

Status Park, Heathrow

Energy and Sustainability Statement

Job No: 2767
Issued: November, 2018
Issue: 1



Contents

1.0	Executive Summary	3
2.0	Site and Proposal	4
3.0	Policy Context	5
4.0	Baseline Parameter and Energy Efficiency	7
5.0	Combined Heat and Power (CHP)	8
6.0	Renewable Technology	9
7.0	Be Lean, Be Clean, Be Green	10
8.0	Final Energy Results and Conclusions	11

Document Control

Author

SW

Date

26.11.18

Signature

Checker

BW

Date

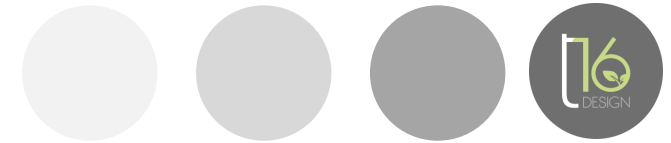
26.11.18

Signature



1.0 Executive Summary

- 1.1 This energy and sustainability report has been prepared for the proposed development of a 140 bed hotel (Class C1) in Status Park, Heathrow.
- 1.2 The purpose of the report is to determine the most suitable method for compliance with the energy requirements that the Local Authority require of the development.
- 1.3 Energy demand for new commercial building in the UK is calculated using the Simplified Building Energy Model (SbEM) method, resulting in a BRUKL calculation.
- 1.4 SBEM is used to demonstrate compliance with Part L of the Building Regulations. Although not intended as a design tool, it is increasingly being used as such, in particular to ascertain likely monthly energy and CO₂ emissions for planning purposes.
- 1.5 We have used an approved SBEM tool to make an initial assessment of the likely energy demand for the proposed development on the site.
- 1.6 A number of improvements beyond the requirements of Part L have been proposed, along with other sustainable building techniques which will enhance the scheme.
- 1.7 In all, the scheme will deliver an improvement of 37% when compared to a building constructed to Building Regulations standards.

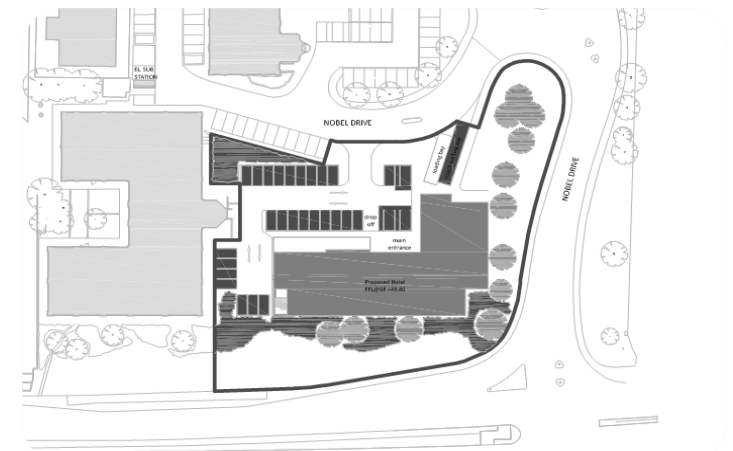


2.0 Site and Proposal

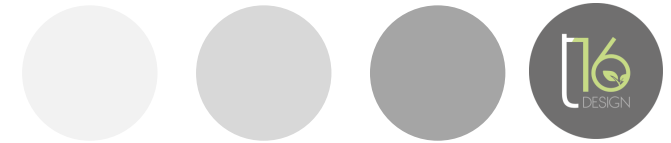
- 2.1 The proposed development is at Status Park to North of Heathrow Airport, at the junction of Bath Road and Noble Drive. The site is currently vacant of buildings.
- 2.2 The proposal is for the construction of a 140 bed hotel with a café/bar on the ground floor and ancillary parking facilities.
- 2.3 The site is in London Borough of Hillingdon. The area is characterised by commercial buildings and hotels, due to the large demand from the neighbouring airport.
- 2.4 As the site is in a London Borough it will be required to meet certain standards set out by the London Plan as well as locally imposed standards relating to Energy and Carbon emissions.



Satellite view as Existing



Site Layout as Proposed



3.0 Policy Context

- 3.1 Hillingdon is a borough of London therefore the local policy is derived from the London Plan which is an overall strategic plan for all new developments (domestic/non-domestic).
- 3.2 The latest iteration of London plan was published in July 2011 with amendments made in October 2013 and March 2015.
- 3.3 The key London Plan Policies used for this energy statement are:
- **Policy 5.2 Minimising carbon dioxide emissions:**
 - New developments should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:
 - Be lean: Use less energy
 - Be clean: supply energy efficiently
 - Be green: Use renewable energy

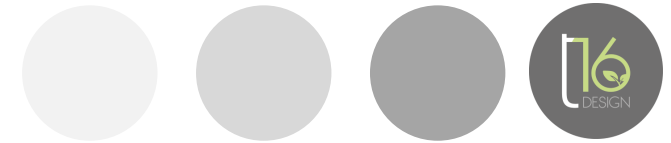


- Major developments should meet the targets for Carbon Dioxide emission reduction set out in table 3.1.

Date of planning application	Improvement relative to Building Regulations Part L 2013	
	Domestic	Non-Domestic
2010-2013	19%	19%
2013-2016	35%	35%
2016-2019	Zero Carbon	As Building Regulations
2019-2031		Zero Carbon

Table 3.1

- **Policy 5.6 Decentralised energy in development proposals:**
 - This policy would require the development proposal to assess the feasibility of CHP system and where a new CHP system is appropriate, to examine possibilities to extend it beyond the site boundary to offer the possibility to adjacent sites. It requires major development proposal to select energy systems in accordance with the following hierarchy.
 - Connection to existing heating or cooling networks
 - Site-wide CHP network
 - Communal heating and cooling



4.0 Baseline Parameter and Energy Efficiency

- 4.1 At this stage, not all Architectural details have been established. Our initial calculations have been formulated at the request of the architect that finds a balance between good design, efficiency of insulation and cost management.
- 4.2 The parameters used for the baseline calculations, used to achieve compliance with Part L 2013, are:
- We have assumed that Accredited Details are to be used and an initial calculation has been made for the "y" value
 - U Values of:
 - Ground Floor – 0.22 W/m²k
 - External Walls - 0.26 W/m²k
 - Exposed Roof – 0.18 W/m²k
 - Windows and Glazed Doors - 1.60 W/m²k
 - Personnel Doors – 2.20W/m²k
 - Air permeability of 8m³/hr/m² @50Pa
 - Gas-powered communal boiler with 91% efficiency
 - Hot Water Provided via gas-powered communal boiler
 - Ventilation provided via 0.3l/s fans in wet rooms.
- 4.3 This set of parameters would, on their own, show compliance with the requirements of Part L2A. However it would not achieve the required 35% reduction in CO₂ emissions.



5.0 Combined Heat and Power (CHP) and District Heating Networks (DHNs)

- 5.1 This section examines whether or not it is viable to connect the proposed development to an existing district heat network and the feasibility of on site CHP system.
- 5.2 Through research it has been discovered that there is a CHP facility located near Heathrow Terminal 2, opened in 2015. This would however not be available for use here, as it does not have the spare capacity to serve the proposed development.
- 5.3 The detailed design for the proposal will ensure that there is a possibility to connect to future District Heating Networks (DHNs). Capped pipework connections should be provided to a low loss header point in the plant room. 2no. 100mm diameter LTHW flow and return pipes should be connected to the low loss header to allow for the future connection of a heating network to the CHP infrastructure. This allows the heating network to provide heating to the apartment block.
- 5.4 On-site CHP would provide a higher overall efficiency than that achieved by grid electricity and individual building heating systems. A CHP system will be particularly suitable for the proposed development due to its high hot water demand and ability to use significant proportion of the generated electricity onsite.
- 5.5 Since the electricity is generated closer to where it is needed, losses in transmission and distribution are also reduced.
- 5.6 An on-site CHP system is therefore proposed.
- 5.7 Although the exact size of the CHP has not been fully ascertained at this stage, assumptions have been made in the SbEM calculations and further detail will be provided at detailed design stage.



6.0 Renewable Technology

6.1 In this section it will be determined what renewable technology is most suitable for this site. The table below shows the technologies considered.

Technology	Notes	Potential Solution
Solar Thermal Panels (ST)	ST technology will be in contradiction with the CHP hot water load and will provide only minimal net CO ₂ benefit.	✗
Photovoltaic Panels (PV)	Photovoltaics is a common, highly reliable and flexible technology which would benefit the site considerable. There can be a high upfront capital investment with comparatively minimal benefit on this development	✓
Biomass boiler	Space requirements for biomass boilers, and the associated fuel storage are considerably greater than for gas-fired boilers. Biomass requires regular fuel delivery for which will add to traffic accessing the which will be undesirable. Air quality is considered another issue with Biomass boilers.	✗
Ground Source Heat Pump	Heat pumps could be used to meet some or all of the space heating demand for the site, taking some of the heat load from the CHP. However, existing underground services on site also make this technology particularly challenging.	✗
Air Source Heat Pump	As above, air source heating pumps could be used to meet some or all of the space heating demand for the site. For the proposed development, this approach offers advantages from an M&E design perspective where the system can be designed to provide both the heating and cooling requirements within a space.	✓
Wind Turbine	Site height and radar restrictions will not permit stand or building integrated turbines on site. Wind turbines also suffer from poor performance in urban environments	✗

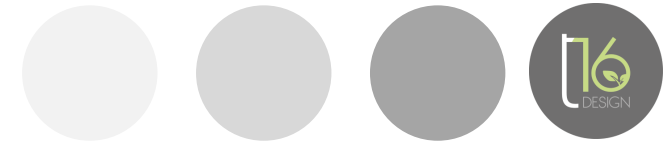
6.2 Through an analysis of the available systems, it has been determined that the most suitable renewable technology for the development are Air Source Heat Pumps to be used to heat and cool the offices, reception, lobby & cafe/bar.



7.0 Be Lean, Be Clean, Be Green

- 7.1 The London Plan specifies this hierarchy when dealing with carbon reduction.
- 7.2 "Be Lean" refers to reducing energy demand through passive means - this has been explained earlier in the report.
- 7.3 "Be Clean" refers to CHP and low carbon heat generation, again dealt with in full within the report.
- 7.4 "Be Green" refers to supplying the remaining energy requirements with renewable technology where possible. This is to be achieved with the use of photovoltaic panels as detailed.
- 7.5 It is considered helpful to show the reduction in emissions at each stage of this process in tabular form. As the baseline calculation already shows compliance with L2A, there is no need for further reductions under the "be lean" category.

Status Park – Reduction of CO2 emissions compared to Part L2A 2013		
Stage	Tonnes Of CO ₂	% Reduction
Baseline: 2013 Part L2A	351.34	-
Be Lean	351.34	0.00%
Be Clean	221.50	36.96%
Be Green	221.02	37.10%



8.0 Final Energy Results and Conclusions

- 8.1 This report has outlined a strategy to comply with the energy requirements set out in the London Plan.
- 8.2 Our recommendation at this stage, which will meet the policy requirement 35% reduction over part L1A and L2A 2013 as required by the London Plan and 27% total emissions (regulated and unregulated) reduction through the use of fabric improvements and renewables, is that the development uses a communal CHP system for heating and hot water, combined with an Air Source Heat Pump system.
- 8.3 The development will comply with policy 5.2 of the London which requires all developments to achieve greater than 35% reduction over Part L2A 2013.
- 8.4 The report has explored the use of clean energy via the hierarchy set out in the London Plan. Consideration has been undertaken and the site could be future proofed to allow for future connections to a DHN.



Studio 105,
37 Queen Street
Colchester
CO1 2PQ

01206 572452
info@t16design.com

This report has been prepared for the exclusive use of the commissioning party and may not be reproduced without prior written permission from T16 Design. All work has been carried out within the terms of the brief using all reasonable skill, care and diligence. No liability is accepted by T16 Design for the accuracy of data or opinions provided by others in the preparation of this report, or for any use of this report other than for the purpose for which it was produced.



Appendix 1 –SbEM/BRUKL Outputs



Assumption used during SBEM 'Prelim Design Stage' BRUKL calculations

Project: **Status Park**

Date and/or Version: **16 November 2018 - Ver. 02**

Building Regulations: **2013 L2A**

Element	Assumptions for Design Stage	Info required at 'As-Built' stage
Power Factor	<0.95 (default value)	N/A
Exposed walls	Maximum 0.26 W/m ² K	Letter confirming construction details & u-values
Exposed Roof/Ceiling	Maximum 0.18 W/m ² K	Letter confirming construction details & u-values
Exposed Ground/Floor	Maximum 0.22 W/m ² K	Letter confirming construction details & u-values
Accredited Construction Details	None	N/A
Air Tightness	Maximum 8.00 at 50 Pa (m ³ /hr-m ²)	Air Pressure Test Certificate
Openings	Max. 2.20 for Doors and 1.60 W/m ² K for all Glazing (including frame) with a solar energy transmittance of 55%. Glazing has been set at 30% average area	BFRC or Manufacturers certificates
Luminous Efficacy	Min. 90 Lumens/Watt (LOR of 100%)	Detailed specification and letter of confirmation of installed items
Lamp Type	LED	As above
Occupancy sensing	Manual-On-Auto-Off sensors (with a max 0.05 W/m ² parasitic power)	As above
Lighting Monitoring & Targeting	N/A	N/A
Heating/Cooling (minimum efficiencies)	ASHP with min. Heating SCOP of 3.80 and Cooling EER of 3.40 & SEER of 5.00 for the Office, Reception, Lobby & Cafe/Bar. The rest of the hotel to have CHP system with 94% gas Boiler efficiency as backup for 10% of the time. CHP with min. 44% seasonal heat efficiency (for 90% of the time) and a min. Heat to Power Ratio of 1.44	Manual, ETL specification or Certificate of installation
Controls	Central Time, Local Time, Local Temperature, Weather and Optimum Start/Stop controls	As above
HVAC Monitoring & Targeting	N/A	N/A
Local Extract	Max. 0.50 (W/l-s) SFP in Toilet/Ensuite areas (remote from zone). Max. 1.0 for Kitchen area with grease filter	Make and model numbers
Mechanical Ventilation	None	N/A
Heat Recovery system	None	N/A
Hot Water System	From CHP for 90% and Boiler for 10% of the time with HWS storage (min. heat losses apply)	Letter confirming installation or certificate
Renewables	None (ASHP for some areas/zones)	N/A

Note: BRUKL calculations have been prepared for **prelim** planning application. These will need to be updated if the above assumptions change for the 'Design' stage. These calculations will also need to be repeated at the 'As-Built' stage to show compliance with Part L.





London Plan Compliance

Values from BRUKL Reports

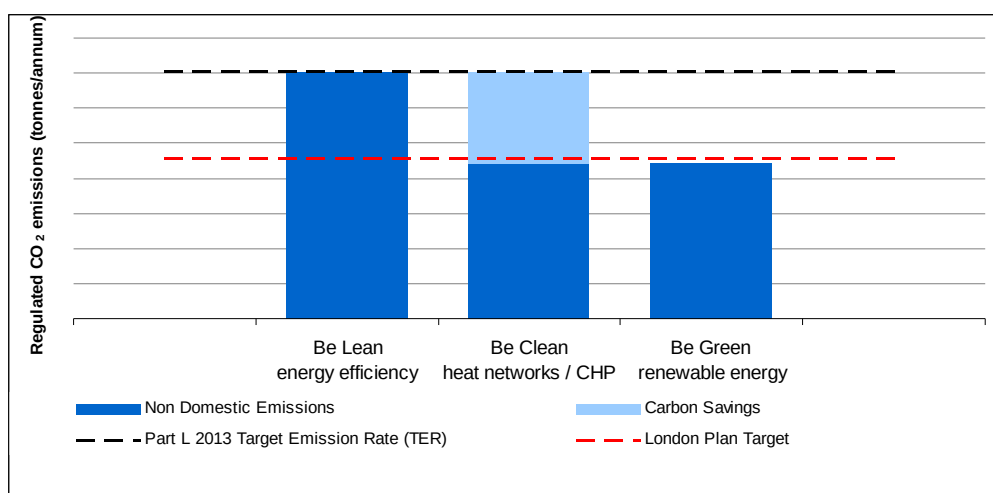
Area	4,773.70	m2
Part L 2013 Target Emission Rate (TER)	73.60	kg/Co2/m2
London Plan Target	35.00	%
Baseline : 2013 Part L2A 2013 (same as TER)	73.60	kg/Co2/m2
After energy demand reduction (Be Lean 02)	73.60	kg/Co2/m2
After heat network / CHP (Be Clean 03)	46.40	kg/Co2/m2
After renewable energy (Be Green 04)	46.30	kg/Co2/m2

Non Domestic: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for non-domestic buildings

	Carbon dioxide emissions for non-domestic buildings (Tonnes CO2 per annum)	
	Regulated	Unregulated
Baseline: 2013 Part L2A 2013	351.34	
After energy demand reduction (Be Lean)	351.34	
After heat network / CHP (Be Clean)	221.50	
After renewable energy (Be Green)	221.02	

Non Domestic: Regulated carbon dioxide savings from each stage of the Energy Hierarchy for non-domestic buildings

	Regulated non-domestic carbon dioxide savings	
	(Tonnes CO2 per annum)	(%)
Savings from energy demand reduction (Be Lean)	0.00	0.00
Savings from heat network / CHP (Be Clean)	129.84	36.96
Savings from renewable energy (Be Green)	0.48	0.14
Total Cumulative Savings	130.32	37.09



Data for chart

	Non Domestic Emissions	Carbon Savings
Be Lean - Energy efficiency	351.34	0.00
Be Clean - Heat networks / CHP	221.50	129.84
Be Green - Renewable energy	221.02	0.48

Project name

Status Park - Be Lean & TER as Baseline**As designed****Date:** Fri Nov 16 16:57:18 2018**Administrative information****Building Details****Address:** ,**Certification tool****Calculation engine:** SBEM**Calculation engine version:** v5.4.b.0**Interface to calculation engine:** DesignBuilder SBEM**Interface to calculation engine version:** v5.4.0**BRUKL compliance check version:** v5.4.b.0**Owner Details****Name:****Telephone number:****Address:** , ,**Certifier details****Name:** Levent Ulfet**Telephone number:** 020 8150 8288**Address:** EPC Expert Ltd (www.EpcExpert.com), The Enterprise Centre Cranborne Road Potters Bar, EN6 3DQ**Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target**

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	73.6
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	73.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	73.6
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.26	0.26	L00 - Circ 01_W_6
Floor	0.25	0.22	0.22	L00 - Ensuite 05_S_3
Roof	0.25	0.18	0.18	L00 - Circ 03 - Lifts_R_11
Windows***, roof windows, and rooflights	2.2	1.6	1.6	L00 - Bed 01-05_G_7
Personnel doors	2.2	2.2	2.2	L00 - Circ 01_D_10
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 -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs. ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. *** Display windows and similar glazing are excluded from the U-value check. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	8

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- CHP replaced with 91% efficiency Boiler

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	-	-	-	-
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.					

2- ASHP replaced with 91% efficient boiler

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	3.4	-	-	-
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- HWS from 91% Boiler

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0
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		Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1			
L00 - Ensuite 05	-	-	0.5	-	-	-	-	-	-	-	-	N/A
L00 - Circ 01	-	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Circ 03 - Lifts	-	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Circ 04	-	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 04 - Linen	-	-	-	-	-	-	-	-	-	-	-	N/A
L00 - WC x3	-	-	0.5	-	-	-	-	-	-	-	-	N/A
L00 - Bed 01-05	-	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Lobby 01	-	-	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
L00 - Circ 02 - Stairs	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 03	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Store 06 - Beer	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 05	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Staff 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Plant 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 02 - Bins	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Kitchen 01	-	-	-	-	-	-	-	-	1	-	N/A
L00 - Ensuite 06	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Bed 06-10	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 01-08	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Circ 01	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Bed 12-16	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 15-16	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 09-11	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 12	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 13-14	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Store 02	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 17	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 18-19	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 20-21	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 22-23	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 24-25	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 26	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 05-06	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 11	-	-	0.5	-	-	-	-	-	-	-	N/A
L02 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A
L05 - Bed 01-08	-	-	-	-	-	-	-	-	-	-	N/A
L05 - Circ 01	-	-	-	-	-	-	-	-	-	-	N/A
L05 - Bed 12-16	-	-	-	-	-	-	-	-	-	-	N/A
L05 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L05 - Ensuite 15-16	-	-	0.5	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I			
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1	Zone	Standard	
L05 - Bed 09-11	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 12	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 13-14	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Store 02	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 17	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 18-19	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 20-21	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 22-23	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 24-25	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 26	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 05-06	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 11	-	-	0.5	-	-	-	-	-	-	-	N/A	
L00 - Reception 01	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Lobby 02 - Reception	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Office 01	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Cafe & Bar	-	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L00 - Ensuite 05		-	80	-	28
L00 - Circ 01		-	80	-	176
L00 - Circ 03 - Lifts		-	80	-	260
L00 - Circ 04		-	80	-	129
L00 - Store 04 - Linen		80	-	-	36
L00 - WC x3		-	80	-	151
L00 - Bed 01-05		-	80	-	289
L00 - Lobby 01		-	80	-	32
L00 - Circ 02 - Stairs		-	80	-	275
L00 - Store 03		80	-	-	25
L00 - Ensuite 01-02		-	80	-	46
L00 - Ensuite 03-04		-	80	-	51
L00 - Store 06 - Beer		80	-	-	13
L00 - Store 05		80	-	-	17
L00 - Store 01		80	-	-	31
L00 - Staff 01		80	-	-	256
L00 - Plant 01		80	-	-	196
L00 - Store 02 - Bins		80	-	-	32

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L00 - Kitchen 01		-	80	-	356
L00 - Ensuite 06		-	80	-	23
L00 - Bed 06-10		-	80	-	269
L00 - Ensuite 07-08		-	80	-	45
L00 - Ensuite 09-10		-	80	-	45
L01 - Bed 01-08		-	80	-	388
L01 - Circ 01		-	80	-	278
L01 - Bed 12-16		-	80	-	223
L01 - Store 01		80	-	-	22
L01 - Ensuite 15-16		-	80	-	34
L01 - Bed 09-11		-	80	-	140
L01 - Ensuite 12		-	80	-	17
L01 - Ensuite 09-10		-	80	-	34
L01 - Ensuite 13-14		-	80	-	34
L01 - Store 02		80	-	-	9
L01 - Ensuite 17		-	80	-	17
L01 - Bed 17-26		-	80	-	466
L01 - Ensuite 18-19		-	80	-	34
L01 - Ensuite 20-21		-	80	-	34
L01 - Ensuite 22-23		-	80	-	34
L01 - Ensuite 24-25		-	80	-	34
L01 - Ensuite 26		-	80	-	17
L01 - Ensuite 01-02		-	80	-	34
L01 - Ensuite 03-04		-	80	-	40
L01 - Ensuite 05-06		-	80	-	32
L01 - Ensuite 07-08		-	80	-	26
L01 - Ensuite 11		-	80	-	16
L02 - Bed 17-26		-	80	-	466
L05 - Bed 01-08		-	80	-	388
L05 - Circ 01		-	80	-	278
L05 - Bed 12-16		-	80	-	223
L05 - Store 01		80	-	-	22
L05 - Ensuite 15-16		-	80	-	34
L05 - Bed 09-11		-	80	-	140
L05 - Ensuite 12		-	80	-	17
L05 - Ensuite 09-10		-	80	-	34
L05 - Ensuite 13-14		-	80	-	34
L05 - Store 02		80	-	-	9
L05 - Ensuite 17		-	80	-	17
L05 - Bed 17-26		-	80	-	466
L05 - Ensuite 18-19		-	80	-	34
L05 - Ensuite 20-21		-	80	-	34
L05 - Ensuite 22-23		-	80	-	34

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L05 - Ensuite 24-25		-	80	-	34
L05 - Ensuite 26		-	80	-	17
L05 - Ensuite 01-02		-	80	-	34
L05 - Ensuite 03-04		-	80	-	40
L05 - Ensuite 05-06		-	80	-	32
L05 - Ensuite 07-08		-	80	-	26
L05 - Ensuite 11		-	80	-	16
L00 - Reception 01		-	80	22	44
L00 - Lobby 02 - Reception		-	80	22	264
L00 - Office 01		80	-	-	144
L00 - Cafe & Bar		-	80	22	269

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?
L00 - Ensuite 05	N/A	N/A
L00 - Bed 01-05	NO (-31.1%)	NO
L00 - Ensuite 01-02	N/A	N/A
L00 - Ensuite 03-04	N/A	N/A
L00 - Staff 01	NO (-3.1%)	NO
L00 - Ensuite 06	N/A	N/A
L00 - Bed 06-10	NO (-8.7%)	NO
L00 - Ensuite 07-08	N/A	N/A
L00 - Ensuite 09-10	N/A	N/A
L01 - Bed 01-08	NO (-47.4%)	NO
L01 - Bed 12-16	NO (-28.8%)	NO
L01 - Ensuite 15-16	N/A	N/A
L01 - Bed 09-11	NO (-34.7%)	NO
L01 - Ensuite 12	N/A	N/A
L01 - Ensuite 09-10	N/A	N/A
L01 - Ensuite 13-14	N/A	N/A
L01 - Ensuite 17	N/A	N/A
L01 - Bed 17-26	NO (-28%)	NO
L01 - Ensuite 18-19	N/A	N/A
L01 - Ensuite 20-21	N/A	N/A
L01 - Ensuite 22-23	N/A	N/A
L01 - Ensuite 24-25	N/A	N/A
L01 - Ensuite 26	N/A	N/A
L01 - Ensuite 01-02	N/A	N/A
L01 - Ensuite 03-04	N/A	N/A
L01 - Ensuite 05-06	N/A	N/A
L01 - Ensuite 07-08	N/A	N/A
L01 - Ensuite 11	N/A	N/A
L02 - Bed 17-26	NO (-28%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L05 - Bed 01-08	NO (-47.4%)	NO
L05 - Bed 12-16	NO (-28.8%)	NO
L05 - Ensuite 15-16	N/A	N/A
L05 - Bed 09-11	NO (-34.7%)	NO
L05 - Ensuite 12	N/A	N/A
L05 - Ensuite 09-10	N/A	N/A
L05 - Ensuite 13-14	N/A	N/A
L05 - Ensuite 17	N/A	N/A
L05 - Bed 17-26	NO (-28%)	NO
L05 - Ensuite 18-19	N/A	N/A
L05 - Ensuite 20-21	N/A	N/A
L05 - Ensuite 22-23	N/A	N/A
L05 - Ensuite 24-25	N/A	N/A
L05 - Ensuite 26	N/A	N/A
L05 - Ensuite 01-02	N/A	N/A
L05 - Ensuite 03-04	N/A	N/A
L05 - Ensuite 05-06	N/A	N/A
L05 - Ensuite 07-08	N/A	N/A
L05 - Ensuite 11	N/A	N/A
L00 - Reception 01	N/A	N/A
L00 - Lobby 02 - Reception	N/A	N/A
L00 - Office 01	NO (-38.3%)	NO
L00 - Cafe & Bar	NO (-8.7%)	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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	4773.7	4773.7
External area [m ²]	4573.8	4573.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	8	3
Average conductance [W/K]	2130.16	2597.72
Average U-value [W/m ² K]	0.47	0.57
Alpha value* [%]	15.49	15.39

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

Building Use

% Area Building Type

A1/A2 Retail/Financial and Professional services
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution

100 C1 Hotels

C2 Residential Institutions: Hospitals and Care Homes
C2 Residential Institutions: Residential schools
C2 Residential Institutions: Universities and colleges
C2A Secure Residential Institutions
Residential spaces
D1 Non-residential Institutions: Community/Day Centre
D1 Non-residential Institutions: Libraries, Museums, and Galleries
D1 Non-residential Institutions: Education
D1 Non-residential Institutions: Primary Health Care Building
D1 Non-residential Institutions: Crown and County Courts
D2 General Assembly and Leisure, Night Clubs, and Theatres
Others: Passenger terminals
Others: Emergency services
Others: Miscellaneous 24hr activities
Others: Car Parks 24 hrs
Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	54.47	60.75
Cooling	0.77	0.84
Auxiliary	10.1	7.46
Lighting	10.46	11.32
Hot water	235.2	234.23
Equipment*	16.77	16.77
TOTAL **	311	314.6

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

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	227.27	267.32
Primary energy* [kWh/m ²]	418.89	418.6
Total emissions [kg/m ²]	73.6	73.6

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

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	160.5	60.2	54.9	0	10.5	0.81	0	0.91	0
	Notional	180.2	80.2	61.1	0	7.7	0.82	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	129.8	275.2	42.5	21.5	0	0.85	3.55	0.91	5
	Notional	149.1	304.5	50.6	23.5	0	0.82	3.6	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.26	L00 - Circ 01_W_6
Floor	0.2	0.22	L00 - Ensuite 05_S_3
Roof	0.15	0.18	L00 - Circ 03 - Lifts_R_11
Windows, roof windows, and rooflights	1.5	1.6	L00 - Bed 01-05_G_7
Personnel doors	1.5	2.2	L00 - Circ 01_D_10
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-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-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	8

Project name

Status Park - Be Clean

As designed

Date: Fri Nov 16 16:46:03 2018

Administrative information**Building Details**

Address: ,

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.4.b.0

Interface to calculation engine: DesignBuilder SBEM

Interface to calculation engine version: v5.4.0

BRUKL compliance check version: v5.4.b.0

Owner Details

Name:

Telephone number:

Address: , ,

Certifier details

Name: Levent Ulfet

Telephone number: 020 8150 8288

Address: The Enterprise Centre Cranborne Road, Potters Bar, EN6 3DQ

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

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	73.6
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	73.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	46.4
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.26	0.26	L00 - Circ 01_W_6
Floor	0.25	0.22	0.22	L00 - Ensuite 05_S_3
Roof	0.25	0.18	0.18	L00 - Circ 03 - Lifts_R_11
Windows***, roof windows, and rooflights	2.2	1.6	1.6	L00 - Bed 01-05_G_7
Personnel doors	2.2	2.2	2.2	L00 - Circ 01_D_10
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 -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs. ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. *** Display windows and similar glazing are excluded from the U-value check. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	8

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- CHP (with Boiler as backup)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	-	-	-
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.					

2- ASHP replaced with 91% efficient boiler

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.91	3.4	-	-	-
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- HWS from CHP (with Boiler as backup)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0
Standard value	N/A	N/A

1- CHP 1

	CHPQA quality index	CHP electrical efficiency
This building	110	0.31
Standard value	105	0.2

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
L00 - Ensuite 05		-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Circ 01		-	-	-	-	-	-	-	-	-	-	N/A
L00 - Circ 03 - Lifts		-	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
L00 - Circ 04	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 04 - Linen	-	-	-	-	-	-	-	-	-	-	N/A
L00 - WC x3	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Bed 01-05	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Lobby 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Circ 02 - Stairs	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 03	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Store 06 - Beer	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 05	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Staff 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Plant 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 02 - Bins	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Kitchen 01	-	-	-	-	-	-	-	-	1	-	N/A
L00 - Ensuite 06	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Bed 06-10	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 01-08	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Circ 01	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Bed 12-16	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 15-16	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 09-11	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 12	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 13-14	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Store 02	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 17	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 18-19	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 20-21	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 22-23	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 24-25	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 26	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 05-06	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 11	-	-	0.5	-	-	-	-	-	-	-	N/A
L02 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A

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	
L05 - Bed 01-08	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Circ 01	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Bed 12-16	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 15-16	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Bed 09-11	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 12	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 13-14	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Store 02	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 17	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 18-19	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 20-21	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 22-23	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 24-25	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 26	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 05-06	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 11	-	-	0.5	-	-	-	-	-	-	-	N/A	
L00 - Reception 01	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Lobby 02 - Reception	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Office 01	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Cafe & Bar	-	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L00 - Ensuite 05		-	80	-	28
L00 - Circ 01		-	80	-	176
L00 - Circ 03 - Lifts		-	80	-	260
L00 - Circ 04		-	80	-	129
L00 - Store 04 - Linen		80	-	-	36
L00 - WC x3		-	80	-	151
L00 - Bed 01-05		-	80	-	289
L00 - Lobby 01		-	80	-	32
L00 - Circ 02 - Stairs		-	80	-	275
L00 - Store 03		80	-	-	25
L00 - Ensuite 01-02		-	80	-	46
L00 - Ensuite 03-04		-	80	-	51
L00 - Store 06 - Beer		80	-	-	13

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L00 - Store 05		80	-	-	17
L00 - Store 01		80	-	-	31
L00 - Staff 01		80	-	-	256
L00 - Plant 01		80	-	-	196
L00 - Store 02 - Bins		80	-	-	32
L00 - Kitchen 01		-	80	-	356
L00 - Ensuite 06		-	80	-	23
L00 - Bed 06-10		-	80	-	269
L00 - Ensuite 07-08		-	80	-	45
L00 - Ensuite 09-10		-	80	-	45
L01 - Bed 01-08		-	80	-	388
L01 - Circ 01		-	80	-	278
L01 - Bed 12-16		-	80	-	223
L01 - Store 01		80	-	-	22
L01 - Ensuite 15-16		-	80	-	34
L01 - Bed 09-11		-	80	-	140
L01 - Ensuite 12		-	80	-	17
L01 - Ensuite 09-10		-	80	-	34
L01 - Ensuite 13-14		-	80	-	34
L01 - Store 02		80	-	-	9
L01 - Ensuite 17		-	80	-	17
L01 - Bed 17-26		-	80	-	466
L01 - Ensuite 18-19		-	80	-	34
L01 - Ensuite 20-21		-	80	-	34
L01 - Ensuite 22-23		-	80	-	34
L01 - Ensuite 24-25		-	80	-	34
L01 - Ensuite 26		-	80	-	17
L01 - Ensuite 01-02		-	80	-	34
L01 - Ensuite 03-04		-	80	-	40
L01 - Ensuite 05-06		-	80	-	32
L01 - Ensuite 07-08		-	80	-	26
L01 - Ensuite 11		-	80	-	16
L02 - Bed 17-26		-	80	-	466
L05 - Bed 01-08		-	80	-	388
L05 - Circ 01		-	80	-	278
L05 - Bed 12-16		-	80	-	223
L05 - Store 01		80	-	-	22
L05 - Ensuite 15-16		-	80	-	34
L05 - Bed 09-11		-	80	-	140
L05 - Ensuite 12		-	80	-	17
L05 - Ensuite 09-10		-	80	-	34
L05 - Ensuite 13-14		-	80	-	34
L05 - Store 02		80	-	-	9

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L05 - Ensuite 17		-	80	-	17
L05 - Bed 17-26		-	80	-	466
L05 - Ensuite 18-19		-	80	-	34
L05 - Ensuite 20-21		-	80	-	34
L05 - Ensuite 22-23		-	80	-	34
L05 - Ensuite 24-25		-	80	-	34
L05 - Ensuite 26		-	80	-	17
L05 - Ensuite 01-02		-	80	-	34
L05 - Ensuite 03-04		-	80	-	40
L05 - Ensuite 05-06		-	80	-	32
L05 - Ensuite 07-08		-	80	-	26
L05 - Ensuite 11		-	80	-	16
L00 - Reception 01		-	80	22	44
L00 - Lobby 02 - Reception		-	80	22	264
L00 - Office 01		80	-	-	144
L00 - Cafe & Bar		-	80	22	269

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?
L00 - Ensuite 05	N/A	N/A
L00 - Bed 01-05	NO (-31.1%)	NO
L00 - Ensuite 01-02	N/A	N/A
L00 - Ensuite 03-04	N/A	N/A
L00 - Staff 01	NO (-3.1%)	NO
L00 - Ensuite 06	N/A	N/A
L00 - Bed 06-10	NO (-8.7%)	NO
L00 - Ensuite 07-08	N/A	N/A
L00 - Ensuite 09-10	N/A	N/A
L01 - Bed 01-08	NO (-47.4%)	NO
L01 - Bed 12-16	NO (-28.8%)	NO
L01 - Ensuite 15-16	N/A	N/A
L01 - Bed 09-11	NO (-34.7%)	NO
L01 - Ensuite 12	N/A	N/A
L01 - Ensuite 09-10	N/A	N/A
L01 - Ensuite 13-14	N/A	N/A
L01 - Ensuite 17	N/A	N/A
L01 - Bed 17-26	NO (-28%)	NO
L01 - Ensuite 18-19	N/A	N/A
L01 - Ensuite 20-21	N/A	N/A
L01 - Ensuite 22-23	N/A	N/A
L01 - Ensuite 24-25	N/A	N/A
L01 - Ensuite 26	N/A	N/A
L01 - Ensuite 01-02	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L01 - Ensuite 03-04	N/A	N/A
L01 - Ensuite 05-06	N/A	N/A
L01 - Ensuite 07-08	N/A	N/A
L01 - Ensuite 11	N/A	N/A
L02 - Bed 17-26	NO (-28%)	NO
L05 - Bed 01-08	NO (-47.4%)	NO
L05 - Bed 12-16	NO (-28.8%)	NO
L05 - Ensuite 15-16	N/A	N/A
L05 - Bed 09-11	NO (-34.7%)	NO
L05 - Ensuite 12	N/A	N/A
L05 - Ensuite 09-10	N/A	N/A
L05 - Ensuite 13-14	N/A	N/A
L05 - Ensuite 17	N/A	N/A
L05 - Bed 17-26	NO (-28%)	NO
L05 - Ensuite 18-19	N/A	N/A
L05 - Ensuite 20-21	N/A	N/A
L05 - Ensuite 22-23	N/A	N/A
L05 - Ensuite 24-25	N/A	N/A
L05 - Ensuite 26	N/A	N/A
L05 - Ensuite 01-02	N/A	N/A
L05 - Ensuite 03-04	N/A	N/A
L05 - Ensuite 05-06	N/A	N/A
L05 - Ensuite 07-08	N/A	N/A
L05 - Ensuite 11	N/A	N/A
L00 - Reception 01	N/A	N/A
L00 - Lobby 02 - Reception	N/A	N/A
L00 - Office 01	NO (-38.3%)	NO
L00 - Cafe & Bar	NO (-8.7%)	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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	4773.7	4773.7
External area [m ²]	4573.8	4573.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	8	3
Average conductance [W/K]	2130.16	2597.72
Average U-value [W/m ² K]	0.47	0.57
Alpha value* [%]	15.49	15.39

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

Building Use

% Area Building Type

A1/A2 Retail/Financial and Professional services
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution

100 C1 Hotels

C2 Residential Institutions: Hospitals and Care Homes
C2 Residential Institutions: Residential schools
C2 Residential Institutions: Universities and colleges
C2A Secure Residential Institutions
Residential spaces
D1 Non-residential Institutions: Community/Day Centre
D1 Non-residential Institutions: Libraries, Museums, and Galleries
D1 Non-residential Institutions: Education
D1 Non-residential Institutions: Primary Health Care Building
D1 Non-residential Institutions: Crown and County Courts
D2 General Assembly and Leisure, Night Clubs, and Theatres
Others: Passenger terminals
Others: Emergency services
Others: Miscellaneous 24hr activities
Others: Car Parks 24 hrs
Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	94.58	60.75
Cooling	0.77	0.84
Auxiliary	10.1	7.46
Lighting	10.46	11.32
Hot water	437.8	234.23
Equipment*	16.77	16.77
TOTAL **	400.29	314.6

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

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	153.43	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	227.27	267.32
Primary energy* [kWh/m ²]	243.99	418.6
Total emissions [kg/m ²]	46.4	73.6

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

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	16.1	60.2	5.3	0	10.5	0.84	0	0.94	0
	Notional	180.2	80.2	61.1	0	7.7	0.82	0	----	----
[ST] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	129.8	275.2	42.5	21.5	0	0.85	3.55	0.91	5
	Notional	149.1	304.5	50.6	23.5	0	0.82	3.6	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.26	L00 - Circ 01_W_6
Floor	0.2	0.22	L00 - Ensuite 05_S_3
Roof	0.15	0.18	L00 - Circ 03 - Lifts_R_11
Windows, roof windows, and rooflights	1.5	1.6	L00 - Bed 01-05_G_7
Personnel doors	1.5	2.2	L00 - Circ 01_D_10
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-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-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	8

Project name

Status Park - Be Green**As designed****Date:** Fri Nov 16 15:58:12 2018**Administrative information****Building Details****Address:** ,**Certification tool****Calculation engine:** SBEM**Calculation engine version:** v5.4.b.0**Interface to calculation engine:** DesignBuilder SBEM**Interface to calculation engine version:** v5.4.0**BRUKL compliance check version:** v5.4.b.0**Owner Details****Name:****Telephone number:****Address:** , ,**Certifier details****Name:** Levent Ulfet**Telephone number:** 020 8150 8288**Address:** The Enterprise Centre Cranborne Road, Potters Bar, EN6 3DQ**Criterion 1: The calculated CO₂ emission rate for the building must not exceed the target**

CO ₂ emission rate from the notional building, kgCO ₂ /m ² .annum	73.6
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	73.6
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	46.3
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.26	0.26	L00 - Circ 01_W_6
Floor	0.25	0.22	0.22	L00 - Ensuite 05_S_3
Roof	0.25	0.18	0.18	L00 - Circ 03 - Lifts_R_11
Windows***, roof windows, and rooflights	2.2	1.6	1.6	L00 - Bed 01-05_G_7
Personnel doors	2.2	2.2	2.2	L00 - Circ 01_D_10
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 -Limit = Limiting area-weighted average U-values [W/(m ² K)] U _a -Calc = Calculated area-weighted average U-values [W/(m ² K)] U _i -Calc = Calculated maximum individual element U-values [W/(m ² K)]				
* There might be more than one surface where the maximum U-value occurs. ** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows. *** Display windows and similar glazing are excluded from the U-value check. N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.				

Air Permeability	Worst acceptable standard	This building
m ³ /(h.m ²) at 50 Pa	10	8

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- CHP (with Boiler as backup)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.94	-	-	-	-
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.					

2- Air Source Heat Pumps

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	3.8	3.4	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- HWS from CHP (with Boiler as backup)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	Hot water provided by HVAC system	0
Standard value	N/A	N/A

1- CHP 1

	CHPQA quality index	CHP electrical efficiency
This building	110	0.31
Standard value	105	0.2

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
	Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
L00 - Ensuite 05		-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Circ 01		-	-	-	-	-	-	-	-	-	-	N/A
L00 - Circ 03 - Lifts		-	-	-	-	-	-	-	-	-	-	N/A

Zone name	SFP [W/(l/s)]									HR efficiency	
ID of system type	A	B	C	D	E	F	G	H	I	Zone	Standard
Standard value	0.3	1.1	0.5	1.9	1.6	0.5	1.1	0.5	1		
L00 - Circ 04	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 04 - Linen	-	-	-	-	-	-	-	-	-	-	N/A
L00 - WC x3	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Bed 01-05	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Lobby 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Circ 02 - Stairs	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 03	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Store 06 - Beer	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 05	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Staff 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Plant 01	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Store 02 - Bins	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Kitchen 01	-	-	-	-	-	-	-	-	1	-	N/A
L00 - Ensuite 06	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Bed 06-10	-	-	-	-	-	-	-	-	-	-	N/A
L00 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A
L00 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 01-08	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Circ 01	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Bed 12-16	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 15-16	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 09-11	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 12	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 13-14	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Store 02	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 17	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A
L01 - Ensuite 18-19	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 20-21	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 22-23	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 24-25	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 26	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 05-06	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A
L01 - Ensuite 11	-	-	0.5	-	-	-	-	-	-	-	N/A
L02 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A

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	
L05 - Bed 01-08	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Circ 01	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Bed 12-16	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Store 01	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 15-16	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Bed 09-11	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 12	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 09-10	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 13-14	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Store 02	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 17	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Bed 17-26	-	-	-	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 18-19	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 20-21	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 22-23	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 24-25	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 26	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 01-02	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 03-04	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 05-06	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 07-08	-	-	0.5	-	-	-	-	-	-	-	N/A	
L05 - Ensuite 11	-	-	0.5	-	-	-	-	-	-	-	N/A	
L00 - Reception 01	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Lobby 02 - Reception	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Office 01	-	-	-	-	-	-	-	-	-	-	N/A	
L00 - Cafe & Bar	-	-	-	-	-	-	-	-	-	-	N/A	

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L00 - Ensuite 05		-	80	-	28
L00 - Circ 01		-	80	-	176
L00 - Circ 03 - Lifts		-	80	-	260
L00 - Circ 04		-	80	-	129
L00 - Store 04 - Linen		80	-	-	36
L00 - WC x3		-	80	-	151
L00 - Bed 01-05		-	80	-	289
L00 - Lobby 01		-	80	-	32
L00 - Circ 02 - Stairs		-	80	-	275
L00 - Store 03		80	-	-	25
L00 - Ensuite 01-02		-	80	-	46
L00 - Ensuite 03-04		-	80	-	51
L00 - Store 06 - Beer		80	-	-	13

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L00 - Store 05		80	-	-	17
L00 - Store 01		80	-	-	31
L00 - Staff 01		80	-	-	256
L00 - Plant 01		80	-	-	196
L00 - Store 02 - Bins		80	-	-	32
L00 - Kitchen 01		-	80	-	356
L00 - Ensuite 06		-	80	-	23
L00 - Bed 06-10		-	80	-	269
L00 - Ensuite 07-08		-	80	-	45
L00 - Ensuite 09-10		-	80	-	45
L01 - Bed 01-08		-	80	-	388
L01 - Circ 01		-	80	-	278
L01 - Bed 12-16		-	80	-	223
L01 - Store 01		80	-	-	22
L01 - Ensuite 15-16		-	80	-	34
L01 - Bed 09-11		-	80	-	140
L01 - Ensuite 12		-	80	-	17
L01 - Ensuite 09-10		-	80	-	34
L01 - Ensuite 13-14		-	80	-	34
L01 - Store 02		80	-	-	9
L01 - Ensuite 17		-	80	-	17
L01 - Bed 17-26		-	80	-	466
L01 - Ensuite 18-19		-	80	-	34
L01 - Ensuite 20-21		-	80	-	34
L01 - Ensuite 22-23		-	80	-	34
L01 - Ensuite 24-25		-	80	-	34
L01 - Ensuite 26		-	80	-	17
L01 - Ensuite 01-02		-	80	-	34
L01 - Ensuite 03-04		-	80	-	40
L01 - Ensuite 05-06		-	80	-	32
L01 - Ensuite 07-08		-	80	-	26
L01 - Ensuite 11		-	80	-	16
L02 - Bed 17-26		-	80	-	466
L05 - Bed 01-08		-	80	-	388
L05 - Circ 01		-	80	-	278
L05 - Bed 12-16		-	80	-	223
L05 - Store 01		80	-	-	22
L05 - Ensuite 15-16		-	80	-	34
L05 - Bed 09-11		-	80	-	140
L05 - Ensuite 12		-	80	-	17
L05 - Ensuite 09-10		-	80	-	34
L05 - Ensuite 13-14		-	80	-	34
L05 - Store 02		80	-	-	9

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L05 - Ensuite 17		-	80	-	17
L05 - Bed 17-26		-	80	-	466
L05 - Ensuite 18-19		-	80	-	34
L05 - Ensuite 20-21		-	80	-	34
L05 - Ensuite 22-23		-	80	-	34
L05 - Ensuite 24-25		-	80	-	34
L05 - Ensuite 26		-	80	-	17
L05 - Ensuite 01-02		-	80	-	34
L05 - Ensuite 03-04		-	80	-	40
L05 - Ensuite 05-06		-	80	-	32
L05 - Ensuite 07-08		-	80	-	26
L05 - Ensuite 11		-	80	-	16
L00 - Reception 01		-	80	22	44
L00 - Lobby 02 - Reception		-	80	22	264
L00 - Office 01		80	-	-	144
L00 - Cafe & Bar		-	80	22	269

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?
L00 - Ensuite 05	N/A	N/A
L00 - Bed 01-05	NO (-31.1%)	NO
L00 - Ensuite 01-02	N/A	N/A
L00 - Ensuite 03-04	N/A	N/A
L00 - Staff 01	NO (-3.1%)	NO
L00 - Ensuite 06	N/A	N/A
L00 - Bed 06-10	NO (-8.7%)	NO
L00 - Ensuite 07-08	N/A	N/A
L00 - Ensuite 09-10	N/A	N/A
L01 - Bed 01-08	NO (-47.4%)	NO
L01 - Bed 12-16	NO (-28.8%)	NO
L01 - Ensuite 15-16	N/A	N/A
L01 - Bed 09-11	NO (-34.7%)	NO
L01 - Ensuite 12	N/A	N/A
L01 - Ensuite 09-10	N/A	N/A
L01 - Ensuite 13-14	N/A	N/A
L01 - Ensuite 17	N/A	N/A
L01 - Bed 17-26	NO (-28%)	NO
L01 - Ensuite 18-19	N/A	N/A
L01 - Ensuite 20-21	N/A	N/A
L01 - Ensuite 22-23	N/A	N/A
L01 - Ensuite 24-25	N/A	N/A
L01 - Ensuite 26	N/A	N/A
L01 - Ensuite 01-02	N/A	N/A

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L01 - Ensuite 03-04	N/A	N/A
L01 - Ensuite 05-06	N/A	N/A
L01 - Ensuite 07-08	N/A	N/A
L01 - Ensuite 11	N/A	N/A
L02 - Bed 17-26	NO (-28%)	NO
L05 - Bed 01-08	NO (-47.4%)	NO
L05 - Bed 12-16	NO (-28.8%)	NO
L05 - Ensuite 15-16	N/A	N/A
L05 - Bed 09-11	NO (-34.7%)	NO
L05 - Ensuite 12	N/A	N/A
L05 - Ensuite 09-10	N/A	N/A
L05 - Ensuite 13-14	N/A	N/A
L05 - Ensuite 17	N/A	N/A
L05 - Bed 17-26	NO (-28%)	NO
L05 - Ensuite 18-19	N/A	N/A
L05 - Ensuite 20-21	N/A	N/A
L05 - Ensuite 22-23	N/A	N/A
L05 - Ensuite 24-25	N/A	N/A
L05 - Ensuite 26	N/A	N/A
L05 - Ensuite 01-02	N/A	N/A
L05 - Ensuite 03-04	N/A	N/A
L05 - Ensuite 05-06	N/A	N/A
L05 - Ensuite 07-08	N/A	N/A
L05 - Ensuite 11	N/A	N/A
L00 - Reception 01	N/A	N/A
L00 - Lobby 02 - Reception	N/A	N/A
L00 - Office 01	NO (-38.3%)	NO
L00 - Cafe & Bar	NO (-8.7%)	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?	YES

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m ²]	4773.7	4773.7
External area [m ²]	4573.8	4573.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	8	3
Average conductance [W/K]	2130.16	2597.72
Average U-value [W/m ² K]	0.47	0.57
Alpha value* [%]	15.49	15.39

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

Building Use

% Area Building Type

A1/A2 Retail/Financial and Professional services
A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
B1 Offices and Workshop businesses
B2 to B7 General Industrial and Special Industrial Groups
B8 Storage or Distribution

100 C1 Hotels

C2 Residential Institutions: Hospitals and Care Homes
C2 Residential Institutions: Residential schools
C2 Residential Institutions: Universities and colleges
C2A Secure Residential Institutions
Residential spaces
D1 Non-residential Institutions: Community/Day Centre
D1 Non-residential Institutions: Libraries, Museums, and Galleries
D1 Non-residential Institutions: Education
D1 Non-residential Institutions: Primary Health Care Building
D1 Non-residential Institutions: Crown and County Courts
D2 General Assembly and Leisure, Night Clubs, and Theatres
Others: Passenger terminals
Others: Emergency services
Others: Miscellaneous 24hr activities
Others: Car Parks 24 hrs
Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	93.42	59.55
Cooling	0.77	0.84
Auxiliary	10.1	7.46
Lighting	10.46	11.32
Hot water	437.8	234.23
Equipment*	16.77	16.77
TOTAL **	399.13	313.4

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

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

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	153.43	0
Solar thermal systems	0	0

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	227.27	267.32
Primary energy* [kWh/m ²]	243.25	418.22
Total emissions [kg/m ²]	46.3	73.6

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

HVAC Systems Performance										
System Type	Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEFF	Cool SSEER	Heat gen SEFF	Cool gen SEER	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Natural Gas										
	Actual	16.1	60.2	5.3	0	10.5	0.84	0	0.94	0
	Notional	180.2	80.2	61.1	0	7.7	0.82	0	----	----
[ST] Split or multi-split system, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	129.8	275.2	10.2	21.5	0	3.54	3.55	3.8	5
	Notional	149.1	304.5	17	23.5	0	2.43	3.6	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.26	L00 - Circ 01_W_6
Floor	0.2	0.22	L00 - Ensuite 05_S_3
Roof	0.15	0.18	L00 - Circ 03 - Lifts_R_11
Windows, roof windows, and rooflights	1.5	1.6	L00 - Bed 01-05_G_7
Personnel doors	1.5	2.2	L00 - Circ 01_D_10
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-Typ} = Typical individual element U-values [W/(m²K)]		U _{i-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	8