrate compliance with criterion 3 an assessment of the solar gains must be undertaken, the actual building results are then compared to a pre-defined standard and if the performance of the actual building is no worse than that of the pre-defined building then it is deemed to comply with the criterion.

4.5 Criterion 4 – Building Performance Consistent with BER

The process for demonstrating compliance with criterion 4 is generally the same as criterion 1, the difference is that the actual building performance is compared to the notional building, for example, the air permeability results, building services commissioning figures and achieved construction u-values are used rather than the design assumptions.

It then must be demonstrated that the actual building performance is equal to or better than the TER.

Notice should be given that commissioning has been carried out according to a procedure approved by the Secretary of State.

4.6 Criterion 5 – Provisions for Energy Efficient Operation of the Building

The owner of the building should be provided with sufficient information about the building, the fixed building services and their maintenance requirements so that the building can be operated in such a manner as to use no more fuel and power than is reasonable in the circumstances.

This is generally achieved by production of a building log book.

5. ENERGY ASSESSMENT

5.1 General

Prioritising a reduction in overall energy demand is the most effective way in which to minimise environmental impacts associated with energy use. The use of energy efficient technologies, in addition to renewables to supply the remaining load results in lower greenhouse gas emissions as compared with the use of conventional alternatives.

The proposed development consists of 8no. industrial units comprising of 4 blocks of 2 units. The shell units contain a large warehouse space, tea point area and WC.

5.1.1 Modelling Information

The building has been modelled using the computer modelling package EDSL TAS Part L 2013 Version 9.5.1 interfaced to SBEM Version v5.6.b.0 which is based on BRE's standard calculation tool and uses a dynamic simulation method for checking compliance.

The geographically nearest CIBSE Test Reference Year (TRY) has been used, which is Leeds.

5.1.2 Drawings

The TAS model has been developed based on the following SMR Architects Drawings:

Title	Drawing Number	Revision
Site Plan	7529-SMR-01-ZZ-DR-A-2001-S2	P1
Building Plan	7529-SMR-01-ZZ-DR-A-8015-S3-	P1
Office Plan	Assumed internal fit-out	-
Roof Plan	7529-SMR-01-ZZ-DR-A-2013-S2	P1
Elevations	7529-SMR-01-ZZ-DR-A-2006-S2	P1

5.2 Proposed Constructional Standards

5.2.1 General

Cost effective measures can be adopted to reduce energy demand without making a significant impact on the design, appearance, or character of the building. It is intended to implement energy efficiency measures to improve on the minimum standards required in Part L2A of the Building Regulations 2013.

The following specific measures are proposed to achieve an energy demand reduction at the development:

- » Improve U-values of the external envelope.
- » Improve U-value of glazing.
- » Improve air permeability of the envelope.
- » Improved efficiency of the space heating, cooling and hot water.
- » Use of energy efficient lighting.
- » Use of intelligent lighting controls.
- » Use of variable speed pumps, fans and drives to match supply and demand.
- » Use of heat recovery to mechanical ventilation systems.

5.2.2 Improve U-values of the External Envelope

The following limiting U-values are proposed by SMR Architects for the development which exceed the minimum requirements under Building Regulations Part L2A.

- » External wall: 0.25 W/m²K.
- » Ground floor: 0.25 W/m²K. (Assumed)
- » Roof: 0.12 W/m²K.
- » Windows: 1.70 W/m²K (G-value = 0.6 light transmittance 71%).
- » Rooflights: 1.70 W/m²K (G-value = 0.6 light transmittance 71%).
- » Vehicle Access Door: 2.20 W/m²K.

5.2.3 Improve Air Permeability of Building Envelope

Air leakage through the building envelope is a significant cause of energy loss.

In order to further reduce energy demand through the reduction of heat loss, it is assumed that the development will target an air permeability of 5.0 m³/(h.m²) at 50Pa. This represents a 50.00 % improvement beyond the minimum recommendations of Approved Document L.

5.3 Proposed Shell Building

5.3.1 Services Standards

The TAS model for the shell units have been developed based on the following M&E fit out:

Domestic Hot Water: 100% supplied via electric instantaneous water

Electric Power Factor Correction: <0.90

No light metering with warning about out-of-range values.

Heat monitoring with warning about out-of-range values.

The input information for each zone type is summarised below.

Area/Demise	Heating	Cooling	Ventilation	Lighting
Warehouse Space	Air Source Heat Pump, wet underfloor system. Seasonal efficiency 344%	None	None	60 lm/W (manual controls)
WCs	Air Source Heat Pump, wet underfloor system. Seasonal efficiency 344%	None	Mechanical exhaust: 0.50W/(l/s) 15 l/s	60 lm/W (auto-on-auto-off)
Tea Point	Air Source Heat Pump, wet underfloor system.	None	Mechanical exhaust: 0.50W/(l/s) 15 l/s	60 lm/W (auto-on-auto-off)

	Seasonal efficiency 344%			
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5.3.2 Energy Analysis

The BRUKL output report for the shell units is included within Appendix A. A summary of the figures are included in the table below:

Calculated Emission Rate	Calculated CO ₂ Emissions (kgCO ₂ /m ² /annum)
Notional Building	35.1
Target Emission Rate (TER)	35.1
Building Emission Rate (BER)	35.1
% Reduction	0.00%

In accordance with Building Regulations Part L2A as the building is a shell building, compliance is demonstrated by assuming services and efficiencies that would be installed as part of the first fit-out work. The efficiencies are entered as such to demonstrate that compliance can be achieved.

5.4 Assumed Fit-out

5.4.1 Renewable and Low Carbon Energy Technologies

Following the incorporation of energy reduction and energy efficiency measures, the feasibility of a number of potentially appropriate renewable and low carbon energy technologies shall be investigated for the proposed development during detailed design.

Technology	Suitable?	Observations
Air source heat pumps	✓	Suitable to generate space heating and cooling for the development and contribute towards the DHW demand.
Ground source heat pumps	X	Possible, but unlikely to be financially viable when compared to the ASHP option.
Combined Heat and Power	X	Not appropriate for a building without a constant base load.
Biomass	X	Possible, but unlikely to be financially viable when compared to the ASHP option.
Solar water heating	X	Available roof space, however carbon savings would be low compared to other technologies to contribute towards the DHW.
Photovoltaics	✓	Available roof space, will be investigated during detailed design.
Wind turbines	X	Poor yield within urbanised area and likely planning issues.

Air source heat pumps may also contribute towards the space heating and cooling demand. This will be investigated further during detailed design.

Potential carbon emission savings from biomass and ground source heat pumps are significant however it is not expected these will be financially viable when compared to other technologies.

It is acknowledged that there is potential energy saving from solar water heating and this could be integrated, however other technologies are expected to have a greater impact on the carbon reduction.

The inclusion of solar photovoltaics would be possible, this will be investigated further during detailed design as will be dependent on planning, overshadowing issues and proximity to other buildings nearby.

A wind turbine would be able to provide zero carbon energy; however, the yield would be compromised by the urbanised surroundings creating greater wind turbulence.

Following the integration of renewable and low carbon energy, finally conventional energy solutions will be considered for any remaining generation.

5.4.2 Services Standards

The TAS model for the proposed units have been developed based on the following assumed M&E fit out:

Domestic Hot Water: 100% supplied via air source heat pump, 344% eff.

Electric Power Factor Correction: <0.90

No light metering with warning about out-of-range values.

Heat monitoring with warning about out-of-range values.

The input information for each zone type is summarised below.

Area/Demise	Heating	Cooling	Ventilation	Lighting
Warehouse Space	Air Source Heat Pump, wet underfloor system. Seasonal efficiency 344%			124 lm/W (manual controls)
WCs	Air Source Heat Pump, wet underfloor system. Seasonal efficiency 344%	None	Mechanical exhaust: 0.50W/(l/s) 15 l/s	124 lm/W (auto-on-auto-off)
Tea Point	Air Source Heat Pump, wet underfloor system. Seasonal efficiency 344%	Split or multi split system. Heat pump (elec). SEER 2.80	Mechanical exhaust: 0.50W/(l/s) 15 l/s	124 lm/W (auto-on-auto-off)
Offices	Split or multi split system. Heat pump (elec). Seasonal efficiency 400%	Split or multi split system. Heat pump (elec). SEER 4.50	Mechanical supply: 0.70W/(l/s) Mechanical extract: 0.70W/(l/s) Plate heat exchanger	124 lm/W (auto-on-auto-off)

			(seasonal efficiency 75%)	
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5.4.3 Energy Analysis

The BRUKL output report for units with an assumed fit-out is included within Appendix B. A summary of the figures are included in the table below:

Calculated Emission Rate	Calculated CO ₂ Emissions (kgCO ₂ /m ² /annum)
Notional Building	24.9
Target Emission Rate (TER)	24.9
Building Emission Rate (BER)	15.9
% Reduction	36.1%

With the proposed fit-out as detailed in section 5.4.2 it can be demonstrated that 27,360kgCO₂/annum will be saved for the proposed development which represents an improvement of 36.1% beyond the requirements of the Building Regulations. This is based upon a minimum reasonable lighting specification to the warehouse to be fitted out by future tenants.

The energy consumption by end use is as follows:

End Use	Energy Consumption (kWh/m ²)
Heating	5.18
Cooling	1.11
Auxiliary	3.1
Lighting	19.98
Hot water	1.18
Total	30.55

Subject to final fit-out arrangement of the units, if the preferred air source heat pumps were to be installed to provide hot water throughout and underfloor heating to the warehouse areas, and VRF air source heat pumps were used to provide heating and cooling to any offices, it is predicted that this will contribute to 24.45% of the buildings overall energy consumption.

Also, if Photovoltaic panels were to be installed on the roof of each unit as well as the above, the electricity generated could contribute 89,437kWh per annum which represents 96.30% of the development's total energy consumption of 92,872kWh, the inclusion of PV is shown within the BRUKL document included within Appendix C.

6. BREEAM

6.1 General

If the proposed building were to be assessed, it would be as a 'Shell' Industrial 2018 New Construction assessment.

A BREEAM pre-assessment has been produced following a discussion with the design team and desktop assessment of the proposed building. It was concluded that due to the nature of the proposed building, shell only fit-out, and site location, the required target of Excellent is deemed unachievable for the proposed development due to the constraints. A copy of the latest pre-assessment is included in Appendix D.

7. SUMMARY

The energy statement has been prepared to address planning policy CC4 'Sustainable Design' of the 'Harrogate District Local Plan 2014 -2035'.

Prioritising a reduction in overall energy demand is the most effective way in which to minimise environmental impacts associated with energy use. The use of energy efficient technologies, in addition to renewables to supply the remaining load results in lower greenhouse gas emissions as compared with the use of conventional alternatives.

The proposed development shall seek to follow the energy hierarchy to reduce carbon emissions through firstly the incorporation of energy reduction and energy efficiency measures, before investigating the feasibility of a number of potentially appropriate renewable and low carbon energy technologies, before finally conventional energy solutions will be considered for any remaining generation.

In accordance with Building Regulations Part L2A as the building is a shell building, compliance is demonstrated by assuming services and efficiencies that would be installed as part of the first fit-out work.

Based on an assumed fit out it is predicted that 27,360kgCO₂/annum will be saved for the proposed development which represents an improvement of 36.1% beyond the requirements of the Building Regulations.

A low carbon energy contribution is proposed from air source heat pumps to provide the hot water and underfloor heating to the warehouse, and VRF air source heat pumps to provide heating and cooling contributing 22,709kWh per annum which represents 24.45% of the sites total energy consumption of 92,872kWh.

PV generating electricity contributing 89,437kWh per annum which represents 96.30% of the sites total energy consumption of 92,872kWh.

A BREEAM pre-assessment has been produced following a discussions with the design team and desktop assessment of the proposed building. It was concluded that due to the nature of the proposed building, shell only fit-out and site location the target of Excellent is deemed unachievable for the proposed development.

Appendix A Shell BRUKL Document

Project name

Thirkhill Park - Pannal

As designed

Date: Tue Jun 22 13:13:38 2021

Administrative information

Building Details

Address: Thirkhill Drive, Harrogate, HG3 1FE

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.1"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.1

BRUKL compliance check version: v5.6.b.0

Certifier details

Name:

Telephone number: 01937 585 082

Address: Unit 1 Waterside, Wetherby, LS22 5NB

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	35.1
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	35.1
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	35.1
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.25	0.25	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.12	0.12	Roof
Windows***, roof windows, and rooflights	2.2	1.7	1.7	Rear Elevation Long
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	2.2	2.2	Roller Shutter GF
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.				
*** Display windows and similar glazing are excluded from the U-value check.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

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

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Warehouses

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.44	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- WCs (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.44	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Tea Point (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.44	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- Elec DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	0
Standard value	1	N/A

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Warehouse 1 Tea Point		-	-	0.5	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency		
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
Warehouse 1 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 2 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 2 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 3 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 3 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 4 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 4 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 5 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 5 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 6 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 6 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 7 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 7 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 8 Tea Point	-	-	0.5	-	-	-	-	-	-	-	-	N/A
Warehouse 8 WC	-	-	0.5	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
Warehouse 1	60	60	-	-	2241
Warehouse 2	60	60	-	-	2006
Warehouse 3	60	60	-	-	1850
Warehouse 4	60	60	-	-	1676
Warehouse 5	60	60	-	-	1563
Warehouse 6	60	60	-	-	1450
Warehouse 7	60	60	-	-	1411
Warehouse 8	60	60	-	-	1257
Warehouse 1 Tea Point	60	60	-	-	56
Warehouse 1 WC	-	-	60	-	42
Warehouse 2 Tea Point	60	60	-	-	57
Warehouse 2 WC	-	-	60	-	42
Warehouse 3 Tea Point	60	60	-	-	58
Warehouse 3 WC	-	-	60	-	39
Warehouse 4 Tea Point	60	60	-	-	57
Warehouse 4 WC	-	-	60	-	43
Warehouse 5 Tea Point	60	60	-	-	56
Warehouse 5 WC	-	-	60	-	41
Warehouse 6 Tea Point	60	60	-	-	55
Warehouse 6 WC	-	-	60	-	42
Warehouse 7 Tea Point	60	60	-	-	55
Warehouse 7 WC	-	-	60	-	42
Warehouse 8 Tea Point	60	60	-	-	58
Warehouse 8 WC	-	-	60	-	44

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Reception 1		-	60	22	83
Reception 2		-	60	22	86
Reception 3		-	60	22	85
Reception 4		-	60	22	85
Reception 5		-	60	22	86
Reception 6		-	60	22	86
Reception 7		-	60	22	85
Reception 8		-	60	22	86

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Warehouse 1	NO (-67%)	NO
Warehouse 2	NO (-64%)	NO
Warehouse 3	NO (-60%)	NO
Warehouse 4	NO (-56%)	NO
Warehouse 5	NO (-52%)	NO
Warehouse 6	NO (-49%)	NO
Warehouse 7	NO (-47%)	NO
Warehouse 8	NO (-40%)	NO
Warehouse 1 Tea Point	NO (-87%)	NO
Warehouse 2 Tea Point	NO (-88%)	NO
Warehouse 3 Tea Point	NO (-83%)	NO
Warehouse 4 Tea Point	NO (-83%)	NO
Warehouse 5 Tea Point	NO (-72%)	NO
Warehouse 6 Tea Point	NO (-77%)	NO
Warehouse 7 Tea Point	NO (-62%)	NO
Warehouse 8 Tea Point	NO (-70%)	NO
Reception 1	NO (-2%)	NO
Reception 2	NO (-17%)	NO
Reception 3	NO (-9%)	NO
Reception 4	NO (-16%)	NO
Reception 5	NO (-10%)	NO
Reception 6	NO (-16%)	NO
Reception 7	NO (-9%)	NO
Reception 8	NO (-13%)	NO

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

Separate submission

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

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	1644	1644
External area [m ²]	5433	5433
Weather	LEE	LEE
Infiltration [m ³ /hm ² @ 50Pa]	5	7
Average conductance [W/K]	1819	1991
Average U-value [W/m ² K]	0.33	0.37
Alpha value* [%]	6.13	6.13

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

Building Use

% Area Building Type

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	9.09	42.46
Cooling	0	0
Auxiliary	2.62	0.25
Lighting	51.92	23.76
Hot water	3.94	4.56
Equipment*	29.37	29.37
TOTAL**	67.57	71.03

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	118.55	391.03
Primary energy* [kWh/m ²]	207.45	203.99
Total emissions [kg/m ²]	35.1	35.1

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

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	7.4	0	0.6	0	2	3.44	0	3.44	0
Notional	9.1	0	1	0	0.1	2.43	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	96.7	0	7.8	0	9.8	3.44	0	3.44	0
Notional	192.1	0	22	0	8.1	2.43	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	8277.3	0	668.4	0	9.3	3.44	0	3.44	0
Notional	28551.1	0	3263.7	0	7.7	2.43	0	----	----

Key to terms

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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.25	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.12	Roof
Windows, roof windows, and rooflights	1.5	1.7	Front Elevation GF
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	2.2	Roller Shutter GF
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5

Appendix B Proposed Fit-out BRUKL Document

Project name

Thirkhill Park - Pannal

As designed

Date: Tue Jun 22 12:10:25 2021

Administrative information

Building Details

Address: Thirkhill Drive, Harrogate, HG3 1FE

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.1"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.1

BRUKL compliance check version: v5.6.b.0

Certifier details

Name:

Telephone number: 01937 585 082

Address: Unit 1 Waterside, Wetherby, LS22 5NB

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	24.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	24.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	15.9
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.25	0.25	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.12	0.12	Roof
Windows***, roof windows, and rooflights	2.2	1.7	1.7	Rear Elevation Long
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	2.2	2.2	Roller Shutter GF
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.				
*** Display windows and similar glazing are excluded from the U-value check.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

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

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Warehouses

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- WCs (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Tea Point (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

4- Offices (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	4.5	-	-	0.75
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- VRF HTG DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.4	0
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]									HR efficiency	
	A	B	C	D	E	F	G	H	I		
ID of system type	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
Warehouse 1 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 1 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 2 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 2 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 3 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 3 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 4 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 4 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 5 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 5 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 6 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 6 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 7 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 7 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 8 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 8 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
FF Office 1	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 2	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 3	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 4	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 5	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 6	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 7	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 8	-	-	-	1.4	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
Standard value	60	60	22		
Warehouse 1	124	-	-		1450
Warehouse 2	124	-	-		1282
Warehouse 3	124	-	-		1164
Warehouse 4	124	-	-		1045
Warehouse 5	124	-	-		953
Warehouse 6	124	-	-		857
Warehouse 7	124	-	-		845
Warehouse 8	124	-	-		728
Warehouse 1 Tea Point	124	-	-		22
Warehouse 1 WC	-	124	-		19
Warehouse 2 Tea Point	124	-	-		22
Warehouse 2 WC	-	124	-		19
Warehouse 3 Tea Point	124	-	-		22
Warehouse 3 WC	-	124	-		19
Warehouse 4 Tea Point	124	-	-		21

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
Warehouse 4 WC		-	124	-	18
Warehouse 5 Tea Point		124	-	-	21
Warehouse 5 WC		-	124	-	19
Warehouse 6 Tea Point		124	-	-	21
Warehouse 6 WC		-	124	-	19
Warehouse 7 Tea Point		124	-	-	22
Warehouse 7 WC		-	124	-	19
Warehouse 8 Tea Point		124	-	-	21
Warehouse 8 WC		-	124	-	18
Reception 1		-	124	22	37
Reception 2		-	124	22	39
Reception 3		-	124	22	38
Reception 4		-	124	22	38
Reception 5		-	124	22	39
Reception 6		-	124	22	39
Reception 7		-	124	22	38
Reception 8		-	124	22	39
GF Stairs 1		-	124	-	18
GF Stairs 2		-	124	-	19
GF Stairs 3		-	124	-	19
GF Stairs 4		-	124	-	19
GF Stairs 5		-	124	-	19
GF Stairs 6		-	124	-	19
GF Stairs 7		-	124	-	19
GF Stairs 8		-	124	-	19
FF Stairs 1		-	124	-	20
FF Stairs 2		-	124	-	19
FF Stairs 3		-	124	-	21
FF Stairs 4		-	124	-	20
FF Stairs 5		-	124	-	21
FF Stairs 6		-	124	-	20
FF Stairs 7		-	124	-	21
FF Stairs 8		-	124	-	20
FF Office 1		124	-	-	496
FF Office 2		124	-	-	436
FF Office 3		124	-	-	410
FF Office 4		124	-	-	361
FF Office 5		124	-	-	350
FF Office 6		124	-	-	317
FF Office 7		124	-	-	291
FF Office 8		124	-	-	265

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Warehouse 1	NO (-90%)	NO
Warehouse 2	NO (-88%)	NO
Warehouse 3	NO (-87%)	NO
Warehouse 4	NO (-85%)	NO
Warehouse 5	NO (-84%)	NO
Warehouse 6	NO (-82%)	NO
Warehouse 7	NO (-82%)	NO
Warehouse 8	NO (-79%)	NO
Warehouse 1 Tea Point	NO (-90%)	NO
Warehouse 2 Tea Point	NO (-88%)	NO
Warehouse 3 Tea Point	NO (-87%)	NO
Warehouse 4 Tea Point	NO (-84%)	NO
Warehouse 5 Tea Point	NO (-83%)	NO
Warehouse 6 Tea Point	NO (-82%)	NO
Warehouse 7 Tea Point	NO (-82%)	NO
Warehouse 8 Tea Point	NO (-78%)	NO
Reception 1	NO (-2%)	NO
Reception 2	NO (-17%)	NO
Reception 3	NO (-9%)	NO
Reception 4	NO (-16%)	NO
Reception 5	NO (-10%)	NO
Reception 6	NO (-16%)	NO
Reception 7	NO (-9%)	NO
Reception 8	NO (-13%)	NO
FF Office 1	NO (-70%)	NO
FF Office 2	NO (-70%)	NO
FF Office 3	NO (-66%)	NO
FF Office 4	NO (-65%)	NO
FF Office 5	NO (-61%)	NO
FF Office 6	NO (-61%)	NO
FF Office 7	NO (-57%)	NO
FF Office 8	NO (-57%)	NO

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

Separate submission

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

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	3040	3040
External area [m ²]	5310	5310
Weather	LEE	LEE
Infiltration [m ³ /hm ² @ 50Pa]	5	7
Average conductance [W/K]	1791	2092
Average U-value [W/m ² K]	0.34	0.39
Alpha value* [%]	7.87	7.87

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

Building Use

% Area Building Type

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5.18	18.81
Cooling	1.11	1.9
Auxiliary	3.1	0.86
Lighting	19.98	26.1
Hot water	1.18	1.53
Equipment*	32.11	32.11
TOTAL**	30.55	49.21

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.69	199.15
Primary energy* [kWh/m ²]	93.79	147.29
Total emissions [kg/m ²]	15.9	24.9

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

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	11.1	0	0.9	0	1.6	3.4	0	3.4	0
Notional	14.1	0	1.6	0	0.1	2.43	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	73.6	0	6	0	9.9	3.4	0	3.4	0
Notional	75.8	0	8.7	0	8.2	2.43	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	7717.3	0	630.5	0	9.9	3.4	0	3.4	0
Notional	22664.4	0	2590.8	0	8.2	2.43	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	33.7	100.8	2.3	6.2	5.8	4	4.5	4	4.5
Notional	46.6	137.7	5.3	10.6	3.9	2.43	3.6	----	----

Key to terms

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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.25	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.12	Roof
Windows, roof windows, and rooflights	1.5	1.7	Front Elevation GF
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	2.2	Roller Shutter GF
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5

Appendix C Proposed Fit-out Including PV BRUKL Document

Project name

Thirkhill Park - Pannal

As designed

Date: Tue Jun 22 10:57:17 2021

Administrative information

Building Details

Address: Thirkhill Drive, Harrogate, HG3 1FE

Certification tool

Calculation engine: TAS

Calculation engine version: "v9.5.1"

Interface to calculation engine: TAS

Interface to calculation engine version: v9.5.1

BRUKL compliance check version: v5.6.b.0

Certifier details

Name:

Telephone number: 01937 585 082

Address: Unit 1 Waterside, Wetherby, LS22 5NB

Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	24.9
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	24.9
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	0.6
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.25	0.25	External Wall
Floor	0.25	0.25	0.25	Ground Floor
Roof	0.25	0.12	0.12	Roof
Windows***, roof windows, and rooflights	2.2	1.7	1.7	Rear Elevation Long
Personnel doors	2.2	-	-	No personal doors in project
Vehicle access & similar large doors	1.5	2.2	2.2	Roller Shutter GF
High usage entrance doors	3.5	-	-	No high usage entrance doors in project
U _a -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs.				
** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.				
*** Display windows and similar glazing are excluded from the U-value check.				
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

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

Building services

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

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	NO
Whole building electric power factor achieved by power factor correction	<0.9

1- Warehouses

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- WCs (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

3- Tea Point (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.4	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

4- Offices (8 Zones)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	4.5	-	-	0.75
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- VRF HTG DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	3.4	0
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]									HR efficiency	
	ID of system type										
Standard value	A	B	C	D	E	F	G	H	I	Zone	Standard
Warehouse 1 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 1 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 2 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 2 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 3 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 3 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 4 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 4 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 5 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 5 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 6 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 6 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 7 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 7 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 8 Tea Point	-	-	0.5	-	-	-	-	-	-	-	N/A
Warehouse 8 WC	-	-	0.5	-	-	-	-	-	-	-	N/A
FF Office 1	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 2	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 3	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 4	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 5	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 6	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 7	-	-	-	1.4	-	-	-	-	-	-	N/A
FF Office 8	-	-	-	1.4	-	-	-	-	-	-	N/A

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
Warehouse 1		124	-	-	1450
Warehouse 2		124	-	-	1282
Warehouse 3		124	-	-	1164
Warehouse 4		124	-	-	1045
Warehouse 5		124	-	-	953
Warehouse 6		124	-	-	857
Warehouse 7		124	-	-	845
Warehouse 8		124	-	-	728
Warehouse 1 Tea Point		124	-	-	22
Warehouse 1 WC		-	124	-	19
Warehouse 2 Tea Point		124	-	-	22
Warehouse 2 WC		-	124	-	19
Warehouse 3 Tea Point		124	-	-	22
Warehouse 3 WC		-	124	-	19
Warehouse 4 Tea Point		124	-	-	21

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name	Standard value	Luminaire	Lamp	Display lamp	
		60	60	22	
Warehouse 4 WC		-	124	-	18
Warehouse 5 Tea Point		124	-	-	21
Warehouse 5 WC		-	124	-	19
Warehouse 6 Tea Point		124	-	-	21
Warehouse 6 WC		-	124	-	19
Warehouse 7 Tea Point		124	-	-	22
Warehouse 7 WC		-	124	-	19
Warehouse 8 Tea Point		124	-	-	21
Warehouse 8 WC		-	124	-	18
Reception 1		-	124	22	37
Reception 2		-	124	22	39
Reception 3		-	124	22	38
Reception 4		-	124	22	38
Reception 5		-	124	22	39
Reception 6		-	124	22	39
Reception 7		-	124	22	38
Reception 8		-	124	22	39
GF Stairs 1		-	124	-	18
GF Stairs 2		-	124	-	19
GF Stairs 3		-	124	-	19
GF Stairs 4		-	124	-	19
GF Stairs 5		-	124	-	19
GF Stairs 6		-	124	-	19
GF Stairs 7		-	124	-	19
GF Stairs 8		-	124	-	19
FF Stairs 1		-	124	-	20
FF Stairs 2		-	124	-	19
FF Stairs 3		-	124	-	21
FF Stairs 4		-	124	-	20
FF Stairs 5		-	124	-	21
FF Stairs 6		-	124	-	20
FF Stairs 7		-	124	-	21
FF Stairs 8		-	124	-	20
FF Office 1		124	-	-	496
FF Office 2		124	-	-	436
FF Office 3		124	-	-	410
FF Office 4		124	-	-	361
FF Office 5		124	-	-	350
FF Office 6		124	-	-	317
FF Office 7		124	-	-	291
FF Office 8		124	-	-	265

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

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
Warehouse 1	NO (-90%)	NO
Warehouse 2	NO (-88%)	NO
Warehouse 3	NO (-87%)	NO
Warehouse 4	NO (-85%)	NO
Warehouse 5	NO (-84%)	NO
Warehouse 6	NO (-82%)	NO
Warehouse 7	NO (-82%)	NO
Warehouse 8	NO (-79%)	NO
Warehouse 1 Tea Point	NO (-90%)	NO
Warehouse 2 Tea Point	NO (-88%)	NO
Warehouse 3 Tea Point	NO (-87%)	NO
Warehouse 4 Tea Point	NO (-84%)	NO
Warehouse 5 Tea Point	NO (-83%)	NO
Warehouse 6 Tea Point	NO (-82%)	NO
Warehouse 7 Tea Point	NO (-82%)	NO
Warehouse 8 Tea Point	NO (-78%)	NO
Reception 1	NO (-2%)	NO
Reception 2	NO (-17%)	NO
Reception 3	NO (-9%)	NO
Reception 4	NO (-16%)	NO
Reception 5	NO (-10%)	NO
Reception 6	NO (-16%)	NO
Reception 7	NO (-9%)	NO
Reception 8	NO (-13%)	NO
FF Office 1	NO (-70%)	NO
FF Office 2	NO (-70%)	NO
FF Office 3	NO (-66%)	NO
FF Office 4	NO (-65%)	NO
FF Office 5	NO (-61%)	NO
FF Office 6	NO (-61%)	NO
FF Office 7	NO (-57%)	NO
FF Office 8	NO (-57%)	NO

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

Separate submission

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

Separate submission

EPBD (Recast): Consideration of alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	3040	3040
External area [m ²]	5310	5310
Weather	LEE	LEE
Infiltration [m ³ /hm ² @ 50Pa]	5	7
Average conductance [W/K]	1791	2092
Average U-value [W/m ² K]	0.34	0.39
Alpha value* [%]	7.87	7.87

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

Building Use

% Area Building Type

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	5.18	18.81
Cooling	1.11	1.9
Auxiliary	3.1	0.86
Lighting	19.98	26.1
Hot water	1.18	1.53
Equipment*	32.11	32.11
TOTAL**	30.55	49.21

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	29.42	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.69	199.15
Primary energy* [kWh/m ²]	93.79	147.29
Total emissions [kg/m ²]	0.6	24.9

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

HVAC Systems Performance

System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	11.1	0	0.9	0	1.6	3.4	0	3.4	0
Notional	14.1	0	1.6	0	0.1	2.43	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	73.6	0	6	0	9.9	3.4	0	3.4	0
Notional	75.8	0	8.7	0	8.2	2.43	0	----	----
[ST] Central heating using water: floor heating, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity									
Actual	7717.3	0	630.5	0	9.9	3.4	0	3.4	0
Notional	22664.4	0	2590.8	0	8.2	2.43	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Electricity, [CFT] Electricity									
Actual	33.7	100.8	2.3	6.2	5.8	4	4.5	4	4.5
Notional	46.6	137.7	5.3	10.6	3.9	2.43	3.6	----	----

Key to terms

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

Key Features

The Building Control Body is advised to give particular attention to items whose specifications are better than typically expected.

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.25	External Wall
Floor	0.2	0.25	Ground Floor
Roof	0.15	0.12	Roof
Windows, roof windows, and rooflights	1.5	1.7	Front Elevation GF
Personnel doors	1.5	-	No personal doors in project
Vehicle access & similar large doors	1.5	2.2	Roller Shutter GF
High usage entrance doors	1.5	-	No high usage entrance doors in project
U _{i-Typ} = Typical individual element U-values [W/(m ² K)]		U _{i-Min} = Minimum individual element U-values [W/(m ² K)]	
* There might be more than one surface where the minimum U-value occurs.			

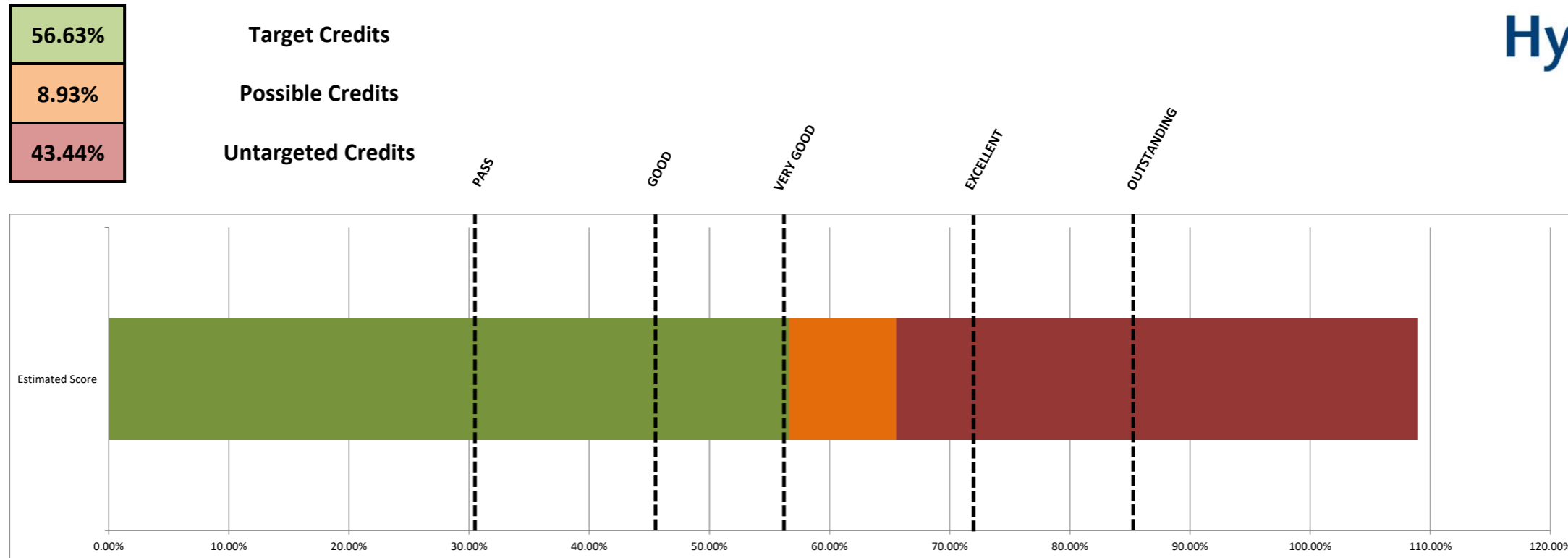
Air Permeability	Typical value	This building
m ³ /(h.m ²) at 50 Pa	5	5

Appendix D BREEAM Pre-assessment

Industrial Units, Thirkill Park - BREEAM New Construction 2018 (Industrial)



Manual version:
2018:3.0



Rev	Date	Notes
Rev 01	19/05/2021	Initial desktop pre-assessment to show route to Very Good prior to meeting 19/05/2021. Target = 64.26%, Possibles = 12.65%.
Rev 02	21/05/2021	Updated pre-assessment following meeting 19/05/2021, now amended to Shell Only rather than Shell & Core. Targeted = 58.29%, Possibles = 17.13%
Rev 03	21/06/2021	Updated following meeting 15/06/2021. Targeted = 56.63%, Possibles = 8.93%

BREEAM 2018 New Construction - Industrial (Shell Only)									
Credit	Available Credits	Target Credits	Possible Credits	Untargeted Credits	Credit Information	Comments	Time Dependent	Responsibility	
Management									
Man 01	Project Brief and Design	1	1	0	0	Project Delivery Planning • 1 credit where by RIBA Stage 2 the design team have identified their roles and responsibilities through the construction process.	Requirements issued to Dave Price 21/05/2021. Initial details received 27/05/2021, comments sent back 02/06/2021 asking for more information to address point 2. Additional information to address point 2 received 15/06/2021.	RIBA STAGE 2	PROJECT MANAGER
		1	0	0	1	Stakeholder Consultation (Interested Parties) • 1 credit where a plan is in place to consult and provide feedback on the design to the relevant stakeholders and bodies.		RIBA STAGE 2	-
		1	1	0	0	BREEAM AP (Concept Design) • 1 credit for appointment of BREEAM AP by RIBA Stage 1 to produce a BREEAM pre-assessment and help confirm the BREEAM target for the scheme.	Discussed at meeting 19/05/2021, will be targeted.	RIBA STAGE 1/2	-
		1	1	0	0	BREEAM AP (Developed Design) • 1 credit for appointment of a BREEAM AP to monitor and report progress against BREEAM targets by attending key Design Team meetings and producing a design stage report.	Discussed at meeting 19/05/2021, will be targeted.		-
Man 02	Life Cycle Cost & Service Life Planning	2	0	0	2	Elemental Life Cycle Cost (LCC) • 2 credits for undertaking a LCC analysis by RIBA Stage 2.		RIBA STAGE 2	-
		1	0	0	1	Component Level LCC Plan • 1 credit where a component level LCC plan has been produced by the end of RIBA Stage 4.		RIBA STAGE 4	QS/ SPECIALIST CONSULTANT

		1	1	0	0	Capitol Cost Reporting • 1 credit where the capital cost of the building in £/m2 is reported via the BREEAM monitoring tool.	Example letter sent to Dave Price 21/05/2021.		QS
Man 03	Responsible Construction Practices	-	-	-	-	Legally Harvested and Traded Timber • A mandatory pre-requisite for the all the timber and timber-based products used are legally harvested and traded timber.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
		1	1	0	0	Environmental Management • 1 credit for the main contractor operating a EMS (ISO14001) covering their main operations and follows best practice pollution guidelines.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
		1	0	0	1	BREEAM AP (Site) • The BREEAM AP is appointed to monitor and report ongoing compliance of the project against relevant sustainability performance criteria during the construction, handover and close out stages.			MAIN CONTRACTOR
		2	2	0	0	Responsible Construction Management • 1 credit for achieving the minimum responsible construction management items outlined in the BREEAM Manual. • 2 credits for achieving the minimum responsible construction management items along with six additional items outlined in the BREEAM Manual.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
		1	1	0	0	Utility Consumption • 1 credit for the monitoring, recording and reporting of on-site energy/carbon and water used during construction.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
		1	1	0	0	Transport of Construction Material • 1 credit for the monitoring, recording and reporting of transport carbon emissions for the materials and waste.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
Man 04	Commissioning and Handover	1	1	0	0	Testing & Inspecting Building Fabric • 1 credit for air tightness testing and a thermographic study post-construction to confirm continuity of insulation, avoidance of excessive thermal bridging, air leakage paths and any remediation required.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
Category score		15	10	0	5				
Category Weighting		12.00%							
% Score		12.00%	8.00%	0.00%	4.00%				

Health & Wellbeing									
Hea 01	Visual Comfort	1	0	0	1	Daylighting • 1 credit where 80% of the other occupied spaces have a daylight factor of at least 2%. In addition uniformity, view of sky and room depth criteria must be satisfied.			-
		1	0	0	1	View Out • 1 credit where 95% of the relevant building areas are within 8m of a suitably sized window that provides an adequate view out.			-
		1	1	0	0	External Lighting • 1 credit for specification of external lighting levels in line with British Standard guidance.	To be included in M&E specification.		EXTERNAL LIGHTING CONSULTANT
Hea 05	Acoustic Performance	1	0	1	0	Internal Indoor Ambient Noise Level; - One credit: Indoor ambient noise levels comply with the design ranges in Section 7 of BS 8233:2017.	Requirements sent to BWB to comment and provide fee to undertake. Discussed at meeting 15/06/2021 and moved to possible.		ACOUSTICIAN
Hea 06	Safety & Security	1	1	0	0	Security of the Site and Building • 1 credit for consultation with a 'Suitably Qualified Security Consultant' at Stage 2 on the design, confirming compliance with 'Secured by Design' principles and incorporating any recommendations. A Security Based Needs assessment must be produced.	Requirements sent to Dave Price and SMR Architects 21/05/2021, plus details of local police and private security consultant. SNA received 03/06/2021, comments sent back 03/06/2021 asking for clarifications and confirmation of SQSS. Updated SNA received 13/06/2021 confirming compliance, however further comments sent back 18/06/2021 asking if the report writer meets the BRE's definition of Suitably Qualified.	RIBA STAGE 2	SECURITY CONSULTANT/ ARCHITECT
Hea 07	Safe & Healthy Surrounding	1	0	0	1	Safe Access • 1 credit where safe access requirements for pedestrians and cyclists have been incorporated into the external design.			-
		1	0	0	1	Outside Space • 1 credit for an outside space providing building users with an external amenity area.			-
Category score		7	2	1	4				
Category Weighting		7.00%							
% Score		7.00%	2.00%	1.00%	4.00%				

Energy									
Ene 01	Reduction of Energy Use & Carbon Emissions	9	2	0	7	Energy Performance • Up to 9 credits awarded based on the Part L analysis and the reduction in Energy Demand, Energy Consumption and Building Emission Rate.	MRB tender stage model to inform this.		M&E

Ene 03	Energy Efficient External Lighting	1	1	0	0	External Lighting • 1 credit where the building is designed to operate without the need for external lighting or alternatively, where the building does have external lighting, the average initial luminous efficacy of the external lighting fittings is no less than 70 luminaire lumens per circuit Watt and all external fittings are appropriately controlled.	To be included in M&E specification. Query at meeting 19/05/2021 as controls will not be included in the shell, but be down to tenant to install. Query sent to the BRE 21/05/2021 regarding this and Pol 04. Response from BRE 01/06/2021 confirms that you are only assessed on the items under your control, and compliance can be based upon the installed lighting (not controls) only.		EXTERNAL LIGHTING CONSULTANT
Ene 04	Low Carbon Design	1	0	0	1	Passive Design Analysis • 1 credit where passive design solutions are incorporated by RIBA Stage 2 to reduce energy consumption of building services resulting in a >5% reduction in the total energy demand.		RIBA STAGE 2	M&E
		1	0	0	1	Free Cooling • 1 credit where a free cooling strategy has been incorporated into the building design, or the building does not require any form of cooling.			-
		1	0	0	1	Low Zero Carbon Feasibility Study • 1 credit for production of a compliant LZC feasibility study by an Energy specialist.		RIBA STAGE 2	M&E
Category score		13	3	0	10				
Category Weighting		9.50%							
% Score		9.50%	2.19%	0.00%	7.31%				

Transport									
Tra 01	Transport Assessment & Travel Plan	2	2	0	0	Travel Plan • 1 credit where a travel plan based on a site and building specific transport assessment has been produced, which influences the development design.	Initial Transport Statement received from BWB 19/05/2021, comments and BREEAM criteria issued 19/05/2021 to include for planning. Initial BREEAM documents received 15/06/2021, comments sent back 21/06/2021.	RIBA STAGE 1/2	TRANSPORT CONSULTANT
Tra 02	Sustainable Transport Measures	10	4	5	1	Transport Options Implementation • Mandatory pre-requisite to achieve the Tra 01 credits. • Up to 10 credits dependant upon the number of transport options implemented in line with the BREEAM requirements.	Discussed at meeting and summary as below: 2. New bus stop as part of the wider outline planning, email sent to Jay Everitt 21/05/2021 querying this. Three Credits possible. 4. EVCP, to be targeted. One Credit targeted. 5. Car sharing spaces. One Credit possible. 6. Early stage council liaison, email sent to Jay Everitt 21/05/2021 querying this. Two Credits possible. 7. Cycle spaces, requirements sent to SMR Architects 21/05/2021. One Credit targeted. 8. Cycle Facilities, future provision for installation would allow credit to be awarded. One Credit targeted. 9. Amenities. One Credit targeted.		TRANSPORT CONSULTANT/ ARCHITECT/ DESIGN TEAM
Category score		12	6	5	1				
Category Weighting		14.50%							
% Score		14.50%	7.25%	6.04%	1.21%				

Water									
Wat 02	Water Monitoring	1	1	0	0	Water Metering • 1 credit for installation of a main water meter. All meters must have a pulsed output.	MANDATORY: (criterion 1 only) A water meter is specified on the mains water supply to each building. To be included in M&E specification.		M&E
Wat 03	Water Leak Detection and Prevention	1	0	0	1	Leak Detection System • 1 credit for installation of a programmable water leak detection unit within the building and between the building and utilities water meter.	Credit removed due to difficulty in covering all of the external pipework within the remit of the scheme.		M&E
Wat 04	Water Efficient Equipment	1	1	0	0	Unregulated Water • 1 credit where the unregulated water demands have been identified and reduced. This can be through either good practice design or specification to achieve a meaningful water demand reduction.			ARCHITECT
Category score		3	2	0	1				
Category Weighting		2.00%							
% Score		2.00%	1.33%	0.00%	0.67%				

Materials									
Mat 01	Building Life Cycle Assessment	7	5	0	2	Building Life Cycle Assessment (LCA) • Up to 6 credits where an LCA on the superstructure is carried out at both Concept Design and Technical Design. • 1 credit where an LCA on the substructure and hard landscaping is carried out at Concept Design.	For the Concept Stage 2 work, summary of additional Hydrock work sent to Dave Price 21/05/2021. Stage 2 work received and uploaded to the BRE 04/06/2021.	RIBA STAGE 2 & RIBA STAGE 4	LCA CONSULTANT
Mat 02	Environmental Product Declarations	1	1	0	0	Specification of Products With a Recognised Environmental Product Declaration • Construction products with an EPD achieve a combined point score of at least 20 calculated in line with BREEAM requirements.	Requirement to be included in Employers Requirements for tender.		ARCHITECT

Mat 03	Responsible	1	1	0	0	Enabling Sustainable Procurement <ul style="list-style-type: none"> 1 credit for producing a documented sustainable procurement plan. 	MANDATORY: (criterion 1 only) All timber and timber based products used on the project are 'Legally harvested and traded timber'. Requirement issued to Dave Price 21/05/2021. SPP received for the scheme 15/06/2021.	RIBA STAGE 2	CLIENT/ DESIGN TEAM
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Mat 03	Sourcing	3	1	0	2	Measuring Responsible Sourcing • Up to 3 credits for selection of materials whose manufacture and production processes have been certified through an EMS (Environmental Management System) process.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
Mat 05	Designing for Durability and Resilience	1	1	0	0	Internal and External Protection Measures • 1 credit for specifying suitable protection measures to areas vulnerable to high pedestrian traffic, internal vehicular/trolley movement and external vehicle collision. Also building elements are designed to limit degradation due to environmental factors.	Discussed at meeting 19/05/2021, ok to target.		ARCHITECT
Mat 06	Material Efficiency	1	0	0	1	Optimise Material Efficiency • 1 credit where opportunities have been identified, investigated and implemented to optimise the materials through procurement, construction, maintenance and end-of-life.		RIBA STAGE 1	-
Category score		14	9	0	5				
Category Weighting		22.00%							
% Score		22.00%	14.14%	0.00%	7.86%				

Waste									
Wst 01	Construction Waste Management	-	-	-	-	Pre-Demolition Audit • 1 credit where a pre-demolition audit of any existing elements is carried out at concept design in line with BREEAM requirements.	BRE KBCN1122 confirms credit is N/A as where, under the developer's ownership, no demolition will be undertaken to enable the assessed development, the pre-demolition audit credit is filtered-out of the assessment.	RIBA STAGE 2	CLIENT
		3	2	0	1	Construction Resource Efficiency • 1 credit for the reduction of non-hazardous waste to be $\leq 13.3m^3$ or ≤ 11.1 tonnes per 100m ² gross internal floor area. • 2 credits for the reduction of non-hazardous waste to be $\leq 7.5m^3$ or ≤ 6.5 tonnes per 100m ² gross internal floor area. • 3 credits for the reduction of non-hazardous waste to be $\leq 3.4m^3$ or ≤ 3.2 tonnes per 100m ² gross internal floor area.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
		1	1	0	0	Diversion of Resources from Landfill • 1 credit where 70% (volume) or 80% (mass) of non-hazardous non-demolition construction waste & 80% (volume) or 90% (mass) of non-hazardous demolition waste are diverted from landfill.	Requirement to be included in Employers Requirements for tender.		MAIN CONTRACTOR
Wst 02	Recycled & Sustainably Sourced Aggregates	1	0	0	1	Project Sustainable Aggregate Points • 1 credit where details of the appropriate aggregates identified are used to calculate project sustainable aggregate points between 3.5 - 6 in line with the BREEAM requirements.			-
Wst 03	Operational Waste	1	1	0	0	Recyclable Waste Storage/ Compactor/ Composting • 1 credit where adequate storage space is provided for the expected general and recyclable waste streams operated on-site.	Discussed at meeting 19/05/2021, query sent to BRE if central waste storage area is acceptable and if any caveats for use.		ARCHITECT
Wst 05	Adaptation to Climate Change	1	0	1	0	Structural and Fabric Resilience • 1 credit where, by RIBA Stage 2, a climate change adaptation strategy appraisal for structural and fabric resilience	Requirements issued to SMR Architects 21/05/2021, plus example evidence.	RIBA STAGE 2	ARCHITECT/ STRUCTURAL
Wst 06	Design for Disassembly & Adaptability	2	0	0	1	Design for Disassembly & Adaptability - Recommendations • 1 credit where a building specific functional adaptation strategy is undertaken by RIBA Stage 2 which includes recommendations to facilitate future adaptation.	Requirements issued to SMR Architects 21/05/2021, plus example evidence.	RIBA STAGE 2	ARCHITECT
			0	0	1	Design for Disassembly & Adaptability - Implementation • 1 credit where updates during Technical Design on the recommendations provided have been implemented. A guide is produced outlining the functional adaptability and disassembly to future tenants.		RIBA STAGE 4	ARCHITECT
Category score		9	4	1	4				
Category Weighting		8.00%							
% Score		8.00%	3.56%	0.89%	3.56%				

Land Use & Ecology									
LE 01	Site Selection	1	1	0	0	Previously Occupied Land • 1 credit awarded where 75% of the developments footprint is on an area of previously developed land for industrial, commercial or domestic purposes in the last 50 years.			ARCHITECT
		1	0	0	1	Contaminated Land • 1 credit where the site is deemed contaminated and appropriate remediation has been undertaken.	BWB site investigation study to inform this. Discussed at meeting 15/06/2021 and moved to untargeted from possible.		-
LE 02	Ecological Risks and Opportunities	1	1	0	0	Survey & Evaluation • 1 credit where an appropriate individual is appointed, survey and evaluation is carried out to determine the ecological baseline of the site, this data is shared with the project team to influence site preparation, design and construction.	Ecology requirements issued to BWB to provide fee to undertake.	RIBA STAGE 1/2	ECOLOGIST/ MAIN CONTRACTOR

	Opportunities	1	1	0	0	Determining Ecological Outcomes • 1 credit where representative stakeholders have been consulted to identify and consider the ecological outcome for the site which is then adopted.	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
LE 03	Managing Impacts on Ecology	-	-	-	-	Ecological Risks & Opportunities for the Site • Mandatory pre-requisite LE 02 credit requirements achieved. • Mandatory pre-requisite that the client/contractor confirms compliance is monitored against all relevant UK/EU/International legislation regarding the ecology of the site.	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
		1	1	0	0	Planning and Measures on-site • 1 credit where roles and responsibilities have been clearly identified at an early project stage to adopt the ecological outcome chosen for the site. Preparation of the site has been implemented early applying appropriate recommendations provided by the representative stakeholders.	Ecology requirements issued to BWB to provide fee to undertake.	RIBA STAGE 1/2	ECOLOGIST/ MAIN CONTRACTOR
		2	1	0	1	Managing Negative Impacts • Negative impacts from the site preparation and construction works have been managed in line with the BREEAM requirements. • 1 credit awarded where loss of ecological value has been limited. • 2 credits awarded where no overall loss of ecological value has occurred.	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
LE 04	Ecological Change and Enhancement	-	-	-	-	Managing Negative Impacts • Mandatory pre-requisite LE 03 "Managing Negative Impacts" credit requirements achieved. • Mandatory pre-requisite that the client/contractor confirms compliance is monitored against all relevant UK/EU/International legislation regarding the ecology of the site.	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
		1	1	0	0	Ecological Enhancement • 1 credit where solutions and measures identified to enhance ecological value have been implemented both on site, and if applicable, within the zone of influence.	Ecology requirements issued to BWB to provide fee to undertake.	RIBA STAGE 1/2	ECOLOGIST/ MAIN CONTRACTOR
		3	1	0	2	Change and Enhancement of Ecology • Up to 3 credits awarded based on a calculation of the change in ecological value occurring as a result of the project.	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
LE 05	Long Term Ecology Management & Maintenance	-	-	-	-	Statutory Obligations, Planning and Site Implementation • Mandatory pre-requisite LE 03 "Managing Negative Impacts" credit requirements achieved. • Mandatory pre-requisite LE 04 at least one credit for "Change and Enhancement of Ecology" is achieved. • Mandatory pre-requisite that the client/contractor confirms compliance is monitored against all relevant UK/EU/International legislation regarding the ecology of the site.	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
		1	1	0	0	Management and Maintenance Throughout the Project • 1 credit where the project team liaise with representative stakeholders to develop solutions and measures to monitor, review and develop management and maintenance solutions for the ecology of the site.	Ecology requirements issued to BWB to provide fee to undertake.	RIBA STAGE 1/2	ECOLOGIST/ MAIN CONTRACTOR
		1	1	0	0	Landscape and Ecology Management Plan • 1 credit where a landscape and ecology management plan is developed in accordance with BS 42020:2013 and is in line with the relevant BREEAM requirements	Ecology requirements issued to BWB to provide fee to undertake.		ECOLOGIST/ MAIN CONTRACTOR
Category score		13	9	0	4				
Category Weighting		19.00%							
% Score		19.00%	13.15%	0.00%	5.85%				

Pollution									
Pol 03	Flood & Surface Water Management	2	2	0	0	Flood Risk • 2 credits for location of site within a low risk flood zone. • 1 credit for location of site within a medium/high risk flood zone with appropriate flood remediation measures.	FRA and Surface Water requirements issued to BWB to include in report, and confirm if achievable.		CIVILS
		1	1	0	0	Surface Water Run-off Rate • 1 credit where the peak rate of surface water run-off is no greater for the developed than pre-developed site and it includes an allowance for climate change.	FRA and Surface Water requirements issued to BWB to include in report, and confirm if achievable.		CIVILS
		1	0	1	0	Surface Water Run-off Volume, Attenuation and Limiting Discharge • 1 credit where flooding will not occur in the event of a local drainage system failure, and the post-development run-off volume is no greater than for the existing site.	FRA and Surface Water requirements issued to BWB to include in report, and confirm if achievable.		CIVILS
		1	0	0	1	Minimising Watercourse Pollution • 1 credit where suitable watercourse pollution measures (SUDS or oil separators) are specified in line with Pollution Prevention Guidance 3 and the SUDS manual. In addition there is no discharge from site for rainfall up to 5mm.	FRA and Surface Water requirements issued to BWB to include in report, and confirm if achievable.		CIVILS
Pol 04	Reduction of Night-Time Light Pollution	1	1	0	0	Light Pollution • 1 credit for the design of the external lighting strategy to reduce light pollution from the development. All external lighting is to be able to be switched off between 2300-0700 hours.	To be included in M&E specification. Query at meeting 19/05/2021 as controls will not be included in the shell, but be down to tenant to install. Query sent to the BRE 21/05/2021 regarding this and Ene 03. Response from BRE 01/06/2021 confirms that you are only assessed on the items under your control, and compliance can be based upon the installed lighting (not controls) only.		EXTERNAL LIGHTING CONSULTANT

Category score	6	4	1	1
Category Weighting	6.00%			
% Score	6.00%	4.00%	1.00%	1.00%

Innovation									
Man 03	Responsible Construction Practices	1	0	0	1	Responsible Construction Management • 1 credit for achieving all the responsible construction management items outlined in the BREEAM Manual.			-
Hea 01	Visual Comfort	1	0	0	1	Daylighting • 1 credit where 80% of occupied spaces have a daylight factor of 3%+.			-
Hea 06	Security	1	0	0	1	Risk Based Security Rating • A compliant risk based security rating scheme has been used and the performance has been confirmed by independent assessment and verification.			-
Mat 01	Building Life Cycle	3	0	0	1	LCA and LCC • Pre-requisite of achieving Elemental LCC plan and Component Level LCC credits of Man 02. • 1 credit where the LCA and LCC are aligned and incorporated within the design decision-making process.		RIBA STAGE 2	-
			1	0	0	Third Party Verification • 1 credit where a suitably qualified third party either carries out the LCAs or produces a report verifying the LCAs produced accurately represent the designs under consideration during Concept Design and Technical Design.	Stage 2 work received and uploaded to the BRE 04/06/2021.	RIBA STAGE 2	-
Mat 03	Responsible Sourcing of Materials	1	0	0	1	Responsibly Sourced Materials • 1 credit based on the EMS certification of materials for their manufacture and supply chain processes such as production and abstraction, including building services.			-
Wst 01	Construction Waste Management	1	0	0	1	Site Waste Management Plan • 1 credit for the reduction of non-hazardous waste to be <1.6m ³ or 1.9 tonnes per 100m ² gross internal floor area. OR • 1 credit for 85% (volume) or 90% (mass) of non-hazardous construction waste is diverted from landfill.			-
Wst 02	Recycled Aggregates	1	0	0	1	Project Sustainable Aggregate Points • 1 credit where details of the appropriate aggregates identified are used to calculate project sustainable aggregate points greater than 6 in line with the BREEAM requirements.			-
LE 02	Identifying & Understanding the Risks & Opportunities for the Project	1	0	0	1	Determine the Ecological Outcomes for the Site • 1 credit where the wider site sustainability-related activities are considered along with the potential for ecosystem service related benefits, in addition to; - The 2 credits of Hea 07 has been achieved, - Criteria 5-23 of Pol 03 has been achieved, - The 1 credit of Pol 05 has been achieved.			-
Category score	10	1	0	8					
Category Weighting	10.00%								
% Score	10.00%	1.00%	0.00%	8.00%					