

Avonmouth House, London Borough of Southwark
Energy Strategy

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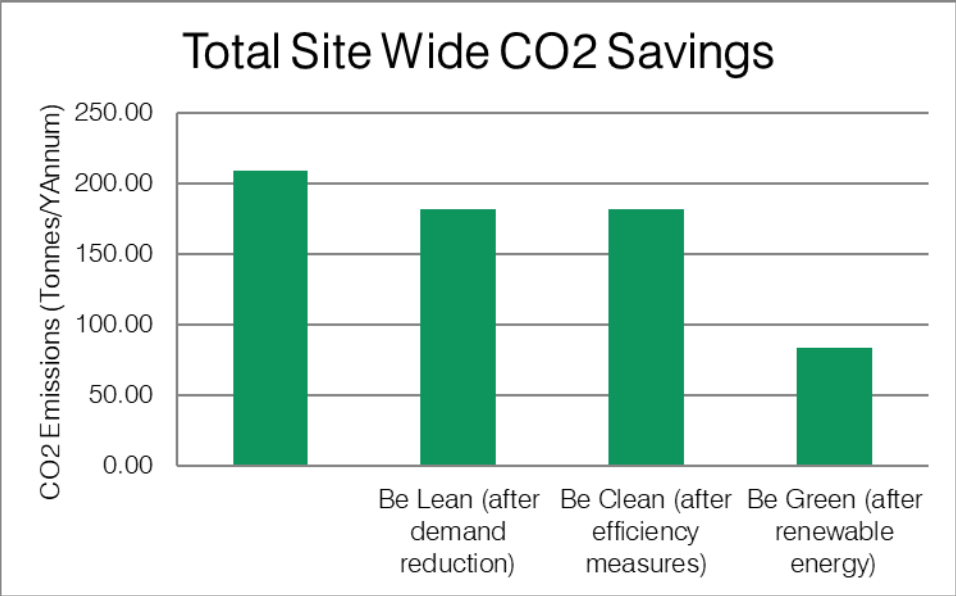
Executive Summary

This energy strategy has been prepared for the proposed development of Avonmouth House. The proposed development consists of the demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and/or Class F1(a) education use and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure.

This report demonstrates how the proposed development addresses local planning policies relating to energy.

Following the energy hierarchy, passive design measures, energy efficient equipment have been proposed, resulting in achieved a 58.9% saving for the development as a whole. The heating and cooling hierarchies have also been followed. An offset payment is proposed to achieve zero carbon overall.

The design team have made all reasonable endeavours to achieve the maximum carbon savings. The fabric performs significantly better than building regulations minimum standards, highly efficient systems are specified, including an ASHP for providing low carbon heating and hot water and the PV system utilises all available roof space.



1 Introduction

This energy strategy has been prepared for the proposed development at Avonmouth House in order to meet the sustainability requirements of the London Plan and the London Borough of Southwark

The site is situated in London Borough of Southwark. The proposed development consists of the demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and/or Class F1(a) education use and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure. The site area is shown in Figure 1-1 below.

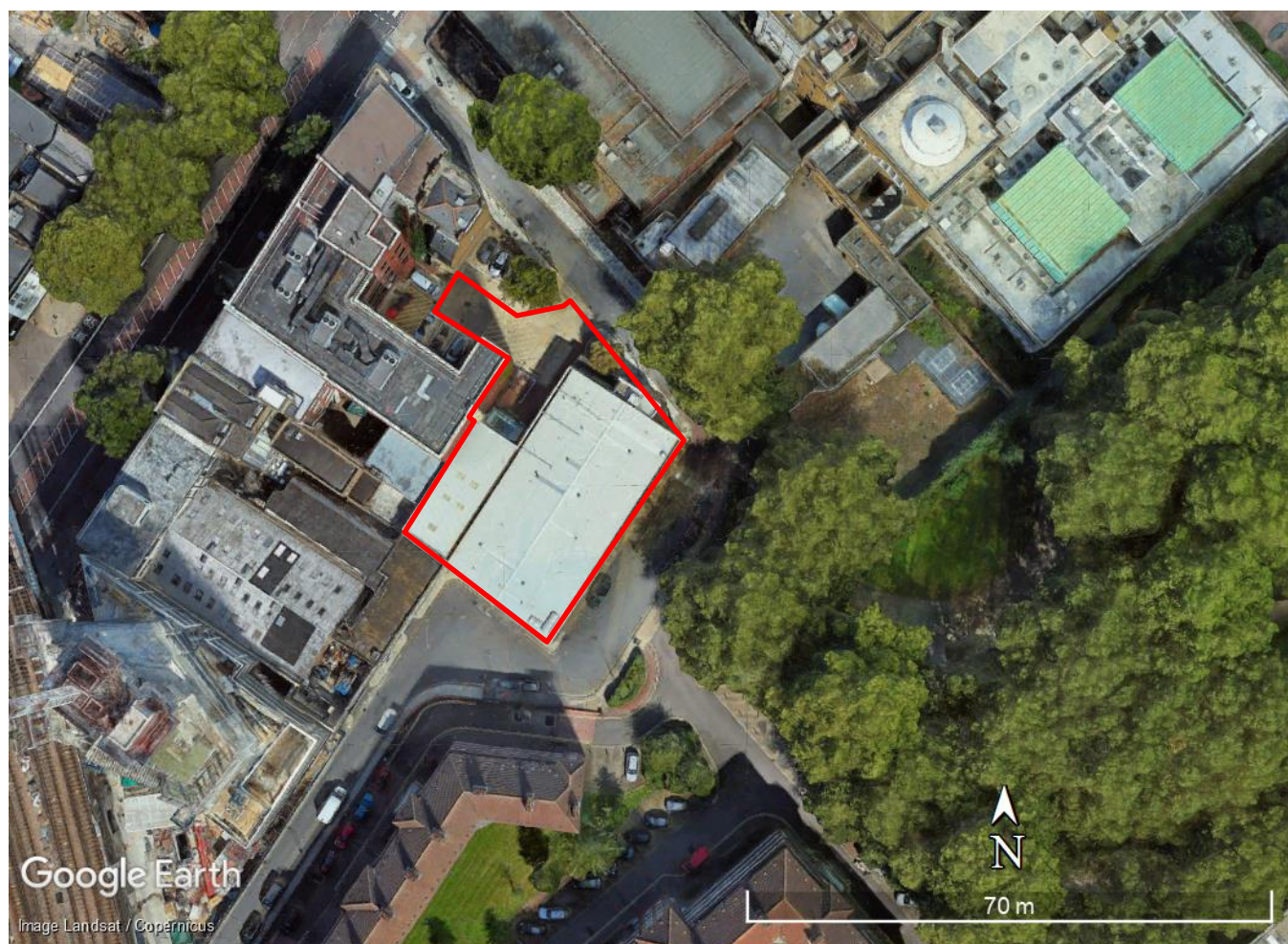


Figure 1-1 – Avonmouth House Site location

1.1 Assessment approach

This report summarises the work undertaken to support the development of an energy strategy for the new development, following the energy hierarchy 'Be Lean, Be Clean, Be Green, Be Seen'.

Energy calculations have been carried out using IES VE Apache tool to produce separate BRUKLS for the employment and student sections of the development. These are used to assess the impact on energy demand and CO₂ emissions of improvements through the hierarchy and demonstrate

the most appropriate solution for the development to meet the relevant planning requirements. The SAP 10 carbon factors have been used to calculate the carbon emissions for the development.

2 Policy

2.1 Southwark Core Strategy 2011

Strategic Policy 13 – High environmental standards

Our approach is:

Development will help us live and work in a way that respects the limits of the planet's natural resources, reduces pollution and damage to the environment and helps us adapt to climate change.

We will do this by:

1. Requiring development to meet the highest possible environmental standards, including targets based on the Code for Sustainable Homes and BREEAM.
2. Requiring all new development to be designed and built to minimise greenhouse gas emissions across its lifetime. This will be achieved by applying the energy hierarchy:
 - Designing all developments so that they require as little energy as possible to build and use.
 - Expecting all major developments to set up and/or connect to local energy generation networks where possible. We will develop local energy networks across Southwark.
 - Requiring developments to use low and zero carbon sources of energy.
3. Enabling existing buildings to become more energy efficient and make use of low and zero carbon sources of energy.

2.2 New Southwark Plan

The following policy from the draft New Southwark Plan have been identified as having relevance to the developments energy strategy.

P69 Energy

Energy Hierarchy

Development must minimise carbon emissions on site in accordance with the following energy hierarchy:

1. Be lean (energy efficient design and construction); then
2. Be clean (low carbon energy supply); then
3. Be green (on site renewable energy generation and storage).

Targets for major development

Major development must reduce carbon dioxide emissions on site by:

1. 100% on 2013 Building Regulations Part L standards for residential development; and

2. A minimum of 40% on 2013 Buildings Regulations Part L and zero carbon (100%) for non-residential developments.
3. Any shortfall against carbon emissions reduction requirements must be secured off site through, planning obligations or as a financial contribution.

Decentralised energy

Major development must be designed to incorporate decentralised energy in accordance with the following hierarchy:

1. Connect to an existing decentralised energy network; then
2. Be future-proofed to connect to a planned decentralised energy network; or
3. Implement a site-wide low carbon communal heating system; and
4. Explore and evaluate the potential to oversize the communal heating system for connection and supply to adjacent sites and, where feasible be implemented.

2.3 The London Plan

Policy SI 2 Minimising greenhouse gas emissions

- A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
 1. be lean: use less energy and manage demand during operation
 2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
 3. be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
 4. be seen: monitor, verify and report on energy performance.
- B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.
- C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
 - a. through a cash in lieu contribution to the borough's carbon offset fund, or
 - b. off-site provided that an alternative proposal is identified, and delivery is certain.
- D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.
- E. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

- F. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Policy SI 3 Energy infrastructure

- A. Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.
- B. Energy masterplans should be developed for large-scale development locations (such as those outlined in Part A and other opportunities) which establish the most effective energy supply options. Energy masterplans should identify:
 1. major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)
 2. heat loads from existing buildings that can be connected to future phases of a heat network
 3. major heat supply plant including opportunities to utilise heat from energy from waste plants
 4. secondary heat sources, including both environmental and waste heat
 5. opportunities for low and ambient temperature heat networks
 6. possible land for energy centres and/or energy storage
 7. possible heating and cooling network routes
 8. opportunities for futureproofing utility infrastructure networks to minimise the impact from road works
 9. infrastructure and land requirements for electricity and gas supplies
 10. implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector
 11. opportunities to maximise renewable electricity generation and incorporate demand-side response measures.
- C. Development Plans should:
 1. identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure
 2. identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and inter-connecting existing networks as well as establishing new networks.
- D. Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:
 1. the heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

- 2. connect to local existing or planned heat networks
 - 3. use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)
 - 4. use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)
 - 5. use ultra-low NOx gas boilers
 - 6. CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality
 - 7. where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.
- E. Heat networks should achieve good practice design and specification standards for primary, secondary and tertiary systems comparable to those set out in the CIBSE/ADE Code of Practice CP1 or equivalent.

Policy SI 4 Managing heat risk

- A. Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.
- B. Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:
 - 1. reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
 - 2. minimise internal heat generation through energy efficient design
 - 3. manage the heat within the building through exposed internal thermal mass and high ceilings
 - 4. provide passive ventilation
 - 5. provide mechanical ventilation
 - 6. provide active cooling systems.

3 Energy Strategy

An energy strategy has been developed following the energy hierarchy ‘Be Lean, Be Clean, Be Green’, ‘Be Seen’. Energy calculations using Building Regulations approved and accredited software have been undertaken at each stage to calculate the savings associated with the measures incorporated.

The energy consumption and carbon emission figures within this report have been calculated using IES VE Apache tool to produce separate BRUKLS for employment use and/or community health hub and/or education use and student sections of the development.

For the purposes of energy modelling, the Class E employment use and/or community health hub and/or Class F1(a) education use section has been treated as office space.

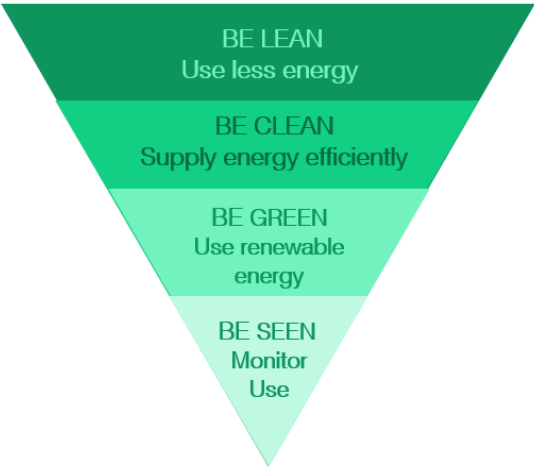


Figure 3-01 The Energy Hierarchy

3.1 Energy Targets

In line with the London Plan and the New Southwark plan, there is a target of zero carbon for the development, with at least a 40% reduction over Part L 2013. Table 3-01 and 3-02 detail the energy and carbon breakdown of the Part L target emission rate. The SAP 10 Carbon Factors have been used for all calculations for the development.

Use Type	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)						Electricity CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	HW	Cooling	Pumps & Fans	Lighting	Total	
Student	172,428	687,269	859,697	180,536	0	0	0	31,409	94,228	122,497	28,542
Employment	8,624	4,639	13,263	2,785	0	0	10,115	3,048	32,621	44,639	10,401
Total	181,052	691,907	872,960	183,322	0	0	10,115	34,457	126,849	167,136	38,943

Table 3-01 Target regulated energy demand and carbon emissions per energy source

Use Type	Total Energy (kWh/yr)	Total CO2 (kg/yr)
Student	982,193	209,078
Employment	57,902	13,186
Total	1,040,095	222,264

Table 3-02 Total target regulated energy demand and carbon emissions

3.2 Be Lean

As part of the Be Lean approach, passive design measures have been considered throughout the pre-planning stage to reduce initial energy demand.

Solar Gain Control and Daylight

Solar gains are a passive form of heating from the sun's radiation and are beneficial to a building during winter months as they provide an effective source of heat and reduce internal heating requirements. However, during summer months they must be controlled in order to mitigate the risk of overheating. They can be controlled through glazing and shading design in order to allow low level winter sun to enter the building and to limit access to high level summer sun.

The glazing strategy design has carefully considered orientation and window size in order to maximise daylight while controlling excessive solar gains. Glazing will incorporate low emissivity coatings to limit overheating without compromising light transmittance.

Overheating

The building follows the steps in the cooling hierarchy to minimise overheating. A separate dynamic overheating assessment has been conducted, please refer to the overheating report for further details.

Building Fabric

Designing an efficient thermal envelope will greatly reduce the need for space heating and cooling as heat transmittance through the thermal elements is reduced. Low air permeability rates will also reduce heating and cooling energy demand by reducing the volume of air that can penetrate the building. As part of a ‘fabric first’ approach, the building fabric has been carefully considered and specified to meet or exceed current Building Regulations minimum requirements, as detailed in Table 3-03 below.

Fabric Component	Proposed Student Specification	Proposed Employment Specification
External Walls	0.15 W/m²K	0.15 W/m²K
Basement walls	0.15 W/m²K	0.15 W/m²K
Internal Partition between heated/unheated spaces	0.30 W/m²K	0.30 W/m²K
Roof	0.13 W/m²K	0.15 W/m²K
Ground Floor	0.15 W/m²K	0.15 W/m²K
Exposed Floor	0.13 W/m²K	0.15 W/m²K
Windows (including glazed doors)	1.2 W/m²K, G-value 0.40	1.2 W/m²K, G-value 0.40
External Doors	1.5 W/m²K	1.5 W/m²K
Air Tightness	3 m³/m²/h	3 m³/m²/h

Table 3-03 Proposed Be Lean passive design measures

Building Services

A communal gas boiler has been assumed for Be Lean calculations only, in line with the guidance in the London plan, and does not reflect the energy strategy of the development. A communal gas boiler of 96% seasonal efficiency has been used in the be lean calculations. Systems have been specified to maximise efficiency therefore reducing energy used to deliver services. The services for the Employment space are assumed at this point, as the end use if not known. Table 3-04 shows the proposed services strategy and energy efficiency measures for the development.

Services Component	Proposed Student Specification	Assumed Employment Specification
Space Heating	Communal Gas boiler, 96% efficient assumed for Be Lean	Communal Gas boiler, 96% efficient assumed for Be Lean
Domestic Hot Water	Communal Gas boiler, 96% efficient assumed for Be Lean	Communal Gas boiler, 96% efficient assumed for Be Lean
Cooling	-	VRF, SEER 5.6

Ventilation	MVHR 85% efficient, SFP 0.95 W/l/s Demand control based on occupant density	MVHR 85% efficient, SFP 0.95 W/l/s
Lighting & Controls	LED lighting, 100lm/W, occupancy sensors in circulation spaces, daylight dimming and occupancy sensors in living areas, Display lighting 60 lm/W	LED lighting, 100lm/W, daylight dimming on ground and 1 st floor spaces, occupancy sensors throughout, Display lighting 60 lm/W
Metering	Metering with warnings for out of range values for HVAC & lighting	Metering with warnings for out of range values for HVAC & lighting
Power Factor Correction	0.95	0.95

Table 3-04 Proposed energy efficient design measures

Energy Use

The breakdown of carbon and energy use has been identified for the site. Table 3-05 and 3-06 show the breakdown of carbon and energy use once the strategies proposed at the be lean stage are incorporated.

Use Type	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)						Electricity CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	HW	Cooling	Pumps & Fans	Lighting	Total	
Student	69,647	685,759	755,406	158,635	0	0	0	56,063	46,216	99,721	23,235
Employment	3,098	4,622	7,720	1,621	0	0	8,892	5,191	17,885	31,169	7,262
Total	72,745	690,381	763,126	160,256	0	0	8,892	61,254	64,100	130,890	30,497

Table 3-05 Be Lean regulated energy demand and carbon emissions per energy source

Use Type	Total Energy (kWh/yr)	Total CO2 (kg/yr)
Student	855,127	181,870
Employment	38,889	8,884
Total	894,016	190,754

Table 3-06 Be Lean target regulated energy demand and carbon emissions

Carbon Savings

Table 3-07 and Figure 3-02 demonstrates the percentage improvement over the notional baseline levels for the be lean stage. Overall, the development demonstrates a 14.2% reduction in CO2 emissions over the gas boiler baseline scenario. This does not meet the London plan target of 15%, however all reasonable measures have been taken to maximise be lean savings.

	Student			Employment			Site Wide		
	CO2 Emissions (tonnes /annum)	CO2 Savings (tonnes /annum)	% Saving	CO2 Emissions (tonnes /annum)	CO2 Savings (tonnes /annum)	% Saving	CO2 Emissions (tonnes /annum)	CO2 Savings (tonnes /annum)	% Saving
Baseline	209.08			13.19			222.26		
Be Lean	181.87	27.21	13.0%	8.88	4.30	32.6%	190.75	31.51	14.2%

Table 3-07 Be Lean improvements over building regulations gas boiler baseline

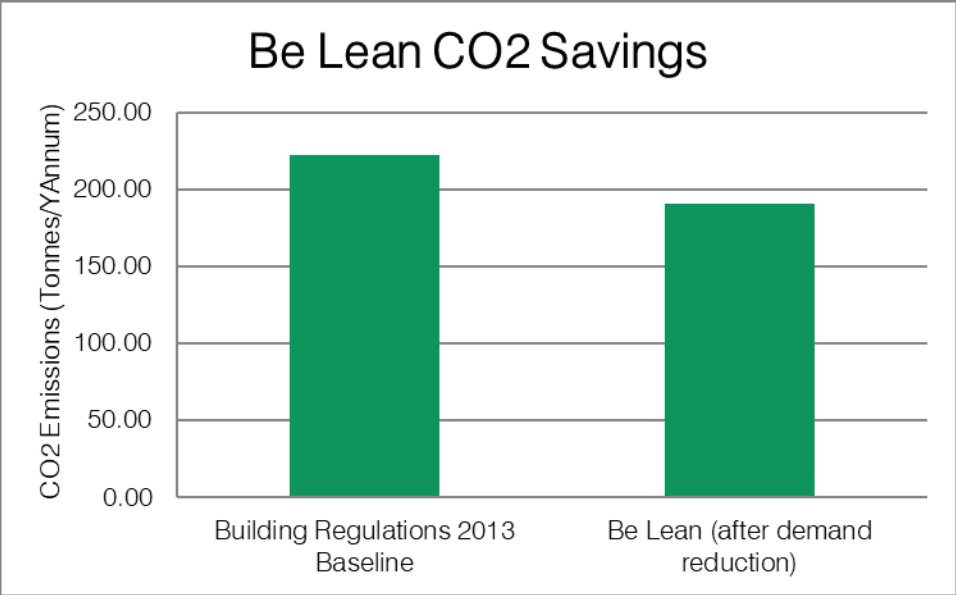


Figure 3-02 Be Lean improvement over the building regulations gas boiler baseline

The student section of the development achieves a 13.0% saving at the be lean stage. Although this does not achieve the target of 15% for non-residential, this is greater than the London plan target for residential development, and the nature of the building is for residential purposes.

The development does not meet the 15% target at the be lean stage, due to the high energy use attributed to domestic hot water (DHW) for student developments within the NCM methodology. Within the baseline scenario, DHW represents 68.8% of the overall buildings CO2 emissions.

This means that measures such as efficient fabric and lighting, which drastically reduce the energy demand for heating and lighting, have relatively little impact on the overall be lean savings, as DHW is so dominate. The development has employed an extremely efficient fabric, MVHR and efficient lighting and controls to halve the baseline emissions for heating and lighting at the be lean stage.

Feedback received from completed student schemes has also generally indicated that the NCM methodology massively overestimates the DHW demand of student schemes, so it is highly unlikely to be as high as indicated in the building regulation calculations. Water efficient appliances will also be installed within the scheme to reduce water use for showering and washing, which will reduce hot water demand for the development, however there is no way to account for this within the energy calculations.

The only available measure to reduce carbon emissions from DHW at the be lean stage is Waste Water Heat Recovery (WWHR). WWHR can help to reduce energy demand and therefore carbon emissions. For multi-tenanted buildings, particularly student accommodation, some issues have been identified with maintenance. The efficiency of the system will drop over time due to scum, dirt etc., that goes down the drain. Significant maintenance programs will be required to stop this. The technology is not widely used due to low overall savings compared to installation costs. Feasibility studies general indicate that the energy savings from WWHR are not as significant as energy modelling demonstrates. This means the real world cost savings in terms of energy reduction is quite low when compared to the cost of installation and maintenance of WWHR technology, and that the payback period for the technology can be longer then the design life of the development and the installed technology. There are also some concerns about the increased risk of legionella, due to the fact that some water will remain in the pipes once pre-warmed, at a temperature of 20-

30 degrees, which is a breeding temperature for legionella. Although this risk is not thought to be extremely high, it is still a cause for concern. This is again particularly relevant in buildings like these where occupancy can be more sporadic. For these reasons the use of WWHR has been discounted

Be Lean Savings – DHW excluded

In order to demonstrate that the development is making Be Lean savings, but is limited by the extremely high hot water demand attributed to student accommodation under part L, calculations have been conducted with all DHW excluded.

These are shown in table 3-08, and demonstrate that the development achieves extremely high be lean stage savings, when just looking at heating, cooling, ventilation and lighting. The student section achieves 41.5% savings across these categories, and the employment section achieves 35.2% savings across these categories. Overall the site wide savings are 40.5% at the be lean stage, with DHW excluded.

	Student			Employment			Site Wide		
	CO ₂ Emissions (tonnes /annum)	CO ₂ Savings (tonnes /annum)	% Saving	CO ₂ Emissions (tonnes /annum)	CO ₂ Savings (tonnes /annum)	% Saving	CO ₂ Emissions (tonnes /annum)	CO ₂ Savings (tonnes /annum)	% Saving
Baseline	64.75			12.21			76.96		
Be Lean	37.86	26.89	41.5%	7.91	4.30	35.2%	45.77	31.19	40.5%

Table 3-08 Be Lean improvements over building regulations gas boiler baseline

3.3 Be Clean

As part of the Be Clean approach, the use of energy efficient equipment, heat networks and community heating have been considered.

The development is located near elephant and castle roundabout. The london heat map does not demonstrate that any existing or proposed networks run close to the site.

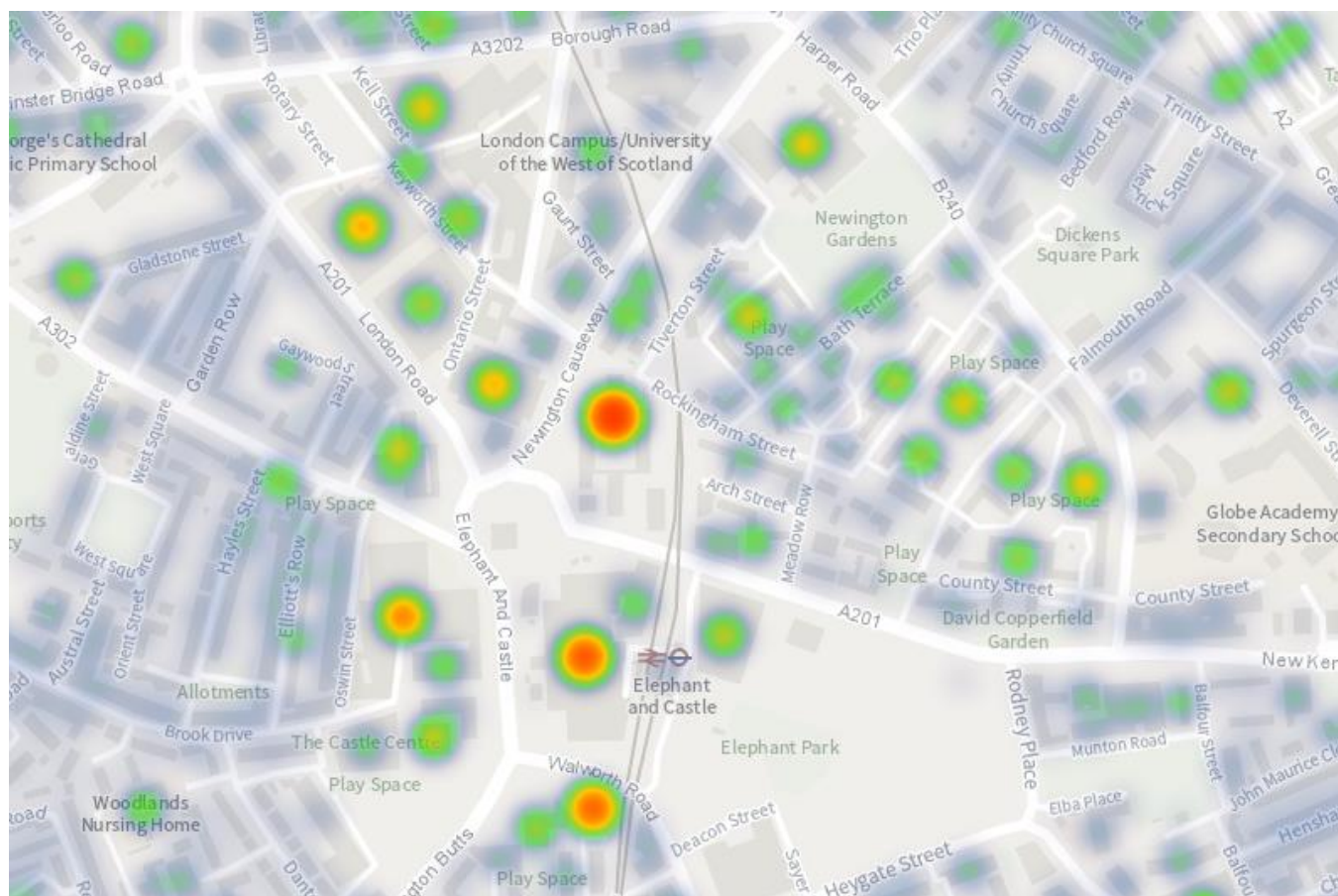


Figure 3-03 London Heat Map for Avonmouth House and surrounding area

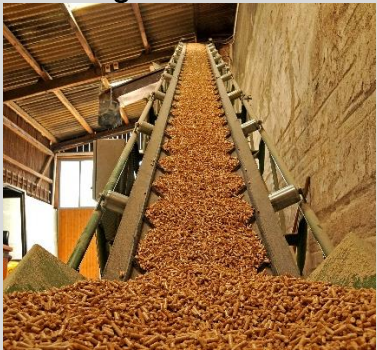
E.ON, the operator of the heat network at nearby Elephant Park, were also contacted regarding the feasibility of connection to their heat network. They confirmed that the site is too far away from any current proposed route for the network, and that it would not be feasible to connect to. A letter of confirmation from E.ON regarding discussions is shown in the Appendix.

Efficient systems for energy delivery have also been investigated. At the scale of this development, Combined Heat and Power (CHP) systems are not viable. CHP requires a high base energy demand load in order to operate efficiently. It is usually more suited to hotel or hospital schemes which have a high hot water demand, or very large residential schemes incorporating hundreds of units. With the continued decarbonisation of the grid over the buildings lifespan, in the long term, CHP is also not viewed as the ideal technology for reducing carbon emissions.

The development will incorporate a community heating system, with a communal heating system for the student section. This will futureproof the development for connection to any heat networks that become available in the future.

3.4 Be Green

At the Be Green stage, renewable and low carbon technologies are investigated. Table 3-09 considers the feasibility of renewable energy technologies for the scheme.

LZC Technologies	Description	Noise	Visual impact	Internal Space	External Space	Capital Cost	Maintenance	Feasibility	
Solar Thermal Collectors 	Solar thermal collectors can be used to provide hot water using the irradiation from the sun. They can generally provide approximately 50% of the hot water demand.							There are areas of flat roof that can incorporate solar technologies. However, carbon savings are quite low and it is quite a high cost technology.	✗
Solar Photovoltaic Panels 	Solar PV panels generate electricity from the sun's energy. They should be installed within 90° of due south ideally at a 30° angle. The electricity can be used to supply the landlords load.							There are areas of flat roof that can incorporate solar technologies. Solar PV is ideal for making carbon savings while being a simple technology.	✓
Biomass Heating 	Solid, liquid or gaseous fuels derived from plant material can provide boiler heat for space and water heating. A biomass boiler would supplement a standard gas heating system so some of the cost may be offset through money saved on using smaller traditional boilers. Reliability of fuel access/supply can be a problem.							Biomass is not considered feasible for this development due to issues with fuel storage, access for delivery vehicles and local NO_x emissions.	✗

Wind Turbines 	Vertical and horizontal axis wind turbines enable electricity to be generated using the energy within the wind. Not suitable for urban environments due to low wind conditions and obstructions.							This development is in an urban environment and so a wind turbine will not be an effective solution.	✗
Ground Source Heat Pumps (GSHP) 	Utilising horizontal loops or vertical boreholes, GSHP make use of the grounds almost constant temperature to provide heating and/or cooling using a heat exchanger connected to a space/water heating delivery system. Optimum efficiency with underfloor heating systems.							GSHP are not a feasible technology for the site since there is a limited external space available for installation of boreholes.	✗
Air Source Heat Pumps (ASHP) 	Air Source Heat Pumps extract latent energy from the external air in a manner similar to ground source heat pumps. Optimum efficiency with underfloor heating systems.							Air source heat pumps are feasible option for both the student and employment spaces.	✓

Table 3-09 Feasibility of LZC technologies for the development

Renewable and low carbon systems

The feasibility study has identified ASHP as the most appropriate technology for the development. A communal ASHP is proposed for the development, with a separate VRF heat pump for the Employment section of the development. All suitable roof space on the development has been reserved for solar PV. All suitable roof space on the top floors has been reserved for Solar PV. The estimated system for the development is outlined in Table 3-10.

Services Component	Proposed Student specification	Proposed Employment Specification
Photovoltaic panels	Total Capacity - 14.5 kWp Orientation – South-West Angle of elevation – 10° Estimated Generation: 15.4 MWh/year Estimated array – 58 panels, 250 Wp, 20% efficiency, panel area 1.6m² Area - 92.8m²	-
Space Heating	Communal ASHP, SCOP 3.13, 90% load Direct Electric Immersion, 10% load (assumed) 95% DHW delivery efficiency	Heating via VRF, SCOP 4.1
Domestic Hot Water		Communal ASHP, SCOP 3.13, 90% load Direct Electric Immersion, 10% load (assumed) 95% DHW delivery efficiency

Table 3-10 Proposed Be Green systems

An initial design for the centralised ASHP system has been produced by the M&E consultant. This will be developed in more details as the design progresses. The system is based of products provided by Lochinvar, and performance figures have been taken from the documentation provided by the manufacturer, shown in the appendix. The performance of systems is likely to change as the system design develops, and other manufacturers may be explored.

A capped off connection will be provided to the proposed employment space to allow for future connection for the provision of domestic hot water.

3.5 Energy and Carbon Savings

Energy Use

The breakdown of carbon and energy use has been identified for the site. Table 3-11 and 3-12 demonstrates the breakdown of carbon and energy use once the strategies proposed in this report are incorporated.

Use Type	Electricity (kWh/yr)							Electricity CO2 (kg/yr)
	Space Heating	Hot Water	Cooling	Pumps & Fans	Lighting	PV	Total	
Student	25,947	255,156	0	56,063	46,216	-15,381	358,800	83,600
Employment	720	1,725	8,892	5,191	17,885		33,553	7,818
Total	26,667	256,881	8,892	61,254	64,100	-15,381	392,353	91,418

Table 3-11 Be Green regulated energy demand and carbon emissions per energy source

Use Type	Total Energy (kWh/yr)	Total CO2 (kg/yr)
Student	358,800	83,600
Employment	33,553	7,818
Total	392,353	91,418

Table 3-12 Be Green target regulated energy demand and carbon emissions

Carbon Savings

Table 3-12 and Figure 3-04 demonstrate the percentage improvement over the notional baseline levels for the development for the district heating case, with renewable measures incorporated.

	Student			Employment			Site Wide		
	CO2 Emissions (tonnes /annum)	CO2 Savings (tonnes /annum)	% Saving	CO2 Emissions (tonnes /annum)	CO2 Savings (tonnes /annum)	% Saving	CO2 Emissions (tonnes /annum)	CO2 Savings (tonnes /annum)	% Saving
Baseline	209.08			13.19			222.26		
Be Lean	181.87	27.21	13.0%	8.88	4.30	32.6%	190.75	31.51	14.2%
Be Clean	181.87	0.00	0.0%	8.88	0.00	0.0%	190.75	0.00	0.0%
Be Green	83.60	98.27	47.0%	7.82	1.07	8.1%	91.42	99.34	44.7%
Total		125.48	60.0%		5.37	40.7%		130.85	58.9%

Table 3-13 Be Green improvements over building regulations gas boiler baseline

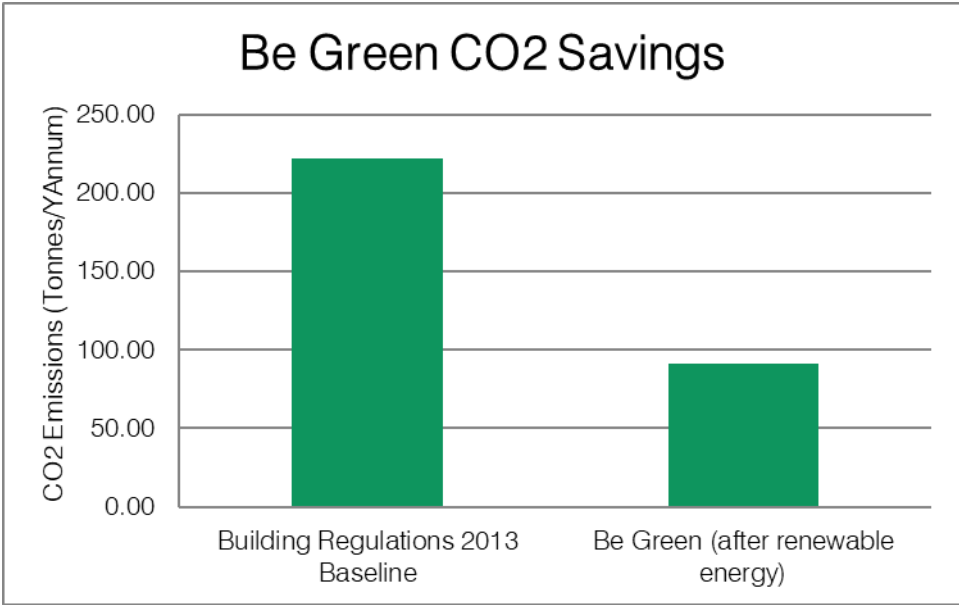


Figure 3-04 Be Green improvement over the building regulations gas boiler baseline

Carbon Offset Payment

Overall, the development has achieved a 58.9% improvement over the baseline scenario, which meets the London plan requirements of on-site carbon savings. In line with the London Plan carbon reduction requirements, there is a target of zero carbon, which can be achieved through an offset payment when there is a shortfall on site. The carbon offset payment is detailed in the Table below, estimated at a carbon price of £95/tonne.

	Carbon emissions (tonnes / annum)	30 year carbon emissions	Offset payment (£95/tonne)
Student	83.60		
Employment	7.82		
Total	91.42	2743	£ 260,542

Table 3-14 Carbon offset payment for the development

3.6 Be Seen

All major plant will be fitted with meters to allow remote monitoring of energy used by the communal heating systems and electrical distribution boards. A contract will be put in place to monitor the readings so that they can be compared with the predicted energy performance, and this information will be reported, as detailed in the GLA’s ‘Be Seen’ guidance.

3.7 Operational costs

The cost to operate the building has been considered as part of the energy strategy. As described in section 3.2, all practical measures have been taken to reduce the energy demand through energy efficiency measures. This will help to keep long term operational costs down. Within the building, the communal system will be designed to CIBSE standards to maximise efficiency and reduce waste heat.

Direct running costs for operational energy for the student units have been estimated to be an average of £232 per annum per unit, based on total electricity use and an electricity price of 15.1 p/kWh. Student occupants are not likely to pay bills directly but have the cost incorporated into rent.

4 Conclusion

This report outlines the energy strategy for the proposed development at Avonmouth House. The proposed development consists of the demolition of existing building and structures and erection of a part 2, part 7, part 14, part 16 storey plus basement mixed-use development comprising 1733sqm (GIA) of space for Class E employment use and/or community health hub and 233 purpose-built student residential rooms with associated amenity space and public realm works, car and cycle parking, and ancillary infrastructure.

As required by the London Plan, the development follows the energy hierarchy, incorporating passive design measures, energy efficient equipment and renewable energy.

The development employs an efficient building fabric, including well insulated walls and highly efficient glazing and efficient systems. At the be lean stage, this results in an 14.2% saving for the development as a whole. Although this does not quite meet the London Plan target of 15%, all reasonable measures have been taken to maximise be lean savings. Justification for why the 15% is not achievable has been outlined.

At the be green stage, PV Panels and an air source heat pump for heating and hot water are proposed to maximise carbon savings for the site. Overall, the development achieves a 58.9%

improvement over the building regulation gas boiler baseline, which meets the London plan target for on-site carbon savings.

There is a target of zero carbon, which can be achieved through an offset payment. The carbon offset is estimated at £260,542.

The figures within this report are based on preliminary analysis only and further detailed studies will be required at the detailed design stage before specifying any of the proposed systems.

5 Appendix

5.1 BRUKL Output Documents

The BRUKL output documents for the Employment and Student sections are shown below.

Project name

220523 Avonmouth House Commercial Energy (be Lean)

As designed

Date: Mon May 23 10:21:37 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.14

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.14

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	15.5
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	15.5
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	10.7
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	0.15	0.15	L00001A6:Surf[2]
Floor	0.25	0.13	0.13	L0000132:Surf[0]
Roof	0.25	0.15	0.15	L0000132:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.24	2	SP000040:Surf[3]
Personnel doors	2.2	1.64	2.2	L0000160:Surf[1]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
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	3

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- VRF, MVHR (Gas Base Case)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	5.6	0	-	0.85
Standard value	0.91*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for 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- ASHP, DHW (Gas Base Case)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.96	-
Standard value	0.8	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		
Commercial L00 Employment Space	-	-	-	1	-	-	-	-	-	-	N/A
Commercial L01 Employment Space	-	-	-	1	-	-	-	-	-	-	N/A
Commercial L01 Employment Space	-	-	-	1	-	-	-	-	-	-	N/A
Commercial LB1 Employment Space	-	-	-	1	-	-	-	-	-	-	N/A
Commercial LB1 Employment Space	-	-	-	1	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
Standard value	60	60	22	
Commercial L00 bin store	100	-	-	17
Commercial L00 cycle storage	100	-	-	36
Commercial L00 Employment Space	100	-	-	1631
Commercial L00 stairs	-	100	-	49
Commercial L00 stairs	-	100	-	64
Commercial L01 Employment Space	100	-	-	2706

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
Commercial L01 Employment Space		100	-	-	1064
Commercial L01 stairs		-	100	-	50
Commercial L01 stairs		-	100	-	49
Commercial LB1 Employment Space		100	-	-	1524
Commercial LB1 Employment Space		100	-	-	1976
Commercial LB1 hall		-	100	-	28
Commercial LB1 hall		-	100	-	21
Commercial LB1 stairs		-	100	-	49
Commercial LB1 stairs		-	100	-	50

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?
Commercial L00 Employment Space	NO (-68.8%)	NO
Commercial L01 Employment Space	NO (-46.7%)	NO
Commercial L01 Employment Space	NO (-53.7%)	NO
Commercial LB1 Employment Space	NO (-68.3%)	NO
Commercial LB1 Employment Space	NO (-83.4%)	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?	YES
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]	1674.6	1674.6
External area [m ²]	1461.8	1461.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	454.23	799.38
Average U-value [W/m ² K]	0.31	0.55
Alpha value* [%]	10.1	10

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	1.85	5.15
Cooling	5.31	6.04
Auxiliary	3.1	1.82
Lighting	10.68	19.48
Hot water	2.76	2.77
Equipment*	37.47	37.47
TOTAL **	23.69	35.26

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

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.23	98.38
Primary energy* [kWh/m ²]	62.75	91.5
Total emissions [kg/m ²]	10.7	15.5

* 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] Split or multi-split system, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
	Actual	7.2	91.6	2.1	6.1	3.5	0.94	4.19	0.96	5.6
	Notional	18.3	94.4	5.9	6.9	2.1	0.86	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	LB000002:Surf[7]
Floor	0.2	0.13	L0000132:Surf[0]
Roof	0.15	0.15	L0000132:Surf[1]
Windows, roof windows, and rooflights	1.5	1.2	L00001A7:Surf[1]
Personnel doors	1.5	1.5	L00001A6:Surf[0]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
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	3

Project name

220523 Avonmouth House Commercial Energy (be Green)

As designed

Date: Mon May 23 10:27:54 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.14

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.14

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	15.2
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	15.2
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	10.4
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	0.15	0.15	L00001A6:Surf[2]
Floor	0.25	0.13	0.13	L0000132:Surf[0]
Roof	0.25	0.15	0.15	L0000132:Surf[1]
Windows***, roof windows, and rooflights	2.2	1.24	2	SP000040:Surf[3]
Personnel doors	2.2	1.64	2.2	L0000160:Surf[1]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
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	3

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- VRF, MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	4.1	5.6	0	-	0.85
Standard value	2.5*	2.6	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types ≤12 kW output, refer to EN 14825 for limiting standards.					

1- ASHP, DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.58	-
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
	ID of system type	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		
Commercial L00 Employment Space		-	-	-	1	-	-	-	-	-	-	N/A
Commercial L01 Employment Space		-	-	-	1	-	-	-	-	-	-	N/A
Commercial L01 Employment Space		-	-	-	1	-	-	-	-	-	-	N/A
Commercial LB1 Employment Space		-	-	-	1	-	-	-	-	-	-	N/A
Commercial LB1 Employment Space		-	-	-	1	-	-	-	-	-	-	N/A

General lighting and display lighting

Zone name	Luminous efficacy [lm/W]			General lighting [W]
	Luminaire	Lamp	Display lamp	
	Standard value	60	60	22
Commercial L00 bin store	100	-	-	17
Commercial L00 cycle storage	100	-	-	36
Commercial L00 Employment Space	100	-	-	1631
Commercial L00 stairs	-	100	-	49
Commercial L00 stairs	-	100	-	64

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
Commercial L01 Employment Space	100	-	-	2706
Commercial L01 Employment Space	100	-	-	1064
Commercial L01 stairs	-	100	-	50
Commercial L01 stairs	-	100	-	49
Commercial LB1 Employment Space	100	-	-	1524
Commercial LB1 Employment Space	100	-	-	1976
Commercial LB1 hall	-	100	-	28
Commercial LB1 hall	-	100	-	21
Commercial LB1 stairs	-	100	-	49
Commercial LB1 stairs	-	100	-	50

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?
Commercial L00 Employment Space	NO (-68.8%)	NO
Commercial L01 Employment Space	NO (-46.7%)	NO
Commercial L01 Employment Space	NO (-53.7%)	NO
Commercial LB1 Employment Space	NO (-68.3%)	NO
Commercial LB1 Employment Space	NO (-83.4%)	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?	YES
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]	1674.6	1674.6
External area [m ²]	1461.8	1461.8
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	454.23	799.38
Average U-value [W/m ² K]	0.31	0.55
Alpha value* [%]	10.1	10

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	0.43	1.73
Cooling	5.31	6.04
Auxiliary	3.1	1.82
Lighting	10.68	19.48
Hot water	1.03	1.12
Equipment*	37.47	37.47
TOTAL **	20.55	30.19

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

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

Energy Production by Technology [kWh/m²]

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

Energy & CO₂ Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m ²]	86.23	98.38
Primary energy* [kWh/m ²]	61.5	90.38
Total emissions [kg/m ²]	10.4	15.2

* 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] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
	Actual	7.2	91.6	0.5	6.1	3.5	4.02	4.19	4.1	5.6
	Notional	18.3	94.4	2	6.9	2.1	2.56	3.79	----	----
[ST] No Heating or Cooling										
	Actual	0	0	0	0	0	0	0	0	0
	Notional	0	0	0	0	0	0	0	----	----

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	LB000002:Surf[7]
Floor	0.2	0.13	L0000132:Surf[0]
Roof	0.15	0.15	L0000132:Surf[1]
Windows, roof windows, and rooflights	1.5	1.2	L00001A7:Surf[1]
Personnel doors	1.5	1.5	L00001A6:Surf[0]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
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	3

Project name

220523 Avonmouth House Student Energy (be lean)

As designed

Date: Mon May 23 10:47:03 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.14

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.14

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	34.7
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	34.7
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	29.9
Are emissions from the building less than or equal to the target?	BER ≤ TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	L0000061:Surf[2]
Floor	0.25	0.15	0.15	LB000021:Surf[0]
Roof	0.25	0.13	0.15	SP000026:Surf[6]
Windows***, roof windows, and rooflights	2.2	1.2	1.2	L00001A8:Surf[2]
Personnel doors	2.2	1.5	1.5	L0000061:Surf[0]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
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	3

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP, No MVHR (Gas Base Case)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0.2	-	-
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					YES
* 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, MVHR (Gas Base Case)

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	0.96	-	0.2	-	0.85
Standard value	0.91*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for 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- ASHP, DHW (Gas Base Case)

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	0.96	-
Standard value	0.8	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 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.03 WC		-	-	-	1	-	-	-	-	-	-	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
L02.A.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.07 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.08 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.A.08 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B LKD	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.07 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.08 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.B.08 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.C LKD	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L02.C.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L02.D.01 Studio	-	-	-	1	-	-	-	-	-	-	N/A
L02.D.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L03.A LKD	-	-	-	1	-	-	-	-	-	-	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
L03.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.05 Bed		-	-	-	1	-	-	-	-	-	-	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
L03.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L03.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.02 Bed		-	-	-	1	-	-	-	-	-	-	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
L04.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L04.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.07 WC		-	-	-	1	-	-	-	-	-	-	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.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L05.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.04 WC		-	-	-	1	-	-	-	-	-	-	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
L06.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L06.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.02 WC		-	-	-	1	-	-	-	-	-	-	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
L07.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.01 studio		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.02 studio		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.03 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L08.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L09.A LKD		-	-	-	1	-	-	-	-	-	-	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
L09.A.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.07 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B. LKD	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.07 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.C.01 Studio	-	-	-	1	-	-	-	-	-	-	N/A
L09.C.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A LKD	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.06 Bed	-	-	-	1	-	-	-	-	-	-	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
L10.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L10.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L10.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L10.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.04 Bed		-	-	-	1	-	-	-	-	-	-	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
L11.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L11.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L12.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.01 Bed		-	-	-	1	-	-	-	-	-	-	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
L13.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L13.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.06 WC		-	-	-	1	-	-	-	-	-	-	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
L14.B.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L14.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L15.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L15.B.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L15.B.01 WC		-	-	-	1	-	-	-	-	-	-	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 bin store		100	-	-	54
L00 Circ		-	100	-	54
L00 Circ		-	100	-	53
L00 concierge		-	100	60	191
L00 lift lobby		-	100	60	97
L00 office		100	-	-	274
L00 Plant		100	-	-	100
L00 post		100	-	-	171
L00 stairs		-	100	-	47
L00 WC		-	100	-	33
L00 WC Circ		-	100	-	22
L01 Circ		-	100	-	67
L01 Stairs		-	100	-	37
L02 Circ		-	100	-	52
L02 Stairs		-	100	-	31
L02.A Circ		-	100	-	56
L02.A LKD		-	100	-	230
L02.A.01 Bed		-	100	-	22
L02.A.01 WC		-	100	-	19
L02.A.02 Bed		-	100	-	22
L02.A.02 WC		-	100	-	19
L02.A.03 Bed		-	100	-	25

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L02.A.03 WC		-	100	-	20
L02.A.04 Bed		-	100	-	24
L02.A.04 WC		-	100	-	19
L02.A.05 Bed		-	100	-	24
L02.A.05 WC		-	100	-	19
L02.A.06 Bed		-	100	-	23
L02.A.06 WC		-	100	-	19
L02.A.07 Bed		-	100	-	23
L02.A.07 WC		-	100	-	16
L02.A.08 Bed		-	100	-	24
L02.A.08 WC		-	100	-	17
L02.B Circ		-	100	-	72
L02.B LKD		-	100	-	321
L02.B.01 Bed		-	100	-	24
L02.B.01 WC		-	100	-	17
L02.B.02 Bed		-	100	-	26
L02.B.02 WC		-	100	-	17
L02.B.03 Bed		-	100	-	26
L02.B.03 WC		-	100	-	17
L02.B.04 Bed		-	100	-	26
L02.B.04 WC		-	100	-	17
L02.B.05 Bed		-	100	-	26
L02.B.05 WC		-	100	-	17
L02.B.06 Bed		-	100	-	24
L02.B.06 WC		-	100	-	17
L02.B.07 Bed		-	100	-	24
L02.B.07 WC		-	100	-	17
L02.B.08 Bed		-	100	-	24
L02.B.08 WC		-	100	-	17
L02.C Circ		-	100	-	58
L02.C LKD		-	100	-	264
L02.C.01 Bed		-	100	-	24
L02.C.01 WC		-	100	-	17
L02.C.02 Bed		-	100	-	24
L02.C.02 WC		-	100	-	17
L02.C.03 Bed		-	100	-	24
L02.C.03 WC		-	100	-	17
L02.C.04 Bed		-	100	-	24
L02.C.04 WC		-	100	-	17
L02.C.05 Bed		-	100	-	24
L02.C.05 WC		-	100	-	17
L02.C.06 Bed		-	100	-	24
L02.C.06 WC		-	100	-	17

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L02.D.01 Studio		-	100	-	31
L02.D.01 WC		-	100	-	29
L03 Circ		-	100	-	52
L03 Stairs		-	100	-	31
L03.A Circ		-	100	-	56
L03.A LKD		-	100	-	230
L03.A.01 Bed		-	100	-	22
L03.A.01 WC		-	100	-	19
L03.A.02 Bed		-	100	-	22
L03.A.02 WC		-	100	-	19
L03.A.03 Bed		-	100	-	25
L03.A.03 WC		-	100	-	20
L03.A.04 Bed		-	100	-	24
L03.A.04 WC		-	100	-	19
L03.A.05 Bed		-	100	-	24
L03.A.05 WC		-	100	-	19
L03.A.06 Bed		-	100	-	23
L03.A.06 WC		-	100	-	19
L03.A.07 Bed		-	100	-	23
L03.A.07 WC		-	100	-	16
L03.A.08 Bed		-	100	-	24
L03.A.08 WC		-	100	-	17
L03.B Circ		-	100	-	72
L03.B LKD		-	100	-	321
L03.B.01 Bed		-	100	-	24
L03.B.01 WC		-	100	-	17
L03.B.02 Bed		-	100	-	26
L03.B.02 WC		-	100	-	17
L03.B.03 Bed		-	100	-	26
L03.B.03 WC		-	100	-	17
L03.B.04 Bed		-	100	-	26
L03.B.04 WC		-	100	-	17
L03.B.05 Bed		-	100	-	26
L03.B.05 WC		-	100	-	17
L03.B.06 Bed		-	100	-	24
L03.B.06 WC		-	100	-	17
L03.B.07 Bed		-	100	-	24
L03.B.07 WC		-	100	-	17
L03.B.08 Bed		-	100	-	24
L03.B.08 WC		-	100	-	17
L03.C Circ		-	100	-	58
L03.C LKD		-	100	-	264
L03.C.01 Bed		-	100	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L03.C.01 WC		-	100	-	17
L03.C.02 Bed		-	100	-	24
L03.C.02 WC		-	100	-	17
L03.C.03 Bed		-	100	-	24
L03.C.03 WC		-	100	-	17
L03.C.04 Bed		-	100	-	24
L03.C.04 WC		-	100	-	17
L03.C.05 Bed		-	100	-	24
L03.C.05 WC		-	100	-	17
L03.C.06 Bed		-	100	-	24
L03.C.06 WC		-	100	-	17
L03.D.01 Studio		-	100	-	31
L03.D.01 WC		-	100	-	29
L04 Circ		-	100	-	52
L04 Stairs		-	100	-	31
L04.A Circ		-	100	-	56
L04.A LKD		-	100	-	230
L04.A.01 Bed		-	100	-	22
L04.A.01 WC		-	100	-	19
L04.A.02 Bed		-	100	-	22
L04.A.02 WC		-	100	-	19
L04.A.03 Bed		-	100	-	25
L04.A.03 WC		-	100	-	20
L04.A.04 Bed		-	100	-	24
L04.A.04 WC		-	100	-	19
L04.A.05 Bed		-	100	-	24
L04.A.05 WC		-	100	-	19
L04.A.06 Bed		-	100	-	23
L04.A.06 WC		-	100	-	19
L04.A.07 Bed		-	100	-	23
L04.A.07 WC		-	100	-	16
L04.A.08 Bed		-	100	-	24
L04.A.08 WC		-	100	-	17
L04.B Circ		-	100	-	72
L04.B LKD		-	100	-	321
L04.B.01 Bed		-	100	-	24
L04.B.01 WC		-	100	-	17
L04.B.02 Bed		-	100	-	26
L04.B.02 WC		-	100	-	17
L04.B.03 Bed		-	100	-	26
L04.B.03 WC		-	100	-	17
L04.B.04 Bed		-	100	-	26
L04.B.04 WC		-	100	-	17

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L04.B.05 Bed		-	100	-	26
L04.B.05 WC		-	100	-	17
L04.B.06 Bed		-	100	-	24
L04.B.06 WC		-	100	-	17
L04.B.07 Bed		-	100	-	24
L04.B.07 WC		-	100	-	17
L04.B.08 Bed		-	100	-	24
L04.B.08 WC		-	100	-	17
L04.C Circ		-	100	-	58
L04.C LKD		-	100	-	264
L04.C.01 Bed		-	100	-	24
L04.C.01 WC		-	100	-	17
L04.C.02 Bed		-	100	-	24
L04.C.02 WC		-	100	-	17
L04.C.03 Bed		-	100	-	24
L04.C.03 WC		-	100	-	17
L04.C.04 Bed		-	100	-	24
L04.C.04 WC		-	100	-	17
L04.C.05 Bed		-	100	-	24
L04.C.05 WC		-	100	-	17
L04.C.06 Bed		-	100	-	24
L04.C.06 WC		-	100	-	17
L04.D.01 Studio		-	100	-	31
L04.D.01 WC		-	100	-	29
L05 Circ		-	100	-	52
L05 Stairs		-	100	-	31
L05.A Circ		-	100	-	56
L05.A LKD		-	100	-	230
L05.A.01 Bed		-	100	-	22
L05.A.01 WC		-	100	-	19
L05.A.02 Bed		-	100	-	22
L05.A.02 WC		-	100	-	19
L05.A.03 Bed		-	100	-	25
L05.A.03 WC		-	100	-	20
L05.A.04 Bed		-	100	-	24
L05.A.04 WC		-	100	-	19
L05.A.05 Bed		-	100	-	24
L05.A.05 WC		-	100	-	19
L05.A.06 Bed		-	100	-	23
L05.A.06 WC		-	100	-	19
L05.A.07 Bed		-	100	-	23
L05.A.07 WC		-	100	-	16
L05.A.08 Bed		-	100	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L05.A.08 WC		-	100	-	17
L05.B Circ		-	100	-	72
L05.B LKD		-	100	-	321
L05.B.01 Bed		-	100	-	24
L05.B.01 WC		-	100	-	17
L05.B.02 Bed		-	100	-	26
L05.B.02 WC		-	100	-	17
L05.B.03 Bed		-	100	-	26
L05.B.03 WC		-	100	-	17
L05.B.04 Bed		-	100	-	26
L05.B.04 WC		-	100	-	17
L05.B.05 Bed		-	100	-	26
L05.B.05 WC		-	100	-	17
L05.B.06 Bed		-	100	-	24
L05.B.06 WC		-	100	-	17
L05.B.07 Bed		-	100	-	24
L05.B.07 WC		-	100	-	17
L05.B.08 Bed		-	100	-	24
L05.B.08 WC		-	100	-	17
L05.C Circ		-	100	-	58
L05.C LKD		-	100	-	264
L05.C.01 Bed		-	100	-	24
L05.C.01 WC		-	100	-	17
L05.C.02 Bed		-	100	-	24
L05.C.02 WC		-	100	-	17
L05.C.03 Bed		-	100	-	24
L05.C.03 WC		-	100	-	17
L05.C.04 Bed		-	100	-	24
L05.C.04 WC		-	100	-	17
L05.C.05 Bed		-	100	-	24
L05.C.05 WC		-	100	-	17
L05.C.06 Bed		-	100	-	24
L05.C.06 WC		-	100	-	17
L05.D.01 Studio		-	100	-	31
L05.D.01 WC		-	100	-	29
L06 Circ		-	100	-	52
L06 Stairs		-	100	-	31
L06.A Circ		-	100	-	56
L06.A LKD		-	100	-	230
L06.A.01 Bed		-	100	-	22
L06.A.01 WC		-	100	-	19
L06.A.02 Bed		-	100	-	22
L06.A.02 WC		-	100	-	19

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L06.A.03 Bed	-	100	-	25
L06.A.03 WC	-	100	-	20
L06.A.04 Bed	-	100	-	24
L06.A.04 WC	-	100	-	19
L06.A.05 Bed	-	100	-	24
L06.A.05 WC	-	100	-	19
L06.A.06 Bed	-	100	-	23
L06.A.06 WC	-	100	-	19
L06.A.07 Bed	-	100	-	23
L06.A.07 WC	-	100	-	16
L06.A.08 Bed	-	100	-	24
L06.A.08 WC	-	100	-	17
L06.B Circ	-	100	-	72
L06.B LKD	-	100	-	321
L06.B.01 Bed	-	100	-	24
L06.B.01 WC	-	100	-	17
L06.B.02 Bed	-	100	-	26
L06.B.02 WC	-	100	-	17
L06.B.03 Bed	-	100	-	26
L06.B.03 WC	-	100	-	17
L06.B.04 Bed	-	100	-	26
L06.B.04 WC	-	100	-	17
L06.B.05 Bed	-	100	-	26
L06.B.05 WC	-	100	-	17
L06.B.06 Bed	-	100	-	24
L06.B.06 WC	-	100	-	17
L06.B.07 Bed	-	100	-	24
L06.B.07 WC	-	100	-	17
L06.B.08 Bed	-	100	-	24
L06.B.08 WC	-	100	-	17
L06.C Circ	-	100	-	58
L06.C LKD	-	100	-	264
L06.C.01 Bed	-	100	-	24
L06.C.01 WC	-	100	-	17
L06.C.02 Bed	-	100	-	24
L06.C.02 WC	-	100	-	17
L06.C.03 Bed	-	100	-	24
L06.C.03 WC	-	100	-	17
L06.C.04 Bed	-	100	-	24
L06.C.04 WC	-	100	-	17
L06.C.05 Bed	-	100	-	24
L06.C.05 WC	-	100	-	17
L06.C.06 Bed	-	100	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L06.C.06 WC		-	100	-	17
L06.D.01 Studio		-	100	-	31
L06.D.01 WC		-	100	-	29
L07 Stairs		-	100	-	31
L07.A Circ		-	100	-	47
L07.A LKD		-	100	-	230
L07.A.01 Bed		-	100	-	22
L07.A.01 WC		-	100	-	19
L07.A.02 Bed		-	100	-	22
L07.A.02 WC		-	100	-	19
L07.A.03 Bed		-	100	-	25
L07.A.03 WC		-	100	-	20
L07.A.04 Bed		-	100	-	24
L07.A.04 WC		-	100	-	19
L07.A.05 Bed		-	100	-	24
L07.A.05 WC		-	100	-	19
L07.A.06 Bed		-	100	-	23
L07.A.06 WC		-	100	-	19
L07.A.07 Bed		-	100	-	23
L07.A.07 WC		-	100	-	16
L07.B Circ		-	100	-	61
L07.B. LKD		-	100	-	283
L07.B.01 Bed		-	100	-	24
L07.B.01 WC		-	100	-	17
L07.B.02 Bed		-	100	-	24
L07.B.02 WC		-	100	-	17
L07.B.03 Bed		-	100	-	26
L07.B.03 WC		-	100	-	17
L07.B.04 Bed		-	100	-	26
L07.B.04 WC		-	100	-	17
L07.C Circ		-	100	-	79
L07.C.01 studio		-	100	-	30
L07.C.01 WC		-	100	-	21
L07.C.02 studio		-	100	-	29
L07.C.02 WC		-	100	-	21
L07.C.03 Studio		-	100	-	31
L07.C.03 WC		-	100	-	29
L08 Circ		-	100	-	52
L08 Stairs		-	100	-	31
L08.A Circ		-	100	-	47
L08.A LKD		-	100	-	230
L08.A.01 Bed		-	100	-	22
L08.A.01 WC		-	100	-	19

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L08.A.02 Bed		-	100	-	22
L08.A.02 WC		-	100	-	19
L08.A.03 Bed		-	100	-	25
L08.A.03 WC		-	100	-	20
L08.A.04 Bed		-	100	-	24
L08.A.04 WC		-	100	-	19
L08.A.05 Bed		-	100	-	24
L08.A.05 WC		-	100	-	19
L08.A.06 Bed		-	100	-	23
L08.A.06 WC		-	100	-	19
L08.A.07 Bed		-	100	-	23
L08.A.07 WC		-	100	-	16
L08.B Circ		-	100	-	79
L08.B. LKD		-	100	-	283
L08.B.01 Bed		-	100	-	24
L08.B.01 WC		-	100	-	17
L08.B.02 Bed		-	100	-	24
L08.B.02 WC		-	100	-	17
L08.B.03 Bed		-	100	-	26
L08.B.03 WC		-	100	-	17
L08.B.04 Bed		-	100	-	26
L08.B.04 WC		-	100	-	17
L08.B.05 Bed		-	100	-	24
L08.B.05 WC		-	100	-	17
L08.B.06 Bed		-	100	-	24
L08.B.06 WC		-	100	-	18
L08.B.07 Bed		-	100	-	29
L08.B.07 WC		-	100	-	19
L08.C.01 Studio		-	100	-	31
L08.C.01 WC		-	100	-	29
L09 Circ		-	100	-	52
L09 Stairs		-	100	-	31
L09.A Circ		-	100	-	47
L09.A LKD		-	100	-	230
L09.A.01 Bed		-	100	-	22
L09.A.01 WC		-	100	-	19
L09.A.02 Bed		-	100	-	22
L09.A.02 WC		-	100	-	19
L09.A.03 Bed		-	100	-	25
L09.A.03 WC		-	100	-	20
L09.A.04 Bed		-	100	-	24
L09.A.04 WC		-	100	-	19
L09.A.05 Bed		-	100	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L09.A.05 WC		-	100	-	19
L09.A.06 Bed		-	100	-	23
L09.A.06 WC		-	100	-	19
L09.A.07 Bed		-	100	-	23
L09.A.07 WC		-	100	-	16
L09.B Circ		-	100	-	79
L09.B. LKD		-	100	-	283
L09.B.01 Bed		-	100	-	24
L09.B.01 WC		-	100	-	17
L09.B.02 Bed		-	100	-	24
L09.B.02 WC		-	100	-	17
L09.B.03 Bed		-	100	-	26
L09.B.03 WC		-	100	-	17
L09.B.04 Bed		-	100	-	26
L09.B.04 WC		-	100	-	17
L09.B.05 Bed		-	100	-	24
L09.B.05 WC		-	100	-	17
L09.B.06 Bed		-	100	-	24
L09.B.06 WC		-	100	-	18
L09.B.07 Bed		-	100	-	29
L09.B.07 WC		-	100	-	19
L09.C.01 Studio		-	100	-	31
L09.C.01 WC		-	100	-	29
L10 Circ		-	100	-	52
L10 Stairs		-	100	-	31
L10.A Circ		-	100	-	47
L10.A LKD		-	100	-	230
L10.A.01 Bed		-	100	-	22
L10.A.01 WC		-	100	-	19
L10.A.02 Bed		-	100	-	22
L10.A.02 WC		-	100	-	19
L10.A.03 Bed		-	100	-	25
L10.A.03 WC		-	100	-	20
L10.A.04 Bed		-	100	-	24
L10.A.04 WC		-	100	-	19
L10.A.05 Bed		-	100	-	24
L10.A.05 WC		-	100	-	19
L10.A.06 Bed		-	100	-	23
L10.A.06 WC		-	100	-	19
L10.A.07 Bed		-	100	-	23
L10.A.07 WC		-	100	-	16
L10.B Circ		-	100	-	79
L10.B. LKD		-	100	-	283

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L10.B.01 Bed		-	100	-	24
L10.B.01 WC		-	100	-	17
L10.B.02 Bed		-	100	-	24
L10.B.02 WC		-	100	-	17
L10.B.03 Bed		-	100	-	26
L10.B.03 WC		-	100	-	17
L10.B.04 Bed		-	100	-	26
L10.B.04 WC		-	100	-	17
L10.B.05 Bed		-	100	-	24
L10.B.05 WC		-	100	-	17
L10.B.06 Bed		-	100	-	24
L10.B.06 WC		-	100	-	18
L10.B.07 Bed		-	100	-	29
L10.B.07 WC		-	100	-	19
L10.C.01 Studio		-	100	-	31
L10.C.01 WC		-	100	-	29
L11 Circ		-	100	-	52
L11 Stairs		-	100	-	31
L11.A Circ		-	100	-	47
L11.A LKD		-	100	-	230
L11.A.01 Bed		-	100	-	22
L11.A.01 WC		-	100	-	19
L11.A.02 Bed		-	100	-	22
L11.A.02 WC		-	100	-	19
L11.A.03 Bed		-	100	-	25
L11.A.03 WC		-	100	-	20
L11.A.04 Bed		-	100	-	24
L11.A.04 WC		-	100	-	19
L11.A.05 Bed		-	100	-	24
L11.A.05 WC		-	100	-	19
L11.A.06 Bed		-	100	-	23
L11.A.06 WC		-	100	-	19
L11.A.07 Bed		-	100	-	23
L11.A.07 WC		-	100	-	16
L11.B Circ		-	100	-	79
L11.B. LKD		-	100	-	283
L11.B.01 Bed		-	100	-	24
L11.B.01 WC		-	100	-	17
L11.B.02 Bed		-	100	-	24
L11.B.02 WC		-	100	-	17
L11.B.03 Bed		-	100	-	26
L11.B.03 WC		-	100	-	17
L11.B.04 Bed		-	100	-	26

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L11.B.04 WC		-	100	-	17
L11.B.05 Bed		-	100	-	24
L11.B.05 WC		-	100	-	17
L11.B.06 Bed		-	100	-	24
L11.B.06 WC		-	100	-	18
L11.B.07 Bed		-	100	-	29
L11.B.07 WC		-	100	-	19
L11.C.01 Studio		-	100	-	31
L11.C.01 WC		-	100	-	29
L12 Circ		-	100	-	52
L12 Stairs		-	100	-	31
L12.A Circ		-	100	-	47
L12.A LKD		-	100	-	230
L12.A.01 Bed		-	100	-	22
L12.A.01 WC		-	100	-	19
L12.A.02 Bed		-	100	-	22
L12.A.02 WC		-	100	-	19
L12.A.03 Bed		-	100	-	25
L12.A.03 WC		-	100	-	20
L12.A.04 Bed		-	100	-	24
L12.A.04 WC		-	100	-	19
L12.A.05 Bed		-	100	-	24
L12.A.05 WC		-	100	-	19
L12.A.06 Bed		-	100	-	23
L12.A.06 WC		-	100	-	19
L12.A.07 Bed		-	100	-	23
L12.A.07 WC		-	100	-	16
L12.B Circ		-	100	-	79
L12.B. LKD		-	100	-	283
L12.B.01 Bed		-	100	-	24
L12.B.01 WC		-	100	-	17
L12.B.02 Bed		-	100	-	24
L12.B.02 WC		-	100	-	17
L12.B.03 Bed		-	100	-	26
L12.B.03 WC		-	100	-	17
L12.B.04 Bed		-	100	-	26
L12.B.04 WC		-	100	-	17
L12.B.05 Bed		-	100	-	24
L12.B.05 WC		-	100	-	17
L12.B.06 Bed		-	100	-	24
L12.B.06 WC		-	100	-	18
L12.B.07 Bed		-	100	-	29
L12.B.07 WC		-	100	-	19

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L12.C.01 Studio		-	100	-	31
L12.C.01 WC		-	100	-	29
L13 Circ		-	100	-	52
L13 Stairs		-	100	-	31
L13.A Circ		-	100	-	47
L13.A LKD		-	100	-	230
L13.A.01 Bed		-	100	-	22
L13.A.01 WC		-	100	-	19
L13.A.02 Bed		-	100	-	22
L13.A.02 WC		-	100	-	19
L13.A.03 Bed		-	100	-	25
L13.A.03 WC		-	100	-	20
L13.A.04 Bed		-	100	-	24
L13.A.04 WC		-	100	-	19
L13.A.05 Bed		-	100	-	24
L13.A.05 WC		-	100	-	19
L13.A.06 Bed		-	100	-	23
L13.A.06 WC		-	100	-	19
L13.A.07 Bed		-	100	-	23
L13.A.07 WC		-	100	-	16
L13.B Circ		-	100	-	79
L13.B. LKD		-	100	-	283
L13.B.01 Bed		-	100	-	24
L13.B.01 WC		-	100	-	17
L13.B.02 Bed		-	100	-	24
L13.B.02 WC		-	100	-	17
L13.B.03 Bed		-	100	-	26
L13.B.03 WC		-	100	-	17
L13.B.04 Bed		-	100	-	26
L13.B.04 WC		-	100	-	17
L13.B.05 Bed		-	100	-	24
L13.B.05 WC		-	100	-	17
L13.B.06 Bed		-	100	-	24
L13.B.06 WC		-	100	-	18
L13.B.07 Bed		-	100	-	29
L13.B.07 WC		-	100	-	19
L13.C.01 Studio		-	100	-	31
L13.C.01 WC		-	100	-	29
L14 Circ		-	100	-	50
L14 Stairs		-	100	-	31
L14.A Circ		-	100	-	61
L14.A LKD		-	100	-	243
L14.A.01 Bed		-	100	-	21

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L14.A.01 WC		-	100	-	20
L14.A.02 Bed		-	100	-	22
L14.A.02 WC		-	100	-	19
L14.A.03 Bed		-	100	-	22
L14.A.03 WC		-	100	-	19
L14.A.04 Bed		-	100	-	24
L14.A.04 WC		-	100	-	17
L14.A.05 Bed		-	100	-	24
L14.A.05 WC		-	100	-	16
L14.A.06 Bed		-	100	-	24
L14.A.06 WC		-	100	-	16
L14.B.01 Studio		-	100	-	29
L14.B.01 WC		-	100	-	22
L15 Circ		-	100	-	50
L15 Stairs		-	100	-	31
L15.A Circ		-	100	-	61
L15.A LKD		-	100	-	243
L15.A.01 Bed		-	100	-	21
L15.A.01 WC		-	100	-	20
L15.A.02 Bed		-	100	-	22
L15.A.02 WC		-	100	-	19
L15.A.03 Bed		-	100	-	22
L15.A.03 WC		-	100	-	19
L15.A.04 Bed		-	100	-	24
L15.A.04 WC		-	100	-	17
L15.A.05 Bed		-	100	-	24
L15.A.05 WC		-	100	-	16
L15.A.06 Bed		-	100	-	24
L15.A.06 WC		-	100	-	16
L15.B.01 Studio		-	100	-	29
L15.B.01 WC		-	100	-	22
LB1 Circ		-	100	-	54
LB1 stairs		-	100	-	47
LB2 Circ		-	100	-	41
LB2 Circ		-	100	-	44
LB2 Circ		-	100	-	69
LB2 cycle store		100	-	-	156
LB2 cycle store		100	-	-	60
LB2 laundry		-	100	-	133
LB2 plant		100	-	-	87
LB2 plant		100	-	-	911
LB2 stairs		-	100	-	47
LB2 store		100	-	-	24

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 concierge	NO (-48.4%)	NO
L00 lift lobby	NO (-27.8%)	NO
L00 office	NO (-45.7%)	NO
L00 post	N/A	N/A
L02.A.01 Bed	NO (-83.8%)	NO
L02.A.02 Bed	NO (-91.1%)	NO
L02.A.03 Bed	NO (-89.3%)	NO
L02.A.04 Bed	NO (-73%)	NO
L02.A.05 Bed	NO (-73%)	NO
L02.A.06 Bed	NO (-71.9%)	NO
L02.A.07 Bed	NO (-86.6%)	NO
L02.A.08 Bed	NO (-57%)	NO
L02.B.01 Bed	NO (-57.1%)	NO
L02.B.02 Bed	NO (-67.4%)	NO
L02.B.03 Bed	NO (-57%)	NO
L02.B.04 Bed	NO (-56.1%)	NO
L02.B.05 Bed	NO (-67.4%)	NO
L02.B.06 Bed	NO (-57%)	NO
L02.B.07 Bed	NO (-57%)	NO
L02.B.08 Bed	NO (-57%)	NO
L02.C.01 Bed	NO (-69.9%)	NO
L02.C.02 Bed	NO (-70%)	NO
L02.C.03 Bed	NO (-70.6%)	NO
L02.C.04 Bed	NO (-71.3%)	NO
L02.C.05 Bed	NO (-74.8%)	NO
L02.C.06 Bed	NO (-79.2%)	NO
L02.D.01 Studio	NO (-94.9%)	NO
L03.A.01 Bed	NO (-75%)	NO
L03.A.02 Bed	NO (-87%)	NO
L03.A.03 Bed	NO (-89.3%)	NO
L03.A.04 Bed	NO (-73%)	NO
L03.A.05 Bed	NO (-73%)	NO
L03.A.06 Bed	NO (-71.9%)	NO
L03.A.07 Bed	NO (-86.6%)	NO
L03.A.08 Bed	NO (-57%)	NO
L03.B.01 Bed	NO (-57.1%)	NO
L03.B.02 Bed	NO (-67.4%)	NO
L03.B.03 Bed	NO (-57%)	NO
L03.B.04 Bed	NO (-56.1%)	NO
L03.B.05 Bed	NO (-67.4%)	NO
L03.B.06 Bed	NO (-57%)	NO
L03.B.07 Bed	NO (-57%)	NO
L03.B.08 Bed	NO (-57%)	NO
L03.C.01 Bed	NO (-68.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L03.C.02 Bed	NO (-68.2%)	NO
L03.C.03 Bed	NO (-68.2%)	NO
L03.C.04 Bed	NO (-68.2%)	NO
L03.C.05 Bed	NO (-71.1%)	NO
L03.C.06 Bed	NO (-73.9%)	NO
L03.D.01 Studio	NO (-92%)	NO
L04.A.01 Bed	NO (-68.1%)	NO
L04.A.02 Bed	NO (-84%)	NO
L04.A.03 Bed	NO (-89.3%)	NO
L04.A.04 Bed	NO (-73%)	NO
L04.A.05 Bed	NO (-73%)	NO
L04.A.06 Bed	NO (-71.9%)	NO
L04.A.07 Bed	NO (-86.6%)	NO
L04.A.08 Bed	NO (-57%)	NO
L04.B.01 Bed	NO (-57.1%)	NO
L04.B.02 Bed	NO (-67.4%)	NO
L04.B.03 Bed	NO (-57%)	NO
L04.B.04 Bed	NO (-56.1%)	NO
L04.B.05 Bed	NO (-67.4%)	NO
L04.B.06 Bed	NO (-57%)	NO
L04.B.07 Bed	NO (-57%)	NO
L04.B.08 Bed	NO (-57%)	NO
L04.C.01 Bed	NO (-68.4%)	NO
L04.C.02 Bed	NO (-68.2%)	NO
L04.C.03 Bed	NO (-67.8%)	NO
L04.C.04 Bed	NO (-67.4%)	NO
L04.C.05 Bed	NO (-67.9%)	NO
L04.C.06 Bed	NO (-70.6%)	NO
L04.D.01 Studio	NO (-89.6%)	NO
L05.A.01 Bed	NO (-68.1%)	NO
L05.A.02 Bed	NO (-84%)	NO
L05.A.03 Bed	NO (-89.3%)	NO
L05.A.04 Bed	NO (-73%)	NO
L05.A.05 Bed	NO (-73%)	NO
L05.A.06 Bed	NO (-71.9%)	NO
L05.A.07 Bed	NO (-86.6%)	NO
L05.A.08 Bed	NO (-57%)	NO
L05.B.01 Bed	NO (-57.1%)	NO
L05.B.02 Bed	NO (-67.4%)	NO
L05.B.03 Bed	NO (-57%)	NO
L05.B.04 Bed	NO (-56.1%)	NO
L05.B.05 Bed	NO (-67.4%)	NO
L05.B.06 Bed	NO (-57%)	NO
L05.B.07 Bed	NO (-57%)	NO
L05.B.08 Bed	NO (-57%)	NO
L05.C.01 Bed	NO (-68%)	NO
L05.C.02 Bed	NO (-67.8%)	NO
L05.C.03 Bed	NO (-67.7%)	NO
L05.C.04 Bed	NO (-67.3%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L05.C.05 Bed	NO (-67.9%)	NO
L05.C.06 Bed	NO (-70.5%)	NO
L05.D.01 Studio	NO (-89.6%)	NO
L06.A.01 Bed	NO (-68.1%)	NO
L06.A.02 Bed	NO (-84%)	NO
L06.A.03 Bed	NO (-89.3%)	NO
L06.A.04 Bed	NO (-73%)	NO
L06.A.05 Bed	NO (-73%)	NO
L06.A.06 Bed	NO (-71.9%)	NO
L06.A.07 Bed	NO (-86.6%)	NO
L06.A.08 Bed	NO (-57%)	NO
L06.B.01 Bed	NO (-57.1%)	NO
L06.B.02 Bed	NO (-67.4%)	NO
L06.B.03 Bed	NO (-56.7%)	NO
L06.B.04 Bed	NO (-56.1%)	NO
L06.B.05 Bed	NO (-67.2%)	NO
L06.B.06 Bed	NO (-57%)	NO
L06.B.07 Bed	NO (-57%)	NO
L06.B.08 Bed	NO (-57%)	NO
L06.C.01 Bed	NO (-67.9%)	NO
L06.C.02 Bed	NO (-67.8%)	NO
L06.C.03 Bed	NO (-67.7%)	NO
L06.C.04 Bed	NO (-67.2%)	NO
L06.C.05 Bed	NO (-67.9%)	NO
L06.C.06 Bed	NO (-70.5%)	NO
L06.D.01 Studio	NO (-89.6%)	NO
L07.A.01 Bed	NO (-68.1%)	NO
L07.A.02 Bed	NO (-84%)	NO
L07.A.03 Bed	NO (-89.3%)	NO
L07.A.04 Bed	NO (-73%)	NO
L07.A.05 Bed	NO (-73%)	NO
L07.A.06 Bed	NO (-71.9%)	NO
L07.A.07 Bed	NO (-86.6%)	NO
L07.B.01 Bed	NO (-58.4%)	NO
L07.B.02 Bed	NO (-58.5%)	NO
L07.B.03 Bed	NO (-68.5%)	NO
L07.B.04 Bed	NO (-58.4%)	NO
L07.C.01 studio	NO (-79.2%)	NO
L07.C.02 studio	NO (-80.7%)	NO
L07.C.03 Studio	NO (-89.6%)	NO
L08.A.01 Bed	NO (-68.1%)	NO
L08.A.02 Bed	NO (-84%)	NO
L08.A.03 Bed	NO (-89.3%)	NO
L08.A.04 Bed	NO (-73%)	NO
L08.A.05 Bed	NO (-73%)	NO
L08.A.06 Bed	NO (-71.9%)	NO
L08.A.07 Bed	NO (-86.6%)	NO
L08.B.01 Bed	NO (-58.4%)	NO
L08.B.02 Bed	NO (-58.5%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L08.B.03 Bed	NO (-68.5%)	NO
L08.B.04 Bed	NO (-58.4%)	NO
L08.B.05 Bed	NO (-64.3%)	NO
L08.B.06 Bed	NO (-64.9%)	NO
L08.B.07 Bed	NO (-88.7%)	NO
L08.C.01 Studio	NO (-89.6%)	NO
L09.A.01 Bed	NO (-68%)	NO
L09.A.02 Bed	NO (-84%)	NO
L09.A.03 Bed	NO (-89.3%)	NO
L09.A.04 Bed	NO (-73%)	NO
L09.A.05 Bed	NO (-73%)	NO
L09.A.06 Bed	NO (-71.9%)	NO
L09.A.07 Bed	NO (-86.6%)	NO
L09.B.01 Bed	NO (-58.4%)	NO
L09.B.02 Bed	NO (-58.5%)	NO
L09.B.03 Bed	NO (-68.5%)	NO
L09.B.04 Bed	NO (-58.4%)	NO
L09.B.05 Bed	NO (-64.4%)	NO
L09.B.06 Bed	NO (-64.9%)	NO
L09.B.07 Bed	NO (-88.7%)	NO
L09.C.01 Studio	NO (-89.5%)	NO
L10.A.01 Bed	NO (-68%)	NO
L10.A.02 Bed	NO (-84%)	NO
L10.A.03 Bed	NO (-89.3%)	NO
L10.A.04 Bed	NO (-73%)	NO
L10.A.05 Bed	NO (-73%)	NO
L10.A.06 Bed	NO (-71.9%)	NO
L10.A.07 Bed	NO (-86.6%)	NO
L10.B.01 Bed	NO (-58.4%)	NO
L10.B.02 Bed	NO (-58.5%)	NO
L10.B.03 Bed	NO (-68.5%)	NO
L10.B.04 Bed	NO (-58.4%)	NO
L10.B.05 Bed	NO (-63.8%)	NO
L10.B.06 Bed	NO (-64.4%)	NO
L10.B.07 Bed	NO (-88.6%)	NO
L10.C.01 Studio	NO (-89.4%)	NO
L11.A.01 Bed	NO (-68%)	NO
L11.A.02 Bed	NO (-84%)	NO
L11.A.03 Bed	NO (-89.3%)	NO
L11.A.04 Bed	NO (-73%)	NO
L11.A.05 Bed	NO (-73%)	NO
L11.A.06 Bed	NO (-71.9%)	NO
L11.A.07 Bed	NO (-86.6%)	NO
L11.B.01 Bed	NO (-58.4%)	NO
L11.B.02 Bed	NO (-58.5%)	NO
L11.B.03 Bed	NO (-68.5%)	NO
L11.B.04 Bed	NO (-58.4%)	NO
L11.B.05 Bed	NO (-63.8%)	NO
L11.B.06 Bed	NO (-64.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L11.B.07 Bed	NO (-88.6%)	NO
L11.C.01 Studio	NO (-89.4%)	NO
L12.A.01 Bed	NO (-68%)	NO
L12.A.02 Bed	NO (-84%)	NO
L12.A.03 Bed	NO (-89.3%)	NO
L12.A.04 Bed	NO (-73%)	NO
L12.A.05 Bed	NO (-73%)	NO
L12.A.06 Bed	NO (-71.9%)	NO
L12.A.07 Bed	NO (-86.6%)	NO
L12.B.01 Bed	NO (-58.4%)	NO
L12.B.02 Bed	NO (-58.5%)	NO
L12.B.03 Bed	NO (-68.5%)	NO
L12.B.04 Bed	NO (-58.4%)	NO
L12.B.05 Bed	NO (-63.8%)	NO
L12.B.06 Bed	NO (-64.4%)	NO
L12.B.07 Bed	NO (-88.6%)	NO
L12.C.01 Studio	NO (-89.4%)	NO
L13.A.01 Bed	NO (-67.8%)	NO
L13.A.02 Bed	NO (-83.9%)	NO
L13.A.03 Bed	NO (-89.3%)	NO
L13.A.04 Bed	NO (-73%)	NO
L13.A.05 Bed	NO (-73%)	NO
L13.A.06 Bed	NO (-71.9%)	NO
L13.A.07 Bed	NO (-86.6%)	NO
L13.B.01 Bed	NO (-58.4%)	NO
L13.B.02 Bed	NO (-58.4%)	NO
L13.B.03 Bed	NO (-68.5%)	NO
L13.B.04 Bed	NO (-58.4%)	NO
L13.B.05 Bed	NO (-63.6%)	NO
L13.B.06 Bed	NO (-64.4%)	NO
L13.B.07 Bed	NO (-88.6%)	NO
L13.C.01 Studio	NO (-89.4%)	NO
L14.A.01 Bed	NO (-89.4%)	NO
L14.A.02 Bed	NO (-84.2%)	NO
L14.A.03 Bed	NO (-84.2%)	NO
L14.A.04 Bed	NO (-58.4%)	NO
L14.A.05 Bed	NO (-58.4%)	NO
L14.A.06 Bed	NO (-88.1%)	NO
L14.B.01 Studio	NO (-83.2%)	NO
L15.A.01 Bed	NO (-89.4%)	NO
L15.A.02 Bed	NO (-84.2%)	NO
L15.A.03 Bed	NO (-84.2%)	NO
L15.A.04 Bed	NO (-58.4%)	NO
L15.A.05 Bed	NO (-58.4%)	NO
L15.A.06 Bed	NO (-88.1%)	NO
L15.B.01 Studio	NO (-83.2%)	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?	YES
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]	7187.5	7187.5
External area [m ²]	6218.9	6218.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1874.71	3825.86
Average U-value [W/m ² K]	0.3	0.62
Alpha value* [%]	10.11	10

* 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
C1 Hotels
C2 Residential Institutions: Hospitals and Care Homes
C2 Residential Institutions: Residential schools

100 C2 Residential Institutions: Universities and colleges

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

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	9.69	23.99
Cooling	0	0
Auxiliary	7.8	4.37
Lighting	6.43	13.11
Hot water	95.41	95.62
Equipment*	39.68	39.68
TOTAL **	119.34	137.1

* 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]	31.47	74.44
Primary energy* [kWh/m ²]	170.84	198.26
Total emissions [kg/m ²]	29.9	34.7

* 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] Electricity										
Actual	52	0	16	0	3.5	0.9	0	0.96	0	
Notional	32.4	0	10.4	0	1.8	0.86	0	----	----	
[ST] Central heating using water: radiators, [HS] LTHW boiler, [HFT] Natural Gas, [CFT] Electricity										
Actual	36.6	0	11.3	0	11.1	0.9	0	0.96	0	
Notional	105.7	0	34.1	0	6.2	0.86	0	----	----	
[ST] No Heating or Cooling										
Actual	0	0	0	0	0	0	0	0	0	
Notional	0	0	0	0	0	0	0	----	----	

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	L100002E:Surf[1]
Floor	0.2	0.13	L000001A:Surf[0]
Roof	0.15	0.13	L00000E6:Surf[0]
Windows, roof windows, and rooflights	1.5	1.2	L00001A8:Surf[2]
Personnel doors	1.5	1.5	L0000061:Surf[0]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
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	3

Project name

**220523 Avonmouth House Student
Energy (be green)**

As designed

Date: Mon May 23 11:02:04 2022

Administrative information

Building Details

Address: Address 1, City, Postcode

Certification tool

Calculation engine: Apache

Calculation engine version: 7.0.14

Interface to calculation engine: IES Virtual Environment

Interface to calculation engine version: 7.0.14

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

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

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	30.7
Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	30.7
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	25.9
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

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

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

Building fabric

Element	U _a -Limit	U _a -Calc	U _i -Calc	Surface where the maximum value occurs*
Wall**	0.35	0.15	0.15	L0000061:Surf[2]
Floor	0.25	0.15	0.15	LB000021:Surf[0]
Roof	0.25	0.13	0.15	SP000026:Surf[6]
Windows***, roof windows, and rooflights	2.2	1.2	1.2	L00001A8:Surf[2]
Personnel doors	2.2	1.5	1.5	L0000061:Surf[0]
Vehicle access & similar large doors	1.5	-	-	No Vehicle access doors in building
High usage entrance doors	3.5	-	-	No High usage entrance doors in building
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	3

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	YES
Whole building electric power factor achieved by power factor correction	>0.95

1- ASHP, No MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.58	-	0.2	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

2- ASHP, MVHR

	Heating efficiency	Cooling efficiency	Radiant efficiency	SFP [W/(l/s)]	HR efficiency
This system	2.58	-	0.2	-	0.85
Standard value	2.5*	N/A	N/A	N/A	0.5
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					YES
* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps. For types <=12 kW output, refer to EN 14825 for limiting standards.					

1- ASHP, DHW

	Water heating efficiency	Storage loss factor [kWh/litre per day]
This building	2.58	-
Standard value	2*	N/A
* Standard shown is for all types except absorption and gas engine heat pumps.		

Local mechanical ventilation, exhaust, and terminal units

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

Zone name	SFP [W/(l/s)]										HR efficiency	
ID of system type	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 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L02.A LKD	-	-	-	1	-	-	-	-	-	-	-	N/A
L02.A.01 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L02.A.01 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L02.A.02 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L02.A.02 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L02.A.03 Bed	-	-	-	1	-	-	-	-	-	-	-	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
L02.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L02.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L02.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L02.D.01 WC		-	-	-	1	-	-	-	-	-	-	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
L03.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.04 WC		-	-	-	1	-	-	-	-	-	-	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
L03.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L03.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L03.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L03.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.01 WC		-	-	-	1	-	-	-	-	-	-	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
L04.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L04.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L04.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L04.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.07 Bed		-	-	-	1	-	-	-	-	-	-	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.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L05.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L05.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L05.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.A.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B LKD		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.04 Bed		-	-	-	1	-	-	-	-	-	-	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
L06.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.08 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.B.08 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C LKD		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L06.C.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L06.D.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L06.D.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.02 Bed		-	-	-	1	-	-	-	-	-	-	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
L07.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L07.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.01 studio		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.02 studio		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.03 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L07.C.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L08.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L08.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L08.C.01 WC		-	-	-	1	-	-	-	-	-	-	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
L09.A LKD	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.A.07 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B. LKD	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.05 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.06 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L09.B.07 WC	-	-	-	1	-	-	-	-	-	-	N/A
L09.C.01 Studio	-	-	-	1	-	-	-	-	-	-	N/A
L09.C.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A LKD	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.01 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.02 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.03 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.04 WC	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A
L10.A.05 WC	-	-	-	1	-	-	-	-	-	-	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	
L10.A.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.A.06 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.A.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.A.07 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B. LKD	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.01 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.02 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.03 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.04 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.05 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.06 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L10.B.07 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L10.C.01 Studio	-	-	-	1	-	-	-	-	-	-	N/A	
L10.C.01 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A LKD	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.01 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.02 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.03 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.04 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.04 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.05 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.05 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.06 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.06 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.07 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.A.07 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B. LKD	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B.01 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B.01 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B.02 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B.02 WC	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B.03 Bed	-	-	-	1	-	-	-	-	-	-	N/A	
L11.B.03 WC	-	-	-	1	-	-	-	-	-	-	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
L11.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L11.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L11.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L11.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L12.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L12.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L12.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A LKD		-	-	-	1	-	-	-	-	-	-	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
L13.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.A.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B. LKD		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.06 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.06 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.07 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L13.B.07 WC		-	-	-	1	-	-	-	-	-	-	N/A
L13.C.01 Studio		-	-	-	1	-	-	-	-	-	-	N/A
L13.C.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A LKD		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.01 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.01 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.02 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.02 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.03 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.03 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.04 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.04 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.05 Bed		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.05 WC		-	-	-	1	-	-	-	-	-	-	N/A
L14.A.06 Bed		-	-	-	1	-	-	-	-	-	-	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
L14.A.06 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L14.B.01 Studio	-	-	-	1	-	-	-	-	-	-	-	N/A
L14.B.01 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A LKD	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.01 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.01 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.02 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.02 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.03 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.03 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.04 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.04 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.05 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.05 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.06 Bed	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.A.06 WC	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.B.01 Studio	-	-	-	1	-	-	-	-	-	-	-	N/A
L15.B.01 WC	-	-	-	1	-	-	-	-	-	-	-	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 bin store		100	-	-	54
L00 Circ		-	100	-	54
L00 Circ		-	100	-	53
L00 concierge		-	100	60	191
L00 lift lobby		-	100	60	97
L00 office		100	-	-	274
L00 Plant		100	-	-	100
L00 post		100	-	-	171
L00 stairs		-	100	-	47
L00 WC		-	100	-	33
L00 WC Circ		-	100	-	22
L01 Circ		-	100	-	67
L01 Stairs		-	100	-	37
L02 Circ		-	100	-	52
L02 Stairs		-	100	-	31
L02.A Circ		-	100	-	56
L02.A LKD		-	100	-	230
L02.A.01 Bed		-	100	-	22
L02.A.01 WC		-	100	-	19
L02.A.02 Bed		-	100	-	22
L02.A.02 WC		-	100	-	19

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L02.A.03 Bed		-	100	-	25
L02.A.03 WC		-	100	-	20
L02.A.04 Bed		-	100	-	24
L02.A.04 WC		-	100	-	19
L02.A.05 Bed		-	100	-	24
L02.A.05 WC		-	100	-	19
L02.A.06 Bed		-	100	-	23
L02.A.06 WC		-	100	-	19
L02.A.07 Bed		-	100	-	23
L02.A.07 WC		-	100	-	16
L02.A.08 Bed		-	100	-	24
L02.A.08 WC		-	100	-	17
L02.B Circ		-	100	-	72
L02.B LKD		-	100	-	321
L02.B.01 Bed		-	100	-	24
L02.B.01 WC		-	100	-	17
L02.B.02 Bed		-	100	-	26
L02.B.02 WC		-	100	-	17
L02.B.03 Bed		-	100	-	26
L02.B.03 WC		-	100	-	17
L02.B.04 Bed		-	100	-	26
L02.B.04 WC		-	100	-	17
L02.B.05 Bed		-	100	-	26
L02.B.05 WC		-	100	-	17
L02.B.06 Bed		-	100	-	24
L02.B.06 WC		-	100	-	17
L02.B.07 Bed		-	100	-	24
L02.B.07 WC		-	100	-	17
L02.B.08 Bed		-	100	-	24
L02.B.08 WC		-	100	-	17
L02.C Circ		-	100	-	58
L02.C LKD		-	100	-	264
L02.C.01 Bed		-	100	-	24
L02.C.01 WC		-	100	-	17
L02.C.02 Bed		-	100	-	24
L02.C.02 WC		-	100	-	17
L02.C.03 Bed		-	100	-	24
L02.C.03 WC		-	100	-	17
L02.C.04 Bed		-	100	-	24
L02.C.04 WC		-	100	-	17
L02.C.05 Bed		-	100	-	24
L02.C.05 WC		-	100	-	17
L02.C.06 Bed		-	100	-	24

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L02.C.06 WC		-	100	-	17
L02.D.01 Studio		-	100	-	31
L02.D.01 WC		-	100	-	29
L03 Circ		-	100	-	52
L03 Stairs		-	100	-	31
L03.A Circ		-	100	-	56
L03.A LKD		-	100	-	230
L03.A.01 Bed		-	100	-	22
L03.A.01 WC		-	100	-	19
L03.A.02 Bed		-	100	-	22
L03.A.02 WC		-	100	-	19
L03.A.03 Bed		-	100	-	25
L03.A.03 WC		-	100	-	20
L03.A.04 Bed		-	100	-	24
L03.A.04 WC		-	100	-	19
L03.A.05 Bed		-	100	-	24
L03.A.05 WC		-	100	-	19
L03.A.06 Bed		-	100	-	23
L03.A.06 WC		-	100	-	19
L03.A.07 Bed		-	100	-	23
L03.A.07 WC		-	100	-	16
L03.A.08 Bed		-	100	-	24
L03.A.08 WC		-	100	-	17
L03.B Circ		-	100	-	72
L03.B LKD		-	100	-	321
L03.B.01 Bed		-	100	-	24
L03.B.01 WC		-	100	-	17
L03.B.02 Bed		-	100	-	26
L03.B.02 WC		-	100	-	17
L03.B.03 Bed		-	100	-	26
L03.B.03 WC		-	100	-	17
L03.B.04 Bed		-	100	-	26
L03.B.04 WC		-	100	-	17
L03.B.05 Bed		-	100	-	26
L03.B.05 WC		-	100	-	17
L03.B.06 Bed		-	100	-	24
L03.B.06 WC		-	100	-	17
L03.B.07 Bed		-	100	-	24
L03.B.07 WC		-	100	-	17
L03.B.08 Bed		-	100	-	24
L03.B.08 WC		-	100	-	17
L03.C Circ		-	100	-	58
L03.C LKD		-	100	-	264

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L03.C.01 Bed		-	100	-	24
L03.C.01 WC		-	100	-	17
L03.C.02 Bed		-	100	-	24
L03.C.02 WC		-	100	-	17
L03.C.03 Bed		-	100	-	24
L03.C.03 WC		-	100	-	17
L03.C.04 Bed		-	100	-	24
L03.C.04 WC		-	100	-	17
L03.C.05 Bed		-	100	-	24
L03.C.05 WC		-	100	-	17
L03.C.06 Bed		-	100	-	24
L03.C.06 WC		-	100	-	17
L03.D.01 Studio		-	100	-	31
L03.D.01 WC		-	100	-	29
L04 Circ		-	100	-	52
L04 Stairs		-	100	-	31
L04.A Circ		-	100	-	56
L04.A LKD		-	100	-	230
L04.A.01 Bed		-	100	-	22
L04.A.01 WC		-	100	-	19
L04.A.02 Bed		-	100	-	22
L04.A.02 WC		-	100	-	19
L04.A.03 Bed		-	100	-	25
L04.A.03 WC		-	100	-	20
L04.A.04 Bed		-	100	-	24
L04.A.04 WC		-	100	-	19
L04.A.05 Bed		-	100	-	24
L04.A.05 WC		-	100	-	19
L04.A.06 Bed		-	100	-	23
L04.A.06 WC		-	100	-	19
L04.A.07 Bed		-	100	-	23
L04.A.07 WC		-	100	-	16
L04.A.08 Bed		-	100	-	24
L04.A.08 WC		-	100	-	17
L04.B Circ		-	100	-	72
L04.B LKD		-	100	-	321
L04.B.01 Bed		-	100	-	24
L04.B.01 WC		-	100	-	17
L04.B.02 Bed		-	100	-	26
L04.B.02 WC		-	100	-	17
L04.B.03 Bed		-	100	-	26
L04.B.03 WC		-	100	-	17
L04.B.04 Bed		-	100	-	26

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L04.B.04 WC		-	100	-	17
L04.B.05 Bed		-	100	-	26
L04.B.05 WC		-	100	-	17
L04.B.06 Bed		-	100	-	24
L04.B.06 WC		-	100	-	17
L04.B.07 Bed		-	100	-	24
L04.B.07 WC		-	100	-	17
L04.B.08 Bed		-	100	-	24
L04.B.08 WC		-	100	-	17
L04.C Circ		-	100	-	58
L04.C LKD		-	100	-	264
L04.C.01 Bed		-	100	-	24
L04.C.01 WC		-	100	-	17
L04.C.02 Bed		-	100	-	24
L04.C.02 WC		-	100	-	17
L04.C.03 Bed		-	100	-	24
L04.C.03 WC		-	100	-	17
L04.C.04 Bed		-	100	-	24
L04.C.04 WC		-	100	-	17
L04.C.05 Bed		-	100	-	24
L04.C.05 WC		-	100	-	17
L04.C.06 Bed		-	100	-	24
L04.C.06 WC		-	100	-	17
L04.D.01 Studio		-	100	-	31
L04.D.01 WC		-	100	-	29
L05 Circ		-	100	-	52
L05 Stairs		-	100	-	31
L05.A Circ		-	100	-	56
L05.A LKD		-	100	-	230
L05.A.01 Bed		-	100	-	22
L05.A.01 WC		-	100	-	19
L05.A.02 Bed		-	100	-	22
L05.A.02 WC		-	100	-	19
L05.A.03 Bed		-	100	-	25
L05.A.03 WC		-	100	-	20
L05.A.04 Bed		-	100	-	24
L05.A.04 WC		-	100	-	19
L05.A.05 Bed		-	100	-	24
L05.A.05 WC		-	100	-	19
L05.A.06 Bed		-	100	-	23
L05.A.06 WC		-	100	-	19
L05.A.07 Bed		-	100	-	23
L05.A.07 WC		-	100	-	16

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L05.A.08 Bed		-	100	-	24
L05.A.08 WC		-	100	-	17
L05.B Circ		-	100	-	72
L05.B LKD		-	100	-	321
L05.B.01 Bed		-	100	-	24
L05.B.01 WC		-	100	-	17
L05.B.02 Bed		-	100	-	26
L05.B.02 WC		-	100	-	17
L05.B.03 Bed		-	100	-	26
L05.B.03 WC		-	100	-	17
L05.B.04 Bed		-	100	-	26
L05.B.04 WC		-	100	-	17
L05.B.05 Bed		-	100	-	26
L05.B.05 WC		-	100	-	17
L05.B.06 Bed		-	100	-	24
L05.B.06 WC		-	100	-	17
L05.B.07 Bed		-	100	-	24
L05.B.07 WC		-	100	-	17
L05.B.08 Bed		-	100	-	24
L05.B.08 WC		-	100	-	17
L05.C Circ		-	100	-	58
L05.C LKD		-	100	-	264
L05.C.01 Bed		-	100	-	24
L05.C.01 WC		-	100	-	17
L05.C.02 Bed		-	100	-	24
L05.C.02 WC		-	100	-	17
L05.C.03 Bed		-	100	-	24
L05.C.03 WC		-	100	-	17
L05.C.04 Bed		-	100	-	24
L05.C.04 WC		-	100	-	17
L05.C.05 Bed		-	100	-	24
L05.C.05 WC		-	100	-	17
L05.C.06 Bed		-	100	-	24
L05.C.06 WC		-	100	-	17
L05.D.01 Studio		-	100	-	31
L05.D.01 WC		-	100	-	29
L06 Circ		-	100	-	52
L06 Stairs		-	100	-	31
L06.A Circ		-	100	-	56
L06.A LKD		-	100	-	230
L06.A.01 Bed		-	100	-	22
L06.A.01 WC		-	100	-	19
L06.A.02 Bed		-	100	-	22

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L06.A.02 WC		-	100	-	19
L06.A.03 Bed		-	100	-	25
L06.A.03 WC		-	100	-	20
L06.A.04 Bed		-	100	-	24
L06.A.04 WC		-	100	-	19
L06.A.05 Bed		-	100	-	24
L06.A.05 WC		-	100	-	19
L06.A.06 Bed		-	100	-	23
L06.A.06 WC		-	100	-	19
L06.A.07 Bed		-	100	-	23
L06.A.07 WC		-	100	-	16
L06.A.08 Bed		-	100	-	24
L06.A.08 WC		-	100	-	17
L06.B Circ		-	100	-	72
L06.B LKD		-	100	-	321
L06.B.01 Bed		-	100	-	24
L06.B.01 WC		-	100	-	17
L06.B.02 Bed		-	100	-	26
L06.B.02 WC		-	100	-	17
L06.B.03 Bed		-	100	-	26
L06.B.03 WC		-	100	-	17
L06.B.04 Bed		-	100	-	26
L06.B.04 WC		-	100	-	17
L06.B.05 Bed		-	100	-	26
L06.B.05 WC		-	100	-	17
L06.B.06 Bed		-	100	-	24
L06.B.06 WC		-	100	-	17
L06.B.07 Bed		-	100	-	24
L06.B.07 WC		-	100	-	17
L06.B.08 Bed		-	100	-	24
L06.B.08 WC		-	100	-	17
L06.C Circ		-	100	-	58
L06.C LKD		-	100	-	264
L06.C.01 Bed		-	100	-	24
L06.C.01 WC		-	100	-	17
L06.C.02 Bed		-	100	-	24
L06.C.02 WC		-	100	-	17
L06.C.03 Bed		-	100	-	24
L06.C.03 WC		-	100	-	17
L06.C.04 Bed		-	100	-	24
L06.C.04 WC		-	100	-	17
L06.C.05 Bed		-	100	-	24
L06.C.05 WC		-	100	-	17

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L06.C.06 Bed		-	100	-	24
L06.C.06 WC		-	100	-	17
L06.D.01 Studio		-	100	-	31
L06.D.01 WC		-	100	-	29
L07 Stairs		-	100	-	31
L07.A Circ		-	100	-	47
L07.A LKD		-	100	-	230
L07.A.01 Bed		-	100	-	22
L07.A.01 WC		-	100	-	19
L07.A.02 Bed		-	100	-	22
L07.A.02 WC		-	100	-	19
L07.A.03 Bed		-	100	-	25
L07.A.03 WC		-	100	-	20
L07.A.04 Bed		-	100	-	24
L07.A.04 WC		-	100	-	19
L07.A.05 Bed		-	100	-	24
L07.A.05 WC		-	100	-	19
L07.A.06 Bed		-	100	-	23
L07.A.06 WC		-	100	-	19
L07.A.07 Bed		-	100	-	23
L07.A.07 WC		-	100	-	16
L07.B Circ		-	100	-	61
L07.B. LKD		-	100	-	283
L07.B.01 Bed		-	100	-	24
L07.B.01 WC		-	100	-	17
L07.B.02 Bed		-	100	-	24
L07.B.02 WC		-	100	-	17
L07.B.03 Bed		-	100	-	26
L07.B.03 WC		-	100	-	17
L07.B.04 Bed		-	100	-	26
L07.B.04 WC		-	100	-	17
L07.C Circ		-	100	-	79
L07.C.01 studio		-	100	-	30
L07.C.01 WC		-	100	-	21
L07.C.02 studio		-	100	-	29
L07.C.02 WC		-	100	-	21
L07.C.03 Studio		-	100	-	31
L07.C.03 WC		-	100	-	29
L08 Circ		-	100	-	52
L08 Stairs		-	100	-	31
L08.A Circ		-	100	-	47
L08.A LKD		-	100	-	230
L08.A.01 Bed		-	100	-	22

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L08.A.01 WC		-	100	-	19
L08.A.02 Bed		-	100	-	22
L08.A.02 WC		-	100	-	19
L08.A.03 Bed		-	100	-	25
L08.A.03 WC		-	100	-	20
L08.A.04 Bed		-	100	-	24
L08.A.04 WC		-	100	-	19
L08.A.05 Bed		-	100	-	24
L08.A.05 WC		-	100	-	19
L08.A.06 Bed		-	100	-	23
L08.A.06 WC		-	100	-	19
L08.A.07 Bed		-	100	-	23
L08.A.07 WC		-	100	-	16
L08.B Circ		-	100	-	79
L08.B. LKD		-	100	-	283
L08.B.01 Bed		-	100	-	24
L08.B.01 WC		-	100	-	17
L08.B.02 Bed		-	100	-	24
L08.B.02 WC		-	100	-	17
L08.B.03 Bed		-	100	-	26
L08.B.03 WC		-	100	-	17
L08.B.04 Bed		-	100	-	26
L08.B.04 WC		-	100	-	17
L08.B.05 Bed		-	100	-	24
L08.B.05 WC		-	100	-	17
L08.B.06 Bed		-	100	-	24
L08.B.06 WC		-	100	-	18
L08.B.07 Bed		-	100	-	29
L08.B.07 WC		-	100	-	19
L08.C.01 Studio		-	100	-	31
L08.C.01 WC		-	100	-	29
L09 Circ		-	100	-	52
L09 Stairs		-	100	-	31
L09.A Circ		-	100	-	47
L09.A LKD		-	100	-	230
L09.A.01 Bed		-	100	-	22
L09.A.01 WC		-	100	-	19
L09.A.02 Bed		-	100	-	22
L09.A.02 WC		-	100	-	19
L09.A.03 Bed		-	100	-	25
L09.A.03 WC		-	100	-	20
L09.A.04 Bed		-	100	-	24
L09.A.04 WC		-	100	-	19

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L09.A.05 Bed	-	100	-	24
L09.A.05 WC	-	100	-	19
L09.A.06 Bed	-	100	-	23
L09.A.06 WC	-	100	-	19
L09.A.07 Bed	-	100	-	23
L09.A.07 WC	-	100	-	16
L09.B Circ	-	100	-	79
L09.B. LKD	-	100	-	283
L09.B.01 Bed	-	100	-	24
L09.B.01 WC	-	100	-	17
L09.B.02 Bed	-	100	-	24
L09.B.02 WC	-	100	-	17
L09.B.03 Bed	-	100	-	26
L09.B.03 WC	-	100	-	17
L09.B.04 Bed	-	100	-	26
L09.B.04 WC	-	100	-	17
L09.B.05 Bed	-	100	-	24
L09.B.05 WC	-	100	-	17
L09.B.06 Bed	-	100	-	24
L09.B.06 WC	-	100	-	18
L09.B.07 Bed	-	100	-	29
L09.B.07 WC	-	100	-	19
L09.C.01 Studio	-	100	-	31
L09.C.01 WC	-	100	-	29
L10 Circ	-	100	-	52
L10 Stairs	-	100	-	31
L10.A Circ	-	100	-	47
L10.A LKD	-	100	-	230
L10.A.01 Bed	-	100	-	22
L10.A.01 WC	-	100	-	19
L10.A.02 Bed	-	100	-	22
L10.A.02 WC	-	100	-	19
L10.A.03 Bed	-	100	-	25
L10.A.03 WC	-	100	-	20
L10.A.04 Bed	-	100	-	24
L10.A.04 WC	-	100	-	19
L10.A.05 Bed	-	100	-	24
L10.A.05 WC	-	100	-	19
L10.A.06 Bed	-	100	-	23
L10.A.06 WC	-	100	-	19
L10.A.07 Bed	-	100	-	23
L10.A.07 WC	-	100	-	16
L10.B Circ	-	100	-	79

General lighting and display lighting	Luminous efficacy [lm/W]			
Zone name	Luminaire	Lamp	Display lamp	General lighting [W]
Standard value	60	60	22	
L10.B. LKD	-	100	-	283
L10.B.01 Bed	-	100	-	24
L10.B.01 WC	-	100	-	17
L10.B.02 Bed	-	100	-	24
L10.B.02 WC	-	100	-	17
L10.B.03 Bed	-	100	-	26
L10.B.03 WC	-	100	-	17
L10.B.04 Bed	-	100	-	26
L10.B.04 WC	-	100	-	17
L10.B.05 Bed	-	100	-	24
L10.B.05 WC	-	100	-	17
L10.B.06 Bed	-	100	-	24
L10.B.06 WC	-	100	-	18
L10.B.07 Bed	-	100	-	29
L10.B.07 WC	-	100	-	19
L10.C.01 Studio	-	100	-	31
L10.C.01 WC	-	100	-	29
L11 Circ	-	100	-	52
L11 Stairs	-	100	-	31
L11.A Circ	-	100	-	47
L11.A LKD	-	100	-	230
L11.A.01 Bed	-	100	-	22
L11.A.01 WC	-	100	-	19
L11.A.02 Bed	-	100	-	22
L11.A.02 WC	-	100	-	19
L11.A.03 Bed	-	100	-	25
L11.A.03 WC	-	100	-	20
L11.A.04 Bed	-	100	-	24
L11.A.04 WC	-	100	-	19
L11.A.05 Bed	-	100	-	24
L11.A.05 WC	-	100	-	19
L11.A.06 Bed	-	100	-	23
L11.A.06 WC	-	100	-	19
L11.A.07 Bed	-	100	-	23
L11.A.07 WC	-	100	-	16
L11.B Circ	-	100	-	79
L11.B. LKD	-	100	-	283
L11.B.01 Bed	-	100	-	24
L11.B.01 WC	-	100	-	17
L11.B.02 Bed	-	100	-	24
L11.B.02 WC	-	100	-	17
L11.B.03 Bed	-	100	-	26
L11.B.03 WC	-	100	-	17

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L11.B.04 Bed		-	100	-	26
L11.B.04 WC		-	100	-	17
L11.B.05 Bed		-	100	-	24
L11.B.05 WC		-	100	-	17
L11.B.06 Bed		-	100	-	24
L11.B.06 WC		-	100	-	18
L11.B.07 Bed		-	100	-	29
L11.B.07 WC		-	100	-	19
L11.C.01 Studio		-	100	-	31
L11.C.01 WC		-	100	-	29
L12 Circ		-	100	-	52
L12 Stairs		-	100	-	31
L12.A Circ		-	100	-	47
L12.A LKD		-	100	-	230
L12.A.01 Bed		-	100	-	22
L12.A.01 WC		-	100	-	19
L12.A.02 Bed		-	100	-	22
L12.A.02 WC		-	100	-	19
L12.A.03 Bed		-	100	-	25
L12.A.03 WC		-	100	-	20
L12.A.04 Bed		-	100	-	24
L12.A.04 WC		-	100	-	19
L12.A.05 Bed		-	100	-	24
L12.A.05 WC		-	100	-	19
L12.A.06 Bed		-	100	-	23
L12.A.06 WC		-	100	-	19
L12.A.07 Bed		-	100	-	23
L12.A.07 WC		-	100	-	16
L12.B Circ		-	100	-	79
L12.B. LKD		-	100	-	283
L12.B.01 Bed		-	100	-	24
L12.B.01 WC		-	100	-	17
L12.B.02 Bed		-	100	-	24
L12.B.02 WC		-	100	-	17
L12.B.03 Bed		-	100	-	26
L12.B.03 WC		-	100	-	17
L12.B.04 Bed		-	100	-	26
L12.B.04 WC		-	100	-	17
L12.B.05 Bed		-	100	-	24
L12.B.05 WC		-	100	-	17
L12.B.06 Bed		-	100	-	24
L12.B.06 WC		-	100	-	18
L12.B.07 Bed		-	100	-	29

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L12.B.07 WC		-	100	-	19
L12.C.01 Studio		-	100	-	31
L12.C.01 WC		-	100	-	29
L13 Circ		-	100	-	52
L13 Stairs		-	100	-	31
L13.A Circ		-	100	-	47
L13.A LKD		-	100	-	230
L13.A.01 Bed		-	100	-	22
L13.A.01 WC		-	100	-	19
L13.A.02 Bed		-	100	-	22
L13.A.02 WC		-	100	-	19
L13.A.03 Bed		-	100	-	25
L13.A.03 WC		-	100	-	20
L13.A.04 Bed		-	100	-	24
L13.A.04 WC		-	100	-	19
L13.A.05 Bed		-	100	-	24
L13.A.05 WC		-	100	-	19
L13.A.06 Bed		-	100	-	23
L13.A.06 WC		-	100	-	19
L13.A.07 Bed		-	100	-	23
L13.A.07 WC		-	100	-	16
L13.B Circ		-	100	-	79
L13.B. LKD		-	100	-	283
L13.B.01 Bed		-	100	-	24
L13.B.01 WC		-	100	-	17
L13.B.02 Bed		-	100	-	24
L13.B.02 WC		-	100	-	17
L13.B.03 Bed		-	100	-	26
L13.B.03 WC		-	100	-	17
L13.B.04 Bed		-	100	-	26
L13.B.04 WC		-	100	-	17
L13.B.05 Bed		-	100	-	24
L13.B.05 WC		-	100	-	17
L13.B.06 Bed		-	100	-	24
L13.B.06 WC		-	100	-	18
L13.B.07 Bed		-	100	-	29
L13.B.07 WC		-	100	-	19
L13.C.01 Studio		-	100	-	31
L13.C.01 WC		-	100	-	29
L14 Circ		-	100	-	50
L14 Stairs		-	100	-	31
L14.A Circ		-	100	-	61
L14.A LKD		-	100	-	243

General lighting and display lighting		Luminous efficacy [lm/W]			General lighting [W]
Zone name		Luminaire	Lamp	Display lamp	
	Standard value	60	60	22	
L14.A.01 Bed		-	100	-	21
L14.A.01 WC		-	100	-	20
L14.A.02 Bed		-	100	-	22
L14.A.02 WC		-	100	-	19
L14.A.03 Bed		-	100	-	22
L14.A.03 WC		-	100	-	19
L14.A.04 Bed		-	100	-	24
L14.A.04 WC		-	100	-	17
L14.A.05 Bed		-	100	-	24
L14.A.05 WC		-	100	-	16
L14.A.06 Bed		-	100	-	24
L14.A.06 WC		-	100	-	16
L14.B.01 Studio		-	100	-	29
L14.B.01 WC		-	100	-	22
L15 Circ		-	100	-	50
L15 Stairs		-	100	-	31
L15.A Circ		-	100	-	61
L15.A LKD		-	100	-	243
L15.A.01 Bed		-	100	-	21
L15.A.01 WC		-	100	-	20
L15.A.02 Bed		-	100	-	22
L15.A.02 WC		-	100	-	19
L15.A.03 Bed		-	100	-	22
L15.A.03 WC		-	100	-	19
L15.A.04 Bed		-	100	-	24
L15.A.04 WC		-	100	-	17
L15.A.05 Bed		-	100	-	24
L15.A.05 WC		-	100	-	16
L15.A.06 Bed		-	100	-	24
L15.A.06 WC		-	100	-	16
L15.B.01 Studio		-	100	-	29
L15.B.01 WC		-	100	-	22
LB1 Circ		-	100	-	54
LB1 stairs		-	100	-	47
LB2 Circ		-	100	-	41
LB2 Circ		-	100	-	44
LB2 Circ		-	100	-	69
LB2 cycle store		100	-	-	156
LB2 cycle store		100	-	-	60
LB2 laundry		-	100	-	133
LB2 plant		100	-	-	87
LB2 plant		100	-	-	911
LB2 stairs		-	100	-	47

General lighting and display lighting		Luminous efficacy [lm/W]			
Zone name		Luminaire	Lamp	Display lamp	General lighting [W]
	Standard value	60	60	22	
LB2 store		100	-	-	24

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 concierge	NO (-48.4%)	NO
L00 lift lobby	NO (-27.8%)	NO
L00 office	NO (-45.7%)	NO
L00 post	N/A	N/A
L02.A.01 Bed	NO (-83.8%)	NO
L02.A.02 Bed	NO (-91.1%)	NO
L02.A.03 Bed	NO (-89.3%)	NO
L02.A.04 Bed	NO (-73%)	NO
L02.A.05 Bed	NO (-73%)	NO
L02.A.06 Bed	NO (-71.9%)	NO
L02.A.07 Bed	NO (-86.6%)	NO
L02.A.08 Bed	NO (-57%)	NO
L02.B.01 Bed	NO (-57.1%)	NO
L02.B.02 Bed	NO (-67.4%)	NO
L02.B.03 Bed	NO (-57%)	NO
L02.B.04 Bed	NO (-56.1%)	NO
L02.B.05 Bed	NO (-67.4%)	NO
L02.B.06 Bed	NO (-57%)	NO
L02.B.07 Bed	NO (-57%)	NO
L02.B.08 Bed	NO (-57%)	NO
L02.C.01 Bed	NO (-69.9%)	NO
L02.C.02 Bed	NO (-70%)	NO
L02.C.03 Bed	NO (-70.6%)	NO
L02.C.04 Bed	NO (-71.3%)	NO
L02.C.05 Bed	NO (-74.8%)	NO
L02.C.06 Bed	NO (-79.2%)	NO
L02.D.01 Studio	NO (-94.9%)	NO
L03.A.01 Bed	NO (-75%)	NO
L03.A.02 Bed	NO (-87%)	NO
L03.A.03 Bed	NO (-89.3%)	NO
L03.A.04 Bed	NO (-73%)	NO
L03.A.05 Bed	NO (-73%)	NO
L03.A.06 Bed	NO (-71.9%)	NO
L03.A.07 Bed	NO (-86.6%)	NO
L03.A.08 Bed	NO (-57%)	NO
L03.B.01 Bed	NO (-57.1%)	NO
L03.B.02 Bed	NO (-67.4%)	NO
L03.B.03 Bed	NO (-57%)	NO
L03.B.04 Bed	NO (-56.1%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L03.B.05 Bed	NO (-67.4%)	NO
L03.B.06 Bed	NO (-57%)	NO
L03.B.07 Bed	NO (-57%)	NO
L03.B.08 Bed	NO (-57%)	NO
L03.C.01 Bed	NO (-68.4%)	NO
L03.C.02 Bed	NO (-68.2%)	NO
L03.C.03 Bed	NO (-68.2%)	NO
L03.C.04 Bed	NO (-68.2%)	NO
L03.C.05 Bed	NO (-71.1%)	NO
L03.C.06 Bed	NO (-73.9%)	NO
L03.D.01 Studio	NO (-92%)	NO
L04.A.01 Bed	NO (-68.1%)	NO
L04.A.02 Bed	NO (-84%)	NO
L04.A.03 Bed	NO (-89.3%)	NO
L04.A.04 Bed	NO (-73%)	NO
L04.A.05 Bed	NO (-73%)	NO
L04.A.06 Bed	NO (-71.9%)	NO
L04.A.07 Bed	NO (-86.6%)	NO
L04.A.08 Bed	NO (-57%)	NO
L04.B.01 Bed	NO (-57.1%)	NO
L04.B.02 Bed	NO (-67.4%)	NO
L04.B.03 Bed	NO (-57%)	NO
L04.B.04 Bed	NO (-56.1%)	NO
L04.B.05 Bed	NO (-67.4%)	NO
L04.B.06 Bed	NO (-57%)	NO
L04.B.07 Bed	NO (-57%)	NO
L04.B.08 Bed	NO (-57%)	NO
L04.C.01 Bed	NO (-68.4%)	NO
L04.C.02 Bed	NO (-68.2%)	NO
L04.C.03 Bed	NO (-67.8%)	NO
L04.C.04 Bed	NO (-67.4%)	NO
L04.C.05 Bed	NO (-67.9%)	NO
L04.C.06 Bed	NO (-70.6%)	NO
L04.D.01 Studio	NO (-89.6%)	NO
L05.A.01 Bed	NO (-68.1%)	NO
L05.A.02 Bed	NO (-84%)	NO
L05.A.03 Bed	NO (-89.3%)	NO
L05.A.04 Bed	NO (-73%)	NO
L05.A.05 Bed	NO (-73%)	NO
L05.A.06 Bed	NO (-71.9%)	NO
L05.A.07 Bed	NO (-86.6%)	NO
L05.A.08 Bed	NO (-57%)	NO
L05.B.01 Bed	NO (-57.1%)	NO
L05.B.02 Bed	NO (-67.4%)	NO
L05.B.03 Bed	NO (-57%)	NO
L05.B.04 Bed	NO (-56.1%)	NO
L05.B.05 Bed	NO (-67.4%)	NO
L05.B.06 Bed	NO (-57%)	NO
L05.B.07 Bed	NO (-57%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L05.B.08 Bed	NO (-57%)	NO
L05.C.01 Bed	NO (-68%)	NO
L05.C.02 Bed	NO (-67.8%)	NO
L05.C.03 Bed	NO (-67.7%)	NO
L05.C.04 Bed	NO (-67.3%)	NO
L05.C.05 Bed	NO (-67.9%)	NO
L05.C.06 Bed	NO (-70.5%)	NO
L05.D.01 Studio	NO (-89.6%)	NO
L06.A.01 Bed	NO (-68.1%)	NO
L06.A.02 Bed	NO (-84%)	NO
L06.A.03 Bed	NO (-89.3%)	NO
L06.A.04 Bed	NO (-73%)	NO
L06.A.05 Bed	NO (-73%)	NO
L06.A.06 Bed	NO (-71.9%)	NO
L06.A.07 Bed	NO (-86.6%)	NO
L06.A.08 Bed	NO (-57%)	NO
L06.B.01 Bed	NO (-57.1%)	NO
L06.B.02 Bed	NO (-67.4%)	NO
L06.B.03 Bed	NO (-56.7%)	NO
L06.B.04 Bed	NO (-56.1%)	NO
L06.B.05 Bed	NO (-67.2%)	NO
L06.B.06 Bed	NO (-57%)	NO
L06.B.07 Bed	NO (-57%)	NO
L06.B.08 Bed	NO (-57%)	NO
L06.C.01 Bed	NO (-67.9%)	NO
L06.C.02 Bed	NO (-67.8%)	NO
L06.C.03 Bed	NO (-67.7%)	NO
L06.C.04 Bed	NO (-67.2%)	NO
L06.C.05 Bed	NO (-67.9%)	NO
L06.C.06 Bed	NO (-70.5%)	NO
L06.D.01 Studio	NO (-89.6%)	NO
L07.A.01 Bed	NO (-68.1%)	NO
L07.A.02 Bed	NO (-84%)	NO
L07.A.03 Bed	NO (-89.3%)	NO
L07.A.04 Bed	NO (-73%)	NO
L07.A.05 Bed	NO (-73%)	NO
L07.A.06 Bed	NO (-71.9%)	NO
L07.A.07 Bed	NO (-86.6%)	NO
L07.B.01 Bed	NO (-58.4%)	NO
L07.B.02 Bed	NO (-58.5%)	NO
L07.B.03 Bed	NO (-68.5%)	NO
L07.B.04 Bed	NO (-58.4%)	NO
L07.C.01 studio	NO (-79.2%)	NO
L07.C.02 studio	NO (-80.7%)	NO
L07.C.03 Studio	NO (-89.6%)	NO
L08.A.01 Bed	NO (-68.1%)	NO
L08.A.02 Bed	NO (-84%)	NO
L08.A.03 Bed	NO (-89.3%)	NO
L08.A.04 Bed	NO (-73%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L08.A.05 Bed	NO (-73%)	NO
L08.A.06 Bed	NO (-71.9%)	NO
L08.A.07 Bed	NO (-86.6%)	NO
L08.B.01 Bed	NO (-58.4%)	NO
L08.B.02 Bed	NO (-58.5%)	NO
L08.B.03 Bed	NO (-68.5%)	NO
L08.B.04 Bed	NO (-58.4%)	NO
L08.B.05 Bed	NO (-64.3%)	NO
L08.B.06 Bed	NO (-64.9%)	NO
L08.B.07 Bed	NO (-88.7%)	NO
L08.C.01 Studio	NO (-89.6%)	NO
L09.A.01 Bed	NO (-68%)	NO
L09.A.02 Bed	NO (-84%)	NO
L09.A.03 Bed	NO (-89.3%)	NO
L09.A.04 Bed	NO (-73%)	NO
L09.A.05 Bed	NO (-73%)	NO
L09.A.06 Bed	NO (-71.9%)	NO
L09.A.07 Bed	NO (-86.6%)	NO
L09.B.01 Bed	NO (-58.4%)	NO
L09.B.02 Bed	NO (-58.5%)	NO
L09.B.03 Bed	NO (-68.5%)	NO
L09.B.04 Bed	NO (-58.4%)	NO
L09.B.05 Bed	NO (-64.4%)	NO
L09.B.06 Bed	NO (-64.9%)	NO
L09.B.07 Bed	NO (-88.7%)	NO
L09.C.01 Studio	NO (-89.5%)	NO
L10.A.01 Bed	NO (-68%)	NO
L10.A.02 Bed	NO (-84%)	NO
L10.A.03 Bed	NO (-89.3%)	NO
L10.A.04 Bed	NO (-73%)	NO
L10.A.05 Bed	NO (-73%)	NO
L10.A.06 Bed	NO (-71.9%)	NO
L10.A.07 Bed	NO (-86.6%)	NO
L10.B.01 Bed	NO (-58.4%)	NO
L10.B.02 Bed	NO (-58.5%)	NO
L10.B.03 Bed	NO (-68.5%)	NO
L10.B.04 Bed	NO (-58.4%)	NO
L10.B.05 Bed	NO (-63.8%)	NO
L10.B.06 Bed	NO (-64.4%)	NO
L10.B.07 Bed	NO (-88.6%)	NO
L10.C.01 Studio	NO (-89.4%)	NO
L11.A.01 Bed	NO (-68%)	NO
L11.A.02 Bed	NO (-84%)	NO
L11.A.03 Bed	NO (-89.3%)	NO
L11.A.04 Bed	NO (-73%)	NO
L11.A.05 Bed	NO (-73%)	NO
L11.A.06 Bed	NO (-71.9%)	NO
L11.A.07 Bed	NO (-86.6%)	NO
L11.B.01 Bed	NO (-58.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L11.B.02 Bed	NO (-58.5%)	NO
L11.B.03 Bed	NO (-68.5%)	NO
L11.B.04 Bed	NO (-58.4%)	NO
L11.B.05 Bed	NO (-63.8%)	NO
L11.B.06 Bed	NO (-64.4%)	NO
L11.B.07 Bed	NO (-88.6%)	NO
L11.C.01 Studio	NO (-89.4%)	NO
L12.A.01 Bed	NO (-68%)	NO
L12.A.02 Bed	NO (-84%)	NO
L12.A.03 Bed	NO (-89.3%)	NO
L12.A.04 Bed	NO (-73%)	NO
L12.A.05 Bed	NO (-73%)	NO
L12.A.06 Bed	NO (-71.9%)	NO
L12.A.07 Bed	NO (-86.6%)	NO
L12.B.01 Bed	NO (-58.4%)	NO
L12.B.02 Bed	NO (-58.5%)	NO
L12.B.03 Bed	NO (-68.5%)	NO
L12.B.04 Bed	NO (-58.4%)	NO
L12.B.05 Bed	NO (-63.8%)	NO
L12.B.06 Bed	NO (-64.4%)	NO
L12.B.07 Bed	NO (-88.6%)	NO
L12.C.01 Studio	NO (-89.4%)	NO
L13.A.01 Bed	NO (-67.8%)	NO
L13.A.02 Bed	NO (-83.9%)	NO
L13.A.03 Bed	NO (-89.3%)	NO
L13.A.04 Bed	NO (-73%)	NO
L13.A.05 Bed	NO (-73%)	NO
L13.A.06 Bed	NO (-71.9%)	NO
L13.A.07 Bed	NO (-86.6%)	NO
L13.B.01 Bed	NO (-58.4%)	NO
L13.B.02 Bed	NO (-58.4%)	NO
L13.B.03 Bed	NO (-68.5%)	NO
L13.B.04 Bed	NO (-58.4%)	NO
L13.B.05 Bed	NO (-63.6%)	NO
L13.B.06 Bed	NO (-64.4%)	NO
L13.B.07 Bed	NO (-88.6%)	NO
L13.C.01 Studio	NO (-89.4%)	NO
L14.A.01 Bed	NO (-89.4%)	NO
L14.A.02 Bed	NO (-84.2%)	NO
L14.A.03 Bed	NO (-84.2%)	NO
L14.A.04 Bed	NO (-58.4%)	NO
L14.A.05 Bed	NO (-58.4%)	NO
L14.A.06 Bed	NO (-88.1%)	NO
L14.B.01 Studio	NO (-83.2%)	NO
L15.A.01 Bed	NO (-89.4%)	NO
L15.A.02 Bed	NO (-84.2%)	NO
L15.A.03 Bed	NO (-84.2%)	NO
L15.A.04 Bed	NO (-58.4%)	NO
L15.A.05 Bed	NO (-58.4%)	NO

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
L15.A.06 Bed	NO (-88.1%)	NO
L15.B.01 Studio	NO (-83.2%)	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?	YES
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]	7187.5	7187.5
External area [m ²]	6218.9	6218.9
Weather	LON	LON
Infiltration [m ³ /hm ² @ 50Pa]	3	3
Average conductance [W/K]	1874.71	3825.86
Average U-value [W/m ² K]	0.3	0.62
Alpha value* [%]	10.11	10

* 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
C1 Hotels
C2 Residential Institutions: Hospitals and Care Homes
C2 Residential Institutions: Residential schools
100 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	3.61	9.17
Cooling	0	0
Auxiliary	7.8	4.37
Lighting	6.43	13.11
Hot water	35.5	38.57
Equipment*	39.68	39.68
TOTAL **	53.34	65.22

* 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	2.14	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]	31.47	74.44
Primary energy* [kWh/m ²]	159.65	195.21
Total emissions [kg/m ²]	25.9	30.7

* 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] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	52	0	6	0	3.5	2.42	0	2.58	0	
Notional	32.4	0	4	0	1.8	2.26	0	----	----	
[ST] Central heating using water: radiators, [HS] Heat pump (electric): air source, [HFT] Electricity, [CFT] Electricity										
Actual	36.6	0	4.2	0	11.1	2.42	0	2.58	0	
Notional	105.7	0	13	0	6.2	2.26	0	----	----	
[ST] No Heating or Cooling										
Actual	0	0	0	0	0	0	0	0	0	
Notional	0	0	0	0	0	0	0	----	----	

Key to terms

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

Key Features

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

Building fabric

Element	U _{i-Typ}	U _{i-Min}	Surface where the minimum value occurs*
Wall	0.23	0.15	L100002E:Surf[1]
Floor	0.2	0.13	L000001A:Surf[0]
Roof	0.15	0.13	L00000E6:Surf[0]
Windows, roof windows, and rooflights	1.5	1.2	L00001A8:Surf[2]
Personnel doors	1.5	1.5	L0000061:Surf[0]
Vehicle access & similar large doors	1.5	-	No Vehicle access doors in building
High usage entrance doors	1.5	-	No High usage entrance doors in building
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	3

5.2 E.On Letter



E.ON City Energy Solutions
Westwood Way
Westwood Business Park
Coventry
CV4 8LG

13TH May 2022

To whom it may concern,

CONNECTION TO ELEPHANT PARK HEAT NETWORK - AVONMOUTH HOUSE

After an initial enquiry, a meeting was held between JAW Sustainability and E.ON in May 2021 to discuss the possibility of the proposed Avonmouth House scheme to connect to the Elephant Park Heat Network. At this stage E.ON confirmed that we did not believe a connection is feasible, due to the distance of the site from the existing network.

Following other potential enquires in the area in the last year, E.ON is now considering extending the Elephant Park Heat Network north to the area surrounding Avonmouth House, which would make a future connection to the scheme possible. Exact timescales for the extension of the network are currently unknown, and are subject to connection of nearby sites, however it is currently expected to be operational around 2026.

Yours sincerely,

Tony Poole
Head of Sales

E.ON UK Infrastructure Services
Limited

Registered Office:
Westwood Way
Westwood Business Park
Coventry CV4 8LG

Registered in
England and Wales
No 07537806

5.3 Heat Pump Data

TECHNICAL PRODUCT SUBMITTAL

AMICUS LAHP-852HT AIR SOURCE HEAT PUMP

EFFICIENCY DATA -Part L2		
Heating Capacity (EN14511) external air+7C 30/35 flow	kW	80.1
Total Power input (EN14511) external air+7C 30/35 flow	kW	18.4
COP (EN14511) external air+7C 30/35 flow	W/W	4.35
EFFICIENCY DATA -ErP and Energy Label		
Energy Label Rating Low temperature		A++
SCOP Low Temperature		3.83
Seasonal Efficiency Low temperature	%	150.1
Energy Label Rating High temperature		A+
SCOP High Temperature		3.13
Seasonal Efficiency High temperature	%	122
GENERAL		
Refrigerant type		R410A
Compressor Type		E.V.I. Scroll
Number of Compressors		2
Number of Circuits		1
Capacity steps		2
Minimum capacity step	%	50
ELECTRICAL DATA		
Power supply	V/Ph/Hz	415/3+N/50
Maximum input power	kW	40
Maximum input current standard unit	A (per phase)	71
Peak input current standard unit	A (per phase)	213
Peak input current unit with soft start option fitted	A (per phase)	143
Fuse rating (delayed)	A	125
Optional Hydraulic kit input power	kW	1.1
Optional Hydraulic kit maximum input current	A	2.45
FANS		
Fan type (standard unit)		Axial
Number of fans (standard unit)		2
Air flow rate for design	m ³ /h	32192
Sound power level ²	dB(A)	74
Sound pressure level ³	dB(A)	42
WATER		
Flow/Return connections	inch	2
Nominal flow rate	L/sec	4.98
Pressure drop across the heat exchanger	kPa	24.9
Minimum water content in the user circuit	litre	800
BREEAM DATA		
Total refrigerant charge	kg	22.5
Operational life	Years	20
Global warming potential		2088

TECHNICAL PRODUCT SUBMITTAL

AMICUS LAHP-852HT AIR SOURCE HEAT PUMP

LAHP-852HT			Heating OUT							Max Outlet
Water Delivery Temperature			35C	40C	45C	50C	55C	60C	65C	
performance data	-10	Heat Output (KW)	46.1	46.3	46.4	46.8	47.3	47.9	49.2	65°c
		Efficiency COP	2.6	2.4	2.2	2.0	1.8	1.6	1.5	
	-9	Heat Output (KW)	47.3	47.5	47.7	47.8	48.4	48.9	50.2	65°c
		Efficiency COP	2.6	2.4	2.2	2.0	1.8	1.6	1.5	
	-8	Heat Output (KW)	48.5	48.6	48.9	49.0	49.4	50.1	51.3	65°c
		Efficiency COP	2.7	2.5	2.3	2.0	1.8	1.7	1.5	
	-7	Heat Output (KW)	49.7	49.8	50.0	50.1	50.6	51.2	52.5	65°c
		Efficiency COP	2.8	2.5	2.3	2.1	1.9	1.7	1.6	
	-6	Heat Output (KW)	50.9	51.0	51.2	51.4	51.8	52.3	53.7	65°c
		Efficiency COP	2.8	2.6	2.4	2.1	1.9	1.7	1.6	
	-5	Heat Output (KW)	52.1	52.2	52.4	52.6	52.9	53.5	54.9	65°c
		Efficiency COP	2.9	2.6	2.4	2.2	2.0	1.8	1.6	
	-4	Heat Output (KW)	53.8	53.9	54.3	54.7	55.1	55.8	57.5	65°c
		Efficiency COP	3.0	2.7	2.5	2.3	2.0	1.8	1.7	
	-3	Heat Output (KW)	56.4	56.4	56.7	57.2	57.7	58.3	60.2	65°c
		Efficiency COP	3.1	2.8	2.5	2.3	2.1	1.9	1.8	
	-2	Heat Output (KW)	58.8	58.8	59.2	59.7	60.4	61.0	62.9	65°c
		Efficiency COP	3.2	2.9	2.7	2.4	2.2	2.0	1.8	
	0	Heat Output (KW)	63.8	64.3	64.4	65.0	65.9	67.0	68.5	65°c
		Efficiency COP	3.5	3.2	2.9	2.6	2.4	2.2	2.0	
5	Heat Output (KW)	76.1	76.9	77.8	78.6	79.6	80.7	82.5	65°c	
	Efficiency COP	4.1	3.8	3.4	3.1	2.8	2.6	2.3		
10	Heat Output (KW)	84.7	85.3	86.0	86.7	87.6	88.7	90.1	65°c	
	Efficiency COP	4.6	4.2	3.8	3.4	3.1	2.8	2.5		
15	Heat Output (KW)	92.8	93.4	94.0	94.7	95.3	96.2	97.5	65°c	
	Efficiency COP	5.2	4.6	4.1	3.7	3.3	3.0	2.7		
20	Heat Output (KW)	99.4	99.9	100.0	101.0	102.0	102.0	104.0	65°c	
	Efficiency COP	5.6	5.0	4.4	4.0	3.6	3.2	2.9		
25	Heat Output (KW)	106.0	107.0	108.0	108.0	109.0	110.0	112.0	65°c	
	Efficiency COP	6.1	5.4	4.8	4.2	3.8	3.4	3.1		

Optional Hydraulic kit Pump details		
Model		LAHP-852HT
Nominal Input power	kW	1.1
Nominal Input current	A	2.45
Nominal water flow rate	l/h	13790
Total head available at the pump	kPa	178
Available head for system pipework	kPa	122
Power supply	V/ph/Hz	400/3/50

Amicus air to water heat pumps must be installed and maintained in line with the Installation Commissioning and Maintenance Instructions which are available on the Literature & Downloads section of www.lochinvar.ltd.uk

TECHNICAL PRODUCT SUBMITTAL

LBT1000 THERMAL STORE

LBT1000

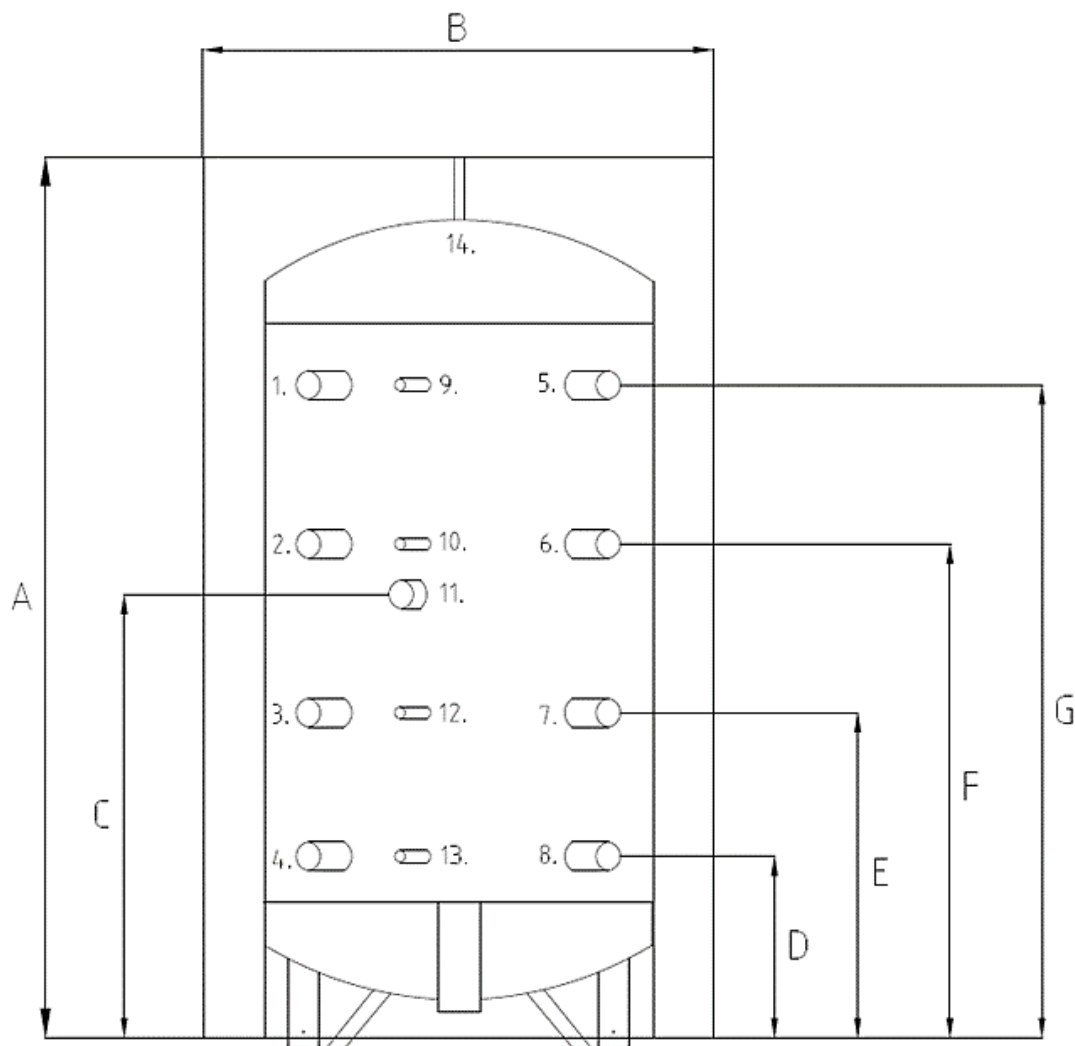
EFFICIENCY DATA-Part L2	
Insulation Thickness	mm
Insulation Type	
Heat Loss	kWh/24h
EFFICIENCY DATA ErP AND ENERGY LABEL	
Ecodesign Energy Label rating	
Standing Loss	W
GENERAL DATA	
Storage Capacity	litres
Weight Empty	kg
Weight Full and Insulated	kg
Maximum Vessel Pressure	bar
Maximum Vessel Temperature	°C

80
Polyurethane
3.01
C
125.4
1000
125
1125
5
95

The LBT Thermal store must be installed and maintained in line with the Installation Commissioning and Maintenance Instructions which are available on the Literature & Downloads section of www.lochinvar.ltd.uk

ErP and Warranty

ErP Data including Product Fiche and Energy Labels where applicable and Warranty information are also available at www.lochinvar.ltd.uk



TECHNICAL PRODUCT SUBMITTAL

LBT1000 THERMAL STORE



No	Description	Unit	LBT300	LBT500	LBT800	LBT1000	LBT1500	LBT2000
A	Total Height (with insulation)	mm	1680	1715	1740	2100	2140	2470
B	Diameter of Water Heater (with insulation)	mm	610	710	990	990	1240	1340
C	Height of Immersion heater connection	mm	880	975	845	1020	1085	1200
D	Connection ASHP return	mm	325	345	290	290	360	390
E	Height of Tank body connection	mm	695	715	660	780	810	930
F	Height of Tank body connection	mm	1065	1085	1030	1270	1260	1470
G	Connection ASHP flow	mm	1435	1455	1400	1760	1710	2010
A	Height of AAV Connection	mm	1680	1715	1740	2100	2140	2470

No	Description	Unit	LBT300	LBT500	LBT800	LBT1000	LBT1500	LBT2000
1	Connection heating system flow	BSP	1¼"	1¼"	1½"	1½"	1½"	1½"
2	Connection Tank body	BSP	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"
3	Connection heating system return	BSP	1¼"	1¼"	1½"	1½"	1½"	1½"
4	Connection alternate heating system return	BSP	1¼"	1¼"	1½"	1½"	1½"	1½"
5	Connection ASHP flow	BSP	1¼"	1¼"	1½"	1½"	1½"	1½"
6	Connection Tank body	BSP	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"
7	Connection Tank body	BSP	1¼"	1¼"	1¼"	1¼"	1¼"	1¼"
8	Connection ASHP return	BSP	1¼"	1¼"	1½"	1½"	1½"	1½"
9	Connection sensor point	BSP	½"	½"	½"	½"	½"	½"
10	Connection sensor point	BSP	½"	½"	½"	½"	½"	½"
11	Connection Immersion heater	BSP	1½"	1½"	1½"	1½"	1½"	1½"
12	Connection sensor point	BSP	½"	½"	½"	½"	½"	½"
13	Connection sensor point	BSP	½"	½"	½"	½"	½"	½"
14	Connection Air vent	BSP	1"	1"	1"	1"	1"	1"

LST Direct Storage vessel

Key features Include:

- Clean out door
- Enamel lined storage vessel
- 3 year storage vessel warranty

RANGE

Storage Capacity	litres
EFFICIENCY DATA-Part L2	
Insulation Thickness	mm
Insulation Type	
Standing Loss	kWh/ltr/day
EFFICIENCY DATA-ErP and Energy Label	
Ecodesign Energy Label rating	
Standing Loss	W
GENERAL DATA	
Recovery Rate @ 44°C	l/hr
Recovery Rate @ 50°C	l/hr
Recovery Rate @ 56°C	l/hr
Dimensions (height)	mm
Dimensions (diameter with insulation)	mm
Weight (empty)	kg
Weight (full)	kg
Minimum Working Pressure	bar
Maximum Working Pressure	bar
Hot Outlet Connection (inches)	BSP
Flow Connection (inches)	BSP
Return Connection (inches)	BSP
Relief Valve Tapping (inches)	BSP
Anode Quantity	

Model

LST550GE

2500
100
Rockwool
0.005
n/a
232
Use heat source data
Use heat source data
Use heat source data
2045
1600
485
2985
0.5
7
2
2
2
2
3

LST Direct storage vessels must be installed and maintained in line with the Installation Commissioning and Maintenance Instructions which are available on the Literature & Downloads section of www.lochinvar.ltd.uk

If the LST Direct storage vessel is being used alongside a gas fired water heater then the Installation Commissioning and Maintenance instructions for the gas appliance should also be consulted prior to installation as the installation requirements may differ.

Particular attention should be made to:-

- Dimensions and clearances page 7
- Vented and Unvented installation requirements page 9
- Maintenance page 13

ErP and Warranty

ErP Data including Product Fiche and Energy Labels where applicable and Warranty information are also available at www.lochinvar.ltd.uk

5.4 Roof PV Layout



Do not scale from this drawing. This drawing is based on dimensional survey information provided by others. The architect cannot accept responsibility for the accuracy of this survey information. All dimensions are shown in metric. This drawing remains the copyright of Stitch Studio Ltd.

DRAWING NOTES

ISSUE	REASON FOR ISSUE	DATE
A	Design updates	24/06/2021
B	Design updates after structure feedback	13/08/2021
C	Design updates after pre app.	19/08/2021
D	Design coordination updates	06/09/2021

KEY PLAN

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PROJECT

Avonmouth House

PROJECT CODE 21235 CLIENT Tribe Student Housing

DRAWING TITLE STATUS
Roof Draft

SCALE SHEET DATE OF FIRST ISSUE
1:250 A3 04.06.21

DRAWING NUMBER REVISION
21235-STCH-XX-RF-DR-A-0108 C