8. APPENDIX A - BREEAM NEW CONSTRUCTION PRE-ASSESSMENT

BREEAM UK New Construction 2014 Pre-Assessment Estimator: Assessment Issue Scoring

BREEAM® UK

Building name	212 High Holborn
Building score (%)	70.20%
Building rating	Excellent
Minimum standards level achieved	Excellent level

MANAGEMENT

Man 01 Project brief and design

No. of BREEAM credits available	4	Available contribution to overall score	2.44%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will stakeholder consultation (project delivery) take place?	Yes	1	1
Will stakeholder consultation (third party) take place?	Yes	1	1
Will a sustainability champion (design) be assigned?	No	1	0
Will a sustainability champion (monitoring progress) be assigned?	No	1	0

Total BREEAM credits achieved	2
Total contribution to overall building score	1.22%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

- Stakeholder consultation covering project delivery
- Stakeholder consultation covering relevant third parties.

Man 02 Life cycle cost and service life planning

No. of BREEAM credits available	4	Available contribution to overall score	2.44%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will an elemental life cycle cost (LCC)analyses be carried out?	No	2	0
Will a component level LCC plan be developed?	No	1	0
Will the predicted capital cost be reported?	Yes	1	1
Expected capital cost of the project (if available)	TBC	£/m^2	

Total BREEAM credits achieved	1
Total contribution to overall building score	0.61%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Predicted capital cost of the project to be provided (£/m2)

Man 03 Responsible construction practices

No. of BREEAM credits available	6	Available contribution to overall score	3.67%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Is all site timber used in the project 'legally harvested and traded timber'?	Yes		
Will/does the principal contractor operate a compliant Environmental Management System?	Yes	1	1
Will a construction stage sustainability champion be assigned?	No	1	0
Will a considerate construction scheme be used by the principal contractor? (One credit where 'compliance' has been achieved. Two credits where 'compliance' is significantly exceeded.)	2	2	2
Will construction site impacts be metered/monitored?	Yes		
Will site utility consumption be metered/monitored?	Yes	1	1
Will transport of construction materials and waste be metered/monitored?	Yes	1	1
Will exemplary level criteria be met?	No	1	0

Key Performance Indicators: Construction site energy use

Energy consumption (total) - site processes		Information not available at design stage
Energy consumption (intensity) - site processes		Information not available at design stage
Distance (total) - materials transport to site		Information not available at design stage
Distance (total) -waste transport from site		Information not available at design stage
Energy consumption (total) - materials transport to site		Information not available at design stage
Energy consumption (total) - waste transport from site		Information not available at design stage
Energy consumption (intensity) - materials transport to site		Information not available at design stage
Energy consumption (intensity) - waste transport from site		Information not available at design stage

Key Performance Indicators: Construction site greenhouse gas emissions

Process greenhouse gas emissions (total) - site processes		Information not available at design stage
Greenhouse gas emissions (intensity) - site processes		Information not available at design stage
Greenhouse gas emissions (total) - materials transport to site		Information not available at design stage
Greenhouse gas emissions (total) - waste transport from site		Information not available at design stage
Greenhouse gas emissions (intensity) - materials transport to site		Information not available at design stage
Greenhouse gas emissions (intensity) - waste transport from site		Information not available at design stage

Key Performance Indicators: Construction site use of freshwater resources

Use of freshwater resource (total) - site processes		Information not available at design stage
Use of freshwater resource (intensity) - site processes		Information not available at design stage

Total BREEAM credits achieved	5
Total contribution to overall building score	3.06%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Comments/notes:

• Pre-requisite - All timber and timber-based products used on the project is 'Legally harvested and traded timber'.
• The principal contractor demonstrates sound environmental management practices (ISO 14001) and consideration for neighbours across their activities on-site.
• Beyond compliance for Considerate Contractors Scheme
• Site related energy, water and transport impacts are monitored and reported to ensure ongoing compliance during the Construction, Handover and Close Out stages and to improve awareness and understanding for future projects.

Man 04 Commisioning and handover

No. of BREEAM credits available	4	Available contribution to overall score	2.44%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will commissioning schedule and responsibilities be developed & accounted for?	Yes	1	1
Will a commissioning manager be appointed?	Yes	1	1
Will the building fabric be commissioned?	Yes	1	1
Will a building user guide be developed prior to handover?	Yes	1	1
Will a training schedule be prepared for building occupiers/managers?			

Total BREEAM credits achieved	4
Total contribution to overall building score	2.44%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Comments/notes:

• Schedule of commissioning including optimal timescales and appropriate testing and commissioning of all building services systems and building fabric in line with best practice.
• Inspecting, testing, identifying and rectifying defects via an appropriate method.
• Provision of a non-technical Building User Guide and user/operator training timed appropriately around handover and proposed occupation.

Man 05 Aftercare

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will aftercare support be provided to building occupiers?			
Will seasonal commissioning occur over 12months once substantially occupied?			
Will a post occupancy evaluation be carried out 1 year after occupation?			
Will exemplary level criteria be met?			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

HEALTH & WELLBEING

Hea 01 Visual Comfort

No. of BREEAM credits available	3	Available contribution to overall score	3.15%
No. of BREEAM innovation credits available	1	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will the design provide adequate glare control for building users?			
How many credits will be targeted for the daylighting criteria?	0	1	0
Will the design provide adequate view out for building users?	No	1	0
Will internal/external lighting levels, zoning and controls be specified in accordance with the relevant CIBSE Guides/British Standards?	Yes	1	1
Will exemplary level criteria be met?	No	1	0

Total BREEAM credits achieved	1
Total contribution to overall building score	1.05%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

Credits awarded for the following:
- Internal and external lighting systems are designed to avoid flicker and provide appropriate illuminance (lux) levels.
- Internal lighting is zoned to allow for occupant control.

Hea 02 Indoor Air Quality

No. of BREEAM credits available	2	Available contribution to overall score	2.10%
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will an air quality plan be produced and building designed to minimise air pollution?			
Will building be designed to minimise the concentration and recirculation of pollutants in the building?	No	1	0
Will the relevant products be specified to meet the VOC testing and emission levels required?			
Will formaldehyde and total VOC levels be measured post construction?			
Will the building be designed to, or have the potential to provide, natural ventilation?	No	1	0
Will exemplary level VOCs (products)criteria be met?			

Key Performance Indicators: Indoor air quality

Concentration levels of formaldehyde		Information not available at design stage
Total volatile organic compound (TVOC) concentration		Information not available at design stage

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

Credits Not Sought at this stage

Hea 03 Safe containment in laboratories

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will an objective risk assessment of proposed laboratory facilities' design be completed?			
Will the manufacture & installation of fume cupboards and containment devices meet best practice standards?			
Will containment level 2 & 3 labs meet best practice safety & performance criteria?			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Hea 04 Thermal comfort

No. of BREEAM credits available	2	Available contribution to overall score	2.10%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will thermal modelling of the design be carried out?	Yes	1	1
Will the building design be adapted for a projected climate change scenario?	Yes	1	1

Key Performance Indicators: Thermal comfort

Predicted Mean Vote (PMV)	INA
Predicted Percentage Dissatisfied (PPD)	INA

Total BREEAM credits achieved	2
Total contribution to overall building score	2.10%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

- Thermal modelling carried out to appropriate standards.
- Projected climate change scenario(s) considered as part of the thermal model.
- The thermal modelling analysis has informed the temperature control strategy for the building and its users

Hea 05 Acoustic Performance

No. of BREEAM credits available	1	Available contribution to overall score	1.05%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Credits	Credits available	Credits achieved
Will the building meet the appropriate acoustic performance standards and testing requirements for: a. Sound insulation b. Indoor ambient noise level c. Reverberation times?	1	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.05%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

The building meets appropriate acoustic performance standards and testing requirements in terms of:
Sound insulation
Indoor ambient noise level
Reverberation times.

Hea 06 Safety and Security

No. of BREEAM credits available	2	Available contribution to overall score	2.10%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Where external site areas are present, will safe access be designed for pedestrians and cyclists?	N/A	0	0
Will a suitably qualified security consultant be appointed and security considerations accounted for?	Yes	2	2

Total BREEAM credits achieved	2
Total contribution to overall building score	2.10%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

The first credit is considered to not be applicable as there are no external site areas to accommodate pedestrian and cycle path within the site boundary. The second credit has been awarded - Secure By Design - Security needs are understood and taken into account in the design and specification.

ENERGY

Ene 01 Reduction of energy use and carbon emissions

No. of BREEAM credits available	12	Available contribution to overall score	8.57%
No. of BREEAM innovation credits available	5	Minimum standards applicable	Yes

How do you wish to assess the number of BREEAM credits achieved for this issue?	Enter building performance data into the Ene01 calculator

Ene 01 Calculator

Country of the UK where the building is located	England	Confirm building regulation and version to be used:	England Part L2A 2013

New Construction (shell and core)

Building floor area	1686	m2

Notional building heating and cooling energy demand	160.06	MJ/m2yr
Actual building heating and cooling energy demand	155.85	MJ/m2yr
Notional building primary energy consumption	136.82	kWh/m2yr
Actual building primary energy consumption	138.90	kWh/m2yr
Target emission rate (TER)	24.40	kgCO2/m2yr
Building emission rate (BER)	15.1	kgCO2/m2yr
Building emission rate improvement over TER	38.1%	
Heating & cooling demand energy performance ratio (EPR_{ED})	0.061	
Primary consumption energy performance ratio (EPR_{PC})	0.000	
CO_2 Energy performance ratio (EPR_{CO2})	0.334	
Overall building energy performance ratio (EPR_{NC})	0.395	

Where specified, please confirm the energy production from onsite or near site energy generation technologies	
Equivalent % of the building's 'regulated' energy consumption generated by carbon neutral sources and used to meet energy demand from 'unregulated' building systems or processes?	

Is the building designed to be 'carbon negative' ?	
If the building is defined as 'carbon negative' what is the total (modelled) renewable/carbon neutral energy generated and exported?	

Total BREEAM credits achieved	5
Total contribution to overall building score	3.57%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Excellent level

Comments/notes:

Nine credits awarded for this issue - Discussions with the M&E indicate that this is achievable.
• Recognise improvements in the energy performance of the building above national building regulations in relation to heating and cooling energy demand, primary energy consumption and carbon dioxide emissions

Ene 02 Energy monitoring

No. of BREEAM credits available	2	Available contribution to overall score	1.43%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment criteria	Compliant?	Credits available	Credits achieved
Will a BMS or sub-meters be specified to monitor energy use from major building services systems?	Yes	1	1
Will a BMS or sub-meters be specified to monitor energy use by tenant/building function areas?	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.43%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Comments/notes:

Credits awarded for the following:

- Energy metering systems are installed to enable energy consumption to be assigned to end uses.
- Sub-meters are provided for high energy load and tenancy areas.

Ene 03 External lighting

No. of BREEAM credits available	1	Available contribution to overall score	0.71%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
Will external light fittings and controls be specified in accordance with the BREEAM criteria?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.71%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credits awarded for the following:

• Specification of energy efficient light fittings for external areas of the development and controls to prevent use during daylight hours or when not needed.

Ene 04 Low carbon design

No. of BREEAM credits available	3	Available contribution to overall score	2.14%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment criteria	Compliant?	Credits available	Credits achieved
Will passive design measures be used in line with an analysis be carried out during concept design stage (RIBA stage 2 or equivalent)?	Yes	1	1
Will free cooling measures be implemented in the whole building in line with the passive design analysis?	Yes	1	1
Will a LZC technology be specified in line with a feasibility study carried out by the completion of the Concept Design stage (RIBA Stage 2 or equivalent)?	Yes	1	1

KPI - Low and/or zero carbon energy generation

Total on-site and/or near-site LZC energy generation	INA	kWh/yr

Total BREEAM credits achieved	3
Total contribution to overall building score	2.14%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

• A feasibility study will be carried out to establish the most appropriate on-site/near-site low or zero carbon (LZC) energy source(s) for the building and is specified.

Ene 05 Energy efficient cold storage

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Will the refrigeration system be designed, installed & commissioned in accrodance with BREEAM criteria?	No	N/A	N/A
Will the refrigeration system demonstrate a saving in indirect greenhouse gas emissions?	No	N/A	N/A

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Ene 06 Energy efficient transportation systems

No. of BREEAM credits available	3	Available contribution to overall score	2.14%
No. of BREEAM innovation credits available	0	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Will a transportation system analysis be carried out to determine and specify the optimum number, size and type of lifts that is most energy efficient?	Yes	1	1
Will the relevant energy-efficient features criteria be met?	Yes	2	2

Total BREEAM credits achieved	3
Total contribution to overall building score	2.14%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

All credits have been awarded for this issue.
Credits are awarded for the following:
• An analysis of the transport demand and usage patterns is undertaken to determine the optimum number and size of lifts, escalators and/or moving walks.
• Energy efficient installations are specified.

Ene 07 Energy efficient laboratory systems

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Pre-requisite: Criterion 1 of Hea 03 - risk assessment of laboratory facilities			
Have the occupants' laboratory requirements & performance criteria been confirmed during the preparation of the initial project brief to minimise energy demand?			
Best Practice Energy Practices in Laboratories (table 27)			
Will the laboratory meet criteria item b) Fan power?			
Will the laboratory criteria item c) Fume cupboard volume flow rates?			
Will the lab meet item d) Grouping / isolation of high filtration/ventilation activities?			
Will the laboratory meet criteria item e) Energy recovery - heat?			
Will the laboratory meet criteria item f) Energy recovery - cooling?			
Will the laboratory meet criteria item g) Grouping of cooling loads?			
Will the laboratory meet criteria item h) Free cooling?			
Will the laboratory meet criteria item i) Load responsiveness?			
Will the laboratory meet criteria item j) Cleanrooms?			
Will the laboratory meet criteria item k) Diversity?			
Will the laboratory meet criteria item l) Room air-change rates?			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Ene 08 Energy efficient equipment

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria

Which of the following will be present and likely to be a/the major contributor to 'unregulated' energy use?	Present	Major impact
Ref A Small power and plug in equipment?		
Ref B Swimming pool?		
Ref C Communal laundry?		
Ref D Data centre?		
Ref E IT-intensive operation areas?		
Ref F Residential areas?		
Ref G Healthcare?		
Ref H Kitchen and catering facilities?		

	Compliant	Credits available	Credits achieved
Will the significant majority contributor(s) to 'unregulated' energy use above meet the BREEAM criteria?			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Ene 09 Drying space

Assessment issue not applicable

No. of BREEAM credits available	N/A	Available contribution to overall score	N/A
No. of BREEAM innovation credits available	N/A	Minimum standards applicable	N/A

Assessment criteria	Compliant?	Credits available	Credits achieved
Will internal/external drying space and fixings be provided?			

Total BREEAM credits achieved	N/A
Total contribution to overall building score	N/A
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

TRANSPORT

Tra 01 Public Transport Accessibility

No. of BREEAM credits available	3	Available contribution to overall score	3.33%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Building type category (for purpose of Tra01 issue assessment)	Business (office/industrial)

Assessment Criteria	Compliant	Credits available	Credits achieved
Indicative public transport accessibility index (AI):	75.72	3	3
Will the building have a dedicated bus service?			N/A

AI	Indicative Accessibility Index for pre-assessment
0	Poor or no public transport provision
1	A single BREEAM compliant public transport node available
2	Some BREEAM compliant public transport nodes/services available
4	A selection of BREEAM compliant public transport nodes/services available
8	Good provision of public transport i.e. small urban centre / suburban area
10	Very Good provision of public transport i.e. small/medium urban centre
12	Excellent provision of public transport, i.e. medium urban centre
18	Excellent provision of public transport, i.e. large urban/metropolitan city centre

Total BREEAM credits achieved	3
Total contribution to overall building score	3.33%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

PTAL 6b Report states AI of + 75. A highly sustainable location in terms of accessibility and public transport. Three credits awarded - Recognition for developments in proximity to good public transport networks, thereby helping to reduce transport-related pollution and congestion.

Tra 02 Proximity to Amenities

No. of BREEAM credits available	1	Available contribution to overall score	1.11%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will the building be in close proximity of and accessible to applicable amenities?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.11%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

The site is located within an urban area of central London, with amenities within easy walking distance. Credit awarded in recognition of developments in close proximity of, and accessible to, local amenities which are likely to be frequently required and used by building occupants.

Tra 03 Cyclist facilities

No. of BREEAM credits available	2	Available contribution to overall score	2.22%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Building type category (for purpose of Tra03 issue assessment)	Business - (office/Industrial)
How many compliant cycle storage spaces will be provided?	30
What cyclist facilities will be provided?	Showers, changing facilities and drying space

Assessment Criteria	Compliant?	Credits available	Credits achieved
Cycle storage spaces	Yes	2	2
Cyclist facilities	Yes		

Total BREEAM credits achieved	2
Total contribution to overall building score	2.22%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Both credits awarded for compliant cycle storage spaces and facilities.
Number of spaces:
Office - 1 cycle space per 10 staff
(See guidance for compliant space and facility criteria)

Tra 04 Maximum Car Parking Capacity

No. of BREEAM credits available	2	Available contribution to overall score	2.22%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Building type category (for purpose of Tra04 issue)	Business - (office/Industrial)
Building's indicative Accessibility Index (sourced from issue Tra01)	75.72

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will BREEAM's maximum parking capacity criteria for the building type/Accessibility Index be met?	Yes	2	2

Total BREEAM credits achieved	2
Total contribution to overall building score	2.22%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

No car parking spaces proposed - credit awarded by default.

Tra 05 Travel Plan

No. of BREEAM credits available	1	Available contribution to overall score	1.11%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will a transport plan based on site specific travel survey/assessment be developed?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.11%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

A transport Statement has been prepred for planning - A site specific travel plan will be required in line with the BREEAM criteria to promote sustainable reductions in transport burdens by undertaking a site specific travel assessment/statement and developing a travel plan based on the needs of the particular site.

WATER

Wat 01 Water Consumption

No. of BREEAM credits available	5	Available contribution to overall score	4.17%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

How do you wish to assess the BREEAM credits to be achieved for this issue?	Define a target % improvement over baseline sanitary fittings
What is the target for % reduction in potable water consumption for sanitary use in the building?	55% - five credits

Please select the calculation procedure used	
Components are not being specified and installed by the developer, but they will be specified by the tenant	No

Standard approach data

Water Consumption from building micro-components	
Water demand met via greywater/rainwater sources	
Total net water consumption	
Improvement on baseline performance	

Key Performance Indicator - use of freshwater resource

Total net Water Consumption	
Default building occupancy	

Alternative approach data

Overall microcomponent performance level achieved	

Total BREEAM credits achieved	5
Total contribution to overall building score	4.17%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Comments/notes:

Four credits awarded - Minimum performance levels for components can be provided as a guide to meet required specification.
Reducing the demand for potable water through the provision of efficient sanitary fitting, rainwater collection and water recycling systems

Wat 02 Water Monitoring

No. of BREEAM credits available	1	Available contribution to overall score	0.83%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will there be a water meter on the mains water supply to the building(s)?	Yes	1	1
Will metering/monitoring equipment be specified on the water supply to any relevant plant/building areas?	Yes		
Will all specified water meters have a pulsed output?	Yes		
If the site/building has an existing BMS connection, will all pulsed meters be connected to the BMS?	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.83%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Comments/notes:

Specification of a water meter/s on the mains water supply to encourage water consumption management and monitoring to reduce the impacts of inefficiencies and leakage.

Wat 03 Water Leak Detection and Prevention

No. of BREEAM credits available	2	Available contribution to overall score	1.67%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will a mains water leak detection system be installed on the building's mains water supply?	Yes	1	1
Will flow control devices be installed in each sanitary area/facility?	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	1.67%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

- Recognition of leak detection systems capable of detecting a major water leak on the mains water supply
- Flow control devices that regulate the supply of water to each WC area/facility to reduce water wastage.

Wat 04 Water Efficient Equipment

No. of BREEAM credits available	1	Available contribution to overall score	0.83%
No. of BREEAM innovation credits available	No	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Has a meaningful reduction in unregulated water demand been achieved?		1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.83%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

no landscaped areas proposed - green roof will form part of the proposals but will rely soley on precipitation throughout the year.

MATERIALS

Mat 01 Life Cycle Impacts

No. of BREEAM credits available	5	Available contribution to overall score	5.58%
No. of BREEAM innovation credits available	3	Minimum standards applicable	No

How do you wish to assess the number of BREEAM credits to be achieved for this issue?	Define the number of Mat 01 credits achieved

Assessment Criteria

Predicted total Mat01 credits achieved	4
Predicted total Mat01 points achieved	
Number of building elements assessed	
Green Guide exemplary level compliant?	
Has IMPACT compliant software been used?	

Key Performance Indicator - embodied green house gas emissions by element

	Total area of element m^2	Total impact $kgCO_2$ eq.	Area of element impact data relevant to m^2
External walls			
Windows			
Roof			
Upper floor construction			
Internal wall			
Floor finishes/coverings			

Key Performance Indicator - embodied green house gas emissions for building (assessed elements only)

Total embodied green house gas emissions for building (by assessed elements)	Missing data	$kgCO_2$ eq.		$kgCO_2$ eq./m^2
Proportion of applicable building elements that data reported covers				

Total BREEAM credits achieved	4
Total contribution to overall building score	4.46%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

Reductions in the building's environmental life cycle impacts through assessment of the main building elements. As follows:
- External Walls
- Windows
- Roof
- Upper floor slab
- Floor finishes/covering

Credits are awarded on the basis of the total number of points achieved, as set out in Table (BREEAM guidance), and calculated using the BREEAM Mat 01 calculator. This point's score is based on the Green Guide rating(s) achieved for the specifications that make-up the main building elements.

Mat 02 Hard Landscaping and Boundary Protection

No. of BREEAM credits available	1	Available contribution to overall score	1.12%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will ≥80% of all external hard landscaping and boundary protection achieve a Green Guide A or A+ rating?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.12%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Only hard landscaping assessed for this issue and boundary protection is not present. Reductions in the environmental life cycle impacts through assessment of the hard landscaping elements.

Mat 03 Responsible Sourcing

No. of BREEAM credits available	4	Available contribution to overall score	4.46%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

Assessment Criteria	Compliant	Credits available	Credits achieved
All timber and timber based products are 'Legally harvested and trader timber'	Yes		
Is there a documented sustainable procurement plan?	Yes	1	1
Percentage of available responsible sourcing of materials points achieved	18.00%	3	1

Please confirm the route used to assess Mat03	Route 1: Lowest RSCS point score

Total BREEAM credits achieved	2
Total contribution to overall building score	2.23%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Comments/notes:

Credits have been awarded as follows:
First credit -Materials sourced in accordance with a sustainable procurement plan.
Second credit - Key building materials are responsibly sourced to reduce environmental and socio-economic impacts (conservative award of credits).

Mat 04 Insulation

No. of BREEAM credits available	1	Available contribution to overall score	1.12%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria		Credits available	Credits achieved	
What is the building's targeted insulating index?	2.50	1	1	Note: An insulatio

Total BREEAM credits achieved	1
Total contribution to overall building score	1.12%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credit awarded - Recognition of the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties

Mat 05 Designing for durability and resilience

No. of BREEAM credits available	1	Available contribution to overall score	1.12%
No. of BREEAM innovation credits available	0	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will suitable durability/protection measures be specified and installed to vulnerable areas of the building?	Yes	1	1
Will suitable durability/protection measures be specified and installed to exposed parts of the building?	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	1.12%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credits awarded for the following:

- The building incorporates measures to reduce impacts associated with damage and wear-and-tear.
- Relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors.

Mat 06 Material efficiency

No. of BREEAM credits available	1	Available contribution to overall score	1.12%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will material efficiency measures be identified & implemented during all RIBA stages?	No	1	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credit Not Sought at this stage

WASTE

Wst 01 Construction Waste Management

No. of BREEAM credits available	4	Available contribution to overall score	4.22%
No. of BREEAM innovation credits available	1	Minimum standards applicable	Yes

How do you wish to assess the number of BREEAM credits to be achieved for this issue?	Define a target number of BREEAM credits		
Select the number of BREEAM credits being targeted for issue Wst 01:	4	BREEAM Wst01 Innovation credits:	0

Assessment Criteria	Compliant?
Construction resource management plan	
Compliant Pre-demolition audit	
Does the excavation waste meet the exemplary level requirements?	

Key Performance Indicators - Construction Waste

Measure/units for the data being reported		
Non-hazardous construction waste (excluding demolition/excavation)		
Total non-hazardous construction waste generated		Note: At the pre-assessment stage this
Non-hazardous non-demolition const. waste diverted from landfill		Note: At this stage this will be a target l
Total non-hazardous non-demolition const. waste diverted from landfill		Note: At the pre-assessment stage this
Total non-hazardous demolition waste generated		Note: At this stage this will be a target l
Non-hazardous demolition waste diverted from landfill		Note: At this stage this will be a target l
Total non-hazardous demolition waste to disposal		Note: At the pre-assessment stage this
Material for reuse		Note: At this stage this will be a target l
Material for recycling		Note: At this stage this will be a target l
Material for energy recovery		Note: At this stage this will be a target l
Hazardous waste to disposal		Note: At this stage this will be a target l

Total BREEAM credits achieved	4
Total contribution to overall building score	4.22%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	Outstanding level

Comments/notes:

Credits awarded for the following:
• Development of a construction resource management plan.
• Reducing construction waste related to on-site construction and off-site manufacture/fabrication.
• Diverting non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (where applicable) generated by the project from landfill.

Wst 02 Recycled Aggregates

No. of BREEAM credits available	1	Available contribution to overall score	1.06%
No. of BREEAM innovation credits available	1	Minimum standards applicable	No

Assessment Criteria	Total
What is the target total % of high-grade aggregate that will be recycled/secondary aggregate?	0%

% of high-grade aggregate that is recycled/secondary aggregate - by application

Structural frame	
Bitumen/hydraulically bound base, binder and surface courses	
Building foundations	
Concrete road surfaces	
Pipe bedding	
Granular fill and capping	

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

credit not sought at this stage

Wst 03 Operational Waste

No. of BREEAM credits available	1	Available contribution to overall score	1.06%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will operational recyclable waste volumes be segregated and stored?	Yes	1	1
Will static waste compactor(s) or baler(s) be specified where appropriate?	N/A		
Will vessel(s) for composting suitable organic waste where appropriate?	N/A		

Total BREEAM credits achieved	1
Total contribution to overall building score	1.06%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Comments/notes:

Provision of suitable space and facilities to allow for segregation and storage of operational recyclable waste volumes generated by the assessed building/unit, its occupant(s) and activities.

Wst 04 Speculative Floor and Ceiling Finishes

No. of BREEAM credits available	1	Available contribution to overall score	1.06%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
The building's occupant(s)/tenant(s) will specify floor/ceiling finishes	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	1.06%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

The building occupants/tenants will specifiy floor/ceiling finishes.

Wst 05 Adaption to climate change

No. of BREEAM credits available	1	Available contribution to overall score	1.06%
No. of BREEAM innovation credits available	1	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will a climate change adaptation strategy appraisal for structural and fabric resilience be conducted by the end of Concept Design (RIBA Stage 2 or equivalent)?	No	1	0

Will exemplary level criteria – Responding to adaptation to climate change be met?	No	1	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	0
Minimum standard(s) level	N/A

Comments/notes:

Credit Not Soughtat this stage

Wst 06 Functional adaptability

No. of BREEAM credits available	1	Available contribution to overall score	1.06%
No. of BREEAM innovation credits available	0	Minimum standards applicable	N/A

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will a building specific functional adaptation strategy appraisal be conducted by Concept Design (RIBA Stage 2 or equivalent) and will functional adaptation measures be implemented?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	N/A

Minimum standard(s) level	N/A

Comments/notes:

Completion of a functional adaptability strategy to encourage consideration and implementation of measures to accommodate future changes to the use of the building and its systems over its lifespan.

LAND USE & ECOLOGY

LE 01 Site Selection

No. of BREEAM credits available	2	Available contribution to overall score	2.20%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will at least 75% of the proposed development's footprint be located on previously occupied land?	Yes	1	1
Is the site deemed to be significantly contaminated?	No	1	0

Total BREEAM credits achieved	1
Total contribution to overall building score	1.10%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

First credit awarded as the development site is a pre-developed site and at least 75% of the proposed building footprint is on a previously developed site. Second credit has been withheld as no evidence has been provided to confirm contamination levels at the site.

LE 02 Ecological Value of Site and Protection of Ecological Features

No. of BREEAM credits available	2	Available contribution to overall score	2.20%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Ecological value of the land defined using	A Suitably Qualified Ecologist

Assessment Criteria	Compliant?	Credits available	Credits achieved
Can the land within the construction zone be defined as 'land of low ecological value'?	Yes	1	1
Will all features of ecological value surrounding the construction zone/site boundary be protected?	Yes	1	1

Total BREEAM credits achieved	2
Total contribution to overall building score	2.20%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Land defined as 'land of ecological value' and existing ecological features will be adequately protected.
Where there are no ecological features present the second credit can be awarded by default.

LE 03 Mitigating Ecological Impact

No. of BREEAM credits available	2	Available contribution to overall score	2.20%
No. of BREEAM innovation credits available	0	Minimum standards applicable	Yes

Data sourced for calculating the change in ecological value from	Suitably Qualified Ecologist site survey of plant species

Assessment Criteria

What is the likely change in ecological value as a result of the sites development?	≥0 species (i.e. no negative change)	Plant species richn

Total BREEAM credits achieved	2
Total contribution to overall building score	2.20%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	Outstanding level

Comments/notes:

There will be no negitive change in the ecological value of the site as a result of the proposed development.

LE 04 Enhancing Site Ecology

No. of BREEAM credits available	2	Available contribution to overall score	2.20%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved	
Will a suitably qualified ecologist be appointed to report on enhancing and protecting site ecology?	Yes	2	1	
Will the suitably qualified ecologist's general recommendations be implemented?	Yes			
What is the targeted/intended improvement in ecological value as a result of enhancement actions?	<6 species (small positive change)			Plant species richı

Total BREEAM credits achieved	1
Total contribution to overall building score	1.10%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

A suitably Qualifed Ecologist woulkd need to be appointed to award these credits. The Ecologist will need to provide recommendations to be implemented within the proposed development site. A green roof may form part of the development proposals, a small positive change may be achievable.

LE 05 Long Term Impact on Biodiversity

No. of BREEAM credits available	2	Available contribution to overall score	2.20%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will a Suitably Qualified Ecologist be appointed to monitor/minimise impacts of site activities on biodiversity?	Yes	2	0
Will a landscape and habitat management plan be produced covering at least the first five years after project completion in accordance with British Standards?	N/A		
Number of applicable measures to improve biodiversity confirmed by SQE:	0		
Number of applicable measures implemented:	0		

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credits not sought at this stage.

POLLUTION

Pol 01 Impact of Refrigerants

No. of BREEAM credits available	3	Available contribution to overall score	2.54%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria		Credits available	Credits achieved
Refrigerant containing systems installed in the assessed building?		2	FALSE
Do all systems (with electric compressors) comply with the requirements of BS EN 378:2008 (parts 2 & 3) & where refrigeration systems containing ammonia are installed, the IoR Ammonia Refrigeration Systems Code of Practice?			
Global Warming Potential of the specified refrigerant(s) 10 or less?			
What is the target range Direct Effect Life Cycle CO2eq. emissions for the system?		kgCO2eq/kW coolth capacity	
Cooling/Heating capacity of the system		kW	
Will a refrigerant leak detection and containment system be specified/installed?		1	0

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credits Not Sought at this stage.

Pol 02 NO_x Emissions

No. of BREEAM credits available	3	Available contribution to overall score	2.54%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria

NO_x emission level - space heating		mg/kWh
NO_x emission level - cooling		mg/kWh
NO_x emission level - DHW		
Does this building meet BREEAM's definition of a highly insulated building?		
Energy consumption: heating and hot water		kWh/m2 yr

Total BREEAM credits achieved	0
Total contribution to overall building score	0.00%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Credits not sought at this stage - heating strategy to be established and reviewed.

Pol 03 Surface Water Run off

No. of BREEAM credits available	5	Available contribution to overall score	4.23%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
What is the actual/likely annual probability of flooding for the assessed site?	Low	2	2
Will a Flood Risk Assessment be undertaken?	Yes		
Will the site meet the BREEAM criteria for peak rate surface water run off?	Yes	1	1
Will the site meet the criteria for surface water run off volume, attenuation and/or limiting discharge?	Yes	1	1
Will the site be designed to minimise watercourse pollution in accordance with the BREEAM criteria?	No	1	0

Total BREEAM credits achieved	4
Total contribution to overall building score	3.38%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

- The development site is situated within flood risk zone one and has a low annual probability of flooding. A Flood Risk Assessment will be undertaken.
- Two credit has been awarded where the site will meet the BREEAM criteria for peak rate surface water runoff.

A drainage consultant should be instructed ASAP to determine the credits awarded for this issue.

Pol 04 Reduction of Night Time Light Pollution

No. of BREEAM credits available	1	Available contribution to overall score	0.85%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Will the external lighting specification be designed to reduce light pollution?	Yes	1	1

Total BREEAM credits achieved	1
Total contribution to overall building score	0.85%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

External light pollution is eliminated through effective design or the removal of the need for unnecessary external lighting.

Pol 05 Noise Attenuation

No. of BREEAM credits available	1	Available contribution to overall score	0.85%
No. of BREEAM innovation credits available	0	Minimum standards applicable	No

Assessment Criteria	Compliant	Credits available	Credits achieved
Will there be noise-sensitive areas/buildings within 800m radius of the development?	Yes	1	1
Will a noise impact assessment be carried out and, if applicable, noise attenuation measures specified?	Yes		

Total BREEAM credits achieved	1
Total contribution to overall building score	0.85%
Total BREEAM innovation credits achieved	N/A
Minimum standard(s) level	N/A

Comments/notes:

Measures to reduce the likelihood of disturbance arising as a result of noise from fixed installations on the development.

INNOVATION

Inn 01 Innovation

No. of BREEAM innovation credits available	10	Available contribution to overall score	10.00%
		Minimum standards applicable	No

Assessment Criteria	Compliant?	Credits available	Credits achieved
Man 03 Responsible construction practices	No	1	0
Man 05 Aftercare	N/A	N/A	0
Hea 01 Visual Comfort	No	1	0
Hea 02 Indoor Air Quality	N/A	N/A	0
Ene 01 Reduction of energy use and carbon emissions	No	5	0
Wat 01 Water Consumption	No	1	0
Mat01 Life Cycle Impacts	No	3	0
Mat03 Responsible Sourcing of Materials	No	1	0
Wst01 Construction Waste Management	No	1	0
Wst02 Recycled Aggregates	No	1	0
Wst 05 Adaption to climate change	N/A	N/A	0

Number of 'approved' innovation credits achieved?	

Total BREEAM innovation credits achieved	0
Total contribution to overall building score	0.00%
Minimum standard(s) level	N/A

9. APPENDIX B - BREEAM REFURBISHMENT AND FIT-OUT PRE-ASSESSMENT

BREEAM®

Code for a Sustainable Built Environment
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BREEAM UK Refurbishment & Fit-out 2014 - Pre-assessment

High Holborn

Pre-assessment

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20 January 2017 Assessment Report

PwC's BREEAM Outstanding rated One Embankment Place in London. Image Hofton + Crow.

bre

Assessment details

Assessment references

Registration number:	2016.287	**Date created:**	14/12/2016
Created by:	Stacey Downes {Element Sustainability Ltd}		
Architect name:			
Developer name:			
Property owner			

Site details

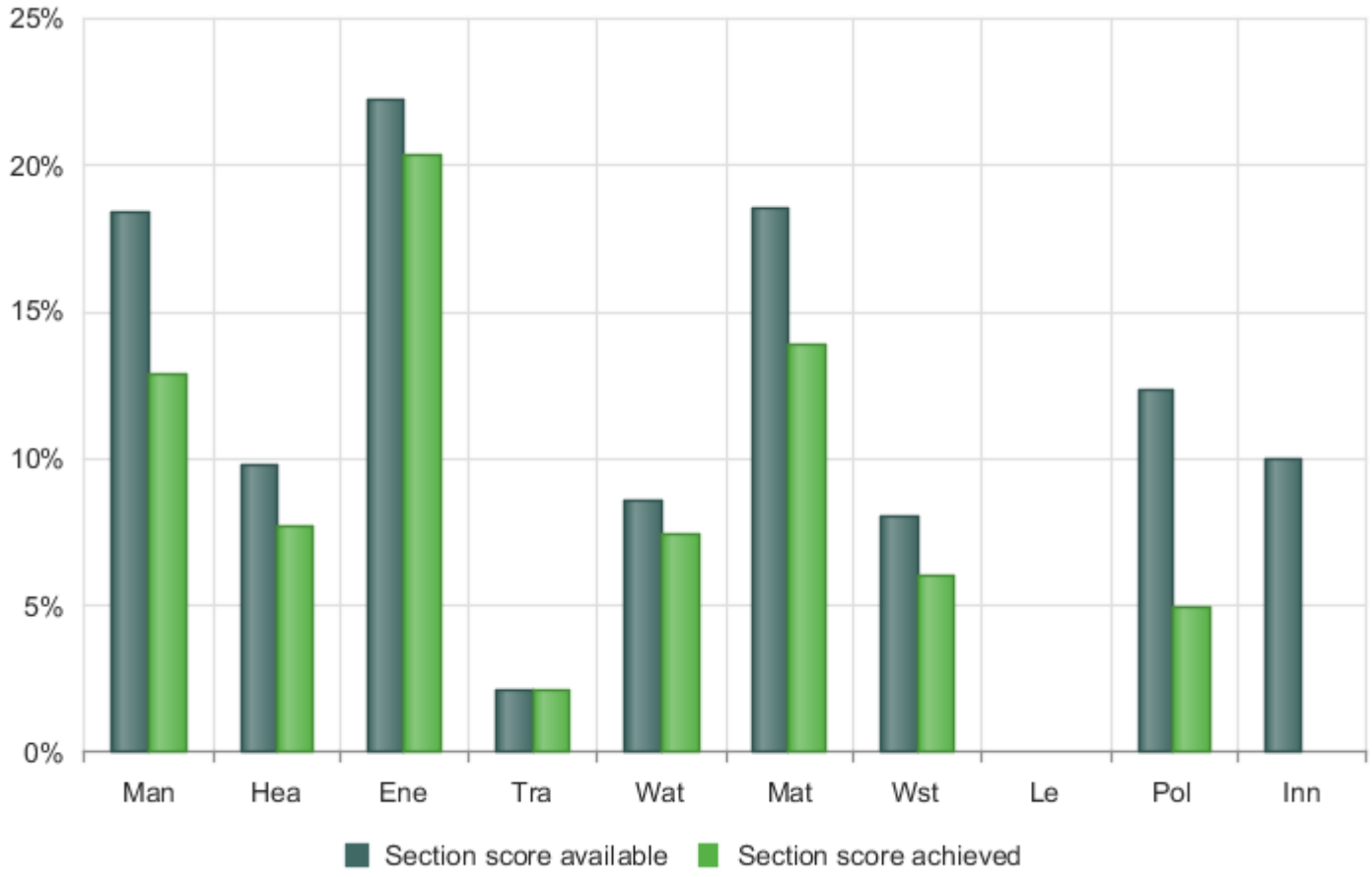
Site name:	212 High Holborn
Address:	212 High Holborn
Town:	London
County:	
Post code:	WC1V 7BF
Country:	United Kingdom

BREEAM rating

BREEAM Rating

	Credits available	Credits achieved	% Credits achieved	Weighting	Category score
Man	20.0	14.0	70.00%	18.35%	12.84%
Hea	9.0	7.0	77.78%	9.85%	7.66%
Ene	24.0	22.0	91.67%	22.19%	20.33%
Tra	2.0	2.0	100.00%	2.14%	2.14%
Wat	8.0	7.0	87.50%	8.56%	7.49%
Mat	12.0	9.0	75.00%	18.53%	13.89%
Wst	8.0	6.0	75.00%	8.03%	6.02%
Le	0.0	0.0	0.00%	0.00%	0.00%
Pol	10.0	4.0	40.00%	12.35%	4.94%
Inn	10.0	0.0	0.00%	10.00%	0.00%
Total	103.0	71.0	68.93%	-	75.33%
Rating	-	-	-	-	Excellent

Performance by environmental category



Issue scores

Please Note: X means the exemplary credit for the relevant issue

Management

Man Management	ManX
14 / 20	0 / 2

Health and Wellbeing

Hea Health & Wellbeing
7 / 9

Energy

Ene Energy	EneX
22 / 24	0 / 5

Transport

Tra Transport
2 / 2

Water

Wat Water	WatX
7 / 8	0 / 1

Materials

Mat Materials	MatX
9 / 12	0 / 2

Waste

Wst Waste	WstX
6 / 8	0 / 1

Land use and ecology

Le Land use and ecology
N/A

Pollution

Pol Pollution
4 / 10

Innovation

Inn Innovation	InnX
N/A	0 / 10

Initial details

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Stage 1 filtering: Scope of the assessment

Part 1 : Fabric and structure : No

Part 2 : Core services : Yes

Part 3 : Local services : Yes

Part 4 : Interior design : No

Stage 2 filtering: Project specific filtering

Is the project a change of use? (e.g. change from office to a hotel) : Yes

Are transportation systems specified or present within the refurbishment or fit-out zone? (lifts, escalators, moving walks) : Yes, newly specified transportation systems

Are there laboratories present and if so what % of total building area do they represent : No laboratories present

Project Type : Major, whole building refurbishment

Laboratory containment area : No laboratories present

Is cold storage specified or present within the refurbishment or fit-out zone? : No

Are there landscaping areas within the refurbishment or fit-out zone/within developer control? : No

If the asset undergoing refurbishment or fit-out is part of a larger building, is the cooling generation plant centralised or localised? : Central

If the asset undergoing refurbishment or fit-out is part of a larger building, is the heating generation plant centralised or localised? : Central

Is Wat01 within the scope of the assessment in accordance with Table 42? : Yes

What is the building type? : Offices

Is this an assessment of a speculative office building? : No

If Industrial, does the building have office areas? : N/A

Does the building have any unregulated water demands? e.g. irrigation, car washing, or other process related water use : No

Does the building have unregulated energy demands from significantly contributing systems? : No

Is the project a simple building? : No

Does the building have external lighting within the scope of works? : Yes

Does the building have any existing or newly specified externally mounted plant? : Yes

If undertaking a Part 4 assessment, is there any equipment specified that requires commissioning (see Man04 CN13) : N/A

Historic building (listed building or building in a conservation area) : Yes, grade 2* listed (England or Wales)

Category assessment

Management | Man

Man Management

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MAN 01 PROJECT BRIEF AND DESIGN	
Stakeholder consultation (project delivery) :	1
Stakeholder consultation (third party) :	1
Sustainability champion (design) :	0
Sustainability champion (monitoring progress) :	0
MAN 02 LIFECYCLE COST AND SERVICE LIFE PLANNING	
Elemental lifecycle cost :	0
Componnent level LCC plan :	0
Capital cost reporting :	1
MAN 03 RESPONSIBLE CONSTRUCTION PRACTICES	
Is all timber used in the project 'legally harvested and traded timber'? :	Yes
Environmental management :	1
Construction stage sustainability champion :	0
Considerate construction :	2
Exemplary level criteria :	
Has the project achieve the minimum standard for an Excellent or Outstanding rating? :	Minimum standard for Outstanding rating
Monitoring of refurbishment or fit-out site impacts :	2
Utility consumption :	Yes
Transport of construction materials and waste :	Yes
MAN 04 COMMISSIONING AND HANDOVER	
Commissioning and testing schedule and responsibilities :	1
Commissioning building services :	1
Handover :	1
Has criterion 9 been met? :	Yes
MAN 05 AFTERCARE	
Aftercare support :	1
Exemplary level criteria :	No
Seasonal commissioning :	1
Post occupancy evaluation :	1

Credits awarded : 14.0

Comments :
Man 01 Project Brief and Design - Stakeholder consultation covering project delivery and relevant third parties.
Man 02 Life Cycle Cost and Service Life Planning - Report the capital cost for the refurbishment/fit-out works in pounds per square metre (£k/m2 via the BREEAM Assessment Scoring and Reporting tool.
Man 03 Construction Site Impacts -The principal contractor demonstrates sound environmental management practices and consideration for neighbours across their activities on-site.
Site related energy, water and transport impacts are monitored and reported to ensure ongoing compliance during the Refurbishment, Handover and Close Out stages and to improve awareness and understanding for future projects.
Man 04 Commissioning and Handover -Schedule of commissioning including optimal timescales and appropriate testing and commissioning of all building services systems and building fabric in line with best practice.
Inspecting, testing, identifying and rectifying defects via an appropriate method.
Provision of a non-technical Building User Guide and user/operator training timed appropriately around handover and proposed occupation.
Man 05 Aftercare - Provision of the necessary infrastructure and resources to provide aftercare support to the building occupier(s).
Seasonal commissioning activities will be completed over a minimum 12 month period, once the building becomes substantially occupied.
The client or building occupier commit to carrying out a post occupancy evaluation (POE) exercise one year after initial building occupation and to disseminate the findings in terms of the buildings post occupancy performance.

Health and Wellbeing | Hea

Hea Health & Wellbeing

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HEA 01 VISUAL COMFORT	
Internal and external lighting :	1
HEA 02 INDOOR AIR QUALITY	
Indoor air quality plan :	1
Ventilation :	0
Potential for natural ventilation :	0
HEA 03 SAFE CONTAINMENT IN LABORATORIES - NA	
HEA 04 THERMAL COMFORT	
Thermal modelling :	1
Adaptation - for a projected climate change scenario :	1
Thermal zoning and controls :	1
HEA 05 ACOUSTIC PERFORMANCE	
Acoustic performance :	2
HEA 06 SAFETY AND SECURITY - NA	
Credits awarded : 7.0	

Comments :
Hea 01 External and Internal Lighting - Internal and external lighting systems are designed to avoid flicker and provide appropriate illuminance (lux) levels. Internal lighting is zoned to allow for occupant control.
Hea 02 - Indoor Air Quality - Minimising sources of air pollution through careful design specification and planning, through an Indoor Air Quality Plan.
Hea 04 Thermal Modelling - Thermal modelling carried out to appropriate standards.
Projected climate change scenario(s) considered as part of the thermal model.
The thermal modelling analysis has informed the temperature control strategy for the building and its users.
Hea 05 - The building meets appropriate acoustic performance standards and testing requirements in terms of: Sound insulation, Indoor ambient noise level and Reverberation times.
Hea 06 Site Security - Security needs are understood and taken into account in the design and specification.

Energy | Ene

Ene Energy

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ENE 01 ASSESSMENT OPTION

Which option is being followed :	Option 1: Whole building energy model

ENE 01 - OPTION 1

Country :	England
Credits :	15.0
Actual (existing) building energy demand (DemEx) :	303.3 kWh/m2
Reference building energy demand (DemRef) :	399.16 kWh/m2
Actual (proposed) building energy demand (DemProp) :	162.45 kWh/m2
Actual (existing) building primary energy consumption (PEEx) :	493.4 kWh/m2
Reference building primary energy consumption (PERef) :	380.64 kWh/m2
Actual (proposed) building primary energy consumption (PEProp) :	165.8 kWh/m2
Actual (existing) building CO2 emissions (BEREx) :	97.25 KgCO2/m2
Reference building CO2 emissions (SER) :	57.98 KgCO2/m2
Actual (proposed) building CO2 emissions (BERProp) :	29.96 kgCO2/m2
Building energy demand individual parameter EPR (Energy performance Ratio) :	1.0
Primary energy consumption individual parameter EPR (Energy performance Ratio) :	1.0
Building CO2 emissions individual parameter EPR (Energy performance Ratio) :	0.94
EPRNDR (Energy Performance Ratio Non Domestic Refurbishment) :	0.97
Additional assessment criteria :	
Historic buildings study compliant :	
Zero regulated carbon :	
Equivalent % of the building's 'regulated' energy consumption generated by carbon neutral sources and used to meet energy demand from 'unregulated' building systems or processes? :	
Is the building designed to be carbon negative? :	
If the building is defined as 'carbon negative' what is the total (modelled) renewable/carbon neutral energy generated and exported? :	
Historic credits scored :	0
Exemplary credits scored :	0

ENE 02 ENERGY MONITORING

Sub-metering of major energy consuming systems :	1
Sub-metering of high energy load and tenancy areas :	1

ENE 03 EXTERNAL LIGHTING

External lighting :	1

ENE 04 LOW CARBON DESIGN

Passive design analysis :	0
Free cooling :	0
Low and zero carbon technologies :	1

ENE 05 ENERGY EFFICIENT COLD STORAGE - NA

ENE 06 ENERGY EFFICIENT TRANSPORTATION SYSTEMS

Energy consumption :	1
Energy efficient measures :	2

ENE 07 ENERGY EFFICIENT LABORATORY SYSTEMS - NOTAPPLICABLE

ENE 08 ENERGY EFFICIENT EQUIPMENT

ENE 09 DRYING SPACE

Credits awarded : 22.0

Transport | Tra

Tra Transport

212 High Holborn

TRA 01 SUSTAINABLE TRANSPORT SOLUTIONS - NA

TRA 02 PROXIMITY TO AMENITIES - NA

TRA 03 CYCLIST FACILITIES - NA

TRA 04 MAXIMUM CAR PARKING CAPACITY

Car parking capacity :	2

TRA 05 TRAVEL PLAN - NA

Credits awarded : 2.0

Comments :
TRA 04 - Maximum Car Parking Facilities - No Car parking spaces are to be provided.

Water | Wat

Wat Water

212 High Holborn

WAT 01 WATER CONSUMPTION

Water consumption :	4
Exemplary level criteria :	

WAT 02 WATER MONITORING

Water monitoring :	1
Has criterion 1 been met? :	Yes

WAT 03 LEAK DETECTION

Leak detection system :	1
Flow control devices :	1

WAT 04 WATER EFFICIENT EQUIPMENT - NA

Credits awarded : 7.0

Comments :
Comments :
Wat 01 Water Consumption - Reducing the demand for potable water through the provision of efficient sanitary fitting, rainwater collection and water recycling systems (4 credits sought here).
Wat 02 Water Monitoring - Specification of a water meter/s on the mains water supply to encourage water consumption management and monitoring to reduce the impacts of inefficiencies and leakage.
Wat 03 Leak Detection - Flow control devices that regulate the supply of water to each WC area/facility to reduce water wastage AND leak detection for major leak detection.

Materials | Mat

Mat Materials

212 High Holborn

MAT 01 ENVIRONMENTAL IMPACT OF MATERIALS

Options :	Option 1
Environmental impact of materials :	5
Exemplary level criteria :	No

MAT 03 RESPONSIBLE SOURCING OF MATERIALS

Sustainable procurement plan :	1
Has criterion 1 been met? :	Yes
Responsible sourcing of materials :	2
Exemplary level criteria :	No

MAT 04 INSULATION

Insulation :	1

MAT 05 DESIGNING FOR DURABILITY AND RESILIENCE - NA

MAT 06 MATERIAL EFFICIENCY

Material efficiency :	0

Credits awarded : 9.0

Comments :
Mat 01 Life Cycle Impact - Reductions in the building?s environmental life cycle impacts through the reuse of materials and the use of tools to analyse the life cycle impact of any new materials using robust environmental information assessment of the main building elements.
Mat 03 Responsible Sourcing of Materials- Materials sourced in accordance with a sustainable procurement plan.Key building materials are responsibly sourced to reduce environmental and socio-economic impacts.
Mat 04 Insulation - Recognition of the use of thermal insulation which has a low embodied environmental impact relative to its thermal properties.
Mat 05 Designing for Durability and Resiliance - The building incorporates measures to reduce impacts associated with damage and wear-and-tear. Relevant building elements incorporate appropriate design and specification measures to limit material degradation due to environmental factors.

Waste | Wst

Wst Waste

212 High Holborn

WST 01 CONSTRUCTION WASTE MANAGEMENT

Pre-refurbishment audit :	1
Re-use and direct recycling of materials :	0
Resource efficiency :	3
Diversion of waste from landfill :	1
Exemplary level criteria :	

WST 02 RECYCLED AGGREGATES - NA

WST 03 OPERATIONAL WASTE - NA

WST 04 SPECULATIVE FINISHES

WST 05 ADAPTATION TO CLIMATE CHANGE - NA

WST 06 FUNCTIONAL ADAPTABILITY

Functional adaptabiliy :	1

Credits awarded : 6.0

Comments :
Wst 01 Refurbishment Waste - Development of a pre-refurbishment audit to identify options for reuse and recycling. Actions to reuse or directly recycle materials. Development of a refurbishment resource management plan. Reducing project waste related to on-site construction and off-site manufacture/fabrication. Diverting non-hazardous construction (on-site and dedicated off-site manufacture/fabrication), demolition and excavation waste (where applicable) generated by the project from landfill.
Wst 06 Functional Adaptability - Encourage consideration and implementation of measures to accommodate future changes to the use of the building and its systems over its lifespan.

Land use and ecology | Le

Le Land use and ecology

212 High Holborn

LE 02 PROTECTION OF ECOLOGICAL FEATURES - NA

LE 05 LONG TERM IMPACT ON BIODIVERSITY - NA

Credits awarded : 0.0

Comments :
N/A

Pollution | Pol

Pol Pollution

212 High Holborn

POL 01 IMPACT OF REFRIGERANTS	
Impact of refrigerants :	0
Leak detection :	0
POL 02 NOX EMISSIONS	
NOx emissions :	0
POL 03 FLOOD RISK AND REDUCING SURFACE WATER RUN-OFF	
Flood risk management :	2
POL 04 REDUCTION OF NIGHT TIME LIGHT POLLUTION	
Reduction of night time light pollution :	1
POL 05 NOISE ATTENUATION	
Noise attenuation :	1
Credits awarded : 4.0	

Comments :
Pol 3 Surface Water - Identifying the buildings flood risk and where applicable adopting flood resilience or resistance measures through refurbishment or fit-out works. Surface water run-off is managed to be no worse as a result of refurbishment works.
Pol 04 Night Time Light Pollution - External light pollution is eliminated through effective design or the removal of the need for unnecessary external lighting.
Pol 05 Acoustic Attenuation - Measures to reduce the likelihood of disturbance arising as a result of noise from fixed installations on the development.

Innovation | Inn

Inn Innovation

212 High Holborn

INN 01 APPROVED INNOVATIONS

Approved innovations :	0

Credits awarded : 0.0

10. EXISTING BUILDING SBEM DATA

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Old Section as-built- PLANNING USE UNLY

As designed

Date: Fri Jan 20 11:47:51 2017

Administrative information

Building Details

Address: 212-214 High Holborn, London, WC1V 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v4.7.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Russell Pridgeon

Telephone number: 0161 337 4353

Address: The Warehouse, Denton, M43 3DS

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

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	26.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	26.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	97.2
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 the building services should achieve reasonable overall standards of energy efficiency

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	1.7	1.7	B1F - Plant Room_W_5
Floor	0.25	0.18	0.18	B1F - Plant Room_S_3
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	5.01	5.01	0F - Restaurant_G_10
Personnel doors	2.2	3	3	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

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

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

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	25

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- Default Central Heating with Radiators

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.65	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- HW from CH with Tank

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.143
Standard value	N/A	N/A

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1F - Plant Room	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Restaurant	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Reception Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Offices Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
B1F - Plant Room	15	-	-	296

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0F - Restaurant	-	36	100	1448
0F - Reception Old	-	32	100	392
0F Mezz - Circulation Old	-	34	-	234
1F - Office Old	17	-	-	2966
1F - Circulation Old	-	23	-	148
2F - Office Old	18	-	-	2853
2F - Circulation Old	-	27	-	126
3F - Offices Old	18	-	-	2824
3F - Circulation Old	-	29	-	120

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?
0F - Restaurant	NO (-62.4%)	NO
0F - Reception Old	N/A	N/A
1F - Office Old	N/A	N/A
2F - Office Old	N/A	N/A
3F - Offices Old	NO (-74.7%)	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?	YES
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 [m²]	698.7	698.7
External area [m²]	321.1	321.1
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	25	3
Average conductance [W/K]	582.71	221.56
Average U-value [W/m²K]	1.81	0.69
Alpha value* [%]	4.38	18.87

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	21.18	1.04
Cooling	0	0
Auxiliary	7.82	5.7
Lighting	64.89	30.03
Hot water	254.33	37.5
Equipment*	62.57	62.57
TOTAL**	**348.22**	**74.28**

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

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	303.3	229.14
Primary energy* [kWh/m²]	559.34	153.99
Total emissions [kg/m²]	97.2	26.4

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	44.2	259.1	21.2	0	7.8	0.58	0	0.65	0
	Notional	3.1	226.1	1	0	5.7	0.82	0	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	1.7	B1F - Plant Room_W_5
Floor	0.2	0.18	B1F - Plant Room_S_3
Roof	0.15	-	"No heat loss roofs"
Windows, roof windows, and rooflights	1.5	5.01	0F - Restaurant_G_10
Personnel doors	1.5	3	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

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

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	25

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Old Section fabric improvements- PLANNING USE UNLY

As designed

Date: Fri Jan 20 10:55:54 2017

Administrative information

Building Details

Address: 212-214 High Holborn, London, WC1V 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v4.7.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Russell Pridgeon

Telephone number: 0161 337 4353

Address: The Warehouse, Denton, M43 3DS

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

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	26.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	26.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	76.9
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 the building services should achieve reasonable overall standards of energy efficiency

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	1.53	1.7	0F - Restaurant_W_8
Floor	0.25	0.12	0.12	B1F - Plant Room_S_3
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	2.2	2.2	0F - Restaurant_G_10
Personnel doors	2.2	0.7	0.7	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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	25

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- Default Central Heating with Radiators

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.65	-	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- HW from CH with Tank

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0.143
Standard value	N/A	N/A

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1F - Plant Room	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Restaurant	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Reception Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Offices Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5

General lighting and display lighting

	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
B1F - Plant Room	100	-	-	81

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0F - Restaurant	-	100	100	398
0F - Reception Old	-	100	100	108
0F Mezz - Circulation Old	-	100	-	64
1F - Office Old	100	-	-	816
1F - Circulation Old	-	100	-	41
2F - Office Old	100	-	-	785
2F - Circulation Old	-	100	-	35
3F - Offices Old	100	-	-	777
3F - Circulation Old	-	100	-	33

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?
0F - Restaurant	NO (-80.1%)	NO
0F - Reception Old	N/A	N/A
1F - Office Old	N/A	N/A
2F - Office Old	N/A	N/A
3F - Offices Old	NO (-86.6%)	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?	YES
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 [m²]	698.7	698.7
External area [m²]	321.1	321.1
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	25	3
Average conductance [W/K]	471.79	221.56
Average U-value [W/m²K]	1.47	0.69
Alpha value* [%]	5.41	18.87

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	24.61	1.04
Cooling	0	0
Auxiliary	7.82	5.7
Lighting	24.32	30.03
Hot water	254.33	37.5
Equipment*	62.57	62.57
TOTAL**	**311.08**	**74.28**

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

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	198.47	229.14
Primary energy* [kWh/m²]	438.99	153.99
Total emissions [kg/m²]	76.9	26.4

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	51.4	147.1	24.6	0	7.8	0.58	0	0.65	0
	Notional	3.1	226.1	1	0	5.7	0.82	0	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.26	B1F - Plant Room_W_5
Floor	0.2	0.12	B1F - Plant Room_S_3
Roof	0.15	-	"No heat loss roofs"
Windows, roof windows, and rooflights	1.5	2.2	0F - Restaurant_G_10
Personnel doors	1.5	0.7	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

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

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	25

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Old Section fully improved- PLANNING USE UNLY

As designed

Date: Fri Jan 20 10:56:30 2017

Administrative information

Building Details

Address: 212-214 High Holborn, London, WC1V 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v4.7.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Russell Pridgeon

Telephone number: 0161 337 4353

Address: The Warehouse, Denton, M43 3DS

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	39
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	39
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	37.9
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 the building services should achieve reasonable overall standards of energy efficiency

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	1.53	1.7	0F - Restaurant_W_8
Floor	0.25	0.12	0.12	B1F - Plant Room_S_3
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	2.2	2.2	0F - Restaurant_G_10
Personnel doors	2.2	0.7	0.7	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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	25

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- VRF mixed mode

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	4.5	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- Instantaneous Elec HWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
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		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1F - Plant Room	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Restaurant	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Reception Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Offices Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
B1F - Plant Room	100	-	-	81

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0F - Restaurant	-	100	100	398
0F - Reception Old	-	100	100	108
0F Mezz - Circulation Old	-	100	-	64
1F - Office Old	100	-	-	816
1F - Circulation Old	-	100	-	41
2F - Office Old	100	-	-	785
2F - Circulation Old	-	100	-	35
3F - Offices Old	100	-	-	777
3F - Circulation Old	-	100	-	33

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?
B1F - Plant Room	N/A	N/A
0F - Restaurant	NO (-80.1%)	NO
0F - Reception Old	N/A	N/A
0F Mezz - Circulation Old	N/A	N/A
1F - Office Old	N/A	N/A
1F - Circulation Old	N/A	N/A
2F - Office Old	N/A	N/A
2F - Circulation Old	N/A	N/A
3F - Offices Old	NO (-86.6%)	NO
3F - Circulation Old	N/A	N/A

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?	YES
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 [m²]	698.7	698.7
External area [m²]	321.1	321.1
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	25	3
Average conductance [W/K]	471.79	221.56
Average U-value [W/m²K]	1.47	0.69
Alpha value* [%]	5.41	18.87

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.2	1.04
Cooling	9.92	18.66
Auxiliary	5.04	4.38
Lighting	24.32	30.03
Hot water	32.42	37.5
Equipment*	62.57	62.57
TOTAL**	**74.9**	**91.62**

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

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	162.45	184.47
Primary energy* [kWh/m²]	224.03	201.39
Total emissions [kg/m²]	37.9	39

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	48.3	114.1	3.2	9.9	5	4.19	3.2	4.5	4.5
	Notional	3.1	181.4	1	18.7	4.4	0.82	2.7	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.26	B1F - Plant Room_W_5
Floor	0.2	0.12	B1F - Plant Room_S_3
Roof	0.15	-	"No heat loss roofs"
Windows, roof windows, and rooflights	1.5	2.2	0F - Restaurant_G_10
Personnel doors	1.5	0.7	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

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

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	25

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

Old Section PV calculation- PLANNING USE UNLY

As designed

Date: Fri Jan 20 12:10:10 2017

Administrative information

Building Details

Address: 212-214 High Holborn, London, WC1V 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v4.7.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Russell Pridgeon

Telephone number: 0161 337 4353

Address: The Warehouse, Denton, M43 3DS

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	39
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	39
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	30
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 the building services should achieve reasonable overall standards of energy efficiency

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	1.53	1.7	0F - Restaurant_W_8
Floor	0.25	0.12	0.12	B1F - Plant Room_S_3
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	2.2	2.2	0F - Restaurant_G_10
Personnel doors	2.2	0.7	0.7	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
$U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]

* 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	25

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- VRF mixed mode

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4	4	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- Instantaneous Elec HWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
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		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1F - Plant Room	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Restaurant	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Reception Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Office Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Offices Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Circulation Old	-	-	-	0.8	-	-	-	-	-	0.7	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
B1F - Plant Room	100	-	-	81

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
0F - Restaurant	-	100	100	398
0F - Reception Old	-	100	100	108
0F Mezz - Circulation Old	-	100	-	64
1F - Office Old	100	-	-	816
1F - Circulation Old	-	100	-	41
2F - Office Old	100	-	-	785
2F - Circulation Old	-	100	-	35
3F - Offices Old	100	-	-	777
3F - Circulation Old	-	100	-	33

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?
B1F - Plant Room	N/A	N/A
0F - Restaurant	NO (-80.1%)	NO
0F - Reception Old	N/A	N/A
0F Mezz - Circulation Old	N/A	N/A
1F - Office Old	N/A	N/A
1F - Circulation Old	N/A	N/A
2F - Office Old	N/A	N/A
2F - Circulation Old	N/A	N/A
3F - Offices Old	NO (-86.6%)	NO
3F - Circulation Old	N/A	N/A

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?	YES
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 [m²]	698.7	698.7
External area [m²]	321.1	321.1
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	25	3
Average conductance [W/K]	471.79	221.56
Average U-value [W/m²K]	1.47	0.69
Alpha value* [%]	5.41	18.87

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	3.6	1.04
Cooling	11.16	18.66
Auxiliary	5.04	4.38
Lighting	24.32	30.03
Hot water	32.42	37.5
Equipment*	62.57	62.57
TOTAL**	**76.54**	**91.62**

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	16.7	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	162.45	184.47
Primary energy* [kWh/m²]	228.32	201.39
Total emissions [kg/m²]	30	39

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	48.3	114.1	3.6	11.2	5	3.73	2.84	4	4
	Notional	3.1	181.4	1	18.7	4.4	0.82	2.7	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.26	B1F - Plant Room_W_5
Floor	0.2	0.12	B1F - Plant Room_S_3
Roof	0.15	-	"No heat loss roofs"
Windows, roof windows, and rooflights	1.5	2.2	0F - Restaurant_G_10
Personnel doors	1.5	0.7	0F - Restaurant_D_9
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

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

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	25

11. EXTENSION BUILDING SBEM DATA

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

New Section improvements - PLANNING USE UNLY

As designed

Date: Fri Jan 20 11:28:47 2017

Administrative information

Building Details

Address: 212-214 High Holborn, London, WC1V 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v4.7.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Russell Pridgeon

Telephone number: 0161 337 4353

Address: The Warehouse, Denton, M43 3DS

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	24.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	24.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	23.5
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 the building services should achieve reasonable overall standards of energy efficiency

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.22	0.22	B1F - Toilets_W_6
Floor	0.25	0.07	0.1	B1F - Cycle Store_S_3
Roof	0.25	0.18	0.18	2F - Office_R_5
Windows***, roof windows, and rooflights	2.2	2.2	2.2	0F Mezz - Office_G_8
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

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

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

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	4

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- Improved VRF mixed Mode

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	4.5	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- Instantaneous Elec HWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
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		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
B1F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
B1F - Cycle Store	-	-	-	0.8	-	-	-	-	-	0.7	0.5
B1F - Gym	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Offices	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Reception	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Cafe	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Circulation 1	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
2F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Offices 1	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Circulation 1	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
4F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
4F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
4F - Offices	-	-	-	0.8	-	-	-	-	-	0.7	0.5
6F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
6F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
6F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
5F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
5F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
5F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
B1F - Toilets	-	100	-	123
B1F - Circulation	-	100	-	123
B1F - Cycle Store	100	-	-	27
B1F - Gym	-	100	-	152
0F - Circulation	-	100	-	44
0F - Offices	100	-	-	149
0F - Reception	-	100	100	148
0F - Cafe	-	100	100	163
0F - Toilets	-	100	-	62
0F Mezz - Office	100	-	-	798
0F Mezz - Circulation 1	-	100	-	42
1F - Office	100	-	-	842
1F - Circulation	-	100	-	56
1F - Toilets	-	100	-	92
2F - Office	100	-	-	815
2F - Toilets	-	100	-	73
2F - Circulation	-	100	-	47
3F - Offices 1	100	-	-	722
3F - Circulation 1	-	100	-	45
3F - Toilets	-	100	-	69
4F - Toilets	-	100	-	69
4F - Circulation	-	100	-	45
4F - Offices	100	-	-	1482
6F - Office	100	-	-	746
6F - Circulation	-	100	-	57

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
6F - Toilets	-	100	-	69
5F - Toilets	-	100	-	69
5F - Circulation	-	100	-	57
5F - Office	100	-	-	746

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?
B1F - Toilets	N/A	N/A
B1F - Circulation	N/A	N/A
B1F - Cycle Store	N/A	N/A
B1F - Gym	N/A	N/A
0F - Circulation	N/A	N/A
0F - Offices	N/A	N/A
0F - Reception	N/A	N/A
0F - Cafe	N/A	N/A
0F - Toilets	N/A	N/A
0F Mezz - Office	NO (-60.2%)	NO
0F Mezz - Circulation 1	N/A	N/A
1F - Office	NO (-21.3%)	NO
1F - Circulation	N/A	N/A
1F - Toilets	N/A	N/A
2F - Office	NO (-21.3%)	NO
2F - Toilets	N/A	N/A
2F - Circulation	N/A	N/A
3F - Offices 1	NO (-26.1%)	NO
3F - Circulation 1	N/A	N/A
3F - Toilets	N/A	N/A
4F - Toilets	N/A	N/A
4F - Circulation	N/A	N/A
4F - Offices	NO (-79.4%)	NO
6F - Office	NO (-65.5%)	NO
6F - Circulation	N/A	N/A
6F - Toilets	N/A	N/A
5F - Toilets	N/A	N/A
5F - Circulation	N/A	N/A
5F - Office	NO (-52.2%)	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?	YES
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 [m²]	1686.3	1686.3
External area [m²]	1502.7	1502.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	4	3
Average conductance [W/K]	633.45	798.54
Average U-value [W/m²K]	0.42	0.53
Alpha value* [%]	15.17	16.45

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	0.96	6.27
Cooling	12.28	14.57
Auxiliary	4.13	3.98
Lighting	20.35	21.17
Hot water	8.09	9.36
Equipment*	39.15	39.15
TOTAL**	**45.82**	**55.35**

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

Energy Production by Technology [kWh/m²]

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

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	155.85	160.06
Primary energy* [kWh/m²]	138.9	136.82
Total emissions [kg/m²]	23.5	24.4

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	14.6	141.3	1	12.3	4.1	4.19	3.2	4.5	4.5
	Notional	18.5	141.6	6.3	14.6	4	0.82	2.7	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.22	B1F - Toilets_W_6
Floor	0.2	0.06	B1F - Circulation_S_3
Roof	0.15	0.18	2F - Office_R_5
Windows, roof windows, and rooflights	1.5	2.2	0F Mezz - Office_G_8
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

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

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	4

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name

New Section PV calculation - PLANNING USE UNLY

As designed

Date: Fri Jan 20 12:48:25 2017

Administrative information

Building Details

Address: 212-214 High Holborn, London, WC1V 7BF

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.2.g.3

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v4.7.0

BRUKL compliance check version: v5.2.g.3

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Russell Pridgeon

Telephone number: 0161 337 4353

Address: The Warehouse, Denton, M43 3DS

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

CO_2 emission rate from the notional building, $kgCO_2/m^2.annum$	24.4
Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	24.4
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	15.1
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 the building services should achieve reasonable overall standards of energy efficiency

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

Building fabric

Element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	Surface where the maximum value occurs*
Wall**	0.35	0.22	0.22	B1F - Toilets_W_6
Floor	0.25	0.07	0.1	B1F - Cycle Store_S_3
Roof	0.25	0.18	0.18	2F - Office_R_5
Windows***, roof windows, and rooflights	2.2	2.2	2.2	0F Mezz - Office_G_8
Personnel doors	2.2	-	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

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

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

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	4

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- Improved VRF mixed Mode

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.5	4.5	-	-	-
Standard value	0.91*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for gas single boiler systems <=2 MW output. For single boiler systems >2 MW or multi-boiler systems, (overall) limiting efficiency is 0.86. For any individual boiler in a multi-boiler system, limiting efficiency is 0.82.

1- Instantaneous Elec HWS

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	1	-
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		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
B1F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
B1F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
B1F - Cycle Store	-	-	-	0.8	-	-	-	-	-	0.7	0.5
B1F - Gym	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Offices	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Reception	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Cafe	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Circulation 1	-	-	-	0.8	-	-	-	-	-	0.7	0.5
0F Mezz - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
1F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I		
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard
2F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
2F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Offices 1	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Circulation 1	-	-	-	0.8	-	-	-	-	-	0.7	0.5
3F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
4F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
4F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
4F - Offices	-	-	-	0.8	-	-	-	-	-	0.7	0.5
6F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5
6F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
6F - Toilets	-	-	-	0.8	-	-	-	-	-	0.7	0.5
5F - Circulation	-	-	-	0.8	-	-	-	-	-	0.7	0.5
5F - Office	-	-	-	0.8	-	-	-	-	-	0.7	0.5

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
B1F - Toilets	-	100	-	123
B1F - Circulation	-	100	-	123
B1F - Cycle Store	100	-	-	27
B1F - Gym	-	100	-	152
0F - Circulation	-	100	-	44
0F - Offices	100	-	-	149
0F - Reception	-	100	100	148
0F - Cafe	-	100	100	163
0F - Toilets	-	100	-	62
0F Mezz - Office	100	-	-	798
0F Mezz - Circulation 1	-	100	-	42
0F Mezz - Toilets	-	100	-	62
1F - Office	100	-	-	842
1F - Circulation	-	100	-	56
1F - Toilets	-	100	-	92
2F - Office	100	-	-	815
2F - Toilets	-	100	-	73
2F - Circulation	-	100	-	47
3F - Offices 1	100	-	-	722
3F - Circulation 1	-	100	-	45
3F - Toilets	-	100	-	69
4F - Toilets	-	100	-	69
4F - Circulation	-	100	-	45
4F - Offices	100	-	-	1482
6F - Office	100	-	-	746

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	**Luminaire**	**Lamp**	**Display lamp**	**General lighting [W]**
Standard value	60	60	22	
6F - Circulation	-	100	-	57
6F - Toilets	-	100	-	69
5F - Circulation	-	100	-	57
5F - Office	100	-	-	746

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?
B1F - Toilets	N/A	N/A
B1F - Circulation	N/A	N/A
B1F - Cycle Store	N/A	N/A
B1F - Gym	N/A	N/A
0F - Circulation	N/A	N/A
0F - Offices	N/A	N/A
0F - Reception	N/A	N/A
0F - Cafe	N/A	N/A
0F - Toilets	N/A	N/A
0F Mezz - Office	NO (-60.2%)	NO
0F Mezz - Circulation 1	N/A	N/A
0F Mezz - Toilets	N/A	N/A
1F - Office	NO (-21.3%)	NO
1F - Circulation	N/A	N/A
1F - Toilets	N/A	N/A
2F - Office	NO (-21.3%)	NO
2F - Toilets	N/A	N/A
2F - Circulation	N/A	N/A
3F - Offices 1	NO (-26.1%)	NO
3F - Circulation 1	N/A	N/A
3F - Toilets	N/A	N/A
4F - Toilets	N/A	N/A
4F - Circulation	N/A	N/A
4F - Offices	NO (-79.4%)	NO
6F - Office	NO (-65.5%)	NO
6F - Circulation	N/A	N/A
6F - Toilets	N/A	N/A
5F - Circulation	N/A	N/A
5F - Office	NO (-52.2%)	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?	YES
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 [m²]	1686.3	1686.3
External area [m²]	1502.7	1502.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	4	3
Average conductance [W/K]	633.45	798.54
Average U-value [W/m²K]	0.42	0.53
Alpha value* [%]	15.17	16.45

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

Building Use

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	0.96	6.27
Cooling	12.28	14.57
Auxiliary	4.13	3.98
Lighting	20.35	21.17
Hot water	8.09	9.36
Equipment*	39.15	39.15
TOTAL**	**45.83**	**55.35**

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	16.15	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	155.85	160.06
Primary energy* [kWh/m²]	138.9	136.82
Total emissions [kg/m²]	15.1	24.4

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

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	14.6	141.3	1	12.3	4.1	4.19	3.2	4.5	4.5
	Notional	18.5	141.6	6.3	14.6	4	0.82	2.7	----	----

Key to terms

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

Key Features

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

Building fabric

Element	$U_{i\text{-}Typ}$	$U_{i\text{-}Min}$	Surface where the minimum value occurs*
Wall	0.23	0.22	B1F - Toilets_W_6
Floor	0.2	0.06	B1F - Circulation_S_3
Roof	0.15	0.18	2F - Office_R_5
Windows, roof windows, and rooflights	1.5	2.2	0F Mezz - Office_G_8
Personnel doors	1.5	-	"No external personnel doors"
Vehicle access & similar large doors	1.5	-	"No external vehicle access doors"
High usage entrance doors	1.5	-	"No external high usage entrance doors"

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

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

Air Permeability	Typical value	This building
m³/(h.m²) at 50 Pa	5	4