Environmental Sustainability Plan

R5 South

King's Cross Central
General Partner Ltd

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King's Cross

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Contents

1 Executive Summary

This Environmental Sustainability Plan has been prepared to explain the contribution that the proposed development of the South Block of Plot R5, will make to sustainable development of the King's Cross Central site.

Specifically, this document addresses the relevant planning conditions of the King's Cross Central outline planning permission (ref. 2004/2307/P) of 22 December 2006 and the associated Section 106 Agreement obligations relating to sustainability and highlights how the project team have responded to these conditions.

R5 South is a predominantly residential building located in the north-east of the King's Cross Central development site. It has been designed to achieve a very high standard of sustainability, with steps identified to achieve a target of Code for Sustainable Homes Level 4 for the residential dwellings. The combination of energy efficient measures and the sourcing of heat and power from the low-carbon district energy system result in an overall annual carbon reduction of 48% relative to the current 2010 Part L target emission rate (TER), which represents an emissions saving of at least 40 tonnes CO_2/ year.

In summary, the main measures that are proposed in order to meet the requirements of the outline planning permission and Code for Sustainable Homes level 4 are, but are not limited to, the following:

Condition 17(A) Energy efficiency measures

- Enhanced building envelope performance through the use of best practice U-Values and well-sealed façades.
- Passive solar design, which effectively uses the orientation and geometry of the blocks alongside high performance building fabric and glazing to minimise solar gain and overheating.
- Installation of a comprehensive building management system to monitor and control the building's performance.
- Energy efficient whole house mechanical ventilation with heat recovery, combined with natural purge ventilation.
- Intelligent, low energy lighting.

Condition 17(B) Reduction in carbon emissions

- Excluding the contribution of the low-carbon district energy system, R5 South is currently achieving carbon emissions 6% lower than Part L of the Building Regulations 2010 through the use of good passive building design, thermal and energy efficiency systems and efficient controls and technology.

Condition 17(C): Provision of Green roofs

- A brown type roof incorporating soil and crushed masonry will be provided on the roof of the 16 storey tower .
- Landscaped roof terraces (private and communal) for use by residents will be provided at 1st and 8th floor levels.

Condition 17(D): Energy supply

- The connection of R5 South to the district energy supply system shall allow it to take advantage of the low-carbon benefits associated with combined heat and power. The district energy system will meet all of the heat and hot water demand for the buildings. It will also generate electrical power which will be sold, thereby offsetting a significant percentage of the buildings' demand.

- The use of a low-carbon energy supply and the aforementioned passive design measures result in R5 South achieving an overall reduction in CO_2 of 56% against the Part L 2010 TER.

Condition 17(E): Code for Sustainable Homes and BREEAM Multi-Residential

- A pre-assessment of the Code for Sustainable Homes criteria has been carried out for the residential accommodation, which has identified an indicative score of 69.44% equating to a Level 4 rating. A number of additional credits have been identified which could see the score increase to 73.42% during detailed design and construction.

Condition 45: Drainage

- The surface water discharge peak flows for Building R5 as a whole (i.e. including R5 North and R5 South) are 173l/s and 5.3l/s for surface water and foul water, respectively. The site-wide drainage networks have been designed on this basis, using SUDS principles to provide an overall peak flow reduction of 10% (based on a 1 in 30 year storm). R5 South has been designed so that together with R5 North, these discharges will not be exceeded and that the site-wide maximum discharge to the existing combined sewer will not exceed 2292 l/s.

S106 - Section AA: Water

- Low water use sanitary ware and appliances will be specified such that internal water use will be less than 105 litres/person/day.

- Water butts are to be installed on the 8th floor roof terrace for the irrigation of soft landscaping.

S106 - Section Y: Construction materials and waste

- Implementation of the Construction Materials and Purchasing Strategy

- Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible returned to be re-used.

- In addition to Section 106 requirements, the project contractor may have its own corporate construction targets which will be applied to the proposed development.

- Maximum credits under the 'Code for Sustainable Homes' for *Man 3* Construction site impacts have been targeted, which includes monitoring and reducing resource use and waste production.

S106 - Section Z: Waste

- A simple 'home user' guide will include information on waste and recycling

- Dedicated storage space and containers will be provided within each dwelling to encourage occupants to recycle.

- Sufficient communal refuse storage space will be provided at ground and basement (-1) levels

2 Introduction

2.1 PURPOSE OF THE PLAN

This Environmental Sustainability Plan describes the environmental strategies that have been included within the design of R5 South in response to the planning conditions of the King's Cross Central (KXC) outline planning permission dated 22 December 2006 (the Outline Planning Permission). In particular, this document provides information in response to Conditions 17, 45 and 48 of the permission, giving details of the strategies adopted and demonstrating that the proposed scheme achieves a very high standard of sustainability for buildings of this scale in an urban environment. The plan also details how obligations contained within sections AA, Y and Z of the Section 106 Agreement will be met.

This document should be read in the context of other plans and documents forming the R5 South submission, including the Planning Compliance Report, the Urban Design Report and the *Code for Sustainable Homes* pre-assessment, the latter being included within this document at Appendix C.

2.2 DESCRIPTION OF R5 SOUTH

R5 South is located in the north-east of the KXC redevelopment site. It is bounded by Cubitt Park to the west, with the approved residential buildings, R4 and R5 North, to the east and north respectively.

When complete, R5 North and R5 South will form a c-shape comprising three main constituent blocks, namely the North, West and South blocks, centred around a communal courtyard. A smaller fourth building, the East Block, will lie on the plot's eastern boundary. As stated above, this submission includes proposals for the South Block only, as highlighted in red in Figure 1.

R5 South is between 8 and 16 storeys in height (including ground floor) and includes a ground floor commercial unit and 2 levels of basement.

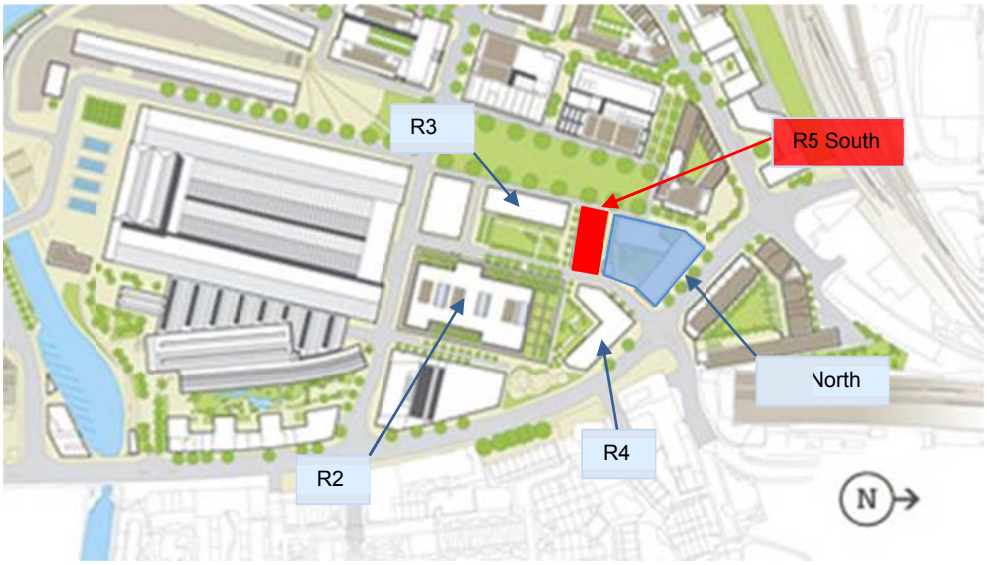


Fig 1: Indicative KXC Master plan showing R5 South highlighted in red

The proposals for R5 South will deliver a highly sustainable urban scheme that meets the environmental, social and economic needs of the local community. It has been designed in close co-

operation with London Borough of Camden (LBC) officers to address the relevant conditions from the Outline Planning Permission and obligations under the associated Section 106 Agreement.

In addition to its connection to the low-carbon KXC district energy system, the proposed development has been designed to include a number of 'passive design' measures that will minimise energy consumption, provide a high quality living environment and reduce reliance on mechanical and electrical systems. The key activities and measures are described in the following sections of this Environmental Sustainability Plan.

3 Responses to Planning Conditions

3.1 CONDITION 17 (A): ENERGY EFFICIENCY MEASURES

'Explain how the proposed building design realises opportunities to include design and technology energy efficiency measures.'

3.1.1 Introduction

As described in Section 2.2, R5 South comprises predominantly residential uses, with a commercial unit at ground floor and two levels of basement primarily for residents' car parking. In terms of occupied and habitable space it is the residential users who will have the largest impact on the building's energy consumption. The measures described in this section therefore relate mainly to the residential element of the building.

3.1.2 Physical form of the building

As explained previously, R5 South is located in the north-east of the KXC redevelopment site. The plot will be bounded by East Street to the east, Cubitt Park to the west and the 'Zone R garden' to the south. Neighbouring development includes R4 to the east (now complete and occupied as 'Rubicon Court'), R5 North to the north (under construction) and R3 to the south.

The central axis of the block runs in a WNW-ESE direction, so that the majority of rooms face NNW or SSE. Of the 76 apartments, 55 (73%) are dual aspect to maximise the daylight within the apartments. The apartments have been laid out such that there are only seven apartments with exclusively north facing windows, with one such apartment on each of the lower floors (levels 1 to 7).

A full description of the R5 South scheme is provided in the separate Urban Design Report produced by Maccreanor Lavington Architects.

3.1.3 Building envelope, specification and thermal performance

The external envelope can act as an important climatic modifier. A well-designed external envelope can significantly reduce energy demand. The need to address thermal comfort issues in summer, while minimising the use of mechanical cooling, has had a strong influence upon the design of R5 South.

The building fabric performance in terms of the specified glazing standard and insulation levels will exceed the requirements of Part L of the Building Regulations 2010. Materials with low U-values will be specified to ensure that infiltration rates also exceed the requirements of Part L.

Element	**Proposed construction U Value (W/m^{2}K)**	***Building Regulation (2010) U Value (W/m^{2}K)***	
		Commercial	*Residential*
External Wall	0.25	*0.35*	*0.30*
Party Wall	0.20	-	-
Roof	0.18	*0.25*	*0.20*
Exposed floor	0.25	*0.25*	*0.25*
Glazing	*1.8 (including window frame)*	*2.2*	*2.0*

Table 1: *Comparison of proposed and current Building Regulation U-Values*

In order to reduce unwanted solar gains into the apartments but maintain a high level of natural lighting and energy efficiency, high performance double glazing will be used on all facades. The glazing will have the following characteristics:

Colour:	Neutral
Visible light transmission (LT Factor): levels 1-7	0.75 (min)
Visible light transmission (LT Factor): levels 8-15	0.65 (min)
Thermal transmittance (G-Value):	0.40 (max)

The building construction process shall incorporate robust details as developed by the Building Research Establishment (BRE) in order to ensure building air tightness for all areas of 3 $m^3/hr/m^2$ at an applied pressure of 50pa or less. These figures are a significant improvement on the Building Regulation Part L minimum requirement of 10 $m^3/hr/m^2$ at an applied pressure of 50pa and will assist in reducing the building energy consumption by improving the air tightness of the building and, as a result, will reduce the energy required to heat the spaces.

3.1.4 Passive solar design

The provision of natural daylighting is an important consideration in passive solar design and the design team have made a conscious effort to optimise daylight penetration into all apartments commensurate with the high density environment, the known and likely massing of the adjoining development plots and the orientation of R5 South within the overall KXC scheme.

Table 2 below indicates the recommended dwelling daylight factors from the BRE's "Site Layout for Daylight and Sunlight: A Guide to Good Practice 1991", which is also replicated in the "Code for Sustainable Homes – Technical guide 2008"

Area	***Recommended Daylight Factor (DF)***
Kitchen	*2%*
Living Room	*1.5%*
Bedroom	*1%*

Table 2: *Summary of dwelling recommended daylight factor from Code for Sustainable Homes*

A full response to the daylighting issues for R5 South is contained in the submitted *Daylight and Sunlight Report* which is bound separately.

As well as the daylight considerations, the potential impact of summertime overheating has also been considered. The orientation and geometry of R5 South assists in minimising the risk of overheating in

apartments, with surrounding buildings such as R2 and R3 likely to provide an "external solar shading" effect that will (on completion) limit the solar gain to many of the south facing apartments.

The high performance of the building fabric, as set out in section 3.1.3 will also benefit the dwellings by limiting overheating.

The SAP (Standard Assessment Procedure) calculation methodology has been used to assess overheating for all apartments in the building and the results indicate that this risk is not significant. A sample calculation has been included in Appendix A.

3.1.5 Scope for using thermal mass

Utilising the thermal mass of a building can reduce peak heating and cooling loads and thus reduce annual energy consumption. Incorporating the building's thermal mass within occupied areas can reduce or remove the need for mechanical cooling systems. To exploit the thermal mass of the building, either direct or indirect contact is required between the structure and the occupied space, via exposed surfaces or energy exchange systems. Given that much of the building is residential there is limited opportunity to exploit the thermal mass directly; this is because the internal finishes will reduce the effectiveness of the concrete structure as an energy store within the apartments.

3.1.6 Choice and design of building systems

The building servicing strategy has been designed to maximise the use of the site-wide, low-carbon district energy system. The district heating pipework will enter the building in the basement and heat will then be circulated around the building via a heat exchanger (located in the basement plant room) and distribution pipework.

The apartments will be provided with a Heat Interface Unit (HIU) that will extract heat energy from the distribution pipework and utilise the heat energy to provide hot water and heating to apartments. All pumps and drives will be inverter driven, allowing them to match the energy requirements of the building. Space heating will be provided by underfloor heating with zone control, allowing a degree of user control within each room and the ability to reduce further energy requirements on a room-by-room basis.

A Building Management System (BMS) system will be provided to control and monitor the following:

a) District heating system plate heat exchangers (secondary side)

b) Secondary heating pumps

c) Cold water storage high and low water level alarms

d) Cold water booster systems

e) Incoming electricity metering and Part L compliant sub-metering

f) Monitoring of heat energy metering within the apartments

g) Monitoring of apartment water metering

The use of a BMS enables automatic system control to ensure the building services operate at maximum efficiency. Monitoring the building services systems assists in maintaining optimum energy consumption through data interrogation and resolution of potential problems.

3.1.7 Natural and mechanical ventilation

All apartments will be provided with whole house mechanical ventilation units with integral heat recovery.

The proposed use of whole house mechanical ventilation systems will reduce excessive loads on the heating system by preheating incoming 'cool' air in winter via exhaust air, thus saving energy for the occupier.

The whole house ventilation systems are designed to operate in two modes; the default mode providing continuous background or 'trickle ventilation' and the second mode providing a 'boost' condition, activated when the bathroom light switch or humidity level is high or cooker hood is activated. Supply air will be filtered and will serve the lounge and bedrooms whilst extract air will be provided from the bathrooms, en-suites and kitchen areas. Rigid, slim duct systems will be routed through the ceiling voids. The intake and discharge points to the flats will be shrouded by architecturally detailed grilles which will form part of the window design. Further details regarding the incorporation of ventilation grilles into the building facades are provided in the Urban Design Report.

Purge ventilation is also provided to all apartments by opening windows/patio doors to achieve Part F compliance and to provide residents with a greater degree of internal control.

A dedicated riser has been included to allow the commercial unit to install a ventilation duct to roof level to allow the unit to be used for a wider range of uses including catering.

3.1.8 Scope for intelligent lighting and other technology to optimise use of natural light

The internal lighting systems have been specified to produce further reductions in energy consumption. All dwellings will feature energy efficient lighting, exceeding the 75% minimum (energy efficient luminaires as a percentage of the total luminaires within an apartment) requirement stipulated in Part L of the Building Regulations and the 75% standard quoted in the Code for Sustainable Homes design criteria. The lighting installation will integrate low energy, high efficiency LED or compact fluorescent light fittings with down lights in all apartments and communal areas.

The building has been designed around a circulation core, which includes windows to the communal staircase and corridor area in order to provide natural daylight. The lighting in these areas will feature daylight dimming and presence detectors to minimise energy consumption.

External lighting will be zoned and controlled via a solar dial time clock and photocell daylight sensors.

Whilst light fittings in the commercial unit are the responsibility of the tenant, there is a commitment to facilitate energy-efficient luminaires with daylight linking. Thus, the lighting control system will use intelligent dimming that responds to daylight levels and occupancy sensors and timers to ensure that lighting is only energised when required. The incoming commercial tenants shall be responsible for ensuring that the lighting within their demise operates in accordance with those systems.

3.1.9 Specification of plant

Plant sizing has been designed to optimise the efficiency of the systems, by matching installed capacity to demand. The Energy Centre and Main Electrical Sub-Station within Building T1 are already built and these will provide thermal energy (i.e. heat and hot water) and offset electrical power for R5 South (see Section 3.4).

Items of equipment which make up the R5 South mechanical building services installation will be specified to achieve high annual energy efficiency operation.

3.2 CONDITION 17 (B): REDUCTION IN CARBON EMISSIONS

'Explain the reduction in carbon emissions achieved through these building design and technology energy efficiency measures, compared with the emissions permitted under the national Building Regulations prevailing at the time of application(s) for approval of reserved matters are submitted.'

R5 South is primarily a residential development which falls under the control of Building Regulation Approved Document Part L1A (ADL1A). However, the scheme also contains a commercial unit on the ground floor that is covered by Building Regulation Approved Document Part L2A (ADL2A). In order to obtain a result for the whole building, two calculations have been completed and the outputs added together based on an area weighting. The combined result provides a target emissions ratio (TER) and building emission rate (BER) for R5 South.

The residential areas of the development have been assessed using SAP (Standard Assessment Procedure) against the requirements of ADL1A. The ground floor commercial unit have been modelled using IES VE Compliance software, which is accredited under ADL2A. The calculations result in a combined TER of 113 tonnes CO_2/year.

The KXC Section 106 Agreement targets each new building to achieve carbon emissions at least 5% lower than Part L of the prevailing Building Regulations (i.e. Building Regulations 2010) using good passive design and energy efficiency measures only such as those set out in Section 3.1. On the basis of these measures alone (i.e. excluding any contribution from the low carbon district energy supply), the carbon emissions from R5 South are expected to be 106 tonnes CO_2/year which is 6% below the TER for the building. Consequently, the building exceeds the target 5% reduction set by the Section 106 Agreement.

Chart 1 shows the comparison of the R5 South TER against the actual BER, excluding any contribution made by the low carbon energy supply.

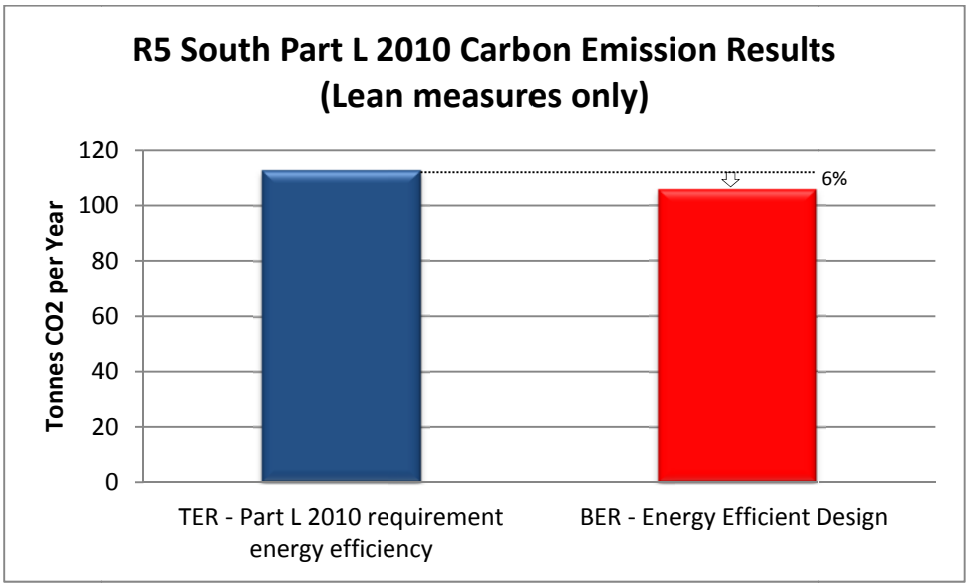


Chart 1: *R5 South TER v BER*

3.3 CONDITION 17 (C): PROVISION FOR GREEN AND/OR BROWN ROOF

'Explain the specification for any green and/or brown roofs.'

Although the Outline Planning Permission does not, within the parameter plans, define plot R5 as a priority location for green/brown roofs, it is proposed that a brown type roof of approximately 378m^2 will be provided on the roof of the 16 storey tower element.

The brown roof will incorporate as much recycled content as possible with a mixed substrate consisting of soil and crushed masonry. Brown roofs tend to be based on evolution rather than design and therefore their maintenance requirements tend to be lower than those for similar-sized green roofs, making them more appropriate for use at high levels. Although typically not as vegetated as a green roof, brown roofs will become naturally colonised by plant species and a variety of insects and birds over time. The roof area is generally inaccessible (save for maintenance) and therefore will provide a relatively undisturbed habitat for a range of wildlife. In addition, the roof top planting can assist in attenuating the surface water run-off.

Atmospheric carbon dioxide will be absorbed by the brown roof, allowing it to play a part, albeit small, in offsetting the emissions of the building. This offset has not been included in the Building Regulations calculations but forms a benefit in its own right.

Landscaped roof terraces totalling 228m^2 (private and communal) for use by residents will be provided at 1st and 8th floor levels.

Taking all of these roof types into account, 76% of the total roof area of R5 South will be either brown roof or landscaped terraces.

3.4 CONDITION 17 (D): ENERGY SUPPLY

Explain how energy shall be supplied to the building(s), highlighting;

I. how the building(s) relate(s) to the site wide strategy for district heating incorporating tri-generation from distributed combined heat and power;

II. how the building(s) relate(s) to the strategy for using bio fuel boilers to supplement the energy supplied through district heating systems;

III. the assessment of the cost-effectiveness and reliability of the supply chain for bio fuel; and

IV. Any other measures to incorporate renewables.

3.4.1 The KXC Energy Centre

The T1 Energy Centre has already been approved, constructed and commissioned. The necessary heat and power distribution infrastructure is being installed across the site to enable the connection of each new building to the district energy system. The thermal energy supplied to R5 South will be used to provide all of its space heating and hot water demands. The combined heat and power (CHP) engines within the T1 Energy Centre will also generate electrical power (to be sold to a third party), which will offset a significant percentage of the buildings' demand.

When fully fitted, it is anticipated that the T1 Energy Centre will include the following principal items.

- 3 No. 1.8MW_{th} gas fired CHP
- A thermal store, integral to the CHP operating hours strategy
- 3 No. 9MW_{th} gas boilers

These items will be installed on a phased basis as the KXC development reaches critical mass, in order to meet peak demands and optimise efficiency. As part of the phased energy strategy, a temporary Energy Pod has been installed on Plot Q1 initially to provide heat for the commissioning of plant during the construction of UAL and subsequently meet occupier demand from September 2011. Similarly, the Energy Pod has provided heat for plant commissioning during the development of Buildings R4 (now completed) and the construction of R5 North (due for completion at the end of 2012).

King's Cross Central General Partner Ltd and its partners have established an Energy Services Company (ESCo) to run the district heating, and remain committed to completing the works on site to install utilities and district energy infrastructure. It is envisaged that the T6 student housing building will trigger the 'switch on' of CHP engines and boilers in the T1 Energy Centre. At that point, the Energy Pod on Q1 could either be decommissioned, or retained (either at that location or elsewhere) for a period of time to assist with commissioning, or provide service resilience.

As outlined in previously submitted (and approved) Environmental Sustainability Plans, future provision has been made within the KXC development for inclusion of biomass boilers. At this time, a robust commercial case to support the inclusion of biomass cannot yet be made, however, this position continues to be actively monitored. The scope for a secondary energy centre within Plot T2 could provide for their inclusion later, subject to procurement of an appropriate fuel source in line with clause 20(a) of Section X of the Section 106 Agreement.

The carbon emission calculations used within this report have assumed that, in total, 62.5% of the thermal energy used across the KXC site will be produced by CHP with the remainder provided by

gas-fired boilers. Furthermore, it has been assumed that the Energy Centre (once fully operational) would operate such that on average just over 50% of R5 South's annual heating and hot water demand would be supplied from the gas-fired CHP plant and just under 50% from gas-fired boilers (heat for heat).

The CHP plant will also, of course, generate power. Some 79% of electricity consumption across the KXC site will be offset by on-site electricity generation.

Additional assessments have been carried out to show the further reduction in overall CO_2 emissions from R5 South if the Energy Centre were to provide 16% of the annual heating demand of the building via biomass boilers, 34% from gas-fired boilers and 50% from CHP.

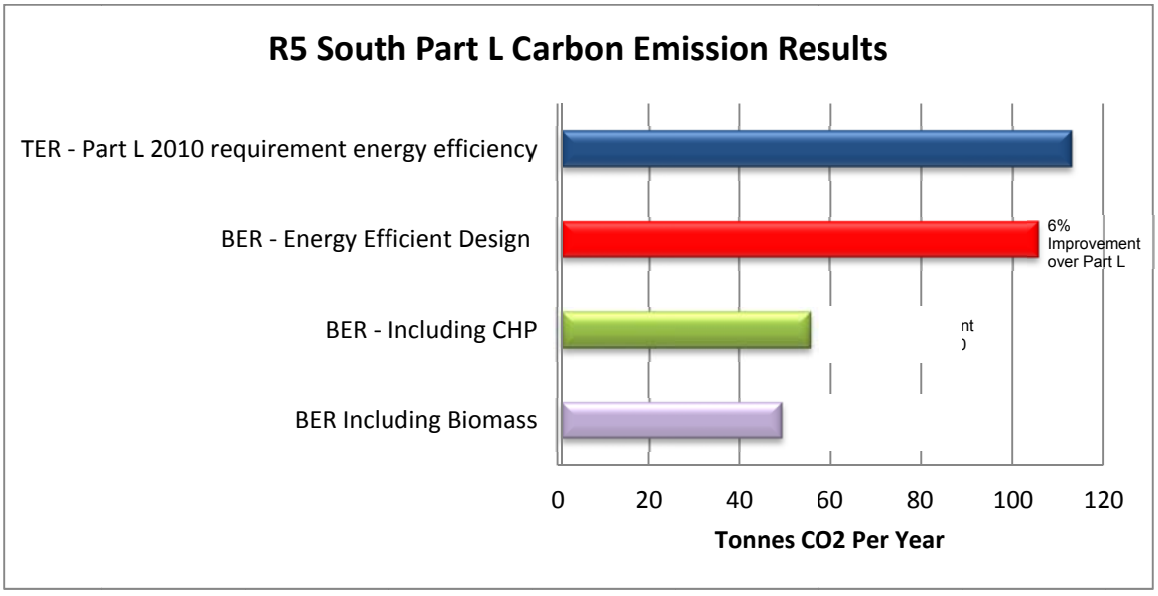
3.4.2 CO_2 Savings Arising from the District Energy System

- Part L of the Building Regulations

Taking into account the passive design and energy efficiency measures set out in Section 3.1 of this plan, combined with the contribution made by the connection of R5 South to the low-carbon district energy system, the BER is reduced further from 106 tonnes CO_2/year to 56 tonnes CO_2/year, representing an overall carbon reduction of 51% in emissions against the TER under Part L.

The addition of biomass boilers within the Energy Centre would result in a further 5% reduction (i.e. a 56% improvement overall).

Chart 2 below provides a comparison of the building's TER against the actual emission rate, including the carbon reductions made as a result of the connection to the low carbon energy supply and the potential introduction of biomass.



3.4.3 Renewable Energy Options

The opportunities for exploiting other forms of renewable technology on R5 South were thoroughly considered during the design process. A range of technologies were examined, even though the September 2005 Energy Assessment or Parameter Plan KXC021 do not highlight R5 South as a building within the KXC site for the application of renewables. The technologies considered included the on-site renewable technologies (wind turbines, solar water heating, ground source heat pumps and photovoltaic generation) described in the same Energy Assessment.

In summary, the review, by technology, had the following outcomes:

- Wind turbines – R5 South is outside the priority zone for wind turbines set by parameter Plan KXC021. In any event, there is mixed evidence regarding the actual 'in-use' output of building-mounted wind turbines and turbines can potentially give rise to noise, vibration and shadow flicker which can impact on residential amenity. Consequently, they are not considered appropriate in this location. On other projects, the proposed wind turbines have been replaced by additional photovoltaic panels.
- Solar hot water – As identified at the outline stage, there are practical problems associated with linking roof top collectors for solar hot water to individual dwellings within high density apartment blocks. Further, increasing the extent of solar water heating to residential apartment blocks has been discounted because it reduces summer heat demand and hence reduces the commercial viability of the district heating CHP.
- Ground source heat pumps (GSHP) – The application of GSHP for R5 South has been examined but is not considered appropriate. Typically, this type of system is best suited to a building where heating and cooling demands are relatively balanced. Given that the proposed scheme is predominantly residential, cooling demands are minimal and, since all of the thermal energy demands of the building will be supplied from the low carbon district heating energy system, there is limited benefit to be gained from a GSHP system.
- Photovoltaics – The installation of arrays of photovoltaic panels on R5 South was examined, only the upper roof is potentially suited to such a system. However, given its relatively small roof area, it was felt that the renewable energy contribution of photovoltaics on this block would not be sufficient enough to justify the cost of installation or the loss of the proposed brown roof.

3.5 CONDITION 17 (E): BREEAM AND CODE FOR SUSTAINABLE HOMES

'Explain how the proposed building(s) have been designed to achieve a BREEAM and/or Ecohomes rating of "very good" (or an equivalent assessment method and rating) or better'

Code for Sustainable Homes

The BRE EcoHomes assessment system, referred to in Condition 17(E), was effectively superseded in April 2007 for all new residential projects by the Government's *Code for Sustainable Homes* ('CfSH') scheme. The CfSH is an equivalent system of assessment for the purposes of that condition. Although most credits under the CfSH are 'tradable' (i.e. chosen at the discretion of the design team), there are a number of mandatory credits for each level of achievement in every dwelling, such as under the energy and water sections.

The CfSH assessment provides an overall score and rating for each individual dwelling across 6 levels, with Level 6 equating to a zero carbon home. Currently CfSH Level 3 approximately equates to an EcoHomes rating of 'Very Good' and we have used this as the minimum target standard under Condition 17(E). However, the project team is actively targeting the achievement of CfSH Level 4.

Hoare Lea have carried out a CfSH pre-assessment for the apartments in R5 South, the full report for which is attached as Appendix C. The assessment provides the design team with an overview of the minimum requirements each dwelling must achieve to obtain CfSH Level 3 (≥57%), and indeed, Level 4 (≥68%).

Chart 3 and the summary points table on the following page indicate the predicted score for the south block of 69.44%, which equates to a Level 4 CfSH rating. Additional credits have been identified in brackets to improve the score to 73.4%.

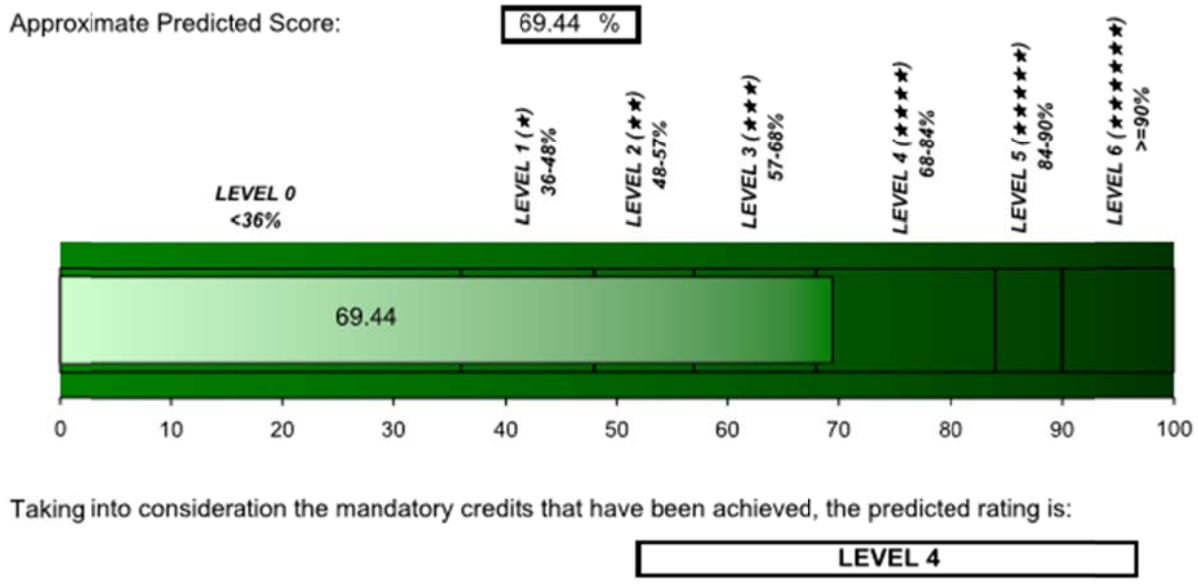


Chart 3: *Summary of CfSH score*

King's Cross Central R5 South	Points Summary	Points Available	Points Scored
Energy	Dwelling Emission Rate	15	8
	Building Fabric	2	1
	Internal Lighting	2	2
	Drying Space	1	1
	Energy Labelled White Goods	2	2
	External Lighting	2	2
	Low or Zero Carbon (LZC) Technologies	2	2
	Cycle Storage	2	1
	Home Office	1	1
Section Total		**29**	**20**
Percentage of points achieved within this section			**69%**
Water	Indoor Water Use	5	3
	External Water Use	1	1
Section Total		**6**	**4**
Percentage of points achieved within this section			66%
Materials	Environmental Impact of Materials	15	6 (10)
	Responsible Sourcing of Materials – Basic Building Elements	6	2
	Responsible Sourcing of Materials – Finishing Elements	3	1
Section Total		**24**	**13**
Percentage of points achieved within this section			54%
Surface Water Run-Off	Management of Surface Water Run-off from developments	**2**	**0**
	Flood Risk	**2**	**2**
Section Total		**4**	**2**
Percentage of points achieved within this section			50%
Waste	Storage of non-recyclable waste and recyclable household waste	**4**	**4**
	Construction Site Waste Management	**2**	**2**
	Composting	**1**	**0 (1)**
Section Total		**7**	**7**
Percentage of points achieved within this section			100%
Pollution	Global Warming Potential (GWP) of Insulants	**1**	1
	NOx Emissions	**3**	2
Section Total		**4**	3
Percentage of points achieved within this section			75%
Health & Wellbeing	Daylighting	**3**	0
	Sound Insulation	**4**	3
	Private Space	**1**	0
	Lifetime Homes	**4**	4
Section Total		**12**	7
Percentage of points achieved within this section			58%
Management	Home User Guide	**3**	3
	Considerate Constructors Scheme	**2**	2
	Construction Site Impacts	**2**	2
	Security	**2**	2
Section Total		**9**	9
Percentage of points achieved within this section			100%
Ecology	Ecological Value of the Site	**1**	1
	Ecological Enhancement	**1**	1
	Protection of Ecological Features	**1**	1
	Change in Ecological Value of Site	**4**	3
	Building Footprint	**2**	2
Section Total		**9**	
Percentage of points achieved within this section			**89%**
Total Points Scored		**69.44% (73.4%)**	
Code for Sustainable Homes Rating		**Level 4**	

***Table 3: R5 South** CfSH Credit Summary*

3.6 CONDITION 17 (F): ECOLOGY

'Explain the incorporation of bird boxes, bat roosts and other wildlife features on the building'.

The provision of a 378m^2 brown roof on the tower roof (as described in our response to condition 17(C) in Section 3.3), offers opportunities for ecological enhancement and increased biodiversity.

The proposed brown roof will comprise a mixed substrate, intended to encourage plant growth. The use of crushed masonry and spoil, will provide an undisturbed environment for wildlife including insects and birds such as the Black Redstart.

Bird and/or bat boxes will be incorporated during construction of the blocks to provide nesting habitats and shelter. Further advice will be sought as to what species are present in the area and the suitability of the buildings for particular boxes to attract those species.

3.7 CONDITION 45: DRAINAGE

'Explain how the new drainage infrastructure within the site shall be designed to achieve a combined (storm and foul) peak discharge to the existing combined sewer of 2,292 l/s or less'

3.7.1 Site wide drainage infrastructure

The figure of 2292 l/s in the wording to Condition 45 describes the maximum peak (storm and foul) discharge which is permissible for the site as a whole to discharge to the existing combined sewers. The peak discharge will be split between the Camden Sewer and York Way Sewer (for Northern Area) and the Camley Sewer / Fleet Sewer (for the Southern Area).

The cumulative peak discharge from the many building plots and areas of infrastructure will exceed 2292 l/s under certain weather conditions. In these instances, the site wide drainage infrastructure, including online and offline attenuation (see below), will attenuate peak flows discharging from individual plots, adopted highway and public realm, enabling cumulative peak flows to be reduced to 2292 l/s or less.

The site wide surface and foul water disposal strategy can be summarised as follows:

- To provide separate surface and foul water networks, combining only at the final manhole prior to connection into the existing Thames Water sewerage network;
- To provide online attenuation (for example oversized pipe work) and offline attenuation (for example proprietary modular underground storage systems / tanks) to buffer peak flows generated within the site down to the agreed discharge rates into the existing Thames Water sewerage network;
- To ensure that no above ground flooding occurs during the worst case 1 in 30 year storm event;
- To ensure that no internal building flooding occurs during the worst case 1 in 100 year (+20%) storm event;
- To accord with PPS 25 and Sewers For Adoption 6th Edition;;
- To discharge at various locations into the sewerage network; and
- To design the above infrastructure such that combined surface and foul water flows do not exceed 2292 l/s during a 1 in 30 storm event.

The site wide drainage infrastructure at King's Cross Central can be described in terms of three drainage infrastructure areas, incorporating both building plots and infrastructure/public realm. These are described under Table 4 below.

Drainage Infrastructure Area	Plot developments	Infrastructure / Public Realm
Eastern Goods Yard	The Granary Complex, Q1, Q2, R1, R2, R3, R4, R5, S1, S2, T1, T2, J1, H1, K1, K2, K3, K4 and 50% of I1)	Transit Street, Wharf Road, Goods Street, Granary Square, Cubitt Park and Handyside Park
Southern Area Infrastructure	A1, A2, A3, A4, A5, B1, B2, B3, B4, B5, B6, D1, D2, F1 and V1	The Boulevard, Goods Way, Station Square and Pancras Square
Remainder of the Northern Area including the Triangle Site	M1, M2, N1, N2, P1, P2, S3, S4, S5, T3, T4, T5, T6 and W1	Canal Street and Cubitt Square

Table 4: *Drainage Infrastructure Areas*

Table 5 identifies the assumed peak foul and surface water flows from each of the building plots which underpins the design of the site-wide infrastructure. The foul water figures are based on CIRIA 177 Variable Peaking Factor and the assumed foul water discharges from various land uses identified in Table 6. The surface water peak flows are based on a 1 in 30 year storm. It should be noted that it is most unlikely that the foul and surface water peak discharges from each individual plot will coincide with each other.

Generally, foul water discharges represent small but consistent flows subject to diurnal patterns. For example, residential properties will exhibit two peaks within their diurnal flow pattern, one in the morning and one in the early evening.

Surface water discharges, on the other hand exhibit extreme variations in flow, directly related to rainfall intensity.

The surface water discharge from each plot development will have its own unique hydrograph (identifying the variation between flow and time – the peak of which only lasting for a few minutes in most cases). Each one of these peaks (within the hydrographs) combine within the main drainage infrastructure at different points in time during the storm event creating an averaged flow within the pipe network.

These flows will discharge into the Thames Water network via flow hydraulic controls at the downstream end of each network. These hydraulic controls limit the discharges to a combined maximum of 2292l/s. Where the plot development discharges combine to produce flows in excess of the maximum allowable discharge, water will be held within the drainage infrastructure which has been specifically sized to accommodate these flows.

Eastern Goods Yard – Peak surface and Foul Water Flows		
	Assumed Peak Flows (l/s)	
Plot reference	Surface Water (1 in 30 year event)	Foul Water
G1	25	1.1
H1	15	0.9
J1	147	4.2
K1	24	1.2
K2	101	0
K3	150	6
K4	117	1.8
L1 – L7	1105	25.2
Q1 & Q2	191	7.3
R1	57	11.8
R2	257	12.8
R3	128	4.6
R4	127	3.5
R5	**173**	**5.3**
S1	158	11.9
S2	162	12.7
T1	192	2.1
T2	162	10.2
I1	25	1.2
N2	84	0
Totals	**3400**	**123.8**

Table 5: *Peak Surface and Foul Water Flows for the Eastern Goods Yard Area*

Land Use	Demand Options	Discharge to Sewer (l/day/hd)	l/s/head	Operational Hours	Population Density (m^2 per person)
Residential	--	**152**	**0.0023457**	**18**	**36.2**
Student Accommodation	-	**152**	**0.0023457**	**18**	**19.5**
Retail	Large Retail	**26.6**	**0.0009236**	**8**	**40**
Food/Drink	Customer/day 2hr sittings	**28.5**	**0.0009896**		**1.4**
Education	General	**19**	**0.0006597**	**8**	**10**
Business	Without Canteen	**41**	**0.0014236**	**8**	**12**
Hotel		**133**	**0.0046181**	**8**	**20**
Leisure	Sports club	**142.5**	**0.0049479**	**8**	**40**

Table 6: *Foul water discharges from various land uses*

3.8.2 Drainage Infrastructure relating to Plot R5 South

R5 South is serviced by the Eastern Goods Yard drainage systems (Table 5), and discharges via a restricted discharge in to the combined Thames Water Camden Sewer. The drainage networks have been designed on SUDS principles (see Section 4.1.2 below) providing an overall peak flow reduction of 10% (based on a 1 in 30 year storm).

Thames Water has approved the surface water discharge into the Camden Sewer for the network serving R5 South. The approved discharges reflect the assumptions described in Tables 6 and 7 (above). The approved surface water discharge peak flows for R5 as a whole (i.e. R5 North and R5 South) are 173 l/s and 5.3 l/s for surface water and foul water, respectively. R5 South has been designed to meet these discharges alongside the approved design for R5 North

It should be noted that the figures in Table 5 do not specifically include public realm areas. However, the Eastern Goods Yard Area public realm was included in the hydraulic model used during the design of the infrastructure to ensure that each of the drainage sub catchments (buildings and public realm) are attenuated and the flows into the combined Thames Sewer restricted so that the permissible discharges set out in the Outline Planning Permission are not exceeded.

4 Section 106 Agreement

4.1 SECTION AA: WATER

The Developer shall use reasonable endeavours to incorporate within the detailed design of the development water efficiency measures such that those designs secure at least forty per cent (40%) of the potable water consumption credits available under the BREEAM/EcoHomes methodologies which represents a reduction of approximately twenty to thirty per cent (20-30%) against typical water consumption.

The Developer shall use reasonable endeavours to incorporate within each phase of the Development one or more of the following alternative water supplies to meet five per cent (5%) or more of the non-potable water needs of such phase:

a) groundwater abstraction;

b) greywater and blackwater recycling;

c) rainwater harvesting.

The Developer shall use reasonable endeavours to ensure that the design for the treatment of storm water run-off within the Development incorporates, where practicable, filtration, attenuation and other techniques that are consistent with the then best practice advice on SUDS, to control the timing and volume of flows.

4.1.1 Domestic water use

In the southeast, climate change is predicted to reduce summer rainfall by up to 30% by 2080. Furthermore the transport, treatment and delivery of potable water involve the consumption of energy and resources. All these issues highlight the need to include design features that reduce water demand in new developments.

Non-residential space is limited in R5 South, with potable water being consumed mainly by the occupants of the residential dwellings. EcoHomes has now been superseded by CfSH and therefore we have followed this methodology for the dwellings in R5 South in relation to residential water consumption.

The environmental benefits that can be achieved by installing carefully selected water efficient sanitary ware and appliances are recognised and the proposals seek to reduce the internal consumption rate of the dwellings to 105 litres/person/day as a maximum. This would represent at least a 30% reduction against typical water consumption, and is a mandatory requirement of Levels 3 and 4 of the CfSH.

In order to achieve this consumption rate, the project team will specify water efficient sanitaryware and appliances in line with CfSH as follows:

- Dual flush WCs
- Low flow rates/aerators on hand basin taps and kitchen sink taps
- Low flow rates for showers
- No over-sized baths (i.e. only standard baths or smaller)

- Water efficient washing machines and dishwashers

Communal rainwater and greywater systems have been investigated, however, at this time, it is considered that neither would be appropriate for R5 South given (i) the disproportionate costs in relation to actual water savings and (ii) the dis-benefit associated with the necessary energy use to operate the systems and distribute the water around the buildings.

A water butt will be provided on the 8th floor terrace for watering of container plants.

4.1.2 Sustainable drainage

Surface water drainage methods that take account of quantity, quality and amenity issues are collectively referred to as Sustainable Urban Drainage Systems ('SUDS'). These systems are more sustainable than conventional drainage methods.

In R5 South and its associated public realm, SUDS have been integrated wherever possible to effect source control and storm water retention/infiltration, provide permeable surfaces and encourage evapotranspiration (e.g. from green/brown roofs). These controls have been located as close as possible to the rainwater source, providing attenuation of the runoff.

As described in Section 3.3 of this Plan, a brown roof and roof terraces featuring container planting will be provided. In addition, the approved central communal courtyard and the adjacent public realm along East Street, East Lane and York Way, will incorporate areas of planted beds, trees and raised lawns. These features will help reduce the peak flow and the total volume discharged by attenuating or detaining rainfall and on warmer days, by encouraging evapotranspiration.

For details on the site-wide drainage strategy, please refer to Section 3.7 of this report.

4.2 SECTION Y: CONSTRUCTION MATERIALS AND WASTE

Section Y of the S.106 Agreement imposes obligations to:

Implement the Construction Materials and Purchasing Strategy

Apply the Construction Materials and Purchasing Strategy to agreeing specifications and targets in contracts with contractors, designers and suppliers of services in relation to construction

Use reasonable endeavours

- ***I. to minimise packaging waste associated with the delivery of construction materials***
- ***II. to produce topsoil and subsoil that uses subsoil and crushed rubble from the site combined with organic material for use in areas of landscaping***
- ***II. to achieve the Construction Targets***

4.2.1 Construction Materials and Purchasing Strategy

The project team intend that the best practice will be followed on the R5 South development, following on from R5 North and surpassed wherever practicable, in order to maximise resource efficiency. The Construction Materials and Purchasing Strategy set out in the Section 106 Agreement will be adopted, while careful planning and effective control will ensure that waste during the construction phase is minimised.

4.2.2 Packaging waste

Packaging used to protect construction materials and assemblies in transportation will be kept to a minimum and wherever possible returned to be re-used.

4.2.3 Soil

R5 South currently comprises approximately 2m of highly variable made ground. There is no top soil to be removed and re-instated.

As far as practicable crushed masonry for the brown roof will be sourced from materials generated by the site clearance and preparation of levels.

Due to the Brownfield nature of the site, there are no natural topsoil or subsoil resources on site. A Topsoil Manufacture Feasibility Study has been undertaken by Tim O'Hare Associates to assess the suitability of site-won clay fill from the KXC site as a constituent of manufactured topsoil, rather than importing material onto site for landscaping use. Due to the density, plasticity and poor drainage qualities associated with clay fill, the study concludes that manufactured topsoil derived from this material would not be suitable for use in permanent landscaping schemes such as green/brown roofs (which require a light weight substrate) or tree pits. As such, it is recommended that imported organic material is used in these areas.

The separate Earthworks and Remediation Plan for R5 South addresses the nature and quantity of materials arising and the arrangements for their re-use and disposal.

4.2.4 Construction Targets

In terms of the Section 106 targets, a commitment has been made by the project team to achieve all necessary targets and develop a strategy to operate site management procedures to mitigate environmental impacts. Additionally, the proposed development has targeted maximum credits under the Code for Man 3 Construction site impacts. This will require the development to implement procedures that cover 4 or more of the items listed below:

- Monitor, report, and set targets for CO_2 production or energy use arising from site activities;
- Monitor and report CO_2 or energy use arising from commercial transport to and from site;
- Monitor, report and set targets for water consumption from site activities;
- Adopt best practice policies in respect of air (dust) pollution arising from site activities;
- Adopt best practice policies in respect of water (ground and surface) pollution occurring on the site;
- 80% of site timber is reclaimed, reused or responsibly sourced

In addition to the Section 106 requirements, the project contractor has its own corporate construction targets which will be applied to the proposed development.

4.3 SECTION Z: WASTE

Section Z of the S.106 Agreement imposes obligations to:

I. Provide occupiers with Waste Information Packs and use reasonable endeavours to obtain feedback on the success or popularity of the initiatives contained within the Packs

III. Use reasonable endeavours to incorporate within the detailed design best practice design solutions that provide for waste segregation and storage areas and to maintain the solutions that are implemented

IV. Provide and maintain segregated waste containers within the Public Realm areas at suitable locations and in appropriate numbers.

4.3.1 Waste information Packs

To comply with Section Z of the Section 106 Agreement, a simple 'home user guide' will be provided to all dwelling occupants. This guide will include information on operational issues, such as design features, energy and water, and the site and its surroundings, such as waste & recycling, transport, local amenities, etc.

4.3.2 Design

Details regarding the Waste and Refuse Strategy are included in the submitted Urban Design Report. Communal refuse storage rooms for residents of R5 South will be provided at ground level and basement level -1. Building management will be responsible for moving bins from the basement store to the ground floor for collection.

The commercial unit will have access to a dedicated refuse store located on East Street.

The locations of the refuse storage rooms are indicated on the submitted architects drawings (MLA/219/P/119 and /120).

In line with the CfSH compliance criteria, the development proposes the following strategy for operational waste and recycling, to be incorporated as part of the detailed design:

Storage of non-recyclable waste

The space for waste storage will be at least the minimum recommended by BS 5906 (British Standards, 2005) i.e. 100 litres volume for a single bedroom dwelling, with a further 70 litres volume for each additional bedroom. Adequate external space will be allocated to accommodate the Local Authority collection scheme. All containers will be accessible to disabled people and sited on a hard, level surface.

Storage of recyclable household waste
The following CfSH credits will be achieved to reflect the provision of dedicated internal storage for recyclable household waste:

1. At least, three internal storage bins
    - all located in an adequate internal space
    - no individual bin smaller than 15 litre
    - minimum total capacity 60 litres

2. To enable effective collection recycling containers will:

    - be located in an adequate external space
    - be sized according to the frequency of collection, based on guidance from the recycling scheme operator store at least 3 types of recyclable waste in identifiably different bins
    - Be located within 30m of an external door.

Public realm waste containers

Waste containers will be placed in the surrounding public realm areas. Their locations and treatment are being designed as part of a site-wide strategy.

APPENDIX A

SAMPLE SAP CALCULATION WITHOUT DISTRICT HEATING

L1A 2010 - Regulations Compliance Report
Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix A of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

Assessor name	Mrs Vicki Limbrick	Assessor number	5907
Client		Last modified	28/09/2012
Address	SAP No 11 South 8th Floor 1 Bed xx, xx		

Check	Evidence	Produced by	OK?
Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target			
TER (kg $CO_2/m^2.a$)	Fuel = Mains gas Fuel factor = 1.00 TER = 18.59	Authorised SAP Assessor	
DER for dwelling as designed (kg $CO_2/m^2.a$)	DER = 17.80	Authorised SAP Assessor	
Are emissions from dwelling as designed less than or equal to the target?	DER 17.80 < TER 18.59	Authorised SAP Assessor	Passed
Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits			
Fabric U-values			
Are all U-values better than the design limits in Table 2?	**Element** **Weighted average** **Highest** Wall 0.27 (max 0.30) 0.27 (max 0.70) Party wall (no party wall) Floor (no floor) Roof (no roof) Openings 1.90 (max 2.00) 1.90 (max 3.30)	Authorised SAP Assessor	Passed
Thermal bridging			
How has the loss from thermal bridges been calculated?	Thermal bridging calculated using default y-value of 0.15	Authorised SAP Assessor	
Heating and hot water systems			
Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide?	Community heating scheme Secondary heating system: None	Authorised SAP Assessor	N/A
Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide?	Cylinder volume = 110.00 litres Declared cylinder loss = 0.02kWh/day Maximum permitted cylinder loss = 1.58kWh/day Primary hot water pipes are (assumed) insulated	Authorised SAP Assessor	Passed
Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide?	Space heating control: Charging system linked to use, TRVs Hot water control: Cylinder thermostat	Authorised SAP Assessor	Passed
Fixed internal lighting			
Does fixed internal lighting comply with paragraphs 42 to 44?	Schedule of installed fixed internal lighting Standard lights = 6 Low energy lights = 20 Percentage of low energy lights = 77 % Minimum = 75 %	Authorised SAP Assessor	Passed

Check	Evidence	Produced by	OK?
Criterion 3: the dwelling has appropriate passive control measures to limit solar gains			
Does the dwelling have a strong tendency to high summertime temperatures?	Overheating risk (June) = Not significant Overheating risk (July) = Slight Overheating risk (August) = Slight Region = Thames Thermal mass parameter = 250.00 Ventilation rate in hot weather = 4.00 ach Blinds/curtains = None	Authorised SAP Assessor	Passed
Criterion 4: the performance of the dwelling, as designed, is consistent with the DER			
Design air permeability ($m^3/(h.m^2)$ at 50Pa)	Design air permeability = 3.00 Max air permeability = 10.00	Authorised SAP Assessor	Passed
Mechanical ventilation system Specific fan power (SFP)	Mechanical ventilation with heat recovery: SFP = 0.60 W/(litre/sec) Max SFP = 1.5 W/(litre/sec) Heat recovery efficiency = 90.00 % Min heat recovery efficiency = 70.00 %	Authorised SAP Assessor	Passed
Have the key features of the design been included (or bettered) in practice?	Design air permeability of 3 $m^3/(h.m^2)$ is less than 5 $m^3/(h.m^2)$ at 50 Pa	Authorised SAP Assessor	

L1A 2010 - Regulations Compliance Report
Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix A of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

Assessor name	Mrs Vicki Limbrick	Assessor number	5907
Client		Last modified	28/09/2012
Address	SAP No 10 South 8th Floor 2 Bed xx, xx		

Check	Evidence	Produced by	OK?
Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target			
TER (kg $CO_2/m^2.a$)	Fuel = Mains gas Fuel factor = 1.00 TER = 15.08	Authorised SAP Assessor	
DER for dwelling as designed (kg $CO_2/m^2.a$)	DER = 13.64	Authorised SAP Assessor	
Are emissions from dwelling as designed less than or equal to the target?	DER 13.64 < TER 15.08	Authorised SAP Assessor	Passed
Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits			
Fabric U-values			
Are all U-values better than the design limits in Table 2?	**Element** — **Weighted average** — **Highest** Wall — 0.27 (max 0.30) — 0.27 (max 0.70) Party wall — (no party wall) Floor — (no floor) Roof — (no roof) Openings — 1.90 (max 2.00) — 1.90 (max 3.30)	Authorised SAP Assessor	Passed
Thermal bridging			
How has the loss from thermal bridges been calculated?	Thermal bridging calculated using default y-value of 0.15	Authorised SAP Assessor	
Heating and hot water systems			
Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide?	Community heating scheme Secondary heating system: None	Authorised SAP Assessor	N/A
Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide?	Cylinder volume = 110.00 litres Declared cylinder loss = 0.02kWh/day Maximum permitted cylinder loss = 1.58kWh/day Primary hot water pipes are (assumed) insulated	Authorised SAP Assessor	Passed
Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide?	Space heating control: Charging system linked to use, TRVs Hot water control: Cylinder thermostat	Authorised SAP Assessor	Passed
Fixed internal lighting			
Does fixed internal lighting comply with paragraphs 42 to 44?	Schedule of installed fixed internal lighting Standard lights = 6 Low energy lights = 24 Percentage of low energy lights = 80 % Minimum = 75 %	Authorised SAP Assessor	Passed

Check	Evidence	Produced by	OK?
Criterion 3: the dwelling has appropriate passive control measures to limit solar gains			
Does the dwelling have a strong tendency to high summertime temperatures?	Overheating risk (June) = Not significant Overheating risk (July) = Slight Overheating risk (August) = Slight Region = Thames Thermal mass parameter = 250.00 Ventilation rate in hot weather = 4.00 ach Blinds/curtains = None	Authorised SAP Assessor	Passed
Criterion 4: the performance of the dwelling, as designed, is consistent with the DER			
Design air permeability ($m^3/(h.m^2)$ at 50Pa)	Design air permeability = 3.00 Max air permeability = 10.00	Authorised SAP Assessor	Passed
Mechanical ventilation system Specific fan power (SFP)	Mechanical ventilation with heat recovery: SFP = 0.60 W/(litre/sec) Max SFP = 1.5 W/(litre/sec) Heat recovery efficiency = 90.00 % Min heat recovery efficiency = 70.00 %	Authorised SAP Assessor	Passed
Have the key features of the design been included (or bettered) in practice?	Design air permeability of 3 $m^3/(h.m^2)$ is less than 5 $m^3/(h.m^2)$ at 50 Pa	Authorised SAP Assessor	

L1A 2010 - Regulations Compliance Report
Design - Draft

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Assessor name	Mrs Vicki Limbrick	Assessor number	5907
Client		Last modified	28/09/2012
Address	SAP No 9 South 8th Floor 3 Bed xx, xx		

Check	Evidence	Produced by	OK?
Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target			
TER (kg $CO_2/m^2.a$)	Fuel = Mains gas Fuel factor = 1.00 TER = 13.98	Authorised SAP Assessor	
DER for dwelling as designed (kg $CO_2/m^2.a$)	DER = 13.21	Authorised SAP Assessor	
Are emissions from dwelling as designed less than or equal to the target?	DER 13.21 < TER 13.98	Authorised SAP Assessor	Passed
Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits			
Fabric U-values			
Are all U-values better than the design limits in Table 2?	**Element** **Weighted average** **Highest** Wall 0.27 (max 0.30) 0.27 (max 0.70) Party wall (no party wall) Floor (no floor) Roof (no roof) Openings 1.90 (max 2.00) 1.90 (max 3.30)	Authorised SAP Assessor	Passed
Thermal bridging			
How has the loss from thermal bridges been calculated?	Thermal bridging calculated using default y-value of 0.15	Authorised SAP Assessor	
Heating and hot water systems			
Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide?	Community heating scheme Secondary heating system: None	Authorised SAP Assessor	N/A
Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide?	Cylinder volume = 110.00 litres Declared cylinder loss = 0.02kWh/day Maximum permitted cylinder loss = 1.58kWh/day Primary hot water pipes are (assumed) insulated	Authorised SAP Assessor	Passed
Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide?	Space heating control: Charging system linked to use, TRVs Hot water control: Cylinder thermostat	Authorised SAP Assessor	Passed
Fixed internal lighting			
Does fixed internal lighting comply with paragraphs 42 to 44?	Schedule of installed fixed internal lighting Standard lights = 6 Low energy lights = 28 Percentage of low energy lights = 82 % Minimum = 75 %	Authorised SAP Assessor	Passed

Check	Evidence	Produced by	OK?
Criterion 3: the dwelling has appropriate passive control measures to limit solar gains			
Does the dwelling have a strong tendency to high summertime temperatures?	Overheating risk (June) = Not significant Overheating risk (July) = Slight Overheating risk (August) = Slight Region = Thames Thermal mass parameter = 250.00 Ventilation rate in hot weather = 4.00 ach Blinds/curtains = None	Authorised SAP Assessor	Passed
Criterion 4: the performance of the dwelling, as designed, is consistent with the DER			
Design air permeability ($m^3/(h.m^2)$ at 50Pa)	Design air permeability = 3.00 Max air permeability = 10.00	Authorised SAP Assessor	Passed
Mechanical ventilation system Specific fan power (SFP)	Mechanical ventilation with heat recovery: SFP = 0.60 W/(litre/sec) Max SFP = 1.5 W/(litre/sec) Heat recovery efficiency = 90.00 % Min heat recovery efficiency = 70.00 %	Authorised SAP Assessor	Passed
Have the key features of the design been included (or bettered) in practice?	Design air permeability of 3 $m^3/(h.m^2)$ is less than 5 $m^3/(h.m^2)$ at 50 Pa	Authorised SAP Assessor	

APPENDIX B

SAMPLE SAP CALCULATION WITH DISTRICT HEATING

L1A 2010 - Regulations Compliance Report
Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix A of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

Assessor name	Mrs Vicki Limbrick	Assessor number	5907
Client		Last modified	28/09/2012
Address	SAP No 11 South 8th Floor 1 Bed xx, xx		

Check	Evidence	Produced by	OK?
Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target			
TER (kg $CO_2/m^2.a$)	Fuel = Mains gas Fuel factor = 1.00 TER = 18.59	Authorised SAP Assessor	
DER for dwelling as designed (kg $CO_2/m^2.a$)	DER = 7.30	Authorised SAP Assessor	
Are emissions from dwelling as designed less than or equal to the target?	DER 7.30 < TER 18.59	Authorised SAP Assessor	Passed
Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits			
Fabric U-values			
Are all U-values better than the design limits in Table 2?	**Element** — **Weighted average** — **Highest** Wall — 0.27 (max 0.30) — 0.27 (max 0.70) Party wall — (no party wall) Floor — (no floor) Roof — (no roof) Openings — 1.90 (max 2.00) — 1.90 (max 3.30)	Authorised SAP Assessor	Passed
Thermal bridging			
How has the loss from thermal bridges been calculated?	Thermal bridging calculated using default y-value of 0.15	Authorised SAP Assessor	
Heating and hot water systems			
Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide?	Community heating scheme Secondary heating system: None	Authorised SAP Assessor	N/A
Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide?	Cylinder volume = 110.00 litres Declared cylinder loss = 0.02kWh/day Maximum permitted cylinder loss = 1.58kWh/day Primary hot water pipes are (assumed) insulated	Authorised SAP Assessor	Passed
Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide?	Space heating control: Charging system linked to use, TRVs Hot water control: Cylinder thermostat	Authorised SAP Assessor	Passed
Fixed internal lighting			
Does fixed internal lighting comply with paragraphs 42 to 44?	Schedule of installed fixed internal lighting Standard lights = 6 Low energy lights = 20 Percentage of low energy lights = 77 % Minimum = 75 %	Authorised SAP Assessor	Passed

Check	Evidence	Produced by	OK?
Criterion 3: the dwelling has appropriate passive control measures to limit solar gains			
Does the dwelling have a strong tendency to high summertime temperatures?	Overheating risk (June) = Not significant Overheating risk (July) = Slight Overheating risk (August) = Slight Region = Thames Thermal mass parameter = 250.00 Ventilation rate in hot weather = 4.00 ach Blinds/curtains = None	Authorised SAP Assessor	Passed
Criterion 4: the performance of the dwelling, as designed, is consistent with the DER			
Design air permeability ($m^3/(h.m^2)$ at 50Pa)	Design air permeability = 3.00 Max air permeability = 10.00	Authorised SAP Assessor	Passed
Mechanical ventilation system Specific fan power (SFP)	Mechanical ventilation with heat recovery: SFP = 0.60 W/(litre/sec) Max SFP = 1.5 W/(litre/sec) Heat recovery efficiency = 90.00 % Min heat recovery efficiency = 70.00 %	Authorised SAP Assessor	Passed
Have the key features of the design been included (or bettered) in practice?	Design air permeability of 3 $m^3/(h.m^2)$ is less than 5 $m^3/(h.m^2)$ at 50 Pa Community heating with CHP - Mains gas Use of the following low carbon or renewable technologies: • Biomass used for community heating	Authorised SAP Assessor	

L1A 2010 - Regulations Compliance Report
Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix A of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

Assessor name	Mrs Vicki Limbrick	Assessor number	5907
Client		Last modified	28/09/2012
Address	SAP No 10 South 8th Floor 2 Bed xx, xx		

Check	Evidence	Produced by	OK?
Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target			
TER (kg $CO_2/m^2.a$)	Fuel = Mains gas Fuel factor = 1.00 TER = 15.08	Authorised SAP Assessor	
DER for dwelling as designed (kg $CO_2/m^2.a$)	DER = 6.24	Authorised SAP Assessor	
Are emissions from dwelling as designed less than or equal to the target?	DER 6.24 < TER 15.08	Authorised SAP Assessor	Passed
Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits			
Fabric U-values			
Are all U-values better than the design limits in Table 2?	**Element** **Weighted average** **Highest** Wall 0.27 (max 0.30) 0.27 (max 0.70) Party wall (no party wall) Floor (no floor) Roof (no roof) Openings 1.90 (max 2.00) 1.90 (max 3.30)	Authorised SAP Assessor	Passed
Thermal bridging			
How has the loss from thermal bridges been calculated?	Thermal bridging calculated using default y-value of 0.15	Authorised SAP Assessor	
Heating and hot water systems			
Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide?	Community heating scheme Secondary heating system: None	Authorised SAP Assessor	N/A
Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide?	Cylinder volume = 110.00 litres Declared cylinder loss = 0.02kWh/day Maximum permitted cylinder loss = 1.58kWh/day Primary hot water pipes are (assumed) insulated	Authorised SAP Assessor	Passed
Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide?	Space heating control: Charging system linked to use, TRVs Hot water control: Cylinder thermostat	Authorised SAP Assessor	Passed
Fixed internal lighting			
Does fixed internal lighting comply with paragraphs 42 to 44?	Schedule of installed fixed internal lighting Standard lights = 6 Low energy lights = 24 Percentage of low energy lights = 80 % Minimum = 75 %	Authorised SAP Assessor	Passed

Check	Evidence	Produced by	OK?
Criterion 3: the dwelling has appropriate passive control measures to limit solar gains			
Does the dwelling have a strong tendency to high summertime temperatures?	Overheating risk (June) = Not significant Overheating risk (July) = Slight Overheating risk (August) = Slight Region = Thames Thermal mass parameter = 250.00 Ventilation rate in hot weather = 4.00 ach Blinds/curtains = None	Authorised SAP Assessor	Passed
Criterion 4: the performance of the dwelling, as designed, is consistent with the DER			
Design air permeability ($m^3/(h.m^2)$ at 50Pa)	Design air permeability = 3.00 Max air permeability = 10.00	Authorised SAP Assessor	Passed
Mechanical ventilation system Specific fan power (SFP)	Mechanical ventilation with heat recovery: SFP = 0.60 W/(litre/sec) Max SFP = 1.5 W/(litre/sec) Heat recovery efficiency = 90.00 % Min heat recovery efficiency = 70.00 %	Authorised SAP Assessor	Passed
Have the key features of the design been included (or bettered) in practice?	Design air permeability of 3 $m^3/(h.m^2)$ is less than 5 $m^3/(h.m^2)$ at 50 Pa Community heating with CHP - Mains gas Use of the following low carbon or renewable technologies: • Biomass used for community heating	Authorised SAP Assessor	

L1A 2010 - Regulations Compliance Report
Design - Draft

This design draft submission provides evidence towards compliance with Part L of the Building Regulations, in accordance with Appendix A of AD L1A. It has been carried out using Approved SAP software. It has been prepared from plans and specifications and may not reflect the 'as built' property. This report covers only items included within the SAP and is not a complete report of regulations compliance.

Assessor name	Mrs Vicki Limbrick	Assessor number	5907
Client		Last modified	28/09/2012
Address	SAP No 9 South 8th Floor 3 Bed xx, xx		

Check	Evidence	Produced by	OK?
Criterion 1: predicted carbon dioxide emission from proposed dwelling does not exceed the target			
TER (kg $CO_2/m^2.a$)	Fuel = Mains gas Fuel factor = 1.00 TER = 13.98	Authorised SAP Assessor	
DER for dwelling as designed (kg $CO_2/m^2.a$)	DER = 5.89	Authorised SAP Assessor	
Are emissions from dwelling as designed less than or equal to the target?	DER 5.89 < TER 13.98	Authorised SAP Assessor	Passed
Criterion 2: the performance of the building fabric and the heating, hot water and fixed lighting systems should be no worse than the design limits			
Fabric U-values			
Are all U-values better than the design limits in Table 2?	**Element** / **Weighted average** / **Highest** Wall: 0.27 (max 0.30) / 0.27 (max 0.70) Party wall: (no party wall) Floor: (no floor) Roof: (no roof) Openings: 1.90 (max 2.00) / 1.90 (max 3.30)	Authorised SAP Assessor	Passed
Thermal bridging			
How has the loss from thermal bridges been calculated?	Thermal bridging calculated using default y-value of 0.15	Authorised SAP Assessor	
Heating and hot water systems			
Does the efficiency of the heating systems meet the minimum value set out in the Domestic Heating Compliance Guide?	Community heating scheme Secondary heating system: None	Authorised SAP Assessor	N/A
Does the insulation of the hot water cylinder meet the standards set out in the Domestic Heating Compliance Guide?	Cylinder volume = 110.00 litres Declared cylinder loss = 0.02kWh/day Maximum permitted cylinder loss = 1.58kWh/day Primary hot water pipes are (assumed) insulated	Authorised SAP Assessor	Passed
Do controls meet the minimum controls provision set out in the Domestic Heating Compliance Guide?	Space heating control: Charging system linked to use, TRVs Hot water control: Cylinder thermostat	Authorised SAP Assessor	Passed
Fixed internal lighting			
Does fixed internal lighting comply with paragraphs 42 to 44?	Schedule of installed fixed internal lighting Standard lights = 6 Low energy lights = 28 Percentage of low energy lights = 82 % Minimum = 75 %	Authorised SAP Assessor	Passed

Check	Evidence	Produced by	OK?
Criterion 3: the dwelling has appropriate passive control measures to limit solar gains			
Does the dwelling have a strong tendency to high summertime temperatures?	Overheating risk (June) = Not significant Overheating risk (July) = Slight Overheating risk (August) = Slight Region = Thames Thermal mass parameter = 250.00 Ventilation rate in hot weather = 4.00 ach Blinds/curtains = None	Authorised SAP Assessor	Passed
Criterion 4: the performance of the dwelling, as designed, is consistent with the DER			
Design air permeability ($m^3/(h.m^2)$ at 50Pa)	Design air permeability = 3.00 Max air permeability = 10.00	Authorised SAP Assessor	Passed
Mechanical ventilation system Specific fan power (SFP)	Mechanical ventilation with heat recovery: SFP = 0.60 W/(litre/sec) Max SFP = 1.5 W/(litre/sec) Heat recovery efficiency = 90.00 % Min heat recovery efficiency = 70.00 %	Authorised SAP Assessor	Passed
Have the key features of the design been included (or bettered) in practice?	Design air permeability of 3 $m^3/(h.m^2)$ is less than 5 $m^3/(h.m^2)$ at 50 Pa Community heating with CHP - Mains gas Use of the following low carbon or renewable technologies: • Biomass used for community heating	Authorised SAP Assessor	

APPENDIX C

R5 SOUTH CODE FOR SUSTAINABLE HOMES PRE-ASSESSMENT DESIGN ADVICE REPORT

Code for Sustainable Homes

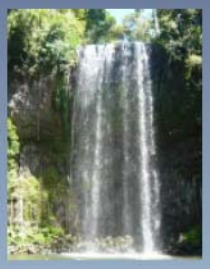
KINGS CROSS R5 - SOUTH BLOCK

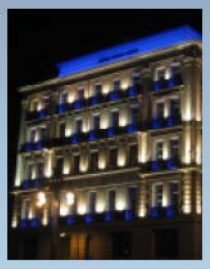
REV: P2

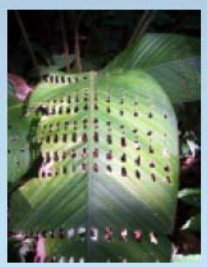
PRE-ASSESSMENT REPORT

CLIENT

Argent







Project reference: 0103353
Date: 12/08/2011

Report produced by:

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ISSUE STATUS

Rev.	Description	Prepared By	Date
P1	Preliminary Report for comment	TBB	27/05/2011
P2	**Updated with Comments from Team**	**TBB**	**12/08/2011**

EXECUTIVE SUMMARY

Hoare Lea have undertaken a preliminary Code for Sustainable Homes (CfSH) Design Stage Assessment on KINGS CROSS R5 - SOUTH BLOCK to establish a potential route to achieve a Code Level 4 rating. The final credit selection is subject to ongoing design development.

The Code for Sustainable Homes Schemes was launched in December 2006 and is the replacement to EcoHomes in England. The Code became operational in April 2007 and having a Code rating for new build homes became mandatory from May 2008.

The basis of the scheme is to provide a certificate for an individual building based upon a set of complex performance criteria. There are two types of assessment available:

1. Design Stage (DS) - leading to an Interim CfSH Certificate

2. Post-Construction Stage (PCS) - leading to an Final CfSH Certificate

A post construction review serves to confirm the interim CfSH rating achieved at the design stage in accordance with the reporting and evidential requirements of the technical guidance.

An independent assessor will assess the overall environmental performance of the building. For both the Design Stage & Post-Construction Stage Assessments the building is awarded a CfSH rating between Level 1 (★) to Level 6 (★★★★★★).

This report is a Design Stage Assessment and covers a range of aspects relating to the design and management of a building during the design stage of the construction process. The main categories that are assessed are as follows:

Energy and CO_2 Emissions
Water
Materials
Surface Water Run-Off
Waste
Pollution
Health and Wellbeing
Management
Ecology

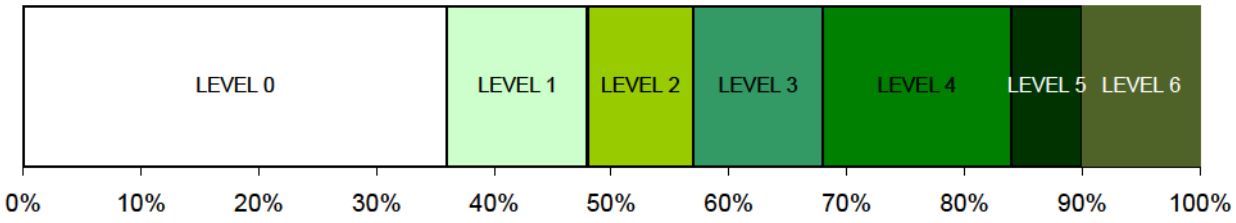
DESCRIPTION OF RATINGS

The CfSH rating is based on the number of environmental credits achieved under each category multiplied by a weighting factor. The rating is given as Level 0 (★) to Level 6 (★★★★★★).

The weighting factors are applied in order to account for the relative significance that each category has on the environmental impact of the building.

The CfSH rating awarded is dependant on the score achieved.

CfSH Ratings:



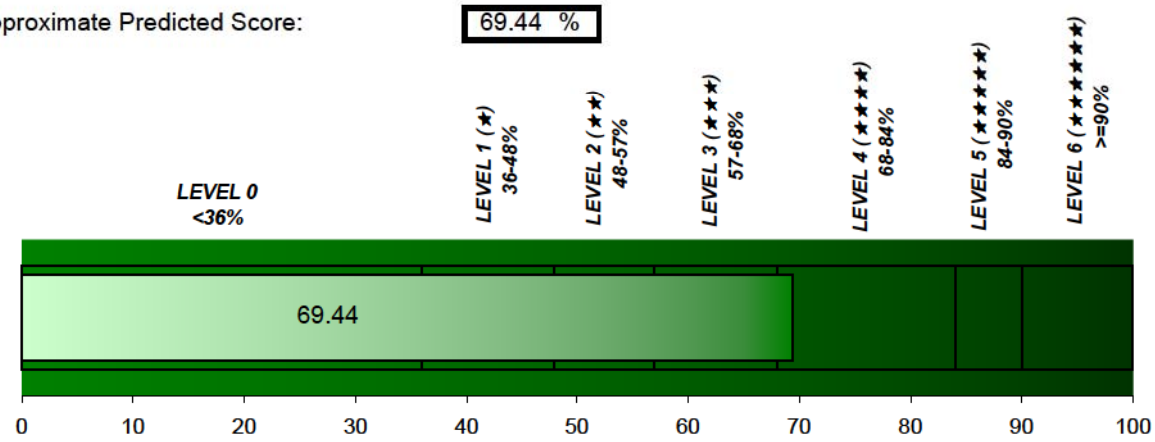
ASSUMED SCORE MANDATORY CREDITS:

Credit Reference	Requirements Met?
Ene 1 - Dwelling Emission Rate (44% improvement over Part L 2006)	YES
Wat 1 - Indoor Water Use (105 litres/person/day water consumption)	YES
Mat 1 - Environmental Impact of Materials	YES
Sur 1 - Management of Surface Water Run-Off	YES
Was 1 - Storage of Non-Recyclable Waste & Recyclable Household Waste	YES
Was 2 - Construction Site Waste Management	YES
Hea 4 - Lifetime Homes (Level 6 only)	N/A

PREDICTED PERFORMANCE OF BUILDING

Predicted Code for Sustainable Homes Rating for KINGS CROSS R5 - SOUTH BLOCK, based upon assumptions and accounting for the Innovation Credits.

Approximate Predicted Score: 69.44 %

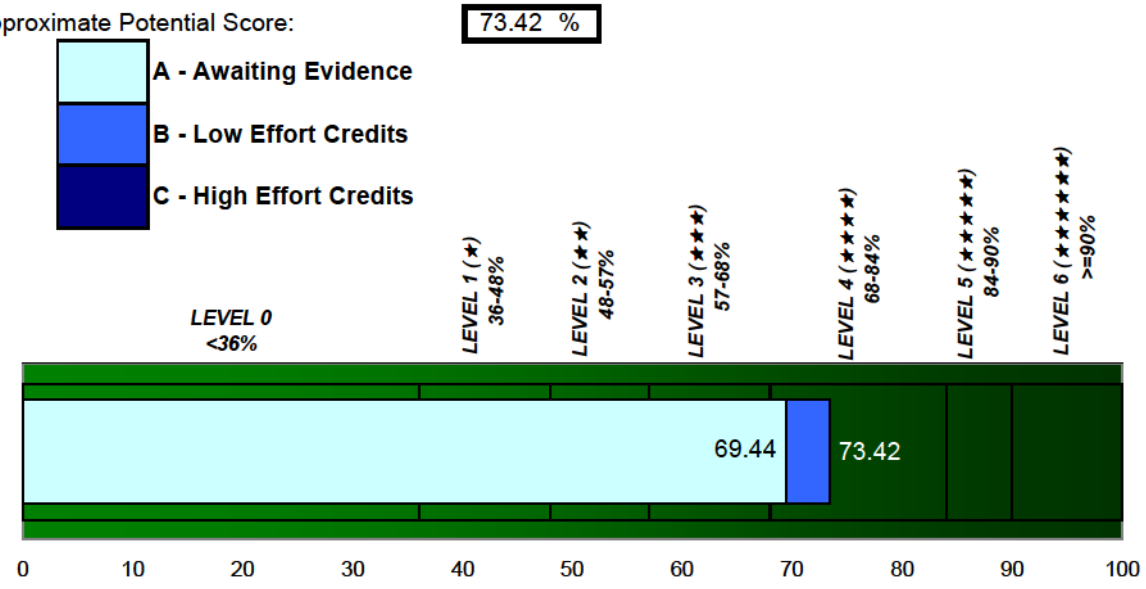


Taking into consideration the mandatory credits that have been achieved, the predicted rating is:

LEVEL 4

There are a number of potential credits that could be targeted for KINGS CROSS R5 - SOUTH BLOCK as detailed within this report:

Approximate Potential Score: 73.42 %



Taking into consideration the mandatory credits that have been achieved, the potential rating is:

LEVEL 4

CREDIT SUMMARY

Category	Assessment Criteria	Credit Reference	Credits Available	Credits Assumed	Potential Additional Credits	
				A	B	C
Energy & Carbon Dioxide Emissions	Dwelling Emission Rate	Ene 1	15	8	-	-
	Building Fabric	Ene 2	2	1	-	-
	Internal Lighting	Ene 3	2	2	-	-
	Drying Space	Ene 4	1	1	-	-
	Energy Labelled White Goods	Ene 5	2	2	-	-
	External Lighting	Ene 6	2	2	-	-
	LZC Technologies	Ene 7	2	2	-	-
	Cycle Storage	Ene 8	2	1	-	-
	Home Office	Ene 9	1	1	-	-
Water	Indoor Water Use	Wat 1	5	3	-	-
	External Water Use	Wat 2	1	1	-	-
Materials	Environmental Impact of Materials	Mat 1	15	4	6	-
	Responsible Sourcing of Materials - Basic Building Elements	Mat 2	6	2	-	-
	Responsible Sourcing of Materials - Finishing Elements	Mat 3	3	1	-	-
Surface Water Run-Off	Management of Surface Water Run-Off	Sur 1	2	0	-	-
	Flood Risk	Sur 2	2	2	-	-
Waste	Storage of Non-Recyclable Waste and Recyclable Household Waste	Was 1	4	4	-	-
	Construction Site Waste Management	Was 2	2	2	-	-
	Composting	Was 3	1	0	1	-

CREDIT SUMMARY

Category	Assessment Criteria	Credit Reference	Credits Available	Credits Assumed	Additional Credits	
				A	B	C
Pollution	Global Warming Potential of Insulants	Pol 1	1	1	-	-
	NO_x Emissions	Pol 2	3	2	-	-
Health & Wellbeing	Daylighting	Hea 1	3	0	-	-
	Sound Insulation	Hea 2	4	3	-	-
	Private Space	Hea 3	1	0	-	-
	Lifetime Homes	Hea 4	4	4	-	-
Management	Home User Guide	Man 1	3	3	-	-
	Considerate Constructors Scheme	Man 2	2	2	-	-
	Construction Site Impacts	Man 3	2	2	-	-
	Security	Man 4	2	2	-	-
Ecology	Ecological Value of Site	Eco 1	1	1	-	-
	Ecological Enhancement	Eco 2	1	1	-	-
	Protection of Ecological Features	Eco 3	1	1	-	-
	Change in Ecological Value of Site	Eco 4	4	3	-	-
	Building Footprint	Eco 5	2	2	-	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
ENERGY AND CARBON DIOXIDE EMISSIONS				
Ene 1	Dwelling Emission Rate	8 CREDITS have been assumed based on the minimum requirements for Code Level 4, i.e. a 44% improvement over the Target Emission Rate (Part L 2006) for every dwelling. (HL/ML)	8	-
Ene 2	Building Fabric	1 CREDIT has been assumed based on the heat loss parameter being less than or equal to 1.3 for every dwelling. (ML/HL)	1	-
Ene 3	Internal Lighting	2 CREDITS have been assumed based greater than or equal to 75% of the internal fittings to habitable rooms being dedicated and energy efficient, i.e. a luminous efficacy greater that 40 lumens per circuit Watt. (HL)	2	-
Ene 4	Drying Space	This credit has not been assumed. An additional credit is available where a permanent fixing is provided within each dwelling for clothes drying (4m for 1 or 2 bed dwellings, 6m for 3 or 4 bed dwellings). (ML)	1	-
Ene 5	Energy Labelled White Goods	2 CREDITS have been assumed where all fridges, freezers or fridges/freezers are provided and have an A+ rating, washing machines and dishwashers will be A rated and washer-dryers and tumble-dryers will be B rated under the EU efficiency labelling scheme. (Argent)	2	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
Ene 6	External Lighting	2 CREDITS have been assumed based on all external space lighting is provided by dedicated energy efficient fittings (i.e. a luminous efficacy greater than 40 lumens per circuit Watt) and all security lighting having: For burglar security lights: a maximum wattage of 150W, movement detecting control devices and daylight sensors. For all other security lighting: dedicated energy efficient fittings as space lighting and fitted with daylight cut-off sensors or timers. (HL)	2	-
Ene 7	LZC Technologies	2 CREDITS have been assumed where 20% of energy is supplied from local renewable or low carbon energy sources. Renewable technologies incorporated should be as a result of a feasibility study. (HL)	2	-
Ene 8	Cycle Storage	1 CREDIT has been assumed where storage for 1 cycle is provided for every two studio apartments or 1 bed dwelling and storage for 1 cycle for every 2 or 3 bed dwellings. (ML)	1	-
Ene 9	Home Office	1 CREDIT has been assumed where sufficient space has been provided in each dwelling for a home office, comprising at least 1.8m of wall length in a room with adequate ventilation. In addition the space should be provided with two double power sockets, two telephone points (or one where the dwelling is connected to cable or broadband is available) and the room should achieve a daylight factor of 1.5%. Location of the home office to be clearly labelled on the drawings. (ML/HL)	1	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
WATER				
Wat 1	Indoor Water Use	3 CREDITS have been assumed based on the sanitary wares schedule included in the stage C report. This is sufficient to achieve a water consumption of less than 105 litres/person/day. (ML)	3	-
Wat 2	External Water Use	1 CREDIT has been assumed where a rainwater collection facility is provided and sized at at least 1litre per sqm of communal garden with a minimum storage capacity of 200 litres. (ML)	1	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
MATERIALS				
Mat 1	Environmental Impact of Materials	Based on the minimum Green Guide ratings as set out in the Stage C report, 4 CREDITS are available. To enable 10 CREDITS to be achieved, a significant improvement in the Green Guide Ratings is required. Further information on the materials specification for the relevant elements is required. Please refer to the Green Guide Online for current ratings. (ML)	4	+6
Mat 2	Responsible Sourcing of Materials - Basic Building Elements	No reference has been made in the Stage C Report to the Responsible Sourcing of Materials. 2 CREDITS have been assumed based on a proportion of the following elements being responsibly sourced (i.e. FSC or equivalent for timber and EMS/BES 6001 for non-timber materials): frame, ground floor, upper floors, roof, external walls, internal walls, foundations/substructure and staircases. (Carillion)	2	-
Mat 3	Responsible Sourcing of Materials - Finishing Elements	No reference has been made in the Stage C Report to the Responsible Sourcing of Materials. 1 CREDIT has been assumed based on a proportion of the following elements being responsibly sourced (i.e. FSC or equivalent for timber and EMS/BES 6001 for non-timber materials): stair, window, external & internal doors, skirting, panelling, furniture, fascias and any other significant use. (Carillion)	1	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
SURFACE WATER RUN OFF				
Sur 1	Management of Surface Water Run-Off	Based on the information contained within the Stage C report it has been assumed that the peak rate of run off is no worse for the developed site than for the pre-developed site and that the additional predicted volume of rainwater discharge for a 1 in 100 year event is entirely reduced using attenuation measures. This satisfies the mandatory requirements. No reference has been made to the provision of SUDS to improve the water quality of the rainwater discharge therefore no credits have been awarded (Civil).	0	-
Sur 2	Flood Risk	2 CREDITS have been assumed where the site is classed as being in Zone 1 (i.e. low probability of flooding) based on the results of a Flood Risk Assessment. (Civil)	2	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
WATER				
Was 1	Storage of Non-Recyclable Waste and Recyclable Household Waste	There is a mandatory requirement to provide a space capable of accomodating 100 litres of storage space for a single bedroom dwelling with a further 70 litres for each additional bedroom. For 4 CREDITS, in addition to the above, three internal storage bins should be provided within each dwelling with no internal bin less than 7 litres and a minimum total capacity per dwelling of 30 litres. This is based on the assumption that there is local authority collection scheme where materials are sorted prior to collection. (ML)	4	-
Was 2	Construction Site Waste Management	There is a mandatory requirement for a Site Waste Management Plan to be developed and implemented. In addition, 2 CREDITS can be awarded where the plan includes procedures and commitments for reducing waste generated and to sort and divert waste from landfill. (Carillion)	2	-
Was 3	Composting	This credit has not been assumed. 1 additional credit is available where there is a local community composting scheme in place, run by the Local Authority. (Argent)	0	+1

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
POLLUTION				
Pol 1	Global Warming Potential of Insulants	1 CREDIT has been assumed where insulation in the following elements has a GWP less than 5 in manufacture and installation: roofs, walls, floors, hot water cylinder, cold water storage tanks and external doors. (ML/HL)	1	-
Pol 2	NOx Emissions	2 CREDITS have been assumed based on discussions on North Block, equivalent to a NO_X emissions level of less than or equal to 70mg/kWh.	2	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
HEALTH AND WELLBEING				
Hea 1	Daylighting	This credit is not being sought due to the depth of the rooms and amount of glazing proposed.	0	-
Hea 2	Sound Insulation	3 CREDITS have been assumed where the airborne sound insulation values are at least 5dB higher and the impact sound insulation values are at least 5dB lower than the performance standards set out in Approved Document E. (ML/Acoustician)	3	-
Hea 3	Private Space	No credits have been assumed due to the amount of space required to achieved this credit.	0	-
Hea 4	Lifetime Homes	4 CREDITS have been assumed where all the requirements of Lifetime Homes have been complied with. (ML)	4	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
MANAGEMENT				
Man 1	Home User Guide	3 CREDITS have been assumed where a building users guide is provided for each dwelling and also covers information relating to the site and its surroundings. (Argent)	3	-
Man 2	Considerate Constructors Scheme	2 CREDITS have been assumed where a score of 32 or greater is achieved in the Considerate Constructors Scheme. (Carillion)	2	-
Man 3	Construction Site Impacts	2 CREDITS have been assumed where the Contractor achieves the following: monitor, report and sets target for energy and water use arising from site activities, adopt best practice policies in respect of air and water pollution and where 80% of site timber is reclaimed, reused or responsibly sourced. (Carillion)	2	-
Man 4	Security	2 CREDITS have been assumed where an Architectural Liaison Officer or Crime Prevention Design Advisor is consulted at the design stage and their recommendation are incorporated into the design of the dwellings. (ML/HL)	2	-

Credit Reference	Assessment Criteria	Assumptions	Credits Assumed	Additional Credits
ECOLOGY				
Eco 1	Ecological Value of Site	1 CREDIT has been assumed based on a suitably qualified ecologist confirming the site is of low ecological value. (Ecologist)	1	-
Eco 2	Ecological Enhancement	1 CREDIT has been assumed based on a suitably qualified ecologist making recommendations to enhance the site ecology and where the client commits to adopt all key recommendations and 30% of the additonal recommendations. (Ecologist/Landscape)	1	-
Eco 3	Protection of Ecological Features	1 CREDIT has been assumed by default as the site is of low ecological value. (Ecologist)	1	-
Eco 4	Change in Ecological Value of Site	3 CREDITS have been assumed based on an improvement to the site ecology of between +3 and +9 species (area weighted). (Ecologist/Landscape)	3	-
Eco 5	Building Footprint	2 CREDITS have been assumed due to the ratio of the building height to the footprint area. (ML)	2	-

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