



Propert
ECO-SERVICES

**Residential Development Land
at Crown Street & Silver Street
Reading
RG1 2SE**

Sustainability Statement

For Thomas Homes Ltd

May 2017

This Sustainability Statement has been prepared by Proport Eco-Services on behalf of their clients to support a planning application for 79 new dwellings at the corner of Crown Street and Silver Street, Reading, RG1 2SE.

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11th May 2017

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Version Control

Version	Date	Author	Status
1.0	02May2017	A. Straszewski	First draft for comment.
1.1	05May2017	A. Straszewski	Second draft, incorporating updated references to other reports.
1.2	11May2017	A. Straszewski	Final, change of number of units & layout, refuse store size.

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1. Executive Summary

This Sustainability Statement is in support of a planning application for the construction of 79 new dwellings at the corner of Crown Street and Silver Street, Reading, RG1 2SE.

As part of its Local Development Framework Reading Borough Council adopted the Core Strategy in 2008 with alterations adopted in January 2015. It contains a number of Policies relating to the sustainability of new dwellings and these are supplemented by the Sites and Detailed Policies Document adopted in 2012, again with alterations in January 2015. In addition, a Revised Sustainable Design and Construction Supplementary Planning Document was adopted in July 2011 and whilst some of the policies in this have since been superseded by central government policy, most notably the withdrawal of the Code for Sustainable Homes, it still sets the framework for the sustainability assessment of new residential development.

This Sustainability Statement addresses all of the relevant policies with regard to sustainability that are relevant to the proposed development and demonstrates how overall, the development fully meets all of the existing applicable policy requirements.

2. Introduction

This report is for submission as part of a planning application and is intended to demonstrate that environmental sustainability has been considered and fully addressed in accordance with planning policy.

The planning application is for the construction 79no. one, two and three bedroom self-contained residential flats, Class C3. It follows a previous application at the same site for a Residential institution (Class C2), Planning Application Number 160868, for which outline planning permission was granted on 30th September 2016. Pre-application communication with the Local Authority Planning Officer has taken place and issues raised in relation to sustainability are addressed in this report.

3. Policy Context

The National Planning Policy Framework (NPPF) sets a presumption in favour of sustainable development (paragraph 14). This includes an environmental dimension aimed at “helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy”. It sets out the 12 core planning principles (paragraph 17.) that underpin the setting of local plans and decision-taking; in particular it addresses the issue of meeting the challenge of climate change and flooding (paragraphs 99-104).

Reading Borough Council adopted its Core Strategy in 2008 and updated it in 2015. It sets out the Council’s adopted planning strategy and provides a framework for sustainable development criteria which development proposals must accord with. With regard to the development this application relates to, the principle policies that apply with regard to sustainability are Policy CS1 (*Sustainable Construction and Design*) as well CS2 (*Waste Minimisation*), CS5 (*Inclusive Access*), CS23 (*Sustainable Travel and Travel Plans*), CS34 (*Pollution and Water Resources*), CS35 (*Flooding*) and CS36 (*Biodiversity and Geology*). The requirements to achieve compliance with these policies is set out in the Site and Detailed Policies Document (2012 & 2015) as well as various Supplementary Planning Documents (SPDs). These contain a number of policies which relate to sustainable development and are referred to in more detail throughout this report.

It is noted that since the adoption of the Council’s Core Strategy the Code for Sustainable Homes has been wound down by the government and no longer applies to new planning submissions or consents. As a result,

the Sustainable Design and Construction Checklist referred to in Appendix 5 of the Revised Sustainable Design and Construction SPD (2011) is no longer applicable, however, the categories it listed are used to guide the overall structure of this report.

In addition, reference is also made to the Sites and Detailed policies SPD (2012, updated 2015) and the Parking Standards and Design SPD (2011).

4. Energy Efficiency and Climate Change.

Applicable policies: CS1: Sustainable Construction and Design, DM1: Adaptation to Climate Change, DM2 Decentralised Energy.

Policy CS1 states that:

- *All new developments maximise the use of energy efficiency and energy conservation measures in their design, layout and orientation to reduce overall energy demand; A*
- *All developments of more than 10 dwellings or 1000m² floorspace incorporate on-site generation of energy from renewable sources and energy efficient design measures (including the use of CHP where appropriate) to off-set at least 20% of predicted carbon dioxide emissions from the estimated energy usage of the completed and occupied development;*

However, the pre-planning application enquiry response (S Ligar, 7 April 2017) states that since the Code for Sustainable Homes requirements have been superseded by The Building Regulations "... a 19% energy efficiency improvement above TER." is required under policy CS1. To avoid potential confusion this assessment has taken the more conservative approach and shows how the proposed development will reduce carbon dioxide emissions relative to the TER by at least 20%.

Development Management Policy DM1, emphasises the importance of consideration being given to measures that will mitigate the future impact of climate change, including orientation, shading etc. all of which are addressed. Policy DM2 requires that any development of more than 20 dwellings considers the inclusion of a CHP plant, biomass fuelled heating scheme or other form of decentralised heating provision. In addition, the feasibility of linking to an existing or future decentralised energy network should also be evaluated.

The site is currently unoccupied and lies at the corner of Silver Street and Crown Street. The proposed development consists of a 79 self-contained residential units, consisting 24no. one bed units, 50no. two bed units and 5no. three bed units.

4.1 Climate Change

The basic principle followed for the design of the development is to reduce the energy demand of the dwellings by means of a 'fabric first' approach. This means that heat loss elements such as walls and roofs exceed the minimum performance requirements of Building Regulations Approved Document Part L1A 2013.

Although passive solar gain can be a significant advantage by reducing energy demand, the constraints imposed by the site and location in terms of orientation and design limit the opportunities for solar gain with some units able to benefit far more than others. In contrast, excessive solar gain during the summer months can lead to potential issues with overheating.

Window sizes have been designed to provide a coherent appearance to the buildings but at the same time trying to balance three main criteria; (i) the need to ensure adequate daylight in the main rooms including the living area, dining area and kitchen (ii) to maximise solar gain where appropriate (iii) reducing window size as the heat loss even through a well-specified double-glazed unit is still significantly higher than through external walls.

As the greatest risk is overheating of the units in the summer months, particularly when the future impact of climate change is taken into account, the aim has generally been to reduce overall solar gain. This includes the use of glazing with reduced thermal transmittance, $g = 0.63$, and a considerable level of shading to the largest glazed window/door unit in each flat, which is set back with a balcony in front. A full landscaping plan (see Section 13) will also be implemented which will include the planting of specimen trees to the west and south of the buildings where windows are most subject to solar gain.

Normally, the ability to purge ventilate by opening windows, combined with appropriate window coverings will enable residents to reduce the risk of overheating using natural ventilation only. However, because of potential noise issues due to the proximity to Crown Street and Silver Street (see Section 12). The ventilation strategy will be based on the use of Mechanical Ventilation and Heat Recovery units in each flat. These will ensure adequate ventilation throughout the year combined with high levels of energy efficiency to reduce heating demand. The use of a summer bypass mechanism in the MVHR units will enable high levels of ventilation in the summer without the need to open windows and therefore reduce the risk of potential summer over-heating.

Whilst the importance of thermal mass is recognised as being important in levelling out fluctuations in internal temperatures this again needs to be balanced against the benefit of construction methods with low thermal mass e.g. timber frame, which can more easily achieve higher levels of thermal insulation. Whilst the use of green roofs has been considered the actual value of these in terms of reducing overheating is difficult to quantify, as is any insulation benefit. The structural loading requirements involved in providing a green roof also significantly increase material use and so the a green roof is not being included in the development proposal.

Overall, each of the units in the development will meet the Building Regulations AD L1A 2013 requirement for the potential risk of summer overheating to be reduced as calculated using SAP 2012.

4.2 Carbon dioxide emissions reduction

This Energy Assessment takes a standard hierarchical approach as follows:

A. Baseline.

A calculation of baseline energy demand, demonstrating the projected annual heating, cooling and electricity demand of the development. The assessment shows the carbon dioxide emissions resulting from the predicted energy use.

B. Energy Efficiency (Lean).

An explanation of how the total energy demand and carbon dioxide emissions will be reduced relative to the baseline energy demand through further improvements to building energy efficiency standards; recalculation of total energy demand and associated carbon dioxide emissions.

C. Decentralised Energy - CHP/CCHP (Clean).

Proposals for the reduction of energy demand and carbon dioxide emissions from heating, cooling and electrical power, including the feasibility of Combined Heat and Power / Combined Cooling, Heating, and Power systems, and community heating systems;

D. Renewable Energy (Green).

Details of any renewable energy technologies to be incorporated in the development, demonstrating how much carbon dioxide emissions from expected energy use will be reduced through on-site renewable energy generation;

The space heating, hot water, pumps, fans and lighting energy requirements were calculated using the detailed Bredem-12 method developed by the Building Research Establishment and used in the SAP 2012 calculation, and referenced in the latest version (2013) of the Building Regulations Approved Document L1A.

The starting point was to determine the performance of the “baseline” for the dwellings using the levels of insulation performance and building services equipment consistent with the dwelling achieving compliance with Approved Document L1A: 2013. The specific energy consumption figures for space heating, hot water and lighting were then extracted.

It is then normal for the calculations to be repeated using improved U-values or other measures proposed for the scheme by the applicant and other possible improvements to building services. However, with the update to AD L1A in 2013 it is now the case that just to comply with the requirements necessitates the use of low u-values and highly efficient building services anyway. As a consequence the “lean case” results are very similar to the baseline. The lean case figures were then used when evaluating the options for renewable energy and the savings in energy demand and associated reduction in CO₂ emissions that the proposed technologies could provide. The results obtained from this analysis are presented in the following sections and summarised graphically in Section 4.7.

4.3 Energy demand and efficiency (Baseline)

The total baseline energy demand has been calculated taking full account of energy demands for space heating and hot water, and electricity for pumps, fans and lights. The baseline was determined by using the orientation and make-up of building elements (walls, windows etc.) with U-values and other values consistent with achieving compliance with Approved Document Part L1A: 2013.

The specific energy consumption figures for all the new dwellings were then extracted from the SAP 2012 software, Table 1.

Table 1. Baseline energy demand and associated CO₂ emissions, L1A 2013 compliance

Energy use	Energy (kWh/yr)	CO ₂ emission (kg/yr)
Primary space heating	129,353	27,940
Secondary space heating	0.0	0.0
Water heating	169,436	36,598
Pumps, fans etc.	5,925	3,075
Lighting	22,843	11,855
Total	327,556	79,469

4.4 Energy efficiency measures (Lean)

As stated in Section 4.2, the update to AD L1A in 2013 now means that the baseline and lean cases are very similar. The only improvement to the dwelling fabric and services that has been to improve the boiler water heating efficiency and provide Mechanical ventilation with heat recovery (MVHR). This improvement results in a 6% reduction in energy demand and a 1.9% reduction in carbon dioxide emissions, Table 2.

Table 2. Lean case energy demand and associated CO₂ emissions

Energy use	Energy (kWh/yr)		CO ₂ emission (kg/yr)		
	Baseline	Lean	Baseline	Lean	Reduction
Primary space heating		112,032		24,199	
Water heating		158,233		34,178	
Pumps, fans etc.		14,946		7,757	
Lighting		22,833		11,850	
Total	327,556	308,044	79,469	77,984	1.9

4.5 Decentralised Energy (Clean)

Although the feasibility of Combined Heat and Power / Combined Cooling, Heating, and Power (CHP/CCHP) systems was considered, the nature of the development precludes the use of such technology. Such systems are better suited to those developments that have a constant heat demand such as residential care homes, leisure centres, hotels or mixed use developments. It is less suited to exclusively residential developments or smaller developments (<100 dwellings) which is the subject of this planning application.

Consideration has also been given to the feasibility of connecting to an existing or planned district heating network, however no local or district heat network currently exists in the locality of the development.

The installation of a community space heating and hot water network in the development site itself has been considered. SAP calculations show that there would be a decrease in energy demand and an associated 3.5% decrease in carbon dioxide emissions, relative to the Lean case, Table 3. Were a community heat and hot water scheme to be installed the choice would be based on cost and feasibility as it seems unlikely that the system could be connected to a local heat network in the foreseeable future. Its use alone would also not reduce the carbon dioxide emissions by the 20% requirement and would therefore still necessitate a contribution from renewables to achieve the total carbon dioxide reduction required.

Table 3. Impact of community heating and hot water system on energy demand and associated CO₂ emissions

Energy use	Energy (kWh/yr)		CO ₂ emission (t/yr)		
	Individual gas boilers	Community heating	Individual gas boilers	Community heating	Reduction (%) <i>cf. Lean case</i>
Primary space heating	112,032	99,754	24,199	21,547	
Water heating	158,233	171,311	34,178	37,003	
Pumps, fans etc.	14,946	9,116	7,757	4,731	
Lighting	22,833	23,078	11,850	11,977	
Total	308,044	303,259	77,984	75,259	3.5

Whilst the use of a community heating system may contribute to the reduction in carbon dioxide emissions it has been recognised that heat losses from Heat Interface Units (HIU) and the pipework connecting it to the central system can be a significant contributor to heat gains in the summer. This is because the system remains fully charged with hot water throughout the year in order to meet hot water demand (CIBSE, 2017). In addition, the plant room for a development of this size would not be insignificant and the space used would either result in a reduction in parking spaces or external landscaping, both important factors in ensuring compliance with local planning policy.

Policy DM2 also suggests the feasibility of a biomass fuelled community system be considered. This has been ruled out on a number of counts but particularly the limited space for plant and especially storage space for fuel; the requirement for regular fuel deliveries to a town centre site and most importantly the high NO_x emissions associated with biomass boilers and the development site's location in an Air Quality Management Area.

Taking regard of all of these factors, a community heating system will not be implemented as part of the development proposals.

4.6 Renewable Energy (Green)

Renewable energy sources are those defined by EU Directive 2009/28/EC and include, wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage treatment plant gas and biogases. All possible domestic renewable energy technologies were evaluated in relation to the site. Most technologies were excluded because of the nature of the site in terms of the type of development (solely residential) and location as described in Table 4.

Table 4. Feasibility of Renewable Energy

Technology	Criteria	Assessment	Overall suitability
Biofuels	Year-round heat demand Established supply chain Sufficient space for delivery of fuel Sufficient space for storage of fuel Sufficient space for boiler and auxiliary equipment Can the flue be designed to meet planning authority requirements	Development is residential with seasonal and daily variations in heat demand. Limited space on site for location of plant room and storage of fuel. Fuel delivery issues re. traffic movements to and from site. Biomass has relatively high NOx emissions which is a significant consideration in the local area.	Not suitable
Ground Source Heat Pump	Sufficient space for horizontal coil or separation of multiple boreholes Ground suitable for vertical drilling and avoidance of obstacles Sufficient space for GSHP and auxiliary equipment	Closed loop indirect borehole system possible but insufficient space for horizontal coil. Unknown soil and geological conditions, particularly sub-surface infra-structure.	Not suitable
Air Source Heat Pump	Sufficient space for ASHP and auxiliary equipment Sufficient distance between installation and neighbours to avoid noise disturbance	Does not reduce carbon dioxide emissions adequately compared with gas. Potential noise and vibration issues. Limited space for water cylinder.	Not suitable
Hydroelectricity	Nearby watercourse with sufficient head Permission available for access to watercourse Climate change modelling confirms longevity of watercourse (25 yrs)	No suitable water course nearby.	Not suitable
Solar PV	Suitable roof orientation, lack of shading Sufficient roof space	Suitable roof pitch and orientation. Ample space on main roof of both buildings No shading.	Suitable

Technology	Criteria	Assessment	Overall suitability
Solar thermal	Suitable roof orientation, lack of shading. Sufficient roof space. Year-round hot water demand. Compatibility with proposed heating system. Sufficient space for communal or individual hot water storage	Carbon savings low as only off-sets main gas and so, used alone, would not reduce CO ₂ emissions by more than 10%. Limited space for water cylinder in many flats or would require community heating system. Significant losses from distribution system.	Not suitable
Wind turbines	Sufficient wind speed. Area free from obstructions / causes of turbulence. Sufficient open space for installation. Sufficient distance between installation and neighbours to avoid noise disturbance	High density urban location with insufficient wind speed. Potential noise and vibration issues.	Not suitable

The most suitable renewable energy option is the installation of a Photovoltaic (PV) system for the generation of electricity. There is ample roof space on the main roofs of each building section with the system split between the two, in proportion to the internal floor area of the flats in each block. Panels can be mounted on frames at an optimal inclination and orientated due south. They can also be mounted away from the roof edges to ensure minimal visibility from ground level. Based on SAP 2012 calculations it has been determined that a 33kWp system consisting of a total of 110 panels, will generate over 28,000 kWh/yr and reduce carbon dioxide emissions by 14.8 t/yr. The impact of the proposed PV system is outlined in Table 5 and a schematic of the possible layout shown on drawing 977.02, Figure 1.

Table 5. Impact of photovoltaic system

System details:	
No. panels	110 x 300W
Orientation	S
Collector area (m ²)	181.5
Shading %	0-20
System efficiency factor ¹	0.863
Energy	
Installed power (kWp)	33
Potential annual generation (kWh/yr)	28,479
Emissions	
Potential annual CO ₂ savings (kg/yr)	14,781

¹ 30°pitch

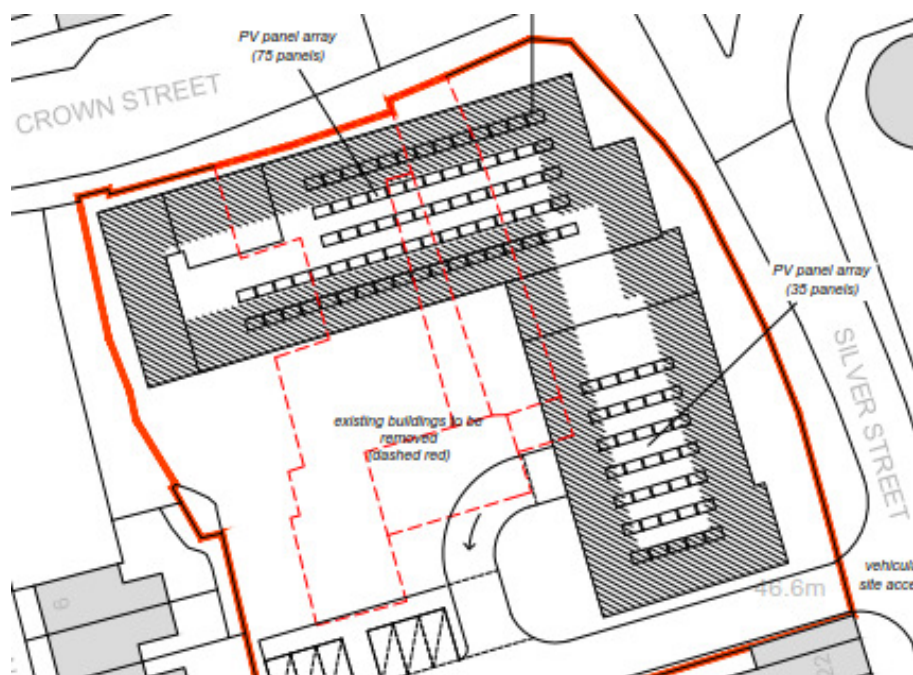


Figure 1. Schematic of potential PV system location

4.7 Summary

The foregoing projected results show that this development proposal meets the applicable planning policies that relate to the energy efficiency and the reduction of carbon dioxide emissions, as a result of fabric improvements but especially the use of renewable technology. The baseline annual energy demand and associated carbon dioxide emissions for the proposed development are 328 MWh and 79.5 tonnes respectively. As a consequence of the high standard of baseline building fabric and services to meet L1A 2013 Building Regulations, only a small improvement to the building fabric and services (Lean case) were considered. This resulted in a 1.9%, 1.5t, reduction in CO₂ emissions, Table 6.

Table 6. Carbon dioxide reduction at each stage of the energy hierarchy

	Regulated carbon dioxide savings	
	t CO ₂ / yr	%
Savings from energy demand reduction	1.485	1.9
Savings from heat network / CHP	0.0	0.0
Savings from renewable energy	14.781	19.0
Cumulative on site savings	16.266	20.5

Evaluation of all possible renewable energy technologies demonstrated that the most suitable, in terms of reducing carbon dioxide emissions, is the installation of a Photovoltaic (PV) system on the roof of the development. Such a system will contribute to the overall reduction in carbon dioxide emissions of 20.5% in line with the Reading Borough Council Core Strategy Policy CS1, Figure 2.

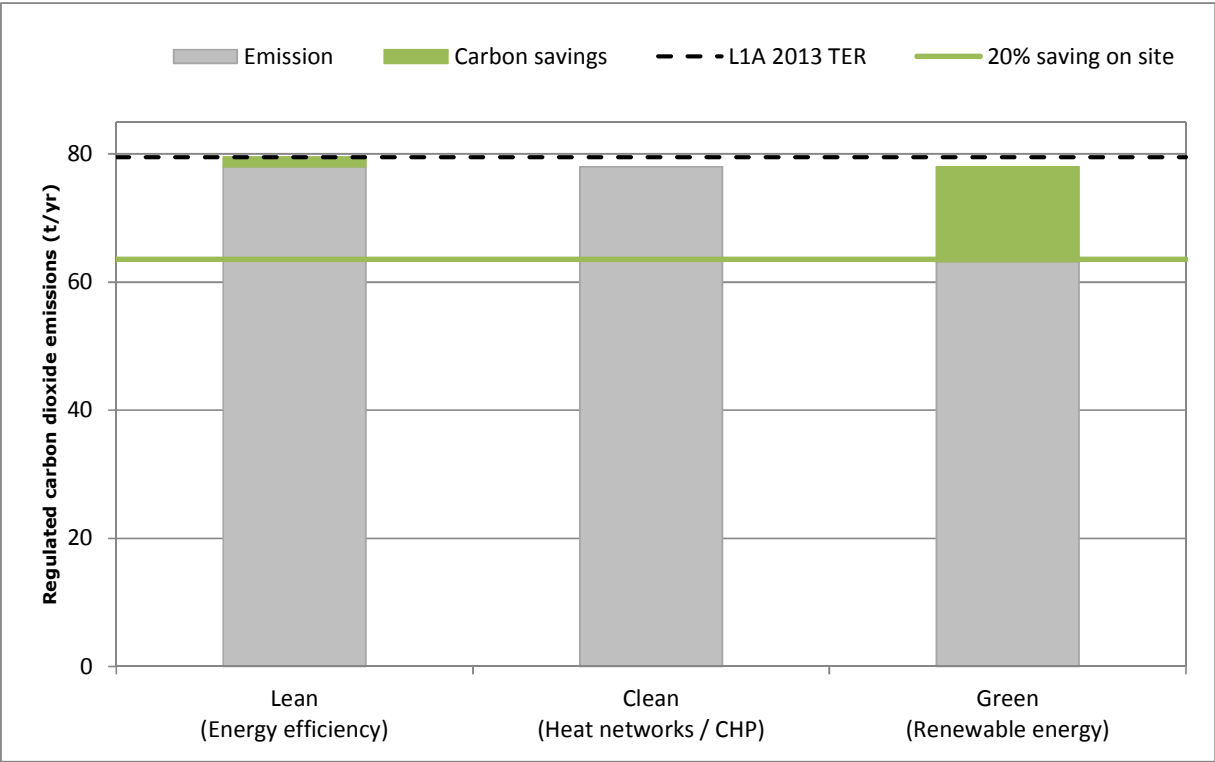


Figure 2. Summary of carbon dioxide emissions at each stage of the assessment

5. Water Resource Management

Applicable policies: CS1: Sustainable Construction and Design.

The dwellings will all comply with Building Regulations Approved Document G (2015) and so meet the requirement to restrict indoor water usage to less than 120 Litres/person/day. This will be achieved by the use of low capacity and flow rate fittings as detailed below:

Fitting	Flow rate / capacity
Basin taps	Max. 6 L/min
Kitchen taps	Max. 6 L/min
WCs	Dual flush 6L / 4L
Baths	Max 210 L capacity
Showers	Max. 11 L/min
Washing machine	Max. 8.17 L/kg dry load (default value)
Dishwasher	Max. 1.25 L/place setting (default value)
No water softener or waste disposal unit	

Waste disposal units will not be fitted as these increase water usage. The development will not incorporate rainwater harvesting or greywater collection and reuse for internal water usage, as the required levels of water usage can be achieved by the installation of low water use fittings as described above.

6. Materials

Applicable policies: CS1: Sustainable Construction and Design.

Where possible, materials will be sourced locally therefore minimising the distance materials will need to travel by road. However, in the context of sustainability and minimising the environmental impact of materials over the lifetime of the building, priority will be given to sourcing materials that have the highest rating in the BRE Green Guide to Specification www.bre.co.uk/greenguide. Priority will be given to the reuse of materials, then preference given to the use of recycled materials before the use of virgin material is accepted.

At least 75% of all timber used on site will be certified as coming from sustainable sources (FSC, PEFC or similar) and all timber will be legally sourced.

Choice of external finishes is usually subject to planning condition and final agreement with the planning authority.

7. Sustainable Drainage

Applicable policies: CS34: Pollution and Water Resources, DM1 Adaptation to Climate Change.

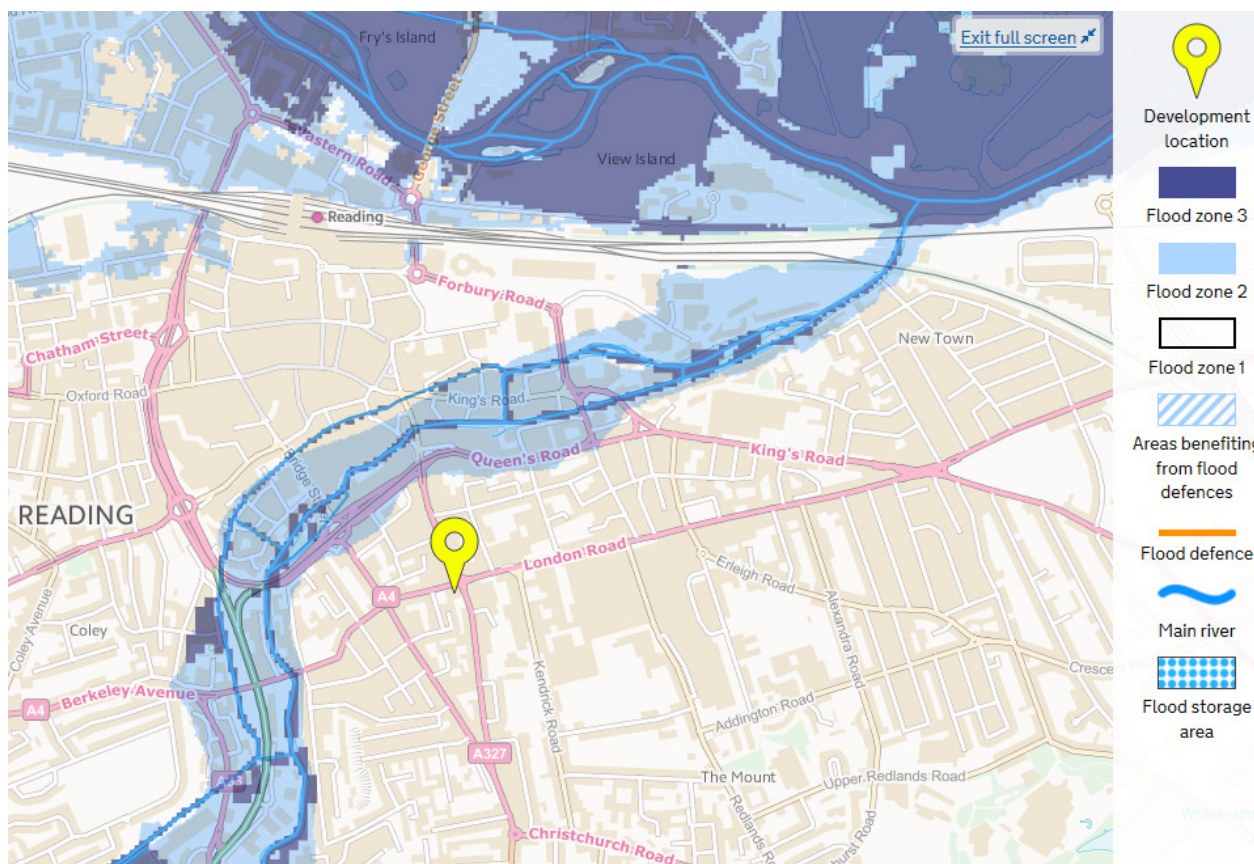
A preliminary drainage scheme incorporating SuDS has been provided as part of the Flood Risk Assessment report from Infrastruct CS Ltd, provided as part of this planning application. The nature of the SuDS will be dependent on site soil infiltration tests but is expected to include the use of soakaways, permeable paving and soft landscaping. Overall, there will be very little change in the impermeable area of the site and therefore the peak rate and volume of surface water run-off from the site, is not anticipated to increase post-development compared with the current situation. At this stage it is not anticipated that a green roof will be installed on the buildings although this may be reviewed once the results of the permeability test are known and the full drainage scheme devised. If it is necessary to discharge surface water off-site then the use of a green roof may be beneficial to act as an attenuation device.

It is anticipated that the requirement for a full sustainable drainage plan will subject to planning condition and a SuDS implemented in agreement with the planning authority.

8. Flood Risk Management

Applicable policies: CS35: Flooding, DM1 Adaptation to Climate Change.

According to the Environment Agency flood risk map (<https://flood-map-for-planning.service.gov.uk/>) the development is sited in Flood Risk Zone 1- *low annual probability of flooding*. There are no indications of risk to the development from other sources of flooding e.g. pluvial or surface water run-off. As the development plot is less than 1 hectare and not in an area of known historic flooding, a full Flood Risk Assessment is not required but has been provided by Infrastruct CS Ltd as part of the planning application submission.



The development will not increase the potential for flooding elsewhere as it will incorporate SuDS where appropriate to reduce surface water run-off – Section 7.

9. Waste, Recycling and Composting Facilities.

Applicable policies: CS2: Waste Minimisation.

There is no longer a legal requirement for construction projects to implement a Site Waste Management Plan but it is in the interest of developers to minimise waste to landfill in order to reduce disposal costs. In addition, the number of material types that can be sent to landfill continues to reduce e.g. gypsum products, requiring an increasing focus on waste minimisation, reuse and recycling. There is limited opportunity for any materials currently on site to be re-used in the proposed development although some materials may be suitable for crushing and reuse in the proposed groundworks.

During construction, waste will be sorted and removed by authorised waste handlers with the emphasis on diverting waste from landfill and maximising the amount of waste that goes for re-use or recycling. Targets will be set with no more than 14% going to landfill, 50% for recycling and 36% for reuse.

The development design includes provision for the storage of waste and recycling containers which is shown on drawing 977.03 and is sufficient for 12no. 1100L bins, a total of 13,200 Litres. The storage area is designed to comply with the requirements of the Reading Borough Council Guidelines 2016 in terms of access, layout and spacing. It is intended that a private waste contractor will be appointed to collect waste and recycling on a weekly basis. This enables the size of the waste storage area to be reduced, compared with the requirements for a fortnightly collection, allowing more outside space to be available for amenity use.

The total size of the waste and recycling containers will meet the requirements of BS 5906:2005 (100 Litres per property plus 70 Litres per each additional bedspace) as well as the requirements of Reading Borough Council detailed in Appendix 1 of the Guidelines, 2016.

		Volume required: L / dwelling	
No. bedrooms	No. dwellings	BS 5906:2005	Council requirement
1	24	100	10 flats per 1100L bin on a weekly collection. 5 flats per 1100L bin on a fortnightly collection
2	50	170	
3	5	240	
Total volume required		12,100 L	8,800 L for weekly collection, 17,600L for fortnightly collection

Internally the dwellings will each be provided with a waste bin with two compartments for general refuse and recycling. A kitchen waste disposal unit will not be installed as these increase internal water usage.

10. Cycle Parking.

Applicable policies: CS24: Car / Cycle Parking

The number of spaces provided is in accordance with Reading Borough Council Revised Parking Standards and design SPD, 2011. This specifies that each 1/2 bed flat should be provided with 0.5 cycle parking spaces and each 3 bed flat with 1 cycle parking space. The proposed development contains 74no. 1/2 bed flats and 5no. 3 bed flats requiring a total of 42 cycle parking spaces. A total of 44 cycle parking spaces will be provided in the basement of the building as shown on drawing 977.04 and also described in the Transport Statement provided by Glanville Consultants that forms part of this planning application. The cycle parking will also meet the standards set out in the SPD in terms of security and access.

11. Sustainable Transport

Applicable policies: CS24: Car / Cycle Parking, DM12: Access, Traffic and Highway-Related Matters

Provision will be made for the secure storage of 44 cycles for each dwelling as shown on the Site Plan drawing D1251-02. The location of the storage allows direct access to the highway, not through the dwelling. The development site has access to local buses within 250m of the development site and is within walking distance of Reading mainline railway station. A full Transport Statement has been provided by Glanville Consultants as part of this planning application

12. Pollution.

Applicable policies: CS34: Pollution and Water Resources, DM19: Air Quality

External lighting will make use of energy efficient fittings and have appropriate controls (PIR, timers and daylight sensors) to minimise light pollution. Air pollution from vehicles driven by occupants of the dwellings will be reduced by the provision of on-site cycle storage and the proximity to public transport as detailed in the Transport Statement has been provided by Glanville Consultants as part of this planning application.

As the development lies within the central Reading Air Quality Management Area space heating and hot water will be provided by mains gas boilers with NO_x emissions of less than 40mg/kWh meeting the requirements to comply with Class 6 (2018). This will ensure that the development site does not further contribute to NO_x levels in the area, the primary source of which is road traffic. This is further detailed in the report provided by Peter Brett Associates LLP which forms part of this planning submission. The aim of reducing NO_x emissions is one of the reasons a community heating and hot water system fuelled by biomass is not suitable for this development (see Section 4.5).

To reduce resident exposure to external airborne pollutants all the flats will be ventilated using Mechanical Ventilation with Heat Recovery (MVHR). This will remove the need for trickle vents in windows and ensure that all air provided to the flats is pre-filtered.

The proximity to highways means that noise is a potential issue. A key mitigation feature is that the ventilation is provided by MVHR with a summer bypass feature. This removes the need for trickle vents in windows and means that adequate ventilation can be provided to the flats throughout the year without opening the windows, although windows can still be opened if desired. Based on the outcome of the noise assessment, acoustic baffles can be fitted to external inlets and outlets of the MVHR to ensure that noise

infiltration is minimised. These measures will ensure that noise levels comply with BS 8233:2014 and Reading Borough Council's policy requirements. A full noise assessment has been provided by John Waring as part of this planning application.

13. Biodiversity

Applicable policies: CS36: Biodiversity and Geology, CS38: Trees, Hedges and Woodlands, DM18: Tree Planting

An ecological assessment of the site has been carried out by Windrush Ecology and is provided as part of this planning application. The report shows that the site contains no significant trees, hedges or woodland and that the flora are of low ecological value. The report suggests mitigation measures in the form of swift nesting boxes. In addition, a landscaping plan provided by Fabrik Ltd as part of this planning application includes areas of hard and soft landscaping as well as the planting of a number of specimen trees to achieve a net increase in tree coverage compared with the situation pre-development. The trees will also provide shading on the south and west aspects of the buildings providing shading in future to help mitigate against the impact of climate change. The landscaping scheme also includes a careful mix of native and non-native species that are attractive to a range of wildlife including bees, butterflies and birds as well as incorporating a mixture of plant heights including shrubs and climbers. As a consequence the biodiversity of the site is expected to increase as a result of the proposed development, compared with the current situation.

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