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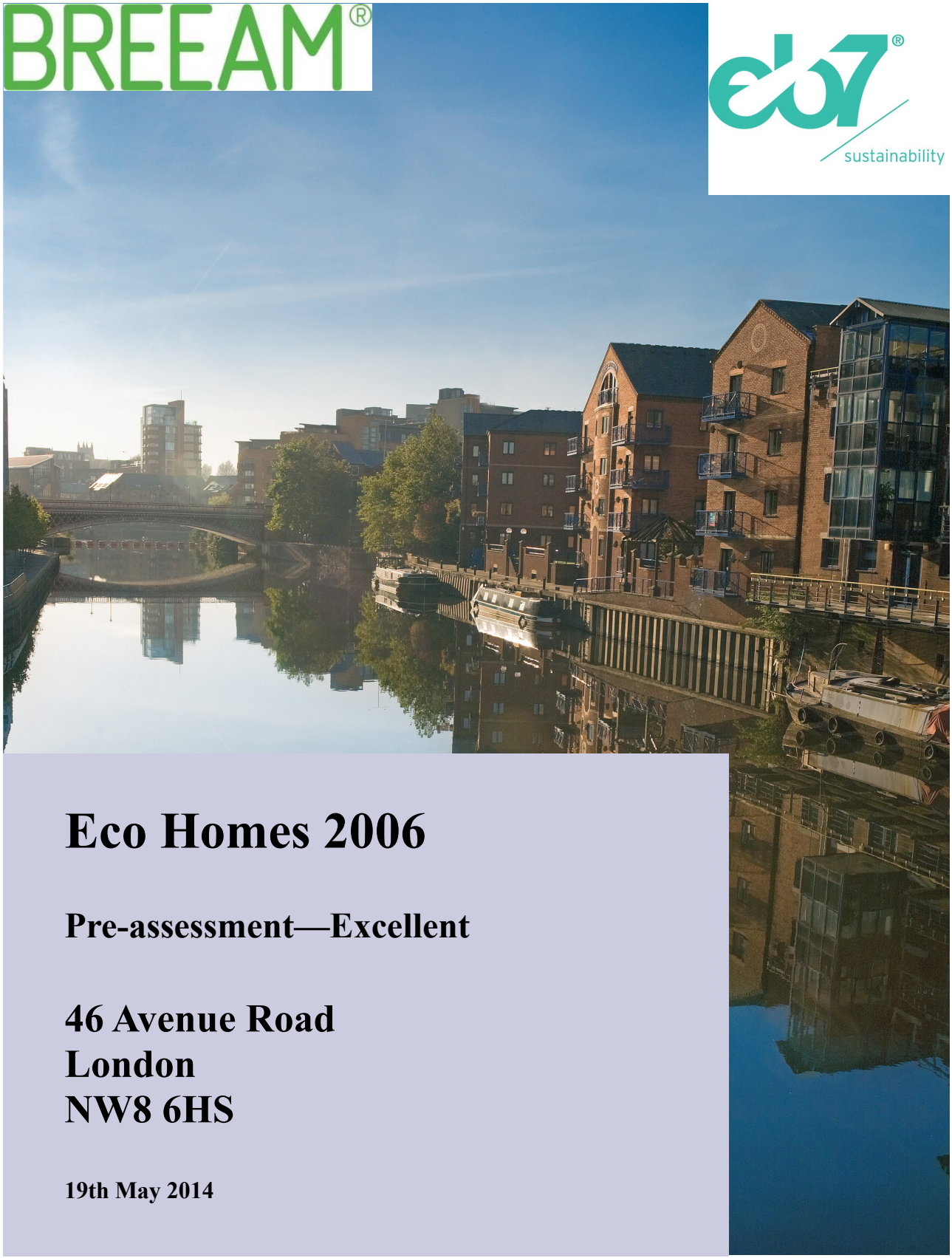

Eco Homes 2006

Pre-assessment—Excellent

46 Avenue Road
London
NW8 6HS

19th May 2014

THE CODE FOR SUSTAINABLE HOMES™

eb7 - environmental consultants

STUDIO F7, BATTERSEA STUDIOS,
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STROMA ACCREDITED CODE ASSESSOR

46 Avenue Road, London, NW8 6HS

PLANNING APPLICATION – BREEAM ECOHOMES SUPPORTING INFORMATION

APPLICATION NUMBER

WHAT IS ECOHOMES?

Eco Homes is a version of BREEAM for homes. It provides an authoritative rating for new, converted or renovated homes, and covers houses, flats and apartments.

Eco Homes balances environmental performance with the need for a high quality of life and a safe and healthy internal environment. Many of the issues are optional, ensuring Eco Homes is flexible enough to be tailored to a particular development or market.

In April 2007 the Code for Sustainable Homes replaced Eco Homes for the assessment of new housing in England, Wales and Northern Ireland. However Eco Homes 2006 will continue to be used for refurbished housing in England, Wales and Northern Ireland and for all housing in Scotland.

ADVANTAGES OF MEETING THE ECOHOMES STANDARD

1. Reduced maintenance costs.
2. Reduced greenhouse gases.
3. Reduced impact on environment.
4. Provide affordable warmth.
5. Healthy and comfortable internal environment.
6. Improved sustainability credentials.
7. Increased level of occupant satisfaction.
8. Outperforms open market housing in terms of energy demand - increased sale-ability.
9. Demonstrates forward thinking and environmental awareness on the part of the Developers and Housing providers.

ECOHOMES ISSUES

The Eco Homes Assessment covers the following areas:

- Energy
- Water
- Pollution
- Transport
- Management
- Land Use & Ecology
- Health and well being
- Materials

STANDARDS

ECOHOMES Rating Total Points

Pass	**36**
Good	**48**
Very Good	**58**
Excellent	**70**

In line with Local Plan policies Development Policy DP22 - Promoting sustainable design and construction, the proposed development will meet Eco Homes Excellent, with the following achievement in unweighted credits:-

- Energy 60%
- Water 60%
- Materials 40%

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SUGGESTED UPGRADED SPECIFICATION

Energy

1. Developer should ensure the use of high efficiency VRF aiir-toair heat pump systems for heating and cooling requirements for the refurbished dwelling. The build fabric is also to be constructed/improved as noted below
2. 75% of all internal lighting to be low energy type.
3. Drying line to be installed to rear garden area to reduce reliance on the use of tumble dryers
4. All external lighting specified to be low energy type with daylight timer controls

Water

5. Reduced use of potable water. This will require low flow fittings - dual flush toilets, flow restrictors to taps reducing the flow of water and low flow rate to showers.
6. A water butt should be installed to a down pipe at the rear of the property to collect rainwater for the upkeep of soft landscaped areas

Materials

7. Elements specified are generally to be 'A' rated in accordance with BRE 'The Green Guide to Housing Specification' 2006 which means that the full life cycle costs and the impact on the environment are assessed. In addition, where possible, developer to use responsibly resourced materials for basic build elements, as well as internal finishes.

Transport

8. Development very close to the Finchley Road - with numerous bus routes and underground services and is expected to perform well in this category.
9. BREEAM compliant cycle store for 4 cycles to be installed in rear gardens
10. Home office to be included in an appropriately day lit room – appropriate number of sockets, telephone points to be specified – an upper floor secondary bedroom would be appropriate

Pollution

11. Insulation used on site will contain no ozone depleting substances i.e. CFC and HCFC free and have a global warming potential of less than 5.
12. The development will demonstrate that it sites within an area of low flood risk – Zone 1

Health and Well Being

13. With all principle accommodation at raised ground floor level, daylight calculations will be undertaken to demonstrate good levels of daylighting in the kitchen dining and living room areas, as well as a view of the sky from all of these principal rooms.

Ecology

14. The development – 100% subterranean – will have a neutral impact on site ecology. An ecologist could be appointed to advise on the potential to enhance site ecology. An ecologist will be appointed to comment on and improve the ecological value

Management

15. A guide will be provided by the developer for the occupants of the dwellings highlighting building performance and providing information on surrounding facilities.
16. Contractor to join the Considerate Contractors Scheme and achieve Best Practice score of 24 or more. In addition, the contractor will produce a Site Waste Management Plan, monitor site activities and seek to reduce site waste, and divert waste from land fill.
17. Under the Construction Site Impacts section, contractor to monitor energy and water use and introduce best site practices to avoid ground water and dust pollution

Overall Score

The proposed development should achieve **71.98** credits which equates to a '**Excellent**' Rating. In addition, the scoring in the Energy, Materials and Water sections equates 62.5%, 77.42% and 66.7% respectively.

Detailed Breakdown

A detailed breakdown of the Eco Homes categories, the recommendations to the developers and how the development will achieve the necessary credits for a Very Good rating is attached in Appendix A. This also includes the evidence that will be needed to be provided at the formal assessment design/post construction stage.

Pre-assessment Estimator

The Eco Homes pre-assessment estimator is attached at Appendix B, which includes a spread sheet calculation of the percentage contribution of each section to the overall score

SAP Dwelling Emission Rate

The Dwelling Emission Rate outputs from SAP2005 are attached at Appendix C, demonstrating an overall emission rate of 22.98 kg/sqm; achieving 7 credits under Ene 1. This has been calculated using the following data:-

- All existing elements in original buildings to remain in situ and u values assumed from SAP2005 Appendix S, with the exception of:-
- New basement walls to achieve u value of 0.19
- New external walls to achieve u=0.23
- New basement floor to achieve u=0.17
- New VRF air-to-air heating and cooling plant
- New mechanical ventilation systems with heat recovery to ensure Part F compliant ventilation levels in basement areas
- Existing ceiling insulation to be upgraded to u = 0.13 and other roof areas upgraded to u = 0.18
- New glazing to be of conservation style hardwood units at u = 2.4, with exception of basment lightwell – glazing units to achieve u = 1.6
- Existing glazing is currently double glazed

CONCLUSION

The Developer and Principle Contractor will be committed to achieving the required score with the above recommendations incorporated into the specification. Occupiers of the homes will enjoy reduced operating and life cycle costs due to the enhancement over and above current Building Regulations and built in features designed to reduce environmental impact and greenhouse gases. Overall the carbon footprint of the scheme will be minimised along with its Ecological impact. All stakeholders involved stand to benefit as a result of the assessment and recommendations.

Report Prepared by **:-**

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BREEAM Ref – DF06

Assessor **Date: 19th May 2014**

Checked **Date: 19th May 2014**

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BREEAM Eco-Homes - Appendix A

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Category	Issue	Notes and Design Stage Evidence Requirements	Credits	Weighted Total
Dwelling emission rate	Ene 1	SAP calculations have been undertaken in line with the requirements of AD L1B. The outcome at 22.98kg/m^2/yr achieves 7 credits **Evidence** SAP worksheet and design plans/spec and proof of Building Regulations approval	7.00	
Building fabric	Ene 2	SAP calculations have been undertaken in line with the requirements of AD L1B. The HLP rating of 2.20 means that 1 credit is achieved **Evidence** SAP worksheet and design plans/spec.	1.00	
Drying Space	Ene 3	An external drying line will be installed in the rear garden area with a minimum of 6m of drying line. **Evidence** Include in specification and show on plans.	1.00	
Eco-Labelled Goods	Ene 4	The developer has committed to installing white goods as follows:- fridge/freezers to be A+ rated, Washing machines, dishwashers to be A rated. Washer/dryer or tumble dryers B rated EB7 can supply copy of the EU guide to energy ratings and specify as such. **Evidence** Confirmation of goods to be installed, type, model and EU rating	2.00	
Internal Lighting	Ene 5	The developer has committed to installing minimum 75% dedicated low energy light fittings throughout the whole development **Evidence** Layouts showing lighting locations and details. Manufacturers literature confirming efficacy minimum 40lumens/circuit watt	2.00	

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External Lighting	Ene 6	All space and security lighting is to use dedicated low energy fittings:- Security lights to be fitted with dusk/dawn controls and any burglar security lights to be max 150w with PIR and dusk/dawn controls **Evidence** Layouts showing lighting locations and details. Manufacturers literature confirming efficacy minimum 40lumens/circuit watt	2.00	**13.75**
Public transport	Tra 1	The developer has confirmed that the dwellings are within 500m of a bus route/underground offering services every 15mins (peak) and 30 mins (off-peak) **Evidence** Plan of area showing bus routes, safe pedestrian route to bus stop and literature confirming frequency of services	2.00	
Cycle storage	Tra 2	With direct access to the rear gardens, the developer will install a secure cycle storage shed able to accommodate 4 cycles **Evidence** Show on drawings and specify security of storage	2.00	
Local amenities	Tra 3	The developer has confirmed that there is a food shop and post box within 500m, and within 1000m – a bank/cash point, public house, food shop, primary school and a pharmacy – all with safe pedestrian route to all. **Evidence** Plan of area showing facilities and pedestrian routes	3.00	
Home office	Tra 4	The dwelling has a study areas in a well lit room Developer confirms that it is equipped with telephone sockets, 2 x double power sockets and has access to broadband **Evidence** Show on plans and confirm above through specification	1.00	**8.00**
Insulant GWP	Pol 1	Any <u>new</u> insulants installed in roof (incl roof hatch), walls (including acoustic), floor and hot water tank to have GWP<5 **Evidence** Details of insulants and manufacturers spec confirming GWP	1.00	

NOx Emissions	Pol 2	The use of VRF heating and cooling precludes the achievement of credits under this section **Evidence** Manufacturers specification of relevant plant and NOx emission data	0.00	
Reduction of Surface water run-off	Pol 3	Developer has confirmed that credits will not be sought under this section **Evidence –** Details/specification of attenuation measures accompanied by design team calculations.	0.00	
Renewable and low emission energy source	Pol 4	Developer has confirmed that credits will not be sought under this section **Evidence –** Feasibility study to be commissioned and recommendations instigated. Full spec of LZCs installed and SAP calcs to demonstrate reduction in emissions	0.00	
Flood Risk	Pol 5	EA maps indicate Zone 1 - developer to formally confirm at design stage. **Evidence –** Design team report confirming source of flood risk data (EA maps)	2.00	**2.73**
Environmental Impact of materials	Mat 1	As majority of material left in situ, the project will score highly in this section. Developer to confirm spec of new build elements. **Evidence** Specification of new build elements and plans indicating elements left in situ	12.00	
Responsible sourcing of basic building elements	Mat 2	Developer wishes to pursue further credits and will provide EMS/FCS certs for new materials to demonstrate responsible sourcing **Evidence** Specification and volume of new build materials used and responsible sourcing certs.	4.00	
Responsible sourcing of finishing elements	Mat 3	Developer wishes to pursue further credits and will provide EMS/FCS certs for new materials to demonstrate responsible sourcing **Evidence** Specification and volume of new build materials used and responsible sourcing certs.	2.00	
Recycling facilities	Mat 4	It is suggested that the client provides 1 x internal bin at capacity 30litres for recycling in fixed location, min bin size 7l within a fixed unit in the kitchen area.	6.00	

		Developer also to provide 2 x external bins – one for domestic waste and the other for the "orange bag" local authority recycling scheme. The bins to be clearly labelled Developer to provide info on Local Authority kerbside recycling scheme. **Evidence** Full details of bins supplied and mark provision plans		**10.84**
Internal potable water use	Wat 1	All new sanitary ware to be installed will be low flow/low flush/low capacity, including new white goods. Developer also to advise flow rates for all existing water consuming devices within property (taps, baths, shower etc.). Developer to target <42cbm/bedspace/year **Evidence** Full details and locations of all water consuming devices	3.00	
External potable water use	Wat 2	A 200l water butt is to be connected to a downpipe to collect rainwater for the purposes of garden irrigation. **Evidence** Provide details of collection systems and mark on plans	1.00	**6.67**
Ecological value of site	Eco 1	As the proposed development is within the footprint of the existing building and a suburban garden, the existing site has low ecological value **Evidence** Detailed plans of site both before and after development noting significant features	1.00	
Ecological enhancement	Eco 2	This section will require an ecologists report on enhancement and commitment to undertake recommendations. **Evidence** Ecologists report and written confirmation that recommendations to be undertaken	1.00	
Protection of ecological features	Eco 3	The site is of low ecological value (see Eco 1). **Evidence** Drawings marking ecological features and protection measures	1.00	

Change in ecological value of site	Eco 4	Given nature of redevelopment as noted under Eco 1, a neutral effect on site ecology will occur during development **Evidence** Drawings of project prior to, and post development marking areas of the different landscape/species to enable calculation to be undertaken	2.00	
Building footprint	Eco 5	The overall redeveloped site will be arranged over 4 floors plus double basement. The assessor has undertaken area calculations, and the footprint/floor area ratio on site is 1.98 : 1 – No credits are achieved **Evidence** Drawings of project marking areas of footprint and internal floor areas	0.00	**8.00**
Day lighting	Hea 1	Looking at layouts, it is expected that the development will achieve good levels of daylighting in the kitchen and all principle rooms **Evidence** Day lighting calculations and plans with room areas and window spec for lounge, dining room, kitchen and study	3.00	
Sound insulation	Hea 2	As a detached property, 4 credits are achieved by default **Evidence** Site plans/drawings showing attached status as well as the testing regime to be undertaken.	4.00	
Private space	Hea 3	The dwelling has ample private garden provision **Evidence** Site plan marking area of private space	1.00	**14.00**
Home user guide	Man 1	Developer is committed to producing a home user guide in line with Eco Homes requirements **Evidence** Letter confirming commitment to provide home user guide to Eco Homes standards	3.00	
Considerate contractors	Man 2	The main contractor will be required to comply with CCS to "beyond best practice", scoring at least 35 points and at least 7 points in each section **Evidence** Written confirmation of commitment to scheme, and score to be targeted	2.00	

Construction Site impacts	Man 3	The main contractor will produce a Site Waste Management Plan, monitor site energy and water activities and seek to reduce site waste, and divert waste from land fill. In addition, the main contractor will monitor and report on the consumption of water and energy during construction activities **Evidence** Written commitment to meet specific areas under CSI and produce SWMP and detail expected outcomes	3.00	
Security	Man 4	A requirement to liaise with architectural liaison officer and undertake recommendations that will comply with, and achieve, Secured by Design award. Basement areas are often problematical for SBD so at this stage, the credits are not awarded **Evidence** A written commitment to undertake liaison and comply with outcomes, and to commit to installation of doors and windows compliant with appropriate standards	0.00	**8.00**
		Total (Target 70 - Excellent)		**71.98**

BREEAM ECO Homes

Appendix B

46 Avenue Road, London, NW8 6HS

Issue		Available Scores	Actual Score	Section Score	Section Weighted Score
Ene	1	15.00	7.00		
	2	2.00	1.00		
	3	1.00	1.00		
	4	2.00	2.00		
	5	2.00	2.00		
	6	2.00	2.00	15.00	13.75
Tra	1	2.00	2.00		
	2	2.00	2.00		
	3	3.00	3.00		
	4	1.00	1.00	8.00	8.00
Pol	1	1.00	1.00		
	2	3.00	0.00		
	3	2.00	0.00		
	4	3.00	0.00		
	5	2.00	2.00	3.00	2.73
Mat	1	16.00	12.00		
	2	6.00	4.00		
	3	3.00	2.00		
	4	6.00	6.00	24.00	10.84
Wat	1	5.00	3.00		
	2	1.00	1.00	4.00	6.67
Eco	1	1.00	1.00		
	2	1.00	1.00		
	3	1.00	1.00		
	4	4.00	3.00		
	5	2.00	0.00	6.00	8.00
Hea	1	3.00	3.00		
	2	4.00	4.00		
	3	1.00	1.00	8.00	14.00
Man	1	3.00	3.00		
	2	2.00	2.00		
	3	3.00	3.00		
	4	2.00	0.00	8.00	8.00
Totals		107.00	76.00	76.00	71.98

EcoHomes

EcoHomes 2006 – The Environmental Rating for Homes

Credit Summary Table, Rating and Scoring sheet – 2006/ Issue 1.2

April 2006

bre

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EcoHomes 2006 Credit Summary Table

Issue		Credit	Dwelling Credits achieved	Location
Energy				
Ene1	**CO_2 emission** Credits are awarded to achieve SAP 2005 CO_2 emissions as follows: • Less than or equal to 40 kg/m^2/yr OR • Less than or equal to 35 kg/m^2/yr OR • Less than or equal to 32 kg/m^2/yr OR • Less than or equal to 30 kg/m^2/yr OR • Less than or equal to 28 kg/m^2/yr OR • Less than or equal to 26 kg/m^2/yr OR • Less than or equal to 24 kg/m^2/yr OR • Less than or equal to 22 kg/m^2/yr OR • Less than or equal to 20 kg/m^2/yr OR • Less than or equal to 18 kg/m^2/yr OR • Less than or equal to 15 kg/m^2/yr OR • Less than or equal to 10 kg/m^2/yr OR • Less than or equal to 5 kg/m^2/yr OR • Less than or equal to 0 kg/m^2/yr OR • Less than or equal to -10 kg/m^2/yr Note: -10 kg CO_2/m^2/yr allows for recognition of 'true zero' carbon solutions.	1 2 3 4 5 6 7 8 9 10 11 12 13 14 15	7 max 15	
Ene2	**Building envelope performance** Up to 2 credits awarded where thermal performance based on the Heat Loss Parameter (HLP) method meets the following requirements: **For new build:** • where the HLP is less than or equal to 1.3 W/m^{2}K OR • where the HLP is less than or equal to 1.1 W/m^{2}K	 1 2	 1	

	For refurbishment: • where the HLP is less than or equal to 2.2 W/m^{2}K OR • where the HLP is less than or equal to 1.75 W/m^{2}K	1 2	max 2	
Ene3	**Drying space** Provision of drying space	1	1 max 1	
Ene4	**Eco Labelled white goods** Provision of eco labelled white goods with the following energy ratings: • All fridges, freezers, fridge-freezers with an A* rating • All washing machines, and dishwashers where supplied, with an A rating and washer dryers and tumble dryers with a rating of B or higher OR • No white goods provided but info on Eco labelling	 1 1 1	2 max 2	
Ene5	**Internal Lighting** • Where 40% dedicated low energy lights have been specified. OR • Where 75% dedicated low energy lights have been specified.	1 2	2 max 2	
Ene6	**External Lighting** **Space lighting** • all space lighting is specifically designed to accommodate only compact fluorescent lamps (CFL) **Security lighting** • all intruder lighting to be 150 watts maximum and be fitted with PIR and day light sensor and all other type of security lighting to accommodate CFLs or fluorescent strips only and be fitted with dawn to dusk sensors or timers	1 1	2 max 2	
Total Number of Energy Credits Achieved			15 max 24	

Transport

Tra1	**Public Transport** **Urban and suburban areas** 80% of the development within: • 1000m of a 30 min peak and an hourly off peak service OR	1		2

	• 500m of a 15 min peak and half hourly off peak service **Rural areas** 80% of the development within: • 1000m of an hourly service OR • 500m of an hourly service OR a community bus service	2 1 2		max 2
Tra2	**Cycle storage** Provision of cycle storage for: • 50% of dwellings OR • 95 % of dwellings	1 2	2 max 2	
Tra3	**Local Amenities** Proximity to local amenities: • Within 500m of a food shop and post box • Within 1000m of 5 of the following: food shop* postal facility, bank/ cash machine, pharmacy, primary school, medical centre, leisure centre, community centre, public house, children's play area, place of worship, outdoor open access public area • Safe pedestrian routes to the local amenities * if not used for the 1st credit	1 1 1		3 max 3
Tra4	**Home office** Provision of space, and services, for a home office	1	1 max 1	
Total Number of Transport Credits Achieved			8 max 8	

Pollution

Pol1	**Insulation ODP and GWP** Specifying insulating materials, that avoid the use of ozone depleting substances and have a global warming potential (GWP) of less than 5 (and an ODP of zero), in either manufacture or composition, for the following elements: • Roof (incl. loft hatch) • Wall – internal and external (incl. all doors, lintels and all acoustic insulation). • Floor (incl. foundations) • Hot water cylinder (incl. pipe insulation and other thermal store)	1	1 max 1	

Pol2	**NO_x emissions** 95% of dwellings throughout the development must be served by heating and hot water systems with an average NO_x emission rate of less than or equal to the levels listed below. • Less than or equal to 100 NO_x mg/kWh OR • Less than or equal to 70 NO_x mg/kWh OR • Less than or equal to 40 NO_x mg/kWh	 1 2 3	0 max 3	
Pol3	**Reduction of surface runoff** Where rainwater holding facilities and/or sustainable drainage techniques are used to provide attenuation of water run-off to either natural watercourses and/or municipal drainage systems, by 50%* in areas of low probability of flooding, 75%* in areas of medium flood risk and 100%* in areas of high flood risk, at peak times from: • Hard surface runoff • Roof runoff * Where a statutory body requires a greater attenuation then the higher requirement should be met in order to achieve these credits.	 1 1	0 max 2	
Pol4	**Renewable and Low Emission Energy Source** • Where evidence provided demonstrates that a feasibility study considering renewable and low emission energy has been carried out and the results implemented AND • Where evidence provided demonstrates that the first credit has been achieved and 10% of total energy demand for the development is supplied from local renewable, or low emission energy, sources* OR • Where evidence provided demonstrates that the first credit has been achieved and 15% of total energy demand for the development is supplied from local renewable, or low emission energy, sources*. * In line with the recommendations of the feasibility study.	 1 1 2	0 max 3	
Pol 5	**Flood Risk Mitigation** • Where evidence provided demonstrates that the assessed development is located in a zone defined as having a low annual probability of flooding. OR • Where evidence provided demonstrates that the	 2	2	

	assessed development is located in a zone defined as having a medium annual probability of flooding and the ground level of the building, car parking and access is above the design flood level for the site's location.	1	max 2	
Total Number of Pollution Credits Achieved			3 max 11	

Materials

Mat1	**Environmental Impact of Materials** The following elements obtaining an A rating from the Green Guide for Housing: • Roof • External walls • Internal walls - party walls and internal partitions • Floors • Windows • External surfacing • Boundary protection	 3 3 3 3 2 1 1	12 max 16	
Mat2	**Responsible sourcing of Materials: Basic building elements** Where the majority of materials in the following basic building elements are responsibly sourced: 1. Frame 2. Ground floor 3. Upper floors (including any loft boarding) 4. Roof (structure and cladding) 5. External walls (including external cladding) 6. Internal walls (including internal partitions) 7. Foundation/substructure 8. Staircase (includes the tread, rises and stringers)	 1-6	4 max 6	
Mat3	**Responsible sourcing of Materials: Finishing elements** Where the majority of materials in the following secondary building and finishing elements are responsibly sourced: 1. Stair (including handrails, balustrades, banisters, other guarding/rails(excluding staircase)) 2. Window (including sub-frames, frames, boards, sills) 3. External & internal door: (including sub-frames, frames, linings, door) 4. Skirting (including architrave, skirting board & rails) 5. Panelling (including any other trim) 6. Furniture (including fitted; kitchen, bedroom and bathroom) 7. Facias (soffit boards, bargeboards, gutter boards, others) 8. Any other significant use.	 1-3	2 max 3	

Mat4	**Recycling of Household waste** Storage of recyclable waste: • Provision of internal storage only OR • Provision of external storage (or LA collection) only OR • Provision of internal AND external (or LA collection) storage	 2 2 6	6 max 6	
Total Number of Materials Credits Achieved			24 max 31	

Water

Wat1	**Internal Potable Water Use** • Less than or 52 m^3 per bedspace per year OR • Less than or equal to 47 m^3 per bedspace per year OR • Less than or equal to 42 m^3 per bedspace per year OR • Less than or equal to 37 m^3 per bedspace per year OR • Less than or equal to 32 m^3 per bedspace per year	 1 2 3 4 5	3 max 5	
Wat2	**External Potable Water Use** Rain water collection system for watering gardens and landscaped areas	 1	1 max 1	
Total Number of Water Credits Achieved			4 max 6	

Land Use and Ecology

Eco1	**Ecological value of site** • Building on land which is inherently of low ecological value	 1		1 max 1
Eco2	**Ecological enhancement** • Enhancing the ecological value of the site through consultation with an accredited expert	 1		1 max 1

Eco3	**Protection of ecological features** • Ensuring the protection of any existing ecological features on the site	1		1 max 1
Eco4	**Change of ecological value of site** • A change of between –9 and –3 species OR • A change of between –3 and +3 species OR • A change between +3 and +9 species OR • A change of greater than +9 species	1 2 3 4		3 max 4
Eco5	**Building footprint** • Where the total combined Floor area: Footprint ratio for all houses on the site is greater than 2.5:1 AND • Where the total combined Floor area: Footprint ratio for all flats on the site is greater than 3.5:1 OR • Where the total combined Floor area: Footprint ratio for all dwellings on the site is greater than 3.5:1	1 2	0 max 2	
Total Number of Land Use and Ecology Credits Achieved			6 max 9	

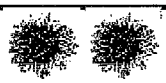
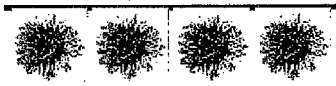
Health and Well Being

Hea1	**Daylighting** Provision of adequate daylighting, according to BS 8206:pt2 in: • In the kitchen • In living rooms, dining rooms and studies • View of sky in all above rooms	1 1 1	3 max 3	
Hea2	**Sound Insulation** Up to 4 credits where pre-completion testing is carried out to comply or improve on performance standards in Approved Document E (2003 Edition, Building Regulations England and Wales).	1-4	4 max 4	
Hea3	**Private space** Provision of private or semi private space	1	1 max 1	

Total Number of Health and Well Being Credits Achieved			8	max 8
Management				
Man 1	**Home User Guide** Where evidence can be provided to demonstrate that there is provision, in each home, of a simple guide that covers information relevant to the 'non-technical' tenant/ occupant on: • The environmental performance of their home • Information relating to the site and surroundings.	2 1	3	max 3
Man 2	**Considerate Constructors** • Demonstrate a commitment to comply with best practice site management principles. OR • Demonstrate a commitment to go significantly beyond best practice site management principles.	1 2		2 max 2
Man 3	**Construction Site Impacts** • Evidence that demonstrates a commitment and a strategy to monitor, sort and recycle construction waste on site. AND • Evidence that demonstrates that 2 or more of a-f listed below are achieved. OR • Evidence that demonstrates that 4 or more of a-f are achieved: a) monitor and report CO_2 or energy arising from site activities b) monitor and report on CO_2 or energy arising from transport to and from site c) monitor water consumption from site activities d) adopt best practice policies in respect of air (dust) pollution arising from the site e) adopt best practice policies in respect of water (ground and surface) pollution occurring on the site f) 80% of site timber is reclaimed, reused or responsibly sourced.	1 1 2		3 max 3

Man 4	**Security** • A commitment to work with an Architectural Liaison Officer and to achieve the Secured by Design award. • Security standards for external doors and windows, to achieve a minimum of either: - LPS1175 SR1 (All doors and windows) OR - PAS24-1 (All external pedestrian doorsets falling within scope of PAS24-1) AND BS7950 (All windows falling within the scope of BS7950)	1 1	0 max 2	
Total Number of Management Credits Achieved			8 max 10	
Total in all Sections			76	

	Issue credits			Weighting Factor	Credits score
	Credits available	No. achieved	% achieved		
ISSUE CATEGORY	1	2	2/1 x100 =3	4	3x4 =5
Energy	24	15	62.50	0.22	13.75
Transport	8	8	100.00	0.08	8.00
Pollution	11	3	27.27	0.10	2.73
Materials	31	24	77.42	0.14	10.84
Water	6	4	66.67	0.10	6.67
Land Use and ecology	9	6	66.67	0.12	8.00
Health and well being	8	8	100.00	0.14	14.00
Management	10	8	80.00	0.10	8.00
Total				1.00	71.98

	Rating	Score
	Pass	36
	Good	48
	Very Good	58
	Excellent	70

Appendix C

SAP – DER Worksheet

46 Avenue Road, London, NW8 6HS

DER WorkSheet: New dwelling design stage

User Details:

Assessor Name:	Neil Ingham	**Stroma Number:**	STRO010943
Software Name:	Stroma FSAP	**Software Version:**	Version: 1.1.0.243

Property Address:

Address : 46, Avenue Road, LONDON, NW8 6HS

1. Overall dwelling dimensions:

	Area(m²)			Ave Height(m)		Vol(m³)	
Ground floor Area	617.37	(1a)	x	2.65	=	1636.03	(1)
First floor Area	224.51	(2a)	x	3.4	=	763.33	(2)
Second floor Area	197.6	(3a)	x	3.15	=	622.44	(3)
Third and Other floors	183.3	(4a)	x	2.8	=	513.24	(4)
Total floor area (1a)+(2a)+(3a)+(4a)+(4b)+(4d)+(4f)+(4h)	1222.78	(5)					
Dwelling volume Area				(1)+(2)+(3)+(4)+(4c)+(4e)+(4g)+(4i)	=	3535.04	(6)

2. Ventilation rate:

			m³ per hour	
Number of chimneys	0	x 40 =	0	(7)
Number of open flues	0	x 20 =	0	(8)
Number of intermittent fans or passive vents	0	x 10 =	0	(9)
Number of flueless gas fires	0	x 40 =	0	(9a)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (7)+(8)+(9)+(9a)	0 ÷box(6)	0	(10)
If a pressurisation test has been carried out, proceed to box (19)			
Number of storeys in the dwelling		0	(11)
Additional infiltration	[(11)-1]x0.1 =	0	(12)
Structural infiltration: 0.25 for steel or timber frame or 0.35 for masonry construction		0	(13)
if both types of wall are present, use the value corresponding to the greater wall area (after deducting areas of openings); if equal user 0.35			
If suspended wooden floor, enter 0.2 (unsealed) or 0.1 (sealed), else enter 0		0	(14)
If no draught lobby, enter 0.05, else enter 0		0	(15)
Percentage of windows and doors draught stripped		0	(16)
Window infiltration	0.25 - [0.2 x Box(16) ÷ 100] =	0	(17)
Infiltration rate	(10)+(12)+(13)+(14)+(15)+(17) =	0	(18)
If based on air permeability value, then [q50 ÷ 20] + (10) in box (19), otherwise (19) = (18)		0.75	(19)
Air permeability value applies if a pressurisation test has been done or a degree air permeability is being used			
Number of sides on which sheltered		3	(20)
(Enter 2 in box (20) for new dwellings where location is not shown)			
Shelter factor	1 - [0.075 x (20)] =	0.78	(21)
Adjusted infiltration rate	(19) x (21) =	0.58	(22)

DER WorkSheet: New dwelling design stage

Calculate effective air change rate for the applicable case

If balanced whole house mechanical ventilation	air throughput (in ach,see 2.6.6) =	0.35	(22a)
If balanced with heat recovery	efficiency in % allowing for in-use factor =	69.7	(22b)
a) If balanced whole house mechanical ventilation with heat recovery	(22) + (22a) x [1-(22b) ÷ 100] =	0.69	(23)
b) If balanced whole house mechanical ventilation without heat recovery	(22) + (22a) =	0	(23a)
c) If whole house extract ventilation or positive input ventilation from outside if (22) < 0.25, then (23b) = 0.5; otherwise (23b) = 0.25 + (22)		0	(23b)
d) If natural ventilation or whole house positive input ventilation from loft if (22) = 1, then (24) = (22); otherwise (24) = 0.5 + [(22)² x 0.5]		0	(24)
Effective air change rate - enter	(23) or (23a) or (23b) or (24) in box (25)	0.69	(25)

3. Heat losses and heat loss parameter:

ELEMENT	Gross area (m²)			U-value		AXU (W/K)	
Doors Type 1	2.64	x		3.1	=	8.184	(26)
Doors Type 2	1.95	x		3.1	=	6.045	(26)
Windows Type 1	6.96	x		1/[1/(2.7)+ 0.04]	=	16.96	(27)
Windows Type 2	8.4	x		1/[1/(2.7)+ 0.04]	=	20.47	(27)
Windows Type 3	2.16	x		1/[1/(2.4)+ 0.04]	=	4.73	(27)
Windows Type 4	1.44	x		1/[1/(2.4)+ 0.04]	=	3.15	(27)
Windows Type 5	7.14	x		1/[1/(2.4)+ 0.04]	=	15.64	(27)
Windows Type 6	1.62	x		1/[1/(2.4)+ 0.04]	=	3.55	(27)
Windows Type 7	4.42	x		1/[1/(2.4)+ 0.04]	=	9.68	(27)
Windows Type 8	1.17	x		1/[1/(2.4)+ 0.04]	=	2.56	(27)
Windows Type 9	13.2	x		1/[1/(1.6)+ 0.04]	=	19.85	(27)
Windows Type 10	17.28	x		1/[1/(1.6)+ 0.04]	=	25.98	(27)
Windows Type 11	7.92	x		1/[1/(2.4)+ 0.04]	=	17.34	(27)
Windows Type 12	1.89	x		1/[1/(2.4)+ 0.04]	=	4.14	(27)
Windows Type 13	20.4	x		1/[1/(2.4)+ 0.04]	=	44.67	(27)
Windows Type 14	6.76	x		1/[1/(2.4)+ 0.04]	=	14.8	(27)
Windows Type 15	1.98	x		1/[1/(2.4)+ 0.04]	=	4.34	(27)
Rooflights Type 1	0.56	x		1/[1/(4.8) + 0.04]	=	2.688	(27b)
Rooflights Type 2	2	x		1/[1/(4.8) + 0.04]	=	9.6	(27b)
Rooflights Type 3	14.1	x		1/[1/(2) + 0.04]	=	28.2	(27b)
Floor	605.97	x		0.17	=	103.0149	(28)
Walls Type1	466.75	x		2.1	=	980.17	(29)
Walls Type2	380.16	x		0.19	=	72.23	(29)
Walls Type3	-0.78	x		0.23	=	-0.18	(29)
Roof Type1	180.74	x		0.13	=	23.83	(30)
Roof Type2	381.58	x		0.16	=	63.31	(30)
Roof Type3	14.3	x		0.18	=	2.57	(30)

DER WorkSheet: New dwelling design stage

Total area of elements, m²		2181.69	(32)
**for windows and rooflights, use effective window U-value calculated as given in paragraph 3.2*			
the above table is expanded as necessary to allow for all different types of element e.g. 6 wall types			
Fabric heat loss, W/K	(26)+(27)+(27a)+(27b)+(28)+(29)+(29a)+(30)+(30a) =	1564.34	(33)
Thermal bridges		327.25	(34)
*if details of thermal bridging are not known calculate y * (32) [see Appendix K] and enter in box (34)*			
Total fabric heat loss	(33) + (34) =	1891.59	(35)
Ventilation heat loss	(25) x 0.33 x (6) =	801.78	(36)
Heat loss coefficient, W/K	(35) + (36) =	2693.37	(37)
Heat loss parameter (HLP), W/m²K	(37) ÷ (5) =	2.2	(38)

4. Water heating energy requirement:

Energy content of hot water used from Table 1 column (b)		4318.68	(39)
Distribution loss from Table 1 column (c)		762.12	(40)
If instantaneous water heating at point of use, enter 0 in boxes (40) to (45)			
For community heating use Table 1 (c) whether or not hot water tank is present			
Water storage loss:			
a) If manufacturer's declared loss factor is known (kWh/day):		2.45	(41)
Temperature factor from Table 2b		0.6	(41a)
Energy lost from water storage, kWh/year	(41) x (41a) x 365 =	536.55	(42)
If manufacturer's declared cylinder loss factor is not known:			
Cylinder volume (litres) including any solar storage within same		600	(43)
If community heating and no tank in dwelling, enter 110 litres in box (43)			
Otherwise if no stored hot water (this includes instantaneous combi boilers) enter '0' in box (43)			
Hot water storage loss factor from Table 2 (kWh/litre/day)		0	(44)
If community heating and no tank in dwelling, use cylinder loss from Table 2 for 50 mm factory insulation			
Volume factor from Table 2a		0	(44a)
Temperature factor from Table 2b		0	(44b)
Energy lost from water storage, kWh/year	((43) x (44) x (44a) x (44b) x 365 =	0	(45)
Enter (42) or (45) in box (46)		536.55	(46)
If dedicated solar storage is within cylinder,	box (47) = (46) x [(43) – (H11)] ÷ (43), else	536.55	(47)
Primary circuit loss from Table 3		0	(48)
Combi loss from Table 3a (enter 0 if not a combi boiler)		0	(49)
Solar DHW input calculated using Appendix H (enter 0 if no solar collector)		0	(50)
Output from water heater, kWh/year	(39)+(40)+(47)+(48)+(49) – (50) =	5617.35	(51)
Heat gains from water heating,	(39)+(40)+(47)+(48)+(49) – (50) =	2118.61	(52)
include (47) in calculation of (52) only if cylinder is in the dwelling or hot water is from community heating			

5. Internal gains:

DER WorkSheet: New dwelling design stage

Lights, appliances, cooking and metabolic (Table 5)		1428	(53)
Reduction of internal gains due to low energy lighting (calculated in Appendix L)		266.09	(53a)
Additional gains from Table 5a		0	(53b)
Water heating	(52) ÷ 8.76 =	241.85	(54)
Total internal gains	(53) + (53b) + (54) - (53a) =	1403.76	(55)

6. Solar gains:

Orientation:	Access Factor Table 6d		Area m²		Flux Table 6a		g_ Table 6b		FF Table 6c		Gains (W)	
Northeast 0.9x	0.77	x	7.92	x	34	x	0.763	x	0.7	=	99.67	(57)
Northeast 0.9x	0.77	x	1.89	x	34	x	0.763	x	0.7	=	214.06	(57)
Northeast 0.9x	0.77	x	20.4	x	34	x	0.763	x	0.7	=	256.72	(57)
Northeast 0.9x	0.77	x	6.76	x	34	x	0.763	x	0.7	=	85.07	(57)
Northeast 0.9x	0.77	x	1.98	x	34	x	0.763	x	0.7	=	24.92	(57)
Southeast 0.9x	0.77	x	17.28	x	64	x	0.79	x	0.7	=	423.82	(59)
Southwest 0.9x	0.77	x	6.96	x	64		0.79	x	0.7	=	170.71	(61)
Southwest 0.9x	0.77	x	8.4	x	64		0.79	x	0.7	=	206.02	(61)
Southwest 0.9x	0.77	x	2.16	x	64		0.76	x	0.7	=	307	(61)
Southwest 0.9x	0.77	x	1.44	x	64		0.76	x	0.7	=	68.22	(61)
Southwest 0.9x	0.77	x	7.14	x	64		0.76	x	0.7	=	169.14	(61)
Southwest 0.9x	0.77	x	1.62	x	64		0.76	x	0.7	=	76.75	(61)
Southwest 0.9x	0.77	x	4.42	x	64		0.76	x	0.7	=	104.7	(61)
Southwest 0.9x	0.77	x	1.17	x	64		0.76	x	0.7	=	27.72	(61)
Southwest 0.9x	0.77	x	13.2	x	64		0.79	x	0.7	=	323.75	(61)
Rooflights 0.9x	1	x	0.56	x	75	x	0.72	x	0.8	=	21.77	(64)
Rooflights 0.9x	1	x	2	x	75	x	0.72	x	0.8	=	77.76	(64)
Rooflights 0.9x	1	x	14.1	x	75	x	0.72	x	0.8	=	548.21	(64)

Total solar gains:	[(56) + ... + (64)] =	3206.01	(65)
Total gains, W	[(56) + ... + (64)] =	4609.78	(66)
Gain/loss ratio (GLR)	(66) ÷ (37) =	1.71	(67)
Utilisation factor (Table 7, using GLR in box (67))		1	(68)
Useful gains, W	(66) x (68) =	4609.65	(69)

7. Mean internal temperature:

		° C	
Mean internal temperature of the living area (Table 8)		18.83	(70)
Temperature adjustment from Table 4e, where appropriate		0	(71)
Adjustment for gains	{[(69) ÷ (37)] - 4.0} x 0.2 x R =	-0.46	(72)

R is obtained from the 'responsiveness' column of Table 4a or Table 4d

DER WorkSheet: New dwelling design stage

Adjusted living room temperature	(70) + (71) + (72) =	18.38	(73)
Temperature difference between zones (Table 9)		2.14	(74)
Living area fraction (0 to 1.0)	living room area ÷ (5) =	0.04	(75)
Rest-of -house fraction	1 - (75) =	0.96	(76)
Mean internal temperature	(73) - [(74) x (76)] =	16.33	(77)

8. Degree days:

Temperature rise from gains	(69) ÷ (37) =	1.71	(78)
Base temperature	(77) - (78) =	14.61	(79)
Degree-days, use box (79) and Table 10		1926.24	(80)

9. Space heating requirement:

Space heating requirement (useful), kWh/year	0.024 x (80) x (37) =	124513.63	(81)

For range cooker boilers where efficiency is obtained from the Boiler Efficiency Database or manufacturer's declared value, multiply the result in box (81) by (1 – Fcase/Fwater) where Fcase is the heat emission from the case of the range cooker at full, load (in kW); and Fwater is the heat transferred to water at full load (in kW). Fcase and Fwater are obtained from the database, record for the range cooker boiler or manufacturer's declared value.

9a. Energy requirements - individual heating systems, including micro-CHP:

Note: when space and water heating is provided by community heating use the alternative worksheet 9b

Space heating:

Fraction of heat from secondary/supplementary system (use value from Table 11, Table 12a or Append		0.1	(82)
Efficiency of main heating system, %		250	(83)

(SEDBUK or from Table 4a or 4b, adjusted where appropriate by the amount shown in the 'efficiency adjustment' column of Table 4c)

Efficiency of secondary/supplementary heating system, % (use value from Table 4a or Appendix E)		65	(84)
Space heating fuel (main) requirement, kWh/year	[1- (82)] x (81) x 100 ÷ (83) =	44824.91	(85)
Space heating fuel (secondary), kWh/year	[(82) x (81) x 100 ÷ (84) =	19155.94	(85a)

Water heating:

Efficiency of water heater, %		100	(86)

(SEDBUK or from Table 4a or 4b, adjusted where appropriate by the amount shown in the 'efficiency adjustment' column of Table 4c)

Energy required for water heating, kWh/year	[(51) x 100 ÷ (86)] =	5617.35	(86a)

Electricity for pumps and fans:

	kWh/year	
each central heating pump, (Table 4f)	0	(87a)
each boiler with a fan-assisted flue (Table 4f)	0	(87b)
warm air heating system fans (Table 4f)	0	(87c)
mechanical ventilation - balanced, extract or positive input from outside (Table 4f)	4945	(87d)
maintaining keep-hot facility for gas combi boiler (Table 4f)	0	(87e)
pump for solar water heating (Table 4f)	0	(87f)
Energy required for water heating, kWh/year (87a) + (87b) + (87c) + (87d) + (87e)+ (87f) =	4945	(87)

12a. CO^2 emissions rate for individual heating systems (including micro-CHP) and community heating without CHP

DER WorkSheet: New dwelling design stage

This page should used when space and water heating is provided by community heating. If boilers or heat pumps only, enter 0 o box (83), and 1.0 in box (84*)*

		Energy kWh/year		Emission factor kg CO²/kWh		Emissions kg CO²/year	
Individual heating system:							
Space heating main from box (85))		44824.91	x	0.42	=	18916.11	(101)
Space heating secondary from box (85a)		19155.94	x	0.03	=	478.9	(102)
Energy for water heating from box (86a)		5617.35	x	0.42	=	2370.52	(103)
Community scheme:							
Efficiency of community boilers % *use actual efficiency if known, or value in Table 4a*						0	(104)
Energy for space heating	(87*) x 100 ÷ (104) =	0	x	0	=	0	(105)
Energy for water heating	(87b*) x 100 ÷ (104) =	0	x	0	=	0	(106)
Space and water heating		[(101) + (102) + (103)] or [(105) + (106)]			=	21765.53	(107)
Electricity for pumps and fans from box (87) or (88*)		4945	x	0.42	=	2086.79	(108)
Energy for lighting from Appendix L		10052.17	x	0.42	=	4242.02	(109)
Energy produced or saved in dwelling		(95) or (95*)	x	0	=	0	(110)
Energy consumed by the above technology		(96) or (96*)	x	0	=	0	(111)
Total CO², kg/year		(107) + (108) + (109) - (110) + (111)			=	28094.34	(112)
Dwelling CO² Emission Rate		(112) ÷ (5) =				22.98	(113)
EI values						70.31	
EI rating						70	
EI band						C	