

Sustainability & Energy Statement

Land at 91 Station Road, West Drayton

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Executive Summary

This Sustainability and Energy Statement has been prepared to accompany a planning application for the erection of a 4-storey building to provide student accommodation and a retail shop following the demolition of the existing hot food takeaway and mini cab office at 91 Station Road, Drayton.

The Statement sets out the commitments of the applicant to the site and the targets that will be applied to the development. The site is located in a sustainable location close to existing facilities and infrastructure and will provide accommodation to meet local need.

Throughout the design process, the applicant and design team members have given careful consideration to the sustainability issues relating to the site, and how these can be enhanced in a marketable and feasible manner. As a result, this Statement demonstrates that the development meets relevant sustainability criteria and in a number of areas exceeds them.

The fabric standards of the building exceed the requirements of the Building Regulations.

The methodology used has been based upon the policy set in the London Plan (and provided in 'Energy Assessment Guidance' published by the Mayor of London) and uses the carbon factors for gas and electricity proposed for SAP 10.

In order to demonstrate the energy efficiency of the building a set of SAP calculations have been prepared for the 'Be Lean' scenario based on the use of gas boilers to each unit. This is not the proposed strategy but purely demonstrates the reduction from the 'Be Lean' condition.

The Regulations Compliance Reports for this option are attached as Appendix 1 and the 'Be Lean' GLA spreadsheet based on the SAP 10 carbon factors are attached as Appendix 2.

The reductions from the Be Lean case can be expressed as follows;

	Student Accommodation		Retail Unit	
	T CO ₂ per year	%	T CO ₂ per year	%
Baseline Emissions (TER based on gas)	7.312		0.428	
Be Lean Savings	6.141	16.02%	0.354	17.30%

The reductions from energy efficiency meet the requirements of the GLA Guidance.

It is proposed to install a communal heat network into the building using an air source heat pump as the heat source. The outdoor unit(s) will be located on the roof of the building and an indicative location is shown on the Roof Plan attached as Appendix 5.

The 'Be Clean' SAP 10 spreadsheet is attached as Appendix 4, which uses the energy demand calculations from the calculations (attached as Appendix 3) to calculate the total site emissions.

In addition to the air source heat pump the roof of the building is able to accommodate a number of photovoltaic panels. The Roof Plan attached as Appendix 5 demonstrates that an array of 19 x 400W photovoltaic panels (7.6 kW) could be installed on the roof. The panels will further reduce emissions.

The reductions in emissions can be summarised as follows:

	Total Emissions	% Reduction
	T CO ₂ per year	
Be Lean		
Baseline (Building Regulations TER) – based on gas	7.741	
Be Lean - after energy efficiency (DER) – based on gas	6.495	16.09%
Be Clean		
Emissions – after ASHPs	3.313	57.20%
Be Green		
Emissions – after renewable technologies (Be Green)	1.704	77.99%

The residual emissions are 1.704 tonnes and therefore, using the carbon offset charge the payment should be **£4,856** (1.704 x £2,850).

1.0 Introduction

This report has been commissioned by the Aquira Developments Limited and provides a Sustainability and Energy Statement for the erection of a 4-storey building to provide student accommodation and a retail shop following the demolition of the existing hot food takeaway and mini cab office at 91 Station Road, Drayton.

The report describes the methodology used in assessing the development and the initiatives proposed.

The building has been designed and will be constructed to reduce energy demand and carbon dioxide emissions.

The objective is to reduce the energy demand to an economic minimum by making investments in the parts of the building that has the greatest impact on energy demand and are the most difficult and costly to change in the future, namely the building fabric.

Once a cost-effective structure has been designed, low-carbon and renewable technologies have been considered for installation to provide heat and/or electricity.

The following hierarchy has been followed:

- Lean reduce demand and consumption
- Clean increase energy efficiency
- Green provide low carbon renewable energy sources

The report has been prepared by Ivan Ball of Bluesky Unlimited who are sustainability consultants.

2.0 Planning Policy Context

National Policy

The UK Government published its sustainable development strategy in 1999 entitled “A better quality of life: A strategy for sustainable development in the UK”. This sets out four main objectives for sustainable development in the UK:

- Social progress that recognises the needs of everyone.
- Effective protection of the environment.
- Prudent use of natural resources.
- Maintenance of high stable levels of economic growth and employment.

Sustainable Communities: Building for the Future, known colloquially as the Communities Plan was published in 2003. The Plan sets out a long-term programme of action for delivering sustainable communities in both urban and rural areas. It aims to tackle housing supply issues in parts of the country, low demand in other parts and the quality of our public spaces. The Communities Plan describes sustainable communities as: Active, inclusive and safe, well run, environmentally sensitive, well designed and built, well connected, thriving, well served and fair for everyone.

The most relevant national planning policy guidance on sustainability is set out in:

- National Planning Policy Framework - 2021

Paragraph 152 states;

“The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.”

Regional and Local Policies

The Development Plan comprises the London Plan (2021) and the London Borough of Hillingdon Local Plan Part 1 (2012) and Part 2 (2020).

London Plan, published March 2021 – the following policies are relevant to the application:

Policy SI 1 Improving air quality

- A** *Development Plans, through relevant strategic, site-specific and area-based policies, should seek opportunities to identify and deliver further improvements to air quality and should not reduce air quality benefits that result from the Mayor's or boroughs' activities to improve air quality.*
- B** *To tackle poor air quality, protect health and meet legal obligations the following criteria should be addressed:*
- 1) Development proposals should not:*
 - a) lead to further deterioration of existing poor air quality*
 - b) create any new areas that exceed air quality limits, or delay the date at which compliance will be achieved in areas that are currently in exceedance of legal limits*
 - c) create unacceptable risk of high levels of exposure to poor air quality.*
 - 2) In order to meet the requirements in Part 1, as a minimum:*
 - a) development proposals must be at least Air Quality Neutral*
 - b) development proposals should use design solutions to prevent or minimise increased exposure to existing air pollution and make provision to address local problems of air quality in preference to post-design or retro-fitted mitigation measures*
 - c) major development proposals must be submitted with an Air Quality Assessment. Air quality assessments should show how the development will meet the requirements of B1*
 - d) development proposals in Air Quality Focus Areas or that are likely to be used by large numbers of people particularly vulnerable to poor air quality, such as children or older people should demonstrate that design measures have been used to minimise exposure.*
- C** *Masterplans and development briefs for large-scale development proposals subject to an Environmental Impact Assessment should consider how local air quality can be improved across the area of the proposal as part of an air quality positive approach. To achieve this a statement should be submitted demonstrating:*
- 1) how proposals have considered ways to maximise benefits to local air quality, and*
 - 2) what measures or design features will be put in place to reduce exposure to pollution, and how they will achieve this.*
- D** *In order to reduce the impact on air quality during the construction and demolition phase development proposals must demonstrate how they plan to comply with the Non-Road Mobile Machinery Low Emission Zone and reduce emissions from the demolition and construction of buildings following best practice guidance.*

- E Development proposals should ensure that where emissions need to be reduced to meet the requirements of Air Quality Neutral or to make the impact of development on local air quality acceptable, this is done on-site. Where it can be demonstrated that emissions cannot be further reduced by on-site measures, off-site measures to improve local air quality may be acceptable, provided that equivalent air quality benefits can be demonstrated within the area affected by the development.*

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:*
- 1) through a cash in lieu contribution to the borough's carbon offset fund, or*
 - 2) 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 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.*

Policy SI 5 Water infrastructure

- A *In order to minimise the use of mains water, water supplies and resources should be protected and conserved in a sustainable manner.*
- B *Development Plans should promote improvements to water supply infrastructure to contribute to security of supply. This should be done in a timely, efficient and sustainable manner taking energy consumption into account.*
- C *Development proposals should:*
- 1) *through the use of Planning Conditions minimise the use of mains water in line with the Optional Requirement of the Building Regulations (residential development), achieving mains water consumption of 105 litres or less per head per day (excluding allowance of up to five litres for external water consumption)*
 - 2) *achieve at least the BREEAM excellent standard for the 'Wat 01' water category or equivalent (commercial development)*
 - 3) *incorporate measures such as smart metering, water saving and recycling measures, including retrofitting, to help to achieve lower water consumption rates and to maximise future-proofing.*
- D *In terms of water quality, Development Plans should:*
- 1) *promote the protection and improvement of the water environment in line with the Thames River Basin Management Plan, and should take account of Catchment Plans*
 - 2) *support wastewater treatment infrastructure investment to accommodate London's growth and climate change impacts. Such infrastructure should be constructed in a timely and sustainable manner taking account of new, smart technologies, intensification opportunities on existing sites, and energy implications. Boroughs should work with Thames Water in relation to local wastewater infrastructure requirements.*
- E *Development proposals should:*
- 1) *seek to improve the water environment and ensure that adequate wastewater infrastructure capacity is provided*
 - 2) *take action to minimise the potential for misconnections between foul and surface water networks.*
- F *Development Plans and proposals for strategically or locally defined growth locations with particular flood risk constraints or where there is insufficient water infrastructure capacity should be informed by Integrated Water Management Strategies at an early stage.*

The energy strategy within the Statement has been prepared in accordance with **Energy Assessment Guidance** published by the Mayor of London.

Hillingdon Local Plan: Part 1 Strategic Policies, adopted November 2012

The following policies have been edited for relevance to this application;

Policy BE1: Built Environment

The Council will require all new development to improve and maintain the quality of the built environment in order to create successful and sustainable neighbourhoods, where people enjoy living and working and that serve the long-term needs of all residents. All new development should:

- 1. Achieve a high quality of design in all new buildings, alterations, extensions and the public realm which enhances the local distinctiveness of the area, contributes to community cohesion and a sense of place;*
- 2. Be designed to be appropriate to the identity and context of Hillingdon's buildings, townscapes, landscapes and views, and make a positive contribution to the local area in terms of layout, form, scale and materials and seek to protect the amenity of surrounding land and buildings, particularly residential properties;*
- 3. Be designed to include "Lifetime Homes" principles so that they can be readily adapted to meet the needs of those with disabilities and the elderly, 10% of these should be wheelchair accessible or easily adaptable to wheelchair accessibility encouraging places of work and leisure, streets, neighbourhoods, parks and open spaces to be designed to meet the needs of the community at all stages of people's lives;*
- 4. In the case of 10 dwellings or over, achieve a satisfactory assessment rating in terms of the latest Building for Life standards (as amended or replaced from time to time);*
- 5. Improve areas of poorer environmental quality, including within the areas of relative disadvantage of Hayes, Yiewsley and West Drayton. All regeneration schemes should ensure that they are appropriate to their historic context, make use of heritage assets and reinforce their significance;*
- 6. Incorporate a clear network of routes that are easy to understand, inclusive, safe, secure and connect positively with interchanges, public transport, community facilities and services;*
- 7. Improve the quality of the public realm and provide for public and private spaces that are attractive, safe, functional, diverse, sustainable, accessible to all, respect the local character and landscape, integrate with the development, enhance and protect biodiversity through the inclusion of living walls, roofs and areas for wildlife, encourage physical activity and where appropriate introduce public art;*
- 8. Create safe and secure environments that reduce crime and fear of crime, anti-social behaviour and risks from fire and arson having regard to Secure by Design standards and address resilience to terrorism in major development proposals;*
- 9. Not result in the inappropriate development of gardens and green spaces that erode the character and biodiversity of suburban areas and increase the risk of flooding through the loss of permeable areas;*

10. *Maximise the opportunities for all new homes to contribute to tackling and adapting to climate change and reducing emissions of local air quality pollutants. The Council will require all new development to achieve reductions in carbon dioxide emission in line with the London Plan targets through energy efficient design and effective use of low and zero carbon technologies. Where the required reduction from on-site renewable energy is not feasible within major developments, contributions off-site will be sought. The Council will seek to merge a suite of sustainable design goals, such as the use of SUDS, water efficiency, lifetime homes, and energy efficiency into a requirement measured against the Code for Sustainable Homes and BREEAM. These will be set out within the Hillingdon Local Plan: Part 2- Development Management Policies Local Development Document (LDD). All developments should be designed to make the most efficient use of natural resources whilst safeguarding historic assets, their settings and local amenity and include sustainable design and construction techniques to increase the re-use and recycling of construction, demolition and excavation waste and reduce the amount disposed to landfill;*
11. *In the case of tall buildings, not adversely affect their surroundings including the local character, cause harm to the significance of heritage assets or impact on important views. Appropriate locations for tall buildings will be defined on a Character Study and may include parts of Uxbridge and Hayes subject to considering the Obstacle Limitation Surfaces for Heathrow Airport. Outside of Uxbridge and Hayes town centres, tall buildings will not be supported. The height of all buildings should be based upon an understanding of the local character and be appropriate to the positive qualities of the surrounding townscape.*

Policy EM1: Climate Change Adaptation and Mitigation

The Council will ensure that climate change mitigation is addressed at every stage of the development process by:

1. *Prioritising higher density development in urban and town centres that are well served by sustainable forms of transport.*
2. *Promoting a modal shift away from private car use and requiring new development to include innovative initiatives to reduce car dependency.*
3. *Ensuring development meets the highest possible design standards whilst still retaining competitiveness within the market.*
4. *Working with developers of major schemes to identify the opportunities to help provide efficiency initiatives that can benefit the existing building stock.*
5. *Promoting the use of decentralised energy within large scale development whilst improving local air quality levels.*
6. *Targeting areas with high carbon emissions for additional reductions through low carbon strategies. These strategies will also have an objective to minimise other pollutants that impact on local air quality. Targeting areas of poor air quality for additional emissions reductions.*
7. *Encouraging sustainable techniques to land remediation to reduce the need to transport waste to landfill. In particular developers should consider bioremediation as part of their proposals.*

8. *Encouraging the installation of renewable energy for all new development in meeting the carbon reduction targets savings set out in the London Plan. Identify opportunities for new sources of electricity generation including anaerobic digestion, hydro electricity and a greater use of waste as a resource.*
9. *Promoting new development to contribute to the upgrading of existing housing stock where appropriate.*

The Borough will ensure that climate change adaptation is addressed at every stage of the development process by:

10. *Locating and designing development to minimise the probability and impacts of flooding.*
11. *Requiring major development proposals to consider the whole water cycle impact, which includes flood risk management, foul and surface water drainage and water consumption.*
12. *Giving preference to development of previously developed land to avoid the loss of further green areas.*
13. *Promoting the use of living walls and roofs, alongside sustainable forms of drainage to manage surface water run-off and increase the amount of carbon sinks.*
14. *Promoting the inclusion of passive design measures to reduce the impacts of urban heat effects.*

Local Plan: Part 2 Development Management Policies, adopted January 2020

Policy DMEI 2: Reducing Carbon Emissions

- A) *All developments are required to make the fullest contribution to minimising carbon dioxide emissions in accordance with London Plan targets. **
- B) *All major development proposals must be accompanied by an energy assessment showing how these reductions will be achieved.*
- C) *Proposals that fail to take reasonable steps to achieve the required savings will be resisted. However, where it is clearly demonstrated that the targets for carbon emissions cannot be met onsite, the Council may approve the application and seek an off-site contribution to make up for the shortfall.*

Policy DMEI 3: Decentralised Energy

- A) *All major developments are required to be designed to be able to connect to a Decentralised Energy Network (DEN).*
- B) *Major developments located within 500 metres of an existing DEN, and minor new-build developments located within 100 metres, will be required to connect to that network, including provision of the means to connect to that network and a reasonable financial contribution to the connection charge, unless a feasibility assessment demonstrates that connection is not reasonably possible.*
- C) *Major developments located within 500 metres of a planned future DEN, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be required to provide a means to connect to that network and developers shall provide a reasonable financial contribution for the future cost of connection and a commitment to connect via a legal*

agreement or contract, unless a feasibility assessment demonstrates that connection is not reasonably possible.

- D) *The Council will support the development of DENs and energy centres in principle, subject to meeting the wider policy requirements of this plan and in particular on design and air quality.*

Policy DMEI 10: Water Management, Efficiency, and Quality

- A) Applications for all new build developments (not conversions, change of use, or refurbishment) are required to include a drainage assessment demonstrating that appropriate sustainable drainage systems (SuDS) have been incorporated in accordance with the London Plan Hierarchy (Policy 5.13: Sustainable drainage).
- B) All major new build developments, as well as minor developments in Critical Drainage Areas or an area identified at risk from surface water flooding must be designed to reduce surface water run-off rates to no higher than the pre-development greenfield run-off rate in a 1:100-year storm scenario, plus an appropriate allowance for climate change for the worst storm duration. The assessment is required regardless of the changes in impermeable areas and the fact that a site has an existing high run-off rate will not constitute justification.
- C) Rain Gardens and non-householder development should be designed to reduce surface water run-off rates to Greenfield run-off rates.
- D) Schemes for the use of SuDS must be accompanied by adequate arrangements for the management and maintenance of the measures used, with appropriate contributions made to the Council where necessary.
- E) Proposals that would fail to make adequate provision for the control and reduction of surface water run-off rates will be refused.
- F) Developments should be drained by a SuDS system and must include appropriate methods to avoid pollution of the water environment. Preference should be given to utilising the drainage options in the SuDS hierarchy which remove the key pollutants that hinder improving water quality in Hillingdon. Major development should adopt a 'treatment train' approach where water flows through different SuDS to ensure resilience in the system.

Water Efficiency

- G) *All new development proposals (including refurbishments and conversions) will be required to include water efficiency measures, including the collection and reuse of rain water and grey water.*
- H) *All new development should demonstrate water usage rates of no more than 105 litres/person/day.*

Water and Wastewater Infrastructure

- J) *All new development proposals will be required to demonstrate that there is sufficient capacity in the water and wastewater infrastructure network to support the proposed development. Where there is a capacity constraint the Local Planning Authority will require the developer to provide a detailed water and/or drainage strategy to inform what infrastructure is required, where, when and how it will be delivered.*

3.0 Assessment Methodology

The baseline carbon dioxide emissions from the building have been established using agreed building specifications and detailed planning drawings.

SAP calculations have been prepared for a representative range of student units and BRUKL calculations have been prepared for the retail unit. The calculations have been based initially on a gas installation in order to demonstrate the Be Lean energy efficiency of the building and then using the preferred, electrical heating system.

Emission Factors

The CO₂ emission factors, where applicable, used throughout this report have been taken from the emerging Building Regulation Approved Document L - 2021.

	kg CO ₂ /kWh
Mains gas	0.210
Grid supplied and displaced electricity	0.233

4.0 Proposal

The proposal is for the construction of a 4-storey building to provide a retail unit at ground-floor level with 15, student units on lower ground-floor, ground, first and second-floor levels.

The accommodation schedule in detail is;

Unit Type	Number	Area	Total Area
		m ²	m ²
Retail Unit	1	36.6	36.6
Student apartments	15	16.7-21.2	503.1
Total			539.7

5.0 Energy Efficiency

5.1 Demand Reduction (Be Lean)

Design

The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practical. It is possible to exceed Building Regulations requirements (Part L - 2013) through demand reduction measures alone, which typically include a combination of passive design measures (e.g. building design and efficient building fabric) and active design measures (e.g. variable speed motors).

Passive Design Measures

The passive design measures proposed include;

Passive Solar Gain

Passive measures include allowing for natural ventilation and exposed thermal mass coupled with high levels of insulation, air tightness and the control of solar gain.

The position of the building within the site is in context with surrounding development and the shape of the site and mirrors the location of the existing building.

Natural Daylighting

The orientation and the size of the windows have been optimised to maximise the amount of natural daylight and therefore reduce the demand for artificial lighting.

Efficient Building Fabric

Building Envelope

U-values of the building envelope must meet Building Regulations Part L standards and further improvements to U-values will reduce the buildings heating requirements.

Ground floors will be insulated with 150mm 'Kingspan' PIR insulation or similar.

The building is suited to traditional load bearing construction and it is assumed the external walls are built in cavity wall construction with fully filled cavities. However, the U-values set out below could equally be achieved using a light-weight framed system using either steel or timber.

The flat roofs will be insulated with 200mm of 'Kingspan' PIR insulation or similar.

Windows are proposed as double glazed with Low 'e' soft coat and argon filled.

It is proposed to set maximum limits for the elemental U-values as follows:

Element	Part L Limiting U-values	Proposed U-values	Proposed Improvement
	W/m ² K	W/m ² K	
Lower-Ground & Ground Floor	0.20	0.11	45%
External Walls	0.30	0.18	43%
Flat Roofs	0.20	0.13	50%
Windows	2.00	1.40	30%
Entrance Doors		1.20	
'g' Value of Glazing			0.72

Air Leakage

Large amounts of heat are lost in winter through air leakage from a building (also referred to as infiltration or air permeability) often through poor sealing of joints and openings in the building

The Building Regulations set a minimum standard for air permeability of 10 m³ of air per hour per m² of envelope area, at 50Pa. It is proposed to achieve a 60% improvement over Building Regulations and the building will target a permeability of 4.0 m³/hr/m².

Thermal Bridging

The significance of Thermal Bridging, as a potentially major source of fabric heat losses, is increasingly understood. Improving the U-values for the main building fabric without accurately addressing the Thermal Bridging is no longer an option and will not achieve the fabric energy efficiency and energy and CO₂ reduction targets set out in this strategy.

The building will use the Accredited Construction Details (ACDs) which will enable the building to achieve the higher energy efficiency requirements of the Building Regulations.

The bridging losses have been based upon the use of the ACDs and calculated using SAP Appendix K Table 1.

Ventilation

As a result of increasing thermal efficiency and air tightness, Building Regulations Approved Document F was also revised in 2006 to address the possibility of overheating and poor air quality.

As a result of the number of shower rooms proposed it is beneficial to install a centralised mechanical ventilation system with heat recovery. This reduces the number of vents on the outside of the building and allows any heat within the extracted air to be recycled.

Active Design Measures will include;

Efficient Lighting and Controls

Throughout the scheme natural lighting will be optimised.

Approved Document L1A requires three in four light fittings (75%) to be dedicated low energy fittings. The building will exceed this and all light fittings will be of a dedicated energy efficient type.

External lighting will be fitted with time controls and light sensors to ensure illumination is restricted to required times. External lighting will be limited to a maximum fitting output of 150w.

Space Heating and Hot Water

The baseline SAP modelling and BRUKL modelling has been based upon the use of a gas heating system but the assessment considers other options for providing space heating and hot water.

5.2 Establishing Energy Demand and Carbon Dioxide Emissions (Be Lean)

The GLA Energy Assessment Guidance requires the energy efficient of a building (Be Lean) to be expressed using a gas heating system as a baseline. These are not necessarily the proposed final option but is used to test the 'Be Lean' reductions only.

Student Accommodation

SAP calculations have been prepared for representative ground, mid and top-floor units.

The Regulations Compliance Reports are attached as Appendix 1 but the energy demand for the modelled units can be summarised as follows;

Room 1 Ground-floor, Single aspect, North facing window	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	586	235
Water heating	1,537	1,464
Electricity for pumps, fans & lighting	219	258
Total	2,342	1,957

Room 3 & 8 Mid-floor, Single aspect, North facing window	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	371	53
Water heating	1,550	1,467
Electricity for pumps, fans & lighting	219	258
Total	2,140	1,778

Room 13 Top-floor, Single aspect, North facing window	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	609	302
Water heating	1,536	1,463
Electricity for pumps, fans & lighting	219	258
Total	2,364	2,023

Room 2 Ground-floor, Single aspect, North facing window	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	586	235
Water heating	1,537	1,464
Electricity for pumps, fans & lighting	219	258
Total	2,342	1,957

Rooms 5 & 10 Mid-floor, Dual aspect, North & East facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	362	56
Water heating	1,551	1,467
Electricity for pumps, fans & lighting	206	245
Total	2,119	1,768

Rooms 15 Top-floor, Dual aspect, North & East facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	624	320
Water heating	1,536	1,463
Electricity for pumps, fans & lighting	206	245
Total	2,366	2,028

Rooms 4 & 9 Mid-floor, Triple aspect, West, North & East facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	674	356
Water heating	1,538	1,465
Electricity for pumps, fans & lighting	193	234
Total	2,405	2,055

Room 14 Top-floor, Triple aspect, West, North & East facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	917	680
Water heating	1,529	1,462
Electricity for pumps, fans & lighting	193	234
Total	2,639	2,376

Room 6 Mid-floor, Dual aspect, SW,& SE facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	442	149
Water heating	1,559	1,474
Electricity for pumps, fans & lighting	203	247
Total	2,204	1,870

Room 11 Top-floor, Dual aspect, SW,& SE facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	713	440
Water heating	1,545	1,470
Electricity for pumps, fans & lighting	203	247
Total	2,461	2,157

Room 7 Mid-floor, Dual aspect, SW,& East facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	367	101
Water heating	1,541	1,460
Electricity for pumps, fans & lighting	194	228
Total	2,102	1,789

Room 12 Top-floor, Dual aspect, SW,& East facing windows	Energy Demand TER	Energy Demand DER
	kWh/yr	kWh/yr
Space heating	612	368
Water heating	1,528	1,456
Electricity for pumps, fans & lighting	194	228
Total	2,334	2,052

Commercial Accommodation (Retail)

The baseline emissions for the retail accommodation have been established by preparing a BRUKL calculation based on the use of a gas heating installation.

The energy demand can be summarised as follows:

Retail Unit	Notional Energy Demand	Notional Energy Demand
	kWh/m ²	kWh/m ²
Heating	33.27	21.05
Hot Water	0.51	0.51
Cooling	0.00	0.00
Auxiliary	3.37	4.68
Lighting	16.39	17.41
Totals	53.53	43.64

Summary

The energy demand figures calculated above have been inputted into the SAP 10 spreadsheet, which is attached as Appendix 2 and provides the total site TER and DER/BER emissions using the emerging carbon emissions factors and as required by the GLA Energy Assessment Guidance.

The reduction in emissions from the student accommodation is **16.02%** and from the retail unit is **17.30%**.

The reductions from energy efficiency for the 'Be Lean' case therefore meets the requirements of the Guidance.

The combined maximum allowable carbon dioxide emissions from the site (TER) are assessed as **7,741 kg CO₂ per year**, with the actual carbon dioxide emissions (DER/BER) assessed as **6,495 kg CO₂ per year**.

The combined reduction in emissions using from energy efficiency for the 'Be Lean' scenario and using the SAP 10 carbon factors is **1,245 kg CO₂ per year**, which equates to;

- **16.09%**

5.3 Low-Carbon and Renewable Technologies (Be Clean and Be Green)

The carbon dioxide emissions established above have been used to test the viability of various renewable and low carbon technologies as follows.

The Government's Renewable Obligation defines renewable energy in the UK. The identified technologies are;

- Small hydro-electric
- Landfill and sewage gas
- Onshore and offshore wind
- Biomass
- Tidal and wave power
- Geothermal power
- Solar

The use of landfill or sewage gas, offshore wind or any form of hydroelectric power is not suitable for the site due to its location. The remaining technologies are considered below;

Wind

Wind turbines are available in various sizes from large rotors able to supply whole communities to small roof or wall-mounted units for individual dwellings.

The Government wind speed database predicts local wind speeds at Station Road to be 4.8 m/s at 10m above ground level and 5.6 m/s at 25m above ground level. This is below the level generally required for commercial investment in large wind turbines. In addition the land take, potential for noise and signal interference make a large wind turbine unsuitable for this development.

Roof mounted turbines could be used at the development to generate small but valuable amounts of renewable electricity but the small output and contribution to total emissions means any investment would be small and purely tokenism. In addition the use of wind turbines will have a detrimental aesthetic impact on the appearance of the development.

Combined Heat and Power and Community Heating

Combined heat and power (CHP) also called co-generation is a de-centralised method of producing electricity from a fuel and 'capturing' the heat generated for use in buildings. The plant is essentially a small-scale electrical power station. The production and transportation of electricity via the National Grid is very inefficient with over 65% of the energy produced at the power station being lost.

Consequently, CHP can demonstrate significant CO₂ savings and although not necessarily classed as renewable energy (depending on the fuel used) the technology is low carbon.

For a CHP plant to be economic it needs to operate for as much of the time as possible (usually deemed to be in excess of 14 hours per day) and therefore the size of the unit is usually based upon the hot water load of the building (s) with additional boilers meeting the peak space heating demand.

There is insufficient baseload to justify a CHP unit and therefore this technology is not proposed.

Ground Source Heat Pumps

Sub soil temperatures are reasonably constant and predictable in the UK, providing a store of the sun's energy throughout the year. Below London the groundwater in the lower London aquifer is at a fairly constant temperature of 12° C. Ground source heat pumps (GSHP) extract this low-grade heat and convert it to usable heat for space heating.

GSHP operates on a similar principle to refrigerators, transferring heat from a cool place to a warmer place. They operate most efficiently when providing space heating at a low temperature, typically via under floor heating or with low temperature radiators.

There is insufficient external area to install a shallow, horizontal collection system and a borehole system would be required. There are limited opportunities to place the bore holes away from the building and in addition the installation would be prohibitively expensive.

The installation of ground source heat pumps into this site is therefore not appropriate.

Solar

(i) Solar Water Heating

Solar hot water panels use the sun's energy to directly heat water circulating through panels or pipes. The technology is simple and easily understood by purchasers.

Solar hot water heating panels are based generally around two types, which are available being 'flat plate collectors' and 'evacuated tubes'. Flat plate collectors can achieve an output of up to 1,124 kWh/annum (Schuco) and evacuated tubes can achieve outputs up to 1,365 kWh/annum (Riomay).

Panels are traditionally roof mounted and for highest efficiencies should be mounted plus or minus 30 degrees of due south. Evacuated tubes can be laid horizontally on flat roofs but flat plate collectors are recommended for installation at an incline of 30 degrees

The total hot water load of the student accommodation (based on gas heating) is calculated as 17,575 kWh per year and assuming panels would reduce demand by 50% the reduction in CO₂ emissions would be **1,845 kg CO₂ per year**. When combined with the energy efficiency measures incorporated into the scheme this equates to a total reduction of **39.92%**.

Solar hot water panels could be used to further reduce emissions.

(ii) Photovoltaics

Photovoltaic panels (PV) provide clean silent electricity. They generate electricity during most daylight conditions although they are most efficient when exposed to direct sunlight or are orientated to face plus or minus 30 degrees of due south.

PV panels can be integrated into many different aspects of a development including roofs, walls, shading devices or architectural panels. The panels typically have an electrical warranty of 20-25 years and an expected system lifespan of 25-40 years.

The building contains a flat roof and could accommodate a number of photovoltaic panels. The Roof Plan attached as Appendix 5 demonstrate a total of 19 panels could be installed. These would be installed on racks and gently inclined towards the southwest and south and assuming the installation of 400W panels the total reduction in emissions from the array would be **1,609 kg CO₂ per year**.

Photovoltaic panels could be used to further reduce emissions.

Air Source Heat Pumps (ASHP)

Air sourced heat pumps operate using the same reverse refrigeration cycle as ground source heat pumps; however, the initial heat energy is extracted from the external air rather than the ground.

Whilst ASHPs generally have a coefficient of performance (CoP) of around 3 because electricity costs around 4.5 times more than gas (per kWh) the annual heating bills for ASHPs can be more expensive than using a gas system.

However, due to the reduction in the carbon emissions factors proposed in the new SAP the use of an electrical heating system can reduce emissions more than a comparable gas installation.

The use of a communal system is appropriate because of the use of the building and the following analysis includes the installation of a communal air source heat pump system to provide space heating and hot water to the student units and to the retail unit. cylinder.

Air source heat pumps are an appropriate technology.

5.4 Establishing Energy Demand and Carbon Dioxide Emissions (Be Clean)

Student Accommodation

The student units modelled above under the 'Be Lean' scenario have been remodelled using a communal air source heat pump system in lieu of a gas system and the retail unit has been assessed as having an individual air source heat pump, which could also provide comfort cooling if required.

The Regulations Compliance Reports are attached as Appendix 3 but the energy demand for the modelled units can be summarised as follows;

Room 1 Ground-floor, Single aspect, North facing window	Energy Demand DER
	kWh/yr
Space heating	169
Water heating	528
Electricity for pumps, fans & lighting	183
Total	880

Room 3 & 8 Mid-floor, Single aspect, North facing window	Energy Demand DER
	kWh/yr
Space heating	34
Water heating	528
Electricity for pumps, fans & lighting	183
Total	745

Room 13 Top-floor, Single aspect, North facing window	Energy Demand DER
	kWh/yr
Space heating	217
Water heating	528
Electricity for pumps, fans & lighting	183
Total	928

Room 2 Ground-floor, Single aspect, North facing window	Energy Demand DER
	kWh/yr
Space heating	169
Water heating	528
Electricity for pumps, fans & lighting	183
Total	880

Rooms 5 & 10 Mid-floor, Dual aspect, North & East facing windows	Energy Demand DER
	kWh/yr
Space heating	37
Water heating	528
Electricity for pumps, fans & lighting	170
Total	735

Rooms 15 Top-floor, Dual aspect, North & East facing windows	Energy Demand DER
	kWh/yr
Space heating	228
Water heating	528
Electricity for pumps, fans & lighting	170
Total	926

Rooms 4 & 9 Mid-floor, Triple aspect, West, North & East facing windows	Energy Demand DER
	kWh/yr
Space heating	243
Water heating	529
Electricity for pumps, fans & lighting	159
Total	931

Room 14 Top-floor, Triple aspect, West, North & East facing windows	Energy Demand DER
	kWh/yr
Space heating	419
Water heating	529
Electricity for pumps, fans & lighting	159
Total	1,107

Room 6 Mid-floor, Dual aspect, SW,& SE facing windows	Energy Demand DER
	kWh/yr
Space heating	103
Water heating	530
Electricity for pumps, fans & lighting	172
Total	805

Room 11 Top-floor, Dual aspect, SW,& SE facing windows	Energy Demand DER
	kWh/yr
Space heating	283
Water heating	530
Electricity for pumps, fans & lighting	172
Total	985

Room 7 Mid-floor, Dual aspect, SW,& East facing windows	Energy Demand DER
	kWh/yr
Space heating	75
Water heating	526
Electricity for pumps, fans & lighting	153
Total	754

Room 12 Top-floor, Dual aspect, SW,& East facing windows	Energy Demand DER
	kWh/yr
Space heating	261
Water heating	526
Electricity for pumps, fans & lighting	153
Total	940

Commercial Accommodation

The specification of the heating (and cooling) system for the commercial accommodation includes the use of an air source heat pump.

The energy demand for the 'Be Clean' scenario can be summarised as follows;

	Actual Energy Demand
	kWh/m ²
Heating	5.75
Hot Water	0.17
Cooling	5.29
Auxiliary	4.20
Lighting	17.41
Totals	32.82

Summary

The energy demand figures calculated above have been inputted into the SAP 10 spreadsheet, which is attached as Appendix 4 and provides the total site DER/BER emissions using the emerging carbon emissions factors and as required by the GLA Energy Assessment Guidance.

The combined maximum allowable carbon dioxide emissions from the site (TER) as assessed above (using a gas system) are **7,741 kg CO₂ per year**, with the actual carbon dioxide emissions (DER/BER) based on the use of ASHP to all units assessed as **3,313 kg CO₂ per year**.

The combined reduction in emissions using for the 'Be Clean' scenario and using the SAP 10 carbon factors is **4,428 kg CO₂ per year**, which equates to;

- **57.20%**

5.5 Summary of Calculations and Proposals for Low-carbon and Renewable Technologies

Be Lean

A baseline calculation has been prepared using 2013 Building Regulations and the SAP 10 carbon factors. Using the current Regulations and based upon a gas heating system for the student accommodation and the retail unit the total site CO₂ emissions are calculated as **7,741 kg CO₂ per year (TER)** and **6,495 kg CO₂ per year (DER/BER)**.

This equates to a reduction of **1,245 kg CO₂ per year** or **16.09%** of the total TER emissions and is therefore compliant with the GLA energy planning guidance. The Regulation Compliance Reports are attached as Appendix 1 and the SAP 10 'Be Lean' spreadsheet is attached as Appendix 2.

Be Clean

A further set of calculations has been prepared for the proposed energy strategy. This proposes the installation of a communal air source heat pump system to the student accommodation and an individual air source heat pump to the retail unit. These calculations have been converted to SAP 10 emissions and the 'Be Clean' spreadsheet is attached as Appendix 4. The Regulation Compliance Reports for the proposed energy strategy (based on Part L – 2013) are attached as Appendix 3.

The actual carbon dioxide emissions (DER/BER) are assessed as **3,313 kg CO₂ per year**.

The reduction in emissions from energy efficiency and air source heat pumps and using the SAP 10 carbon factors is **4,428 kg CO₂ per year** (compared to the baseline TER emissions), which equates to a reduction of **57.20%**.

Be Green

In addition, it is proposed to install a photovoltaic array of 7.6 kW on the roof of the building. The array will be comprised of 19 x 400W panels, which will be installed, gently inclined on racks and orientated towards the southwest and south. The panels will reduce emissions by a further **1,609 kg CO₂ per year** (based on postcode UB7 and using the SAP 10 emissions factors).

The Roof Plan showing the indicative location of the panels is attached as Appendix 5.

Summary

The total reduction in emissions from energy efficiency, low-carbon and renewable technologies are calculated as; 6,037 kg CO₂ per year, which equates to a reduction of 77.99% (% of TER).

The residual emissions are **1.704 tonnes**, which requires a carbon offset payment of **£4,856** (based on the carbon offset payment of £2,850 per tonne).

6.0 Climate change adaption and Water resources

Sustainable Drainage Systems (SUDS)

The site lies within Flood Zone 1 and is classified as being of low risk. The existing site includes some buildings and hard surfacing, which are impermeable. The proposal does not detrimentally impact on the volume or rate of surface water run-off.

Surface Water Management

Consideration has been given to the use of grey water recycling. However, customer's resistance to the appearance of the recycled water and the cost of the systems does not currently make them a viable option. They have therefore not been included in the proposals.

Water efficiency measures

In excess of 20% of the UK's water is used domestically with over 50% of this used for flushing WCs and washing (source: Environment Agency). The majority of this comes from drinking quality standard or potable water.

The water efficiency measures included will ensure that the water use target of 110 litres per person per day is achieved (including 5 litres/p/d for external water use).

Water efficient devices will be fully evaluated, and installed, wherever possible. The specification of such devices will be considered at detailed design stage and each will be subject to an evaluation based on technical performance, cost and market appeal, together with compliance with the water use regulations.

The following devices will be incorporated within the student units:

- water efficient taps;
- water efficient toilets;
- low output showers;
- flow restrictors to manage water pressures to achieve optimum levels and
- water meters.

Water consumption calculations have been carried out using the Water Efficiency Calculator provided by the BRE. Although not perfect this calculator gives a good indication of the probable water use in a dwelling, although this is largely dependent on the way on which occupants use their homes.

Below is a typical specification, which would achieve the 105 Litres per person per year target (excluding five litres per person per day allowance for external water use).

Schedule of Appliance Water Consumption		
Appliance	Flow rate or capacity	Total Litres
WC	6/36 litres dual flush	17.64
Basin	2.0 litres/min.	4.74
Shower	9.0 litres/min	39.33
Bath	175 litres	19.25
Sink	5.0 litres/min	12.56
Washing Machine	6.75 litres/kg	14.18
Dishwasher	1.25 litres/places	4.50
		112.20
	Normalisation Factor	0.91
		102.10

7.0 Materials and Waste

The BRE Green Guide to Specification is a simple guide for design professionals. The guide provides environmental impact, cost and replacement interval information for a wide range of commonly used building specifications over a notional 60-year building life. The construction specification will prioritise materials within ratings A+, A or B.

Preference will be given to the use of local materials & suppliers where viable to reduce the transport distances and to support the local economy. A full evaluation of these suppliers will be undertaken at the next stage of design.

In addition, timber would be sourced, where practical, certified by PEFC or an equivalent approved certification body and all site timber used within the construction process would be recycled.

All insulation materials to will have a zero ozone depleting potential

Construction waste

Targets will be set to promote resource efficiency in accordance with guidance from WRAP, Envirowise, BRE and DEFRA.

The overarching principle of waste management is that waste should be treated or disposed of within the region where it is produced.

Construction operations generate waste materials as a result of general handling losses and surpluses. These wastes can be reduced through appropriate selection of the construction method, good site management practices and spotting opportunities to avoid creating unnecessary waste.

The Construction Strategy will explore these issues, some of which are set out below:

- Proper handling and storage of all materials to avoid damage.
- Efficient purchasing arrangements to minimise over ordering.
- Segregation of construction waste to maximise potential for reuse/recycling.
- Suppliers who collect and reuse/recycle packaging materials.

Appendix 1 – Regulations Compliance Reports for Modelled Units using Baseline Gas

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:55

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 1

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

30.11 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

26.35 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

42.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

37.6 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

0.11 (max. 0.25)

0.11 (max. 0.70)

OK

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	No cylinder thermostat	
	No cylinder	
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
Based on:		
Overshading:	Average or unknown	
Windows facing: North	1.31m ²	
Ventilation rate:	4.00	
Blinds/curtains:	None	

10 Key features

Party Walls U-value	0 W/m ² K
Floors U-value	0.11 W/m ² K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:54

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Rooms 3 & 8

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

27.81 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

24.32 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

30.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

25.4 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
 Hot water controls: No cylinder thermostat

No cylinder
 Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
 Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
 Specific fan power: 0.56
 Maximum 1.5 **OK**
 MVHR efficiency: 92%
 Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**

Based on:

Overshading: Average or unknown
 Windows facing: North 1.31m²
 Ventilation rate: 4.00
 Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:54

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 13

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

30.36 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

27.10 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

44.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

41.3 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
Hot water controls: No cylinder thermostat

No cylinder
Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
Specific fan power: 0.56
Maximum 1.5 **OK**
MVHR efficiency: 92%
Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**

Based on:

Overshading: Average or unknown
Windows facing: North 1.31m²
Ventilation rate: 4.00
Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:53

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 2

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

30.11 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

26.35 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

42.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

37.6 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

0.11 (max. 0.25)

0.11 (max. 0.70)

OK

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	No cylinder thermostat	
	No cylinder	
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
Based on:		
Overshading:	Average or unknown	
Windows facing: North	1.31m ²	
Ventilation rate:	4.00	
Blinds/curtains:	None	

10 Key features

Party Walls U-value	0 W/m ² K
Floors U-value	0.11 W/m ² K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:53

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Rooms 5 & 10

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

27.37 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

24.00 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

30.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

25.2 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
Hot water controls: No cylinder thermostat

No cylinder
Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
Specific fan power: 0.56
Maximum 1.5 **OK**
MVHR efficiency: 92%
Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Medium **OK**

Based on:

Overshading: Average or unknown
Windows facing: North 1.31m²
Windows facing: East 0.8m²
Ventilation rate: 4.00
Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:52

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 15

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

30.17 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

26.95 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

45.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

42.1 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
Hot water controls: No cylinder thermostat

No cylinder
Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
Specific fan power: 0.56
Maximum 1.5 **OK**
MVHR efficiency: 92%
Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**
Based on:
Overshading: Average or unknown
Windows facing: North 1.31m²
Windows facing: East 0.8m²
Ventilation rate: 4.00
Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:52

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19.75m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Rooms 4 & 9

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

29.27 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

26.06 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

48.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

42.9 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
 Hot water controls: No cylinder thermostat

No cylinder
 Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
 Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
 Specific fan power: 0.56
 Maximum 1.5 **OK**
 MVHR efficiency: 92%
 Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**
 Based on:
 Overshading: Average or unknown
 Windows facing: West 1.31m²
 Windows facing: East 1.31m²
 Windows facing: North 2.62m²
 Ventilation rate: 6.00
 Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:51

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19.75m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 14

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

31.83 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

29.57 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

61.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

55.9 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database OK

Hot water controls: No cylinder thermostat

No cylinder

Boiler interlock: Yes OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%

Minimum 75.0% OK

8 Mechanical ventilation

Continuous supply and extract system

Specific fan power: 0.56

Maximum 1.5 OK

MVHR efficiency: 92%

Minimum 70% OK

9 Summertime temperature

Overheating risk (Thames valley): Slight OK

Based on:

Overshading: Average or unknown

Windows facing: West 1.31m²

Windows facing: East 1.31m²

Windows facing: North 2.62m²

Ventilation rate: 6.00

Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:51

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 21.21m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 6

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

25.35 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

22.57 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

32.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

28.5 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
 Hot water controls: No cylinder thermostat

No cylinder
 Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
 Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
 Specific fan power: 0.56
 Maximum 1.5 **OK**
 MVHR efficiency: 92%
 Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**
 Based on:
 Overshading: Average or unknown
 Windows facing: South East 0.8m²
 Windows facing: South West 2.62m²
 Ventilation rate: 6.00
 Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:51

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 21.21m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 11

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

27.97 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

25.49 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

46.1 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

43.5 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	No cylinder thermostat	
	No cylinder	
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
Based on:		
Overshading:	Average or unknown	
Windows facing: South East	0.8m ²	
Windows facing: South West	2.62m ²	
Ventilation rate:	6.00	
Blinds/curtains:	None	

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:50

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 16.73m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 7

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

30.66 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

27.25 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

34.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

31.3 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls Time and temperature zone control by device in database **OK**
 Hot water controls: No cylinder thermostat

No cylinder
 Boiler interlock: Yes **OK**

7 Low energy lights

Percentage of fixed lights with low-energy fittings 100.0%
 Minimum 75.0% **OK**

8 Mechanical ventilation

Continuous supply and extract system
 Specific fan power: 0.56
 Maximum 1.5 **OK**
 MVHR efficiency: 92%
 Minimum 70% **OK**

9 Summertime temperature

Overheating risk (Thames valley): Slight **OK**
 Based on:
 Overshading: Average or unknown
 Windows facing: West 0.8m²
 Windows facing: South West 1.31m²
 Ventilation rate: 6.00
 Blinds/curtains: None

10 Key features

Party Walls U-value 0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 12:40:50

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 16.73m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 12

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Mains gas

Fuel factor: 1.00 (mains gas)

Target Carbon Dioxide Emission Rate (TER)

33.65 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

30.63 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

50.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

49.2 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Database: (rev 464, product index 018447):

Boiler systems with radiators or underfloor heating - mains gas

Brand name: Worcester

Model: Greenstar 8000 Style

Model qualifier: GR8700iW 30 CB NG

(Combi)

Efficiency 89.4 % SEDBUK2009

Minimum 88.0 %

OK

Secondary heating system:

None

Regulations Compliance Report

5 Cylinder insulation

Hot water Storage: No cylinder

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	No cylinder thermostat	
	No cylinder	
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
Based on:		
Overshading:	Average or unknown	
Windows facing: West	0.8m ²	
Windows facing: South West	1.31m ²	
Ventilation rate:	6.00	
Blinds/curtains:	None	

10 Key features

Party Walls U-value	0 W/m ² K
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19 Station Road, West Drayton

UK Part L2 Building Energy Performance and CO₂ emissions Report

created 22/Oct/2021



INTEGRATED
ENVIRONMENTAL
SOLUTIONS LTD

Project detail

Building type:		No of Rooms:	1
Climate:	London	Total building floor area:	40.0 m ²
Air permeability:	3.5 m ³ / m ² .hr @ 50Pa	Actual conditioned floor area:	40.0 m ²
Assessor:	Name	Notional conditional floor area:	40.0 m ²

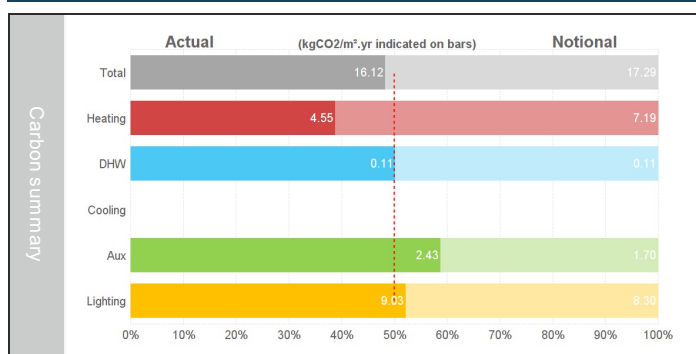
Part L2 (2013) England results

BER: **16.1** kg.CO₂/m².yr



TER: **17.3** kg.CO₂/m².yr

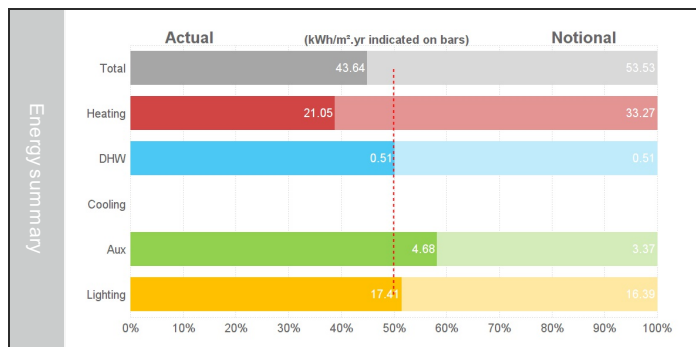
Carbon summary (kgCO₂/m².yr)



	kgCO ₂ /m ² .yr	Actual	Notional
Heating		4.55	7.19
DHW		0.11	0.11
Cooling		0.00	0.00
Aux		2.43	1.70
Lighting		9.03	8.30
Renew ables		(0.00)	(0.00)
Total		16.12	17.29

Results represent total CO₂ output. BER rating includes applicable adjustment factors.

Energy summary (kWh/m².yr)



	kWh/m ² .yr	Actual	Notional
Heating		21.05	33.27
DHW		0.51	0.51
Cooling		0.00	0.00
Aux		4.68	3.37
Lighting		17.41	16.39
Renew ables		(0.00)	(0.00)
Total		43.64	53.53

Appendix 2: 'Be Lean' GLA SAP 10 Spreadsheet

Be Lean - SAP 2012 Methodology SAP 10 Carbon Factors

Project 19 Station Road, West Drayton
 Client
 Date Nov-21
 Rev A



	SAP 2012	Carbon Factor	SAP 10	Carbon Factor
Gas		0.216	Gas	0.210
Grid Elec		0.519	Grid Elec	0.233

	Price
Gas	£0.0392 per kW/hr
Electricity	£0.1696 per kW/hr

Student Accommodation

TER

DER - based on Gas Boilers - SAP 10 factors

Plot	Floor Area	Space Htg	Water Htg	Pumps/ Fans	Lighting	Emissions
Room 1	19.00	586.30	1537.19	75.00	143.66	497
Rooms 3 & 8	19.00	371.30	1549.69	75.00	143.66	909
Room 13	19.00	608.89	1536.05	75.00	143.66	501
Room 2	19.00	586.30	1537.19	75.00	143.66	497
Rooms 5 & 10	19.00	362.35	1550.63	75.00	130.88	899
Room 15	19.00	623.70	1535.75	75.00	130.88	501
Rooms 4 & 9	19.75	673.60	1538.39	75.00	118.38	1019
Room 14	19.75	917.33	1528.49	75.00	118.38	559
Room 6	21.21	441.95	1558.85	75.00	128.32	468
Room 11	21.21	713.19	1544.92	75.00	128.32	522
Room 7	16.73	366.68	1541.49	75.00	119.08	446
Room 12	16.73	612.35	1527.51	75.00	119.08	495

Space Htg	Water Htg	Pumps/ Fans	Lighting	Emissions
234.49	1463.97	113.94	143.66	417
53.33	1467.17	113.94	143.66	709
301.54	1463.00	113.94	143.66	431
234.49	1463.97	113.94	143.66	417
55.71	1467.13	113.94	130.88	710
319.82	1462.81	113.94	130.88	431
356.05	1465.07	115.48	118.38	849
680.38	1461.74	115.48	118.38	504
149.47	1473.71	118.47	128.32	398
439.78	1469.77	118.47	128.32	459
101.23	1460.33	109.29	119.08	381
367.72	1456.30	109.29	119.08	436

7312

6141

Total Site Target Emissions	7,312	kgCO ₂ per year
Total Site Design Emissions (Be Lean)	6,141	kgCO ₂ per year
Total Reduction	1,171	kgCO ₂ per year
% Reduction	16.02%	

Commercial Accommodation

TER

BER - based on Gas Boilers - SAP 10 factors

Plot	Floor Area	Heating	Cooling	Aux/ Lighting	Hot Water	Emissions
Retail Unit	36.6	33.27	0.00	19.76	0.51	428.5
						428.5

Heating	Cooling	Aux/ Lighting	Hot Water	Emissions
21.05	0.00	22.09	0.51	354.4
				354.4

Total Site Target Emissions	428	kgCO ₂ per year
Total Site Design Emissions (Be Lean)	354	kgCO ₂ per year
Total Reduction	74	kgCO ₂ per year
% Reduction	17.30%	

Combined Reduction

Total Site Target Emissions	7,741	kgCO ₂ per year
Total Site Design Emissions (Be Lean)	6,495	kgCO ₂ per year
Total Reduction	1,245	kgCO ₂ per year
% Reduction	16.09%	

Appendix 3 – Regulations Compliance Reports for Modelled Units using ASHPs

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:55

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 1 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

45.43 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

24.02 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

42.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

37.6 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

Party wall

0.00 (max. 0.20)

-

Floor

0.11 (max. 0.25)

0.11 (max. 0.70)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system: None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes

OK

6 Controls

Space heating controls

Time and temperature zone control by device in database

OK

Hot water controls:

Cylinderstat

OK

Independent timer for DHW

OK

Boiler interlock:

Yes

OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100.0%

Minimum

75.0%

OK

8 Mechanical ventilation

Continuous supply and extract system

Specific fan power:

0.56

Maximum

1.5

OK

MVHR efficiency:

92%

Minimum

70%

OK

9 Summertime temperature

Overheating risk (Thames valley):

Slight

OK

Based on:

Overshading:

Average or unknown

Windows facing: North

1.31m²

Ventilation rate:

4.00

Blinds/curtains:

None

10 Key features

Party Walls U-value

0 W/m²K

Floors U-value

0.11 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:55

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Rooms 3 & 8 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

42.31 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

20.33 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

30.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

25.4 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes

OK

6 Controls

Space heating controls

Time and temperature zone control by device in database

OK

Hot water controls:

Cylinderstat

OK

Independent timer for DHW

OK

Boiler interlock:

Yes

OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100.0%

Minimum

75.0%

OK

8 Mechanical ventilation

Continuous supply and extract system

Specific fan power:

0.56

Maximum

1.5

OK

MVHR efficiency:

92%

Minimum

70%

OK

9 Summertime temperature

Overheating risk (Thames valley):

Medium

OK

Based on:

Overshading:

Average or unknown

Windows facing: North

1.31m²

Ventilation rate:

4.00

Blinds/curtains:

None

10 Key features

Party Walls U-value

0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:54

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 13 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

45.78 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

25.32 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

44.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

41.3 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes

OK

6 Controls

Space heating controls

Time and temperature zone control by device in database

OK

Hot water controls:

Cylinderstat

OK

Independent timer for DHW

OK

Boiler interlock:

Yes

OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100.0%

Minimum

75.0%

OK

8 Mechanical ventilation

Continuous supply and extract system

Specific fan power:

0.56

Maximum

1.5

OK

MVHR efficiency:

92%

Minimum

70%

OK

9 Summertime temperature

Overheating risk (Thames valley):

Slight

OK

Based on:

Overshading:

Average or unknown

Windows facing: North

1.31m²

Ventilation rate:

4.00

Blinds/curtains:

None

10 Key features

Party Walls U-value

0 W/m²K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:54

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 2 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

45.43 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

24.02 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

42.7 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

37.6 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

Party wall

0.00 (max. 0.20)

-

Floor

0.11 (max. 0.25)

0.11 (max. 0.70)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system: None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
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Based on:

Overshading:	Average or unknown
Windows facing: North	1.31m ²
Ventilation rate:	4.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
Floors U-value	0.11 W/m ² K

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:53

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Rooms 5 & 10 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

41.95 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

20.05 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

30.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

25.2 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK
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Based on:

Overshading:	Average or unknown
Windows facing: North	1.31m ²
Windows facing: East	0.8m ²
Ventilation rate:	4.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:53

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 15 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

45.78 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

25.27 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

45.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

42.1 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK
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Based on:

Overshading:	Average or unknown
Windows facing: North	1.31m ²
Windows facing: East	0.8m ²
Ventilation rate:	4.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:52

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19.75m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Rooms 4 & 9 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

44.76 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

24.45 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

48.0 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

42.9 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Medium	OK
-----------------------------------	--------	----

Based on:

Overshading:	Average or unknown
Windows facing: West	1.31m ²
Windows facing: East	1.31m ²
Windows facing: North	2.62m ²
Ventilation rate:	6.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:52

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 19.75m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 14 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

48.5 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

29.07 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

61.3 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

55.9 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
-----------------------------------	--------	----

Based on:

Overshading:	Average or unknown
Windows facing: West	1.31m ²
Windows facing: East	1.31m ²
Windows facing: North	2.62m ²
Ventilation rate:	6.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:52

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 21.21m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 6

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

38.91 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

19.70 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

32.2 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

28.5 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

Party wall

0.00 (max. 0.20)

-

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system: None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
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Based on:

Overshading:	Average or unknown
Windows facing: South East	0.8m ²
Windows facing: South West	2.62m ²
Ventilation rate:	6.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:51

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 21.21m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 11 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

42.6 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

24.10 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

46.1 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

43.5 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
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Based on:

Overshading:	Average or unknown
Windows facing: South East	0.8m ²
Windows facing: South West	2.62m ²
Ventilation rate:	6.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
---------------------	----------------------

Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:51

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 16.73m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 7 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

**This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.**

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

47.39 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

23.38 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

34.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

31.3 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

Party wall

0.00 (max. 0.20)

-

Floor

(no floor)

Roof

(no roof)

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

OK

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system: None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
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Based on:

Overshading:	Average or unknown
Windows facing: West	0.8m ²
Windows facing: South West	1.31m ²
Ventilation rate:	6.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
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Regulations Compliance Report

Approved Document L1A, 2013 Edition, England assessed by Stroma FSAP 2012 program, Version: 1.0.4.26
Printed on 02 November 2021 at 13:21:51

Project Information:

Assessed By: Bluesky Unlimited

Building Type: Flat

Dwelling Details:

NEW DWELLING DESIGN STAGE

Total Floor Area: 16.73m²

Site Reference : 91 Station Road, West Drayton

Plot Reference: Room 12 - ASHP

Address :

Client Details:

Name: Progress Planning

Address :

This report covers items included within the SAP calculations.

It is not a complete report of regulations compliance.

1a TER and DER

Fuel for main heating system: Electricity

Fuel factor: 1.55 (electricity)

Target Carbon Dioxide Emission Rate (TER)

51.5 kg/m²

Dwelling Carbon Dioxide Emission Rate (DER)

29.17 kg/m²

OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)

50.4 kWh/m²

Dwelling Fabric Energy Efficiency (DFEE)

49.2 kWh/m²

OK

2 Fabric U-values

Element

Average

Highest

External wall

0.18 (max. 0.30)

0.18 (max. 0.70)

OK

Party wall

0.00 (max. 0.20)

-

OK

Floor

(no floor)

Roof

0.13 (max. 0.20)

0.13 (max. 0.35)

OK

Openings

1.40 (max. 2.00)

1.40 (max. 3.30)

OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals

4.00 (design value)

Maximum

10.0

OK

4 Heating efficiency

Main Heating system:

Heat pumps with radiators or underfloor heating - electric
Vaillant aroTHERM 3.5kW

Secondary heating system:

None

5 Cylinder insulation

Hot water Storage:

Measured cylinder loss: 0.93 kWh/day
Permitted by DBSCG: 1.89 kWh/day

OK

Regulations Compliance Report

Primary pipework insulated: Yes OK

6 Controls

Space heating controls	Time and temperature zone control by device in database	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK
Boiler interlock:	Yes	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings	100.0%	
Minimum	75.0%	OK

8 Mechanical ventilation

Continuous supply and extract system		
Specific fan power:	0.56	
Maximum	1.5	OK
MVHR efficiency:	92%	
Minimum	70%	OK

9 Summertime temperature

Overheating risk (Thames valley):	Slight	OK
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Based on:

Overshading:	Average or unknown
Windows facing: West	0.8m ²
Windows facing: South West	1.31m ²
Ventilation rate:	6.00
Blinds/curtains:	None

10 Key features

Party Walls U-value	0 W/m ² K
---------------------	----------------------

19 Station Road, West Drayton

UK Part L2 Building Energy Performance and CO₂ emissions Report

created 22/Feb/2021



INTEGRATED
ENVIRONMENTAL
SOLUTIONS LTD

Project detail

Building type:		No of Rooms:	1
Climate:	London	Total building floor area:	40.0 m ²
Air permeability:	3.5 m ³ / m ² .hr @ 50Pa	Actual conditioned floor area:	40.0 m ²
Assessor:	Name	Notional conditional floor area:	40.0 m ²

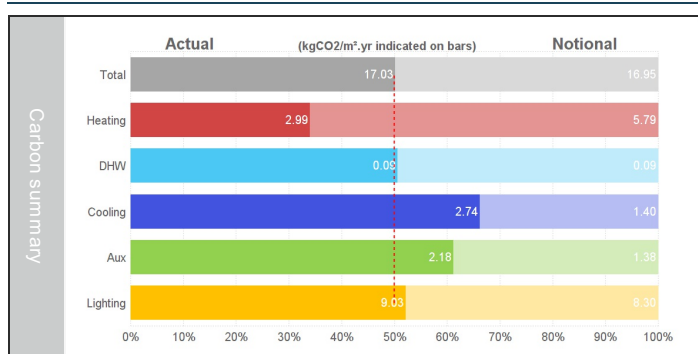
Part L2 (2013) England results

BER: **17.0** kg.CO₂/m².yr



TER: **17.0** kg.CO₂/m².yr

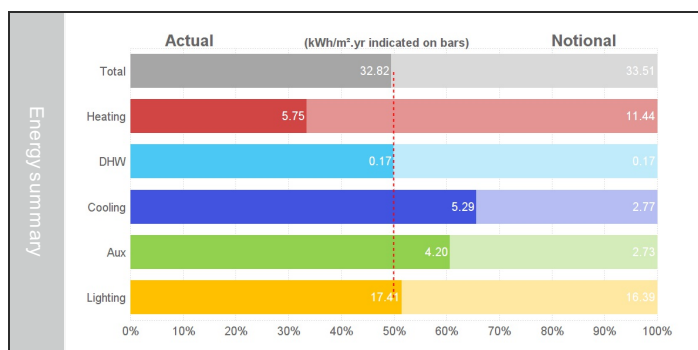
Carbon summary (kgCO₂/m².yr)



	kgCO ₂ /m ² .yr	Actual	Notional
Heating		2.99	5.79
DHW		0.09	0.09
Cooling		2.74	1.40
Aux		2.18	1.38
Lighting		9.03	8.30
Renew ables		(0.00)	(0.00)
Total		17.03	16.95

Results represent total CO₂ output. BER rating includes applicable adjustment factors.

Energy summary (kWh/m².yr)



	kWh/m ² .yr	Actual	Notional
Heating		5.75	11.44
DHW		0.17	0.17
Cooling		5.29	2.77
Aux		4.20	2.73
Lighting		17.41	16.39
Renew ables		(0.00)	(0.00)
Total		32.82	33.51

Appendix 4: 'Be Clean' GLA SAP 10 Spreadsheet

Be Clean - SAP 2012 Methodology SAP 10 Carbon Factors



Project 19 Station Road, West Drayton
 Client
 Date Nov-21
 Rev A

	SAP 2012	Carbon Factor	SAP 10	Carbon Factor
Gas		0.216	Gas	0.210
Grid Elec		0.519	Grid Elec	0.233

	Price
Gas	£0.0392 per kW/hr
Electricity	£0.1696 per kW/hr

Student Accommodation

TER

DER - based on ASHPs - SAP 10 factors

Plot	Floor Area	Space Htg	Water Htg	Pumps/ Fans	Lighting	Emissions
Room 1	19.00	440.15	1799.25	75.00	143.66	521
Rooms 3 & 8	19.00	248.28	1814.09	75.00	143.66	968
Room 13	19.00	461.09	1797.83	75.00	143.66	525
Room 2	19.00	440.15	1799.25	75.00	143.66	521
Rooms 5 & 10	19.00	246.99	1814.40	75.00	130.88	962
Room 15	19.00	481.97	1796.80	75.00	130.88	527
Rooms 4 & 9	19.75	544.11	1796.69	75.00	118.38	1073
Room 14	19.75	777.08	1784.20	75.00	118.38	583
Room 6	21.21	332.95	1817.08	75.00	128.32	499
Room 11	21.21	582.94	1800.48	75.00	128.32	548
Room 7	16.73	260.37	1806.77	75.00	119.08	479
Room 12	16.73	482.53	1790.30	75.00	119.08	523

Space Htg	Water Htg	Pumps/ Fans	Lighting	Emissions
169.20	527.62	38.94	143.66	205
34.06	527.62	38.94	143.66	347
216.58	527.62	38.94	143.66	216
169.20	527.62	38.94	143.66	205
36.70	527.62	38.94	130.88	342
227.78	527.62	38.94	130.88	216
242.96	528.47	40.48	118.38	434
418.98	528.47	40.48	118.38	258
102.87	530.41	43.47	128.32	188
282.61	530.41	43.47	128.32	229
74.77	525.62	34.29	119.08	176
261.41	525.62	34.29	119.08	219

7729

3033

Total Site Target Emissions (based on ASHP) **7,729** kgCO₂ per year

Total Site Design Emissions (Be Clean) **3,033** kgCO₂ per year

Commercial Accommodation

TER

BER - based on ASHP - SAP 10 factors

Plot	Floor Area	Heating	Cooling	Aux/ Lighting	Hot Water	Emissions
Retail Unit	36.6	11.44	2.77	19.12	0.17	285.9

Heating	Cooling	Aux/ Lighting	Hot Water	Emissions
5.75	5.29	21.61	0.17	280.1

285.9

280.1

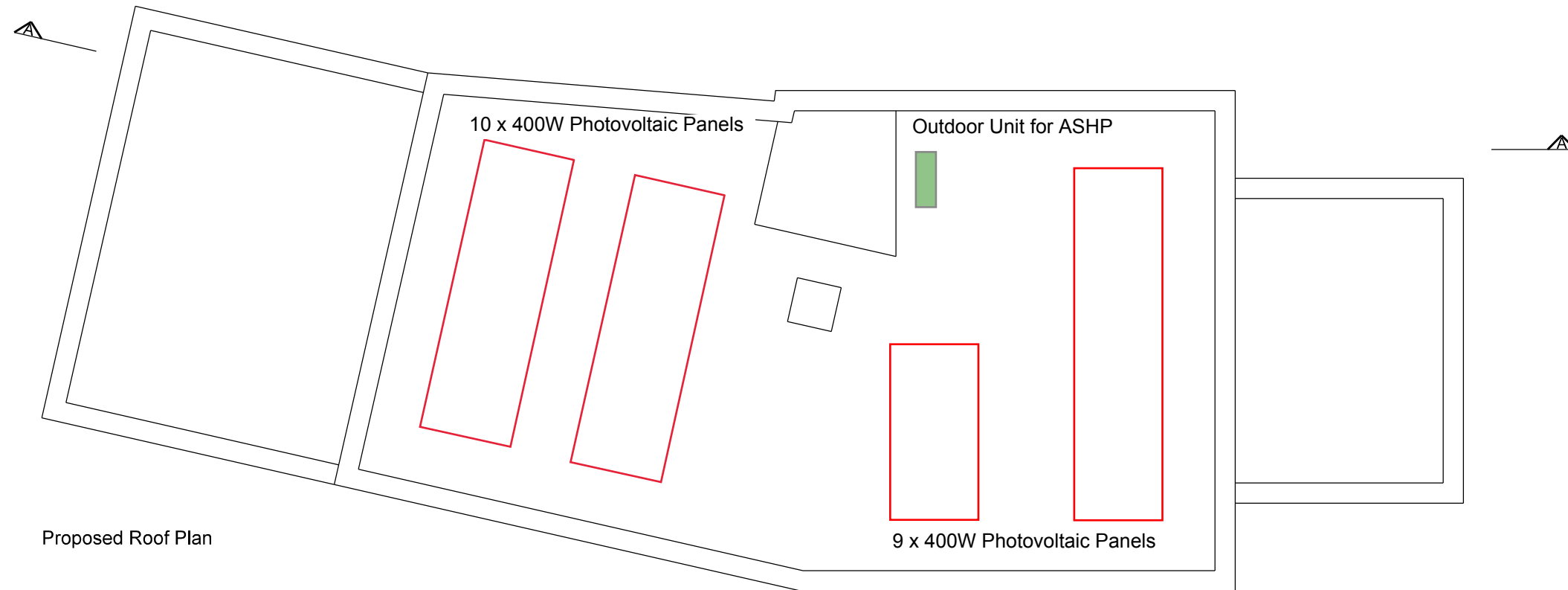
Total Site Target Emissions (based on ASHP) **286** kgCO₂ per year

Total Site Design Emissions (Be Clean) **280** kgCO₂ per year

Combined Reduction

Total Site Design Emissions (Be Lean) **3,313** kgCO₂ per year

Appendix 5 – Roof Plans showing Indicative Layout of Photovoltaic Panels & ASHP Location



REVISION	DESCRIPTION	BY	DATE
RFP Architects Ltd Factory House Factory Road, Llanblethian Cowbridge, CF71 7JD T. 029 2039 9000 www.rfparchitects.com RFP ARCHITECTS			
CLIENT: ACQUIRA DEVELOPMENT LIMITED			
JOB TITLE: 91 STATION ROAD WEST DRAYTON MIDDLESEX, UB7 7LT			
DRAWING TITLE: PROPOSED THIRD FLOOR AND ROOF PLANS			
STATUS PLANNING	DATE 14.01.21	DRAWN JNW	CHECKED VFW
SCALE @ A3 1:100			
JOB NO. 2324	DRAWING NO. DP 302		REV.
THIS DRAWING IS COPYRIGHT. ALL DIMENSIONS TO BE CHECKED ON SITE. ANY DISCREPANCIES TO BE REPORTED IMMEDIATELY TO THE ARCHITECTS. ALL DIMENSIONS TO BE CHECKED PRIOR TO ORDER OF MATERIALS OR FABRICATION OF WORK. THIS DRAWING SHOULD NOT BE SCALED.			