FISHER STREET
OVER SITE DEVELOPMENT

SUSTAINABILITY STATEMENT

CROSSRAIL LIMITED
MARCH 2013

PREPARED BY JACOBS

Crossrail JACOBS

C123 – Intermediate Shafts

FISHER STREET
OVER SITE DEVELOPMENT
SUSTAINABILITY STATEMENT

Document Number: C123-JUL-T1-RGN-CR086_OD014_Z-50001

Document History:

Revision:	Date:	Prepared by:	Checked by:	Approved by:	Reason for Issue:
1.0	01-11-12	Mason Baker 576895	Una Wheeler 832165	John Lewis 345828	To support planning application

CROSSRAIL REVIEW AND ACCEPTANCE STATUS This decal is to be used for submitted documents requiring acceptance by CRL.		
☐	Code 1.	Accepted. Work May Proceed
☐	Code 2.	Not Accepted. Revise and resubmit. Work may proceed subject to incorporation of changes indicated
☐	Code 3.	Not Accepted. Revise and resubmit. Work may not proceed
☐	Code 4.	Received for information only. Receipt is confirmed
Reviewed/Accepted by:(signature)		
Print Name:		Date:
Acceptance by CRL does not relieve the designer/supplier from full compliance with their contractual obligations and does not constitute CRL approval of design, details, calculations, analyses, test methods or materials developed or selected by the designer/supplier.		

Client: Crossrail
Project: C123 Intermediate Shafts

Document control sheet: BPP 04 F8
Job Number: B1348001

	Originated by	Checked by	Reviewed by	Approved by
ORIGINAL Rev 1.0	NAME Mason Baker	NAME Una Wheeler	NAME John Lewis	NAME David Hughes
DATE 01/11/2012	INITIALS MB	INITIALS UW	INITIALS	INITIALS
	Document Status: Issue to client			

REVISION	NAME	NAME	NAME	NAME
DATE	INITIALS	INITIALS	INITIALS	INITIALS
	Document Status			

REVISION	NAME	NAME	NAME	NAME
DATE	INITIALS	INITIALS	INITIALS	INITIALS
	Document Status			

REVISION	NAME	NAME	NAME	NAME
DATE	INITIALS	INITIALS	INITIALS	INITIALS
	Document Status			

Contents

1 Definitions, Abbreviations and Acronyms

ALO	Architectural Liaison Officer
CCS	Considerate Constructors Scheme
The Code	Code for Sustainable Homes
CHP	Combined Heat and Power
CO_2	Carbon Dioxide
CPG3	Camden Planning Guidance 3
CS13	Core Strategy 13
DER	Dwelling Emission Rate
DP22	Development Policy 22
EIA	Environmental Impact Assessment
FEE	Fabric Energy Efficiency
FRA	Flood Risk Assessment
GSHP	Ground Source Heat Pump
GWP	Global Warming Potential
LDF	Local Development Framework
LZC	Low and Zero Carbon
NIFA	Net Internal Floor Area
NIGFA	Net Internal Ground Floor Area
NO_x	Nitrogen Oxide
OSD	Over Site Development
RIBA	Royal Institute of British Architects
SAP	Standard Assessment Procedure for Energy Rating of Dwellings
SuDs	Sustainable Urban Drainage System
SWMP	Site Waste Management Plan
TER	Target Emission Rate
U-value	A measure of heat loss in a building element such
WRAP	Waste Resources Action Programme

2 Introduction

This document represents the Sustainability Statement for the Fisher Street Over Site Development (OSD). It includes a summary of the Code for Sustainable Homes pre-assessment, Energy Statement and Waste Statement, in line with the London Borough of Camden's requirements for planning applications.

2.1 Background to the Proposed Development

The proposed Fisher Street OSD will be constructed above the Fisher Street shaft and head house, constructed as part of the Crossrail rail network. The development will comprise 22 residential units and be eight storeys tall.

2.2 London Borough of Camden Planning Policy

The London Borough of Camden Local Development Framework (LDF) is a collection of planning documents that (in conjunction with national planning policy and the Mayor's London Plan) sets out the Council's strategy for managing growth and development in the borough, including where new homes, jobs and infrastructure will be located.

2.2.1 Camden Core Strategy

The lead LDF document is the Core Strategy, which sets out the key elements of the Council's planning vision and strategy for the borough and contains strategic policies. The Core Strategy contributes to achieving the vision and objectives of Camden's Community Strategy and helps the Council's partners and other organisations deliver relevant parts of their programmes. All other planning documents must be consistent with the Core Strategy.

The Core Strategy helps the London Borough of Camden to define and plan for the future of the borough by:

- contributing to achieving the vision and objectives of their community strategy;
- helping their partners and other organisations deliver relevant parts of their programmes;
- covering the physical aspects of location and land use;
- addressing factors that make places attractive, sustainable and successful (such as social and economic matters); and
- balancing the needs of residents, businesses and future generations.

Core Strategy 13 (CS13) specifically relates to 'tackling climate change through promoting higher environmental standards'. The particular issues covered by CS13 are included in Appendix 1 for reference.

2.2.2 Camden Development Policy

Camden Development Policies contribute towards delivering the Core Strategy by setting out detailed planning policies that the Council will use when determining applications for planning permission in the borough to achieve the vision and objectives of the Core Strategy (see Relationship with the Core Strategy below).

Camden Development Policy 22 (DP22) 'promoting sustainable design and construction' contributes towards delivering the strategy in CS13 by providing detail of the sustainability standards the London Borough of Camden expects development to meet.

The requirements of DP22 are included in Appendix 1 for reference.

2.2.3 Camden Planning Guidance 3

The London Borough of Camden has produced a series of Planning Guidance documents to support the policies of the LDF. The guidance is consistent with the Core Strategy and the Development Policies.

Camden Planning Guidance 3 (CPG3) relates to sustainability. CPG3 provides information to prospective developers on ways to achieve carbon reductions and more sustainable developments by highlighting the requirements and guidelines which support the relevant LDF policies, CS13 and DP22.

2.3 London Borough of Camden Requirements for Sustainability Statements

To contribute towards compliance with the planning policies described above, the London Borough of Camden requires a Sustainability Statement to accompany planning applications for all new build residential houses and flats.

The following outlines the information included in the Sustainability Statement for the Fisher Street OSD.

2.3.1 Sustainability Assessment Tool

The Code for Sustainable Homes (the Code) sustainability assessment tool is used by the London Borough of Camden to determine sustainable design and construction measures to reduce the energy, water and materials used in the design and construction of a proposed development. It is understood that the London Borough of Camden expects all new build housing to comply with the Code Level 4 by 2013 and will encourage compliance with the Code Level 6 (zero carbon) by 2016.

To meet this requirement, a Code pre-assessment has been undertaken to provide an indication of the Code level anticipated to be achieved based on the measures currently incorporated into the outline design of the Fisher Street Shaft OSD.

Further details of the Code pre-assessment, including a credit-by-credit breakdown, to support the Fisher Street Shaft OSD planning application, can be found in Section 3. A summary of the Code score/rating anticipated to be achieved by the development can be found in Appendix A.

2.3.2 Energy Statement

In accordance with CPG 3, developments involving five or more dwellings and/or with a gross internal floor area in excess of 500m^2 are required by the London Borough of Camden to submit an energy statement which demonstrates how carbon emissions will be reduced in line with the energy hierarchy:

1. Be lean – *use less energy*
2. Be clean – *supply energy efficiently*
3. Be green – *use renewable energy*

The energy statement is also required to include the following information:

- a calculation of baseline energy demand and carbon dioxide emissions arising from the development;
- a description of the proposed design measures to maximise the energy efficiency of the development;

- a description of how the development has considered further carbon dioxide reductions;
- a description of how the development has considered using renewable energy technologies to further reduce carbon dioxide emissions; and
- a conclusion outlining the contribution of each set of measures and recommendations for the approach most suitable for the development.

An overview of the Energy Statement prepared to support the Fisher Street Shaft OSD planning application can be found in Section 4 below. The full Energy Statement and Low & Zero Carbon Technology Study can be found in Appendix D of the Fisher Street OSD RIBA Stage C Report.

2.3.3 Flooding

The London Borough of Camden requires:

- developments located up stream of the areas shown on Core Strategy Map 5 to demonstrate how the risk of flooding will not be increased through inclusion of mitigation measures; and
- developments of 1 hectare and over to submit a flood risk assessment in accordance with Planning Policy Statement 25.

The above requirements do not apply to the Fisher Street Shaft OSD and therefore a flood risk assessment has not been prepared as part of the Sustainability Statement.

Flood risk has also been identified as a 'non-significant environmental issue' by the Fisher Street OSD Environmental Impact Assessment (EIA) Scoping Report (July 2012), prepared for Crossrail Ltd by URS Infrastructure & Environment UK Ltd, and as such will not be addressed by the EIA for the site.

2.3.4 Waste Statement

The London Borough of Camden requires all major developments (more than 10 residential units) to produce a statement on how the development will aim for 15-20% of the total value of materials used in construction to be derived from recycled and reused sources.

The selection of materials should be based on the WRAP Quick Wins assessment, or equivalent, which cover construction specification, product or material that offers the opportunity to increase recycled content beyond current practice, and:

- is cost-competitive to install;
- is technically acceptable;
- meets the required level of performance;
- is reliably available; and
- demonstrates strong environmental credentials.

The Waste Statement prepared to support the Fisher Street Shaft OSD Planning application can be found in Section 5 below.

3 Code for Sustainable Homes Pre-assessment

To meet the London Borough of Camden's planning requirements, a Code for Sustainable Homes Pre-assessment for the Fisher Street OSD has been undertaken by Jacobs UK Ltd. The predicted likely score for the development, based on the concept design at RIBA Stage C, is currently 71.29%, which equates to the achievement of the Code Level 4.

3.1 Introduction

The Code for Sustainable Homes (the Code) is an environmental assessment method for rating and certifying the performance of new homes. It is a national standard for use in the design and construction of new homes with a view to encouraging continuous improvement in sustainable home building.

The Code covers nine categories of sustainable design, with credits awarded for a building design achieving specified degrees of performance under the requirements of each category. Weightings are applied to adjust the relative values of credits achievable within the different categories, as follows:

Category	Total credits	Weighting factor (%)	Weighted value per credit
1. Energy and CO_2 Emissions	31	36.4	1.17
2. Water	6	9.0	1.50
3. Materials	24	7.2	0.30
4. Surface Water Run-off	4	2.2	0.55
5. Waste	8	6.4	0.80
6. Pollution	4	2.8	0.70
7. Health and Well-being	12	14.0	1.17
8. Management	9	10.0	1.11
9. Ecology	9	12.0	1.33

For a development to achieve the Code Level 4, as expected by the London Borough of Camden for all new build housing by 2013, a score equal to or greater than 68 is required. There are also a number of mandatory requirements to achieve each level of the Code. In the case of Code Level 4, the mandatory requirements are:

- a minimum of three credits under Ene 1: Dwelling Emission Rate;
- a minimum of three credits under Wat 1: Indoor Water Use;
- three of five key building elements having a Green Guide rating of A+ to D under Mat 1: Environmental Impact of Materials (no associated minimum credit requirement);
- surface water run-off rates and volumes to be no greater than previous conditions of the development site under Sur 1: Management of Surface Water Run-off from Developments (no associated minimum credit requirement); and
- adequate accessible storage of household waste under Was 1: Storage of Non-recyclable and Recyclable Household Waste (no associated minimum credit requirement).

The pre-assessment indicates that the Fisher Street OSD meets all of the above mandatory requirements necessary for the achievement of the Code Level 4.

3.2 Current Pre-assessment Status

The Code pre-assessment has been completed for the Fisher Street OSD based on the design of the development at the completion of RIBA Stage C, or concept design. Based on the current design, the Fisher Street OSD at RIBA Stage C is predicted to achieve a 'likely' score of 71.29% and a Code Level 4 equivalent rating. A further 11.43% has also been identified as being 'possible', 14.94% as being 'unlikely', and 2.33% as being 'not possible'.

For purposes of the Code pre-assessment, definitions for the current award/achievement of credits are as follows:

- Likely – most or all of the Code credit compliance criteria are likely to be met by the development based on information currently available at the completion of concept design;
- Possible – the Code credit criteria are currently considered unlikely to be met by concept design proposals; however, it may be feasible to achieve credits if appropriate design changes are made during detailed design;
- Unlikely – the Code credit criteria are currently considered unlikely to be met by concept design proposals and are considered to be either not possible to achieve for the development or significant design changes are required during detailed design; and
- Not possible – the Code credit criteria are considered not possible to achieve for the development.

At this stage of design it has been necessary to make some assumptions with regard to the award of credits, as there is an insufficient level of detail available from the current stage of design for evidence to be available. However, this presents an opportunity for the development to achieve an improved level of building sustainability performance by highlighting areas to be explored to achieve additional credits during the completion of detailed design.

Sections 3.3 to 3.11 provide an overview of the current status regarding the award of credits for the Fisher Street OSD against each of the Code categories. Credits where assumptions have been made, and where further consideration and input during detailed design is required, are also highlighted.

A summary of the score achieved against each of the Code categories can be found in Appendix D of the Fisher Street OSD RIBA Stage C Report.

3.3 Energy and Carbon Dioxide Emissions

Ene 1 Dwelling Emission Rate

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	10	3	-	7	-

The Energy Statement and Low & Zero Carbon Study produced for the Fisher Street OSD (see Appendix D of the Fisher Street OSD RIBA Stage C Report) details the energy modelling undertaken for the development.

Energy modelling using Standard Assessment Procedure for Energy Rating of Dwellings (SAP) 2009 has been undertaken for all dwellings in the OSD, with an area weighted total calculated

for the whole building. The energy modelling results show the Target Emission Rate (TER) for regulated emissions associated with the development to be 14.54kgCO_2/m^2/yr and the baseline Dwelling Emission Rate (DER) 13.85kgCO_2/m^2/yr.

Ground Source Heat Pumps (GSHP) have been identified by the study as being the preferred Low and Zero Carbon (LZC) technology option recommended for the development (see Section 4 below). The specification of GSHP leads to a reduced DER of 10.97kgCO_2/m^2/yr, which equates to an improvement of 25% over the TER.

The 25% improvement of DER over TER equates to the award of three credits for the Fisher Street OSD at the current stage of design. The award of three credits also meets the Code Level 4 minimum mandatory requirements.

Ene 2 Fabric Energy Efficiency

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	9	8	-	1	-

Credits are awarded for Ene 2 based on the Fabric Energy Efficiency (FEE) performance generated by the energy model, future-proofing reductions in CO_2 for the life of the development. As the Fisher Street OSD is an apartment block, an area weighted average calculation methodology is used.

The energy model produced for the OSD shows that the specification of GSHP as the LZC technology recommended for the development achieves an area weighted FEE rating of 33.62kWh/m^2/yr. This equates to the award of eight credits under the Ene 2 scoring criteria.

Ene 3 Energy Display Devices

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

Ene 3 requires current electricity and primary fuel consumption data to be displayed to occupants of the development.

Although the Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail that would include the specification of energy display devices, it is anticipated that the technology will be incorporated by the developer during progression of detailed design. Therefore, the award of the two credits available for display of fuel consumption data for mains electricity and gas is deemed likely.

Ene 4 Drying Space

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	1	-	-	-

The bathrooms have been identified as being the most suitable location for the provision of drying space within each of the apartments in the Fisher Street OSD.

The bathrooms currently provide adequate space for the required length of drying line and will have the necessary extraction rate to meet the requirements to permit the award of the single credit available.

Ene 5 Energy Labelled White Goods

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail that includes the specification of white goods for the development's apartments. It is anticipated that A+ rated fridges and freezers; A rated washing machines and dishwashers; and B rated tumble dryers, under the EU Energy Efficiency Labelling Scheme, will be provided by the developer and therefore the award of the two credits available is deemed likely.

Ene 6 External Lighting

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail that includes the specification for external lighting. However, it is anticipated that the requirements of Ene 6 will be incorporated by the developer during the detailed design of external lighting for the OSD to enable the likely award of the two credits that are available.

Ene 7 Low and Zero Carbon Technologies

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

Ene 7 aims to limit CO_2 emissions and running costs arising from the operation of a dwelling and its services by encouraging the specification of LZC technologies to supply a significant proportion of energy demand. Credits are awarded depending on the percentage reduction in CO_2 as a result of on site LZC technologies. This reduction is taken from the DER and not the TER.

The baseline DER generated by the energy model for the Fisher Street OSD is 25,957kgCO_2/yr, or 13.85kgCO_2/m^2/yr. The inclusion of GSHP within the development results in a reduced DER of 10.97kgCO_2/m^2/yr. This represents over a 15% reduction in CO_2 emissions for the development from the inclusion of LZC technologies and the award of the two credits available under Ene 7 requirements.

Ene 8 Cycle Storage

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

There are a total of 41 bedrooms included in the concept design of the Fisher Street OSD, split across 22 apartments as follows:

- 5 x 1 bedroom apartments;
- 16 x 2 bedroom apartments; and

- 1 x 4 bedroom apartment

This equates to the provision of storage spaces for 41 cycles in order to achieve the award of the two credits available under the requirements of Ene 8.

Provision has been made in the concept design of the development for the allocation of 42 cycle storage spaces. Two areas have been identified to locate two 2-tier cycle racks (1 x 12 spaces per tier, 1 x 9 spaces per tier), provided in a secure external area within the footprint of the development.

Ene 9 Home Office

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	1	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail that includes the full specification to meet Ene 9 requirements. However, there is sufficient space and services to enable the developer to include provision for prospective occupants to establish a home office work setting.

The award of the single credit available under Ene 9 has therefore been deemed likely.

3.4 Water

Wat 1 Indoor Water Use

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	5	3	2	-	-

Although the Fisher Street OSD concept design at RIBA Stage C does not yet include sufficient specification to allow water consumption for the development to be calculated, it is anticipated that a water consumption rate of 105 litres/person/day can be achieved by the developer as detailed design progresses.

The achievement of a water consumption rate of 105 litres/person/day is a mandatory requirement to achieve the Code Level 4, therefore, the award of three credits under Wat 1 has been deemed likely.

A further two credits have been deemed possible, as there is scope for the developer to investigate opportunities to further reduce water consumption, including the use of external space for the collection and storage of rainwater for reuse within the development.

Wat 2 External Water Use

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	-	1	-	-

The achievement of the single credit available under Wat 2 is currently deemed possible, as further investigation is required during detailed design to determine whether systems to collect and recycle rainwater can be incorporated into the Fisher Street OSD.

The credit will be achieved if a system to collect and recycle rainwater for use instead of potable water in WCs and/or washing machines is incorporated to reduce water consumption of the development and achieve further credits under Wat 1. Alternatively, the single credit can be achieved through installation of rainwater butts, which meet Wat 2 requirements, to collect rainwater for irrigation/watering purposes in the currently proposed external areas of the first floor and eighth floor terraces.

3.5 Materials

Mat 1 Environmental Impact of Materials

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	15	10	5	-	-

At this stage of concept design, the Code Mat 1 calculator has not be completed for the Fisher Street OSD, however, either an A+ or A Green Guide rating has been stipulated for all five of the key building elements in the outline specification for the development.

Given that under Mat 1 requirements an A+ rating for a building element equates to the award of three credits and an A rating equates to two credits, a maximum of 15 credits, or minimum of 10 credits, could be achieved. Therefore, currently 10 credits have been deemed likely for the development, with a further five credits deemed possible.

Mat 2 Responsible Sourcing of Materials – Basic Building Elements

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	6	6	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby the responsible sourcing of materials can be fully addressed. However, it is anticipated that the developer will specify all basic building elements used in construction of the development to be responsibly sourced in line with the Code requirements. Therefore, the award of the six credits available is currently deemed likely.

Mat 3 Responsible Sourcing of Materials – Finishing Elements

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	3	1	2	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby the responsible sourcing of materials can be fully addressed. There are currently some 'high-spec' finishing materials included in the concept design. Having reviewed these materials against Mat 3 requirements, it is likely that only a single credit will currently be achieved. However, it is anticipated that through the progression of the OSD detailed design, the developer will be able to specify finishing elements that can be responsibly sourced in line with the Code requirements. Therefore, two credits are currently also deemed possible.

3.6 Surface Water Run-off

Sur 1 Management of Surface Water Run-off from Developments

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	1	-	1	-

There is no increase in the man made impermeable area as a result of the Fisher Street OSD; therefore the Code mandatory requirement for Sur 1 is met.

Although the design is not yet at a stage whereby an appropriately qualified professional can carry out calculations, it is anticipated that the inclusion of a green roof and paved/decked area on the first floor and eighth floor terraces, which include a Sustainable Urban Drainage System (SuDs), will help to ensure that there is no discharge from the developed site for rainfall depths up to 5mm.

Green roofs reduce the peak flow and the total volumes discharged from a roof and are known to be able to intercept at least 5mm of rainfall if appropriately maintained. Therefore, a single credit is deemed likely for the Fisher Street OSD under Sur 1 requirements.

Sur 2 Flood Risk

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

The proposed Fisher Street OSD represents a low risk of flooding. The site is located in an Environment Agency Flood Zone 1 and as the development covers an area of less than one hectare, a full Flood Risk Assessment (FRA) is not required to satisfy London Borough of Camden Planning requirements.

Flood risk has also been identified as a ‘non-significant environmental issue’ by the Fisher Street Over Site Development Environmental Impact Assessment (EIA) Scoping Report (July 2012), prepared for Crossrail Ltd by URS Infrastructure & Environment UK Ltd, and as such will not be addressed by the EIA for the site.

Based on this information, the award of the two credits available under the requirements of Sur 2 are deemed likely.

3.7 Waste

Was 1 Storage of Non-recyclable and Recyclable Household Waste

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	4	4	-	-	-

Adequate external space has been provided in a dedicated secure bin store area for the Fisher Street OSD concept design. The bin store is of sufficient size to house the minimum volume required by the London Borough of Camden (5 x 1280 litre Eurobin). The Borough requirement is the larger of the two volumes when also considering BS 5906 requirements.

Internal storage space has been provided within the kitchen area of each apartment of the Fisher Street OSD to meet the London Borough of Camden recyclable household waste

collection scheme, which is mixed recyclables (30 litre bin) and organic kitchen waste (7 litre kitchen caddy).

Finalised building and space requirements with regard to waste storage may need to be determined in liaison with the London Borough of Camden's Street Environment Service, but the award of the four credits available under the requirements of Was 1 is currently deemed likely.

Was 2 Construction Site Waste Management

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	3	3	-	-	-

The development is not at a stage of design whereby instruction would be given to inform the construction stage of the development, and therefore construction site waste management is yet to be addressed. However, it is anticipated that the developer of the Fisher Street OSD will commit to the development and implementation of a Site Waste Management Plan (SWMP) that includes benchmarks, procedures and commitments that meet the requirements of Was 2. Therefore, award of the three credits available is currently deemed likely to be achieved.

Was 3 Composting

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	1	-	-	-

The London Borough of Camden provides a kitchen waste collection system, which the Fisher Street OSD will be able to utilise. Kitchen waste collection facilities will be provided as described under Was 1.

Based on this information the award of the single credit available under the requirements of Was 3 is currently deemed likely.

3.8 Pollution

Pol 1 Global Warming Potential (GWP) of Insulants

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	1	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby the GWP of insulants is addressed. However, it is anticipated that the developer will specify that insulants used in construction of the development are to be in line with the Code requirements (i.e. GWP <5). Therefore, 1 credit is currently deemed likely.

Pol 2 NO_x Emissions

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	3	3	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby the NO_x emissions from space heating and hot water systems is addressed. However, it is anticipated that the developer will specify that the space heating and hot water systems used in the development are to be in line with the Code requirements (i.e. dry NO_x level ≤40 mg/kWh). Therefore, the award of the three credits available is currently deemed likely.

3.9 Health and Well-being

Hea 1 Daylight

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	3	1	-	2	-

At the time of the Code pre-assessment for the Fisher Street OSD, a daylight assessment is yet to be produced.

Owing to the central London location of the development and layout of the apartments in the concept design, currently only one credit is deemed likely; whereby an average daylight factor of at least 1.5% is achieved for living rooms, dining rooms and studies.

Further improvement in meeting the Code requirements for daylight may be possible as detailed design progresses, increasing the number of credits achieved under Hea 1.

Hea 2 Sound Insulation

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	4	-	3	-	1

Robust details of wall type E-WM-13 is currently specified in the concept design for all dwelling to dwelling separating walls within the Fisher Street OSD. Selection of this robust details wall type equates to the award of three credits under the requirements of Hea 2.

The current structural concept design floor type for the development is a 250mm cast in-situ concrete slab, with a 50mm screed applied directly to the slab, suspended ceiling and floating floor. Although the structural design of the floors within the Fisher Street OSD is unlikely to change, the inclusion of a 3mm IsoRubber Top bonded to the slab during detailed design, as per robust details floor type E-FC-10, is likely to result in the award of three credits under the requirements of Hea 2. However, as this is currently not an inclusion in the concept design, three credits are only deemed possible at this time.

The achievement of 4 credits is not possible when using robust details wall and floor types, as the number of credits awarded is based on the lower performance, with highest performing floor type achieving a maximum of three credits.

Hea 3 Private Space

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	-	-	-	1

The Fisher Street OSD concept design does not meet the Code requirements for private space; therefore it is not possible to achieve the single credit available under Hea 3.

Hea 4 Lifetime Homes

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	4	4	-	-	-

The Fisher Street OSD concept design has been developed to meet all 16 of the Lifetime Homes criteria, as per London Borough of Camden planning requirements. Therefore, the award of the four credits available under Hea 4 requirements is deemed likely. The Design and Access Statement for the Fisher Street OSD provides further details on the meeting of all 16 of the Lifetime Homes Requirements.

3.10 Management

Man 1 Home User Guide

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	3	3	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby the production of a Home User Guide is addressed. However, it is anticipated that the developer will provide confirmation that a guide will be produced to the standards required by Man 1 and provided to all dwellings within the development. Therefore, the award of the three credits available is currently deemed likely.

Man 2 Considerate Constructors Scheme

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby the registration of the development with the Considerate Constructors Scheme (CCS) is addressed. However, it is anticipated that the developer will ensure CCS registration prior to the commencement of construction; therefore the award of the two credits available is currently deemed likely to be achieved.

Man 3 Construction Site Impacts

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

The Fisher Street OSD at RIBA Stage C is currently not designed to a level of detail whereby construction site impacts are fully addressed. However, it is anticipated that the developer will ensure that procedures are implemented to promote management of construction in a manner that mitigates environmental impacts. Therefore, the award of the two credits available is currently deemed likely to be achieved under the requirements of Man 3.

Man 4 Security

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

A meeting was held with the London Borough of Camden Architectural Liaison Officer (ALO) during the development of the Fisher Street OSD concept design to determine the security measures to be safeguarded relating to the area where the development is planned.

From the meeting it was established that a crime impact statement highlighting the seven attributes to be considered for Secured by Design would need to be produced. A number of comments raised by the ALO have also been resolved in the scheme design. These items will need to be implemented by the developer and evidence of compliance provided to the ALO.

Consultation with the ALO and implementation of their recommendations is likely to result in the award of the two credits available under Man 4 requirements.

3.11 Ecology

Eco 1 Ecological Value of Site

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	1	-	-	-

The completion of the Code checklist for Eco 1 provides confirmation that the Fisher Street OSD is situated on land of low ecological value. Therefore, the award of the single credit available is currently deemed likely to be achieved under the requirements of Eco 1.

Eco 2 Ecological Enhancement

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	-	1	-	-

A suitably qualified ecologist has not been appointed to recommend features to enhance the ecology of the site; however, this may be investigated by the developer during detailed design. Therefore, it remains possible to achieve the single credit available under Eco 2.

Eco 3 Protection of Ecological Features

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	1	1	-	-	-

Completion of the Code checklist for Eco 1 confirms that the site is of low ecological value; therefore, the single credit available for Eco 3 is deemed likely through award by default.

Eco 4 Change in Ecological Value of Site

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	4	2	-	2	-

At the current stage of design, with no ecological enhancement anticipated and in line with the Code criteria, currently the change in ecological value of the Fisher Street OSD can be determined as 'neutral' i.e. the overall change in species per hectare is greater than -3 and less than or equal to +3. Therefore, two credits are currently deemed likely to be achieved under the requirements of Eco 4.

If an ecologist is appointed by the developer, owing to the nature and location of the site, it is anticipated that no more than three species would be introduced; meaning only two credits would remain achievable.

Eco 5 Building Footprint

	Available	Likely	Possible	Unlikely	Not Possible
Credits:	2	2	-	-	-

The total Net Internal Ground Floor Area (NIGFA) of the Fisher Street OSD is approximately 560m^2. The total Net Internal Floor Area (NIFA) for the 8 floors of the development is approximately 2447m^2. In accordance with the Code requirements, the calculation of the building footprint ratio is therefore:

$$\text{Site Wide Footprint to Floor Area Ratio} = \frac{\text{NIFA}}{\text{NIGFA}}$$

$$= \frac{2447\text{m}^2}{560\text{m}^2}$$

$$= 4.37$$

The NIFA to NIGFA ratio for the Fisher Street OSD of 4.37:1 therefore means that the two credits available are likely to be achieved by the development under the requirements of Eco 5.

4 Energy Statement

The following section of the Sustainability Statement provides a summary of the Energy Statement produced for the Fisher Street OSD. The full Energy Statement and Low & Zero Carbon Study can be found in Appendix D of the Fisher Street OSD RIBA Stage C Report.

Energy used within buildings accounts for the highest proportion of carbon dioxide (CO_2) emissions from the London Borough of Camden. All buildings are therefore encouraged promote energy efficiency.

The London Borough of Camden's approach to improving the energy efficiency of buildings is to implement the energy hierarchy to minimise energy consumption, as detailed in Section 2.3.2 above.

The intention is for new developments to reduce their CO_2 emissions by following the steps in the energy hierarchy to reduce energy consumption.

CPG3 provides information on the production of an energy statement to support planning applications for new developments. The energy statement is intended to set out how a development has been designed to follow the steps of the energy hierarchy and demonstrate how the proposed measures are appropriate and viable to its context.

Sections 4.1 to 4.5 below provide a summary of the key information contained in the Energy Statement and Low & Zero Carbon Technology Study prepared for the Fisher Street OSD against the headings to be included in an energy statement, as required by the London Borough of Camden's planning requirements.

4.1 Baseline Energy Demand and Carbon Dioxide Emissions

Energy modelling using SAP 2009 has been undertaken for all dwellings in the proposed Fisher Street OSD. An area weighted total has been calculated for the whole building and used for all energy related calculations. The energy model primarily calculates regulated emissions only. Unregulated emissions from the use of appliances have been calculated using the formula taken from the Code Level 6 'Zero Carbon' requirements. This provides a figure for 'total' emissions from the development, including both regulated and unregulated energy.

To calculate the CO_2 emissions for the development, energy consumption figures have been converted to equivalent emissions using the factors for gas and electricity contained within Building Regulations Part L (2010), as follows:

Fuel type	CO_2 emissions factor
Gas	0.198
Electricity (grid)	0.517
Electricity (displaced)	0.529

The energy model generated a base case scenario. The maximum level of emissions allowed under Part L, the TER, was calculated using the predetermined criteria set by the Building Regulations. A 'TER+' scenario was also calculated to include unregulated emissions, as described above.

The TER CO_2 emissions for the Fisher Street OSD have been calculated, as follows:

Total floor area (m^2)	TER ($kgCO_2$/yr)	TER+ ($kgCO_2$/yr)	TER ($kgCO_2/m^2$/yr)	TER+ ($kgCO_2/m^2$/yr)
1,874	27,244	60,037	14.54	32.04

4.2 Design Measures to Maximise Energy Efficiency

The energy model for the development has also been used to produce a Dwelling Emission Rate (DER) to estimate the performance of a dwelling within the development. The DER calculation includes energy efficiency measures appropriate for inclusion in the current stage of design (concept design/RIBA Stage C), but excludes the contribution of any LZC technologies.

The concept design energy efficiency measures achieve the following values which are included in the model. Assumptions have been made with regard to the building services and building fabric not covered by concept design, which will be addressed further in detailed design.

Element	Value
External walls	0.2 U-value
Roof	0.13 U-value
Floor	0.2 U-value
Windows	1.3 U-value
Solid doors	1.0 U-value
Glazed doors	1.5 U-value
Air tightness	$3m^3/hr/m^2$
Energy efficient lighting	100%
Gas boiler efficiency	95%
Ventilation	Natural with extract fans
Water heating	From main system

A ‘DER+’ scenario has also been calculated to include unregulated emissions, as described in 4.1 above.

The DER CO_2 emissions for the Fisher Street OSD have been calculated by the model, as follows:

Total floor area (m^2)	DER ($kgCO_2$/yr)	DER+ ($kgCO_2$/yr)	DER ($kgCO_2/m^2$/yr)	DER+ ($kgCO_2/m^2$/yr)
1,874	25,957	58,750	13.85	31.35

The DER for the development achieves a 4.7% improvement over the baseline TER.

4.3 Consideration of Further Carbon Dioxide Reductions

The London Borough of Camden requires new developments to explore the potential of decentralised energy, such as connection to a district heat network or combined heat and power (CHP) systems.

Developments that are located within a 1km radius of an existing or emerging district heat network, or within 500m of a potential network, are expected to connect to the network unless it can be demonstrated that connection is not technically feasible or financially viable.

The interactive 'London Heat Map' tool identifies that the Fisher Street OSD site is approximately 1.2km from an existing district heating network that serves the Barbican and Smithfield area of London. This means that there is no immediate opportunity to connect to this district heating network due to the distance involved. The overall heating and hot water demand is expected to be relatively low compared to other heat users in the area, therefore, it is also unlikely the development will be the sole catalyst for a new, or extension to an existing, district heating network.

The use of a gas CHP system in the Fisher Street OSD would not be feasible due to the relatively low and variable heat loads expected for the development. As the building has a relatively low heating and hot water demand, the CHP system would only be operating for limited hours, which further restricts the overall viability of CHP.

4.4 Consideration of Renewable Energy Technologies

A renewable technologies assessment has been undertaken for the Fisher Street OSD, which reviews the feasibility of a number of renewable technologies deemed appropriate for the development. The suitable renewable technologies considered by the assessment included:

- solar thermal;
- photovoltaics;
- ground source heat pumps (including those powered by renewable energy);
- biomass (single room heater);
- combined heat and power; and
- air source heat pumps.

The renewable energy technologies feasibility assessment was conducted against a number of criteria, including:

- energy generation;
- spatial impact;
- integration with other technologies;
- operational viability;
- estimated cost; and
- CO_2 reduction potential.

The outcome of the assessment indicates that air source heat pumps or ground source heat pumps are the most feasible options for the Fisher Street OSD.

The full renewable technology feasibility assessment is covered by the Energy Statement and Low & Zero Carbon Study located in Appendix D of the Fisher Street OSD RIBA Stage C Report.

4.5 Conclusions and Recommendations for the Proposed Development

Based on the analysis undertaken, the most viable option for the Fisher Street OSD is either ground source heat pumps or air source heat pumps. Although the technologies proposed have been deemed technically feasible, several additional considerations have been made, including:

- planning implications;
- ground conditions;

- available heat load;
- available plant room space;
- associated CO_2 savings;
- equipment cost; and
- Code for Sustainable Homes assessment.

With particular reference to the Code assessment for the development, the air source heat pump option does not meet the Level 4 mandatory requirement for Ene 1, as it only produces an 11% emission reduction over the TER. The option also fails to achieve any credits under Ene 7. Either additional LZC technologies or fundamental changes to the building layout and fabric would be required in order to meet the mandatory requirements under Ene 1.

The ground source heat pump option does however meet the Code Level 4 mandatory requirement for Ene 1 by producing a 25% reduction over the TER, and achieves two credits under Ene 7.

The London Borough of Camden sets a target for new developments to aim for a 20% reduction in CO_2 emissions from on site renewable energy technologies; however, as additional LZC technologies would be required, this is currently deemed not feasible for the Fisher Street OSD concept design.

The 20% target is based on CO_2 emissions from both regulated electrical and thermal gas consumption and unregulated consumption, such as small power and cooking. Emissions are split 44:56 for the development, regulated to unregulated energy. Ground source heat pumps are a low emission heat technology only able to address the smallest proportion of the overall emissions and are not able to serve the unregulated consumption. As a result, low emission heat technologies such as heat pumps are unlikely to be able to meet the 20% LZC reduction at this development.

Despite this, ground source heat pumps remain the recommended LZC technology, as CO_2 emissions are reduced to a greater extent and a better performance rating is achieved against the requirements of the Code.

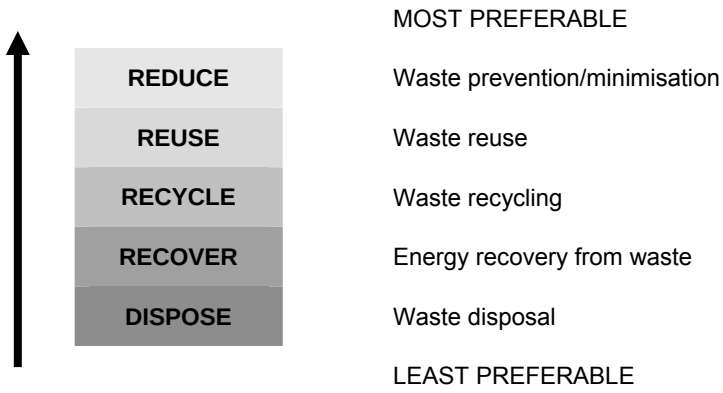
5 Waste Statement

The London Borough of Camden requires major developments (>10 dwellings) to aim for 15-20% of the total value of materials used in construction to be derived from recycled and reused sources. Opportunities to reduce waste should be explored in line with the WRAP Quick Wins assessments and the waste hierarchy.

WRAP Quick Wins:

- cost-competitive to install;
- technically acceptable;
- meet the required level of performance;
- reliably available; and
- demonstrate strong environmental credentials.

The waste hierarchy:



In accordance with the waste hierarchy, the London Borough of Camden's preferred approach during construction is to prioritise the use of reclaimed materials and materials with higher levels of recycled content over the use of new materials, and for demolition, to prioritise on site reuse and recycling opportunities over off site recycling and disposal.

At the current stage of design, specification of the materials for the construction of the Fisher Street OSD is yet to progress to a level of detail whereby the WRAP Quick Wins assessment and the waste hierarchy approach has been applied. However, there are a number of opportunities to be considered and explored as detailed design progresses with regard to the generation of waste from the construction of the development.

These opportunities are covered by 5.1 to 5.5 below in line with the waste hierarchy approach.

5.1 Reduction

The form of the development and selection of materials for construction, support the principals of designing for deconstruction in that the materials and the building's constituent parts can be segregated for ease of recycling or reuse upon dismantling of the Fisher Street OSD at the end of its operational life-span.

There will be minimal demolition and no groundwork associated with the construction of the development, minimising the production of waste usually associated with these stages of a project. The developer will inherit the site following completion of the Crossrail Fisher Street Shaft works ready for construction of the OSD. Owing to the phasing of the work necessary to allow construction of the OSD, all foundations and piling associated with the development will have been completed during construction of the Fisher Street Shaft and head house associated with the Crossrail works.

Procurement decisions and activities in relation to materials will play an important role in reducing waste production throughout the construction process. The procurement of materials has significant potential to result in wastage through over-ordering, acceptance of damaged goods, spoiling of materials and excessive packaging. Suppliers may be reluctant to take back unused materials, therefore creating unnecessary generation of waste that can be easily avoided; however, conversely, damaged goods and materials delivered to the site by suppliers should be rejected to help reduce site related waste. Take-back schemes should be investigated with suppliers.

Taking into account considerations such as effective supply chain communications, packaging options, management (including separation) of materials, and timing of deliveries, will help to reduce the amount of waste produced. On site storage space will be minimal for the project and therefore supply chain management, which controls material procurement and uses “just in time” deliveries to ensure they coincide with the use of materials, will reduce storage requirements and minimise material spoilage and waste. Where storage of materials is necessary, designated storage areas should give consideration to any constraints imposed by the site and its location, and should be safe, secure and weatherproof to help prevent escape or spoiling of materials.

5.2 Reuse

As there will be minimal demolition and groundwork, there is no requirement to identify reuse opportunities commonly associated with these stages of work (i.e. on site and/or off site reuse of excavation and demolition material). There will be minimal quantities of concrete waste produced when piles are revealed prior to construction of the OSD, however, there are no opportunities to reuse this waste on site. Owing to the small amount of demolition waste being generated, identification of an opportunity to reuse this material off site may also be difficult; however, opportunities should still be investigated.

The on site reuse of materials produced during the demolition and excavation stages of a project provides one of the best opportunities to utilise materials from reused and recycled sources. There is no use for demolition and excavation materials on the project; therefore, sourcing other reused and recycled materials will be the main focus to achieve the London Borough of Camden’s target of 15-20% of the total value of materials used in construction to be derived from recycled and reused sources.

The concept design of the building is concrete framed. The use of concrete in significant volumes in the construction of the Fisher Street OSD presents an opportunity to incorporate recycled content into the construction of the development by specifying concrete with a high Pulverised Fuel Ash (PFA) or Ground Granulated Blast-furnace Slag (GGBS) content.

Further opportunities to achieve the 15-20% target will need to be investigated as the development progresses through detailed design.

5.3 Recycling

Facilities should be made available on site during construction to allow for the segregation of metals and other high value materials and bulk materials, such as plasterboard, timber and

packaging (card, plastic, etc.), to increase recycling rates for the project. A suitable waste service provider(s) should be identified that is able to handle and manage the waste produced to ensure high recycling rates are achieved, as the segregation of construction waste for reuse and recycling is maximised through the use of a specialist construction waste recycling facility.

Other opportunities for off site recycling and reuse of waste, other than collection by a waste contractor, can also be investigated, including take-back schemes with suppliers for unused materials and use of unused materials or waste by other projects, or initiatives such as community schemes.

5.4 Disposal

It should be ensured that on site management and disposal of waste meets all legal requirements and that good practice in terms of materials management, waste segregation and handling are applied. On site storage of waste should be in appropriate containers to minimise potential damage to the environment in compliance with the requirements of the Duty of Care Regulations.

Waste management services should be selected based on anticipated waste arisings and give due consideration to the production of hazardous waste types. The selection of appropriate contractors that can meet waste disposal requirements is an important consideration for any project. Wherever opportunities to segregate and recycle waste are identified it is important that a waste contractor is selected that is able to meet the necessary disposal requirements. It is important to ensure that selected waste contractors are able to provide the data and information to demonstrate compliance with legal obligations and progress towards the achievements of waste targets set for the project, as necessary.

5.5 Site Waste Management Plan

SWMPs are currently a legal requirement for all construction projects with a value in excess of £300,000, although Defra has announced the Regulations will be scrapped in the near future. However, production of a SWMP remains good practice to assist in the management of waste on large projects and should be a consideration for construction of the Fisher Street OSD. Not only is the development of a SWMP considered good practice, but is also a requirement of the Code under Was 2 Construction Site Waste Management.

The purpose of a SWMP is to improve material resource efficiency by increasing reuse and recycling, to divert construction and demolition waste from landfill and to ensure compliance with existing waste management controls. SWMP are therefore important tools to ensure legal compliance, improve environmental performance and reduce rising costs associated with waste disposal. It is recognised that a SWMP initiated at design stage that gives consideration to best practice opportunities to minimise waste generation and maximise diversion of waste from landfill throughout the design and construction process, has the greatest potential to achieve both cost savings and environmental benefit.

A SWMP is a ‘live document’ developed during the design stage and updated throughout the life of the project and is used to record how waste is managed on site, including:

- recording decisions taken to prevent waste through design;
- forecasting on site waste production;
- planning how to reduce, reuse and recycle forecasted waste arisings;
- implementing and monitoring planned activity; and
- reviewing the SWMP and recording lessons learnt.

If utilised and implemented correctly, the SWMP will help the project to identify and manage waste effectively, reduce the amount of waste sent to landfill, reduce demand for raw materials and generate a greater take-up of recycled materials.

6 References

Camden Local Development Framework; Camden Core Strategy 2012 – 2025; London Borough of Camden; Adopted version 2010

Camden Planning Guidance 3, Sustainability; London Borough of Camden

Camden Local Development Framework; Camden Development Policies; Adopted version 2010; DP22 Promoting sustainable design and construction

Code for Sustainable Homes, Technical Guide; Department for Communities and Local Government; November 2010

Fisher Street Over Site Development EIA Scoping Report; URS Infrastructure & Environment UK Ltd; July 2012

Appendix 1: London Borough of Camden Planning Policy Summary

Core Strategy 13

Reducing the effects of and adapting to climate change

The Council will require all development to take measures to minimise the effects of, and adapt to, climate change and encourage all development to meet the highest feasible environmental standards that are financially viable during construction and occupation by:

a. *ensuring patterns of land use that minimise the need to travel by car and help support local energy networks;*
b. *promoting the efficient use of land and buildings;*
c. *minimising carbon emissions from the redevelopment, construction and occupation of buildings by implementing, in order, all of the elements of the energy hierarchy; and*
d. *ensuring buildings and spaces are designed to cope with, and minimise the effects of, climate change.*

The Council will have regard to the cost of installing measures to tackle climate change as well as the cumulative future costs of delaying reductions in carbon dioxide emissions.

Local energy generation

The Council will promote local energy generation and networks by:

e. *working with our partners and developers to implement local energy networks in the parts of Camden most likely to support them; and*
f. *protecting existing local energy networks where possible (e.g. at Gower Street and Bloomsbury) and safeguarding potential network routes (e.g. Euston Road).*

Water and surface water flooding

We will make Camden a water efficient borough and minimise the potential for surface water flooding by:

g. *protecting our existing drinking water and foul water infrastructure, including Barrow Hill Reservoir, Hampstead Heath Reservoir, Highgate Reservoir and Kidderpore Reservoir;*
h. *making sure development incorporates efficient water and foul water infrastructure; and*
i. *requiring development to avoid harm to the water environment, water quality or drainage systems and prevents or mitigates local surface water and down-stream flooding, especially in areas up-hill from, and in, areas known to be at risk from surface water flooding such as South and West Hampstead, Gospel Oak and King's Cross (see Map 5).*

Camden's carbon reduction measures

The Council will take a lead in tackling climate change by:

j. *taking measures to reduce its own carbon emissions;*
k. *trialling new energy efficient technologies, where feasible; and*
l. *raising awareness on mitigation and adaptation measures.*

Development Policy 22

The Council will require development to incorporate sustainable design and construction measures. Schemes must:

a. *demonstrate how sustainable development principles, including the relevant measures set out in paragraph 22.5 below, have been incorporated into the design and proposed implementation; and*

b. *incorporate green or brown roofs and green walls wherever suitable.*

The Council will promote and measure sustainable design and construction by:

c. *expecting new build housing to meet Code for Sustainable Homes Level 3 by 2010 and Code Level 4 by 2013 and encouraging Code Level 6 (zero carbon) by 2016.;*

d. *expecting developments (except new build) of 500 sq m of residential floorspace or above or 5 or more dwellings to achieve "very good" in EcoHomes assessments prior to 2013 and encouraging "excellent" from 2013;*

e. *expecting non-domestic developments of 500sqm of floorspace or above to achieve "very good" in BREEAM assessments and "excellent" from 2016 and encouraging zero carbon from 2019.*

The Council will require development to be resilient to climate change by ensuring schemes include appropriate climate change adaptation measures, such as:

f. *summer shading and planting;*

g. *limiting run-off;*

h. *reducing water consumption;*

i. *reducing air pollution; and*

j. *not locating vulnerable uses in basements in flood-prone areas.*