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LIV INTERNATIONAL

LAND ADJACENT TO MIDDLEFIELD, LONDON, NW8 6NE

ENERGY OPTIONS REPORT

APRIL 2016

	Name	Date
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1. EXECUTIVE SUMMARY

1.1 The following report presents an outline energy options appraisal for the proposed development at Land adjacent to Middlefield, London, NW8 6NE.

1.2 The Appraisal assesses the most appropriate renewable energy technologies for the project, total projected energy demand for the site and the proportion that might be met from appropriate renewable energy supplies.

1.3 The report includes:

- Estimated total operational energy demand for the development based on indicated usage
    - This is 74325 kWh per year
- A brief appraisal of the various renewable energy technologies and their applicability to this development.

By Technology

Solar Thermal

1.4 Solar Thermal systems were found to be unlikely to deliver the required 20% of energy supply due to the limited area of south facing roof in proportion to the scale of hot water demand. They could however contribute a small proportion towards the overall target.

Photovoltaics

1.5 Photovoltaic (PV) was found to be suitable to reduce CO_2 emissions by 20% of total energy demand.

Heat Pumps

1.6 Ground Source Heat Pump technologies could contribute a sizable proportion of the overall energy demands, but CO_2 savings would be unlikely to achieve the required reduction.

Wind Power

1.7 Small scale wind could provide some electrical supply in conjunction with other technologies but the practical output of such systems has been shown to fall short of theoretical power production.

Biomass

1.8 Biomass might be able to provide a significant contribution towards the 20% target, although storage of fuel would present a logistical barrier.

District Heating

1.9 There is no opportunity for district heating adjacent to this development.

Overall

1.10 SAP modelling has shown that the following technology would be the preferred option in contributing to the 20% CO_2 target.

3.4 kWp per property of Photovoltaic Panels:

- Total CO_2 displaced by the above = 4571 $kgCO_2$
- Total CO_2 emissions from development = 22201 $kgCO_2$
- Percentage displaced by the above = 20.59%

2. INTRODUCTION

2.1 Phlorum Ltd were commissioned to provide an energy options appraisal to act as part of a planning submission to London Borough of Camden for the proposed development.

2.2 The aim of this assessment is to show how a 20% reduction in the energy demands for the property, as expressed in CO_2, might be achieved from Renewable Energy Sources.

Method

i. SAP assessments were carried out on the property to derive the energy performance against a preliminary Part L1a compliant building and services specification.

ii. From this bassline, the impact of various renewable energy and low carbon technologies have been evaluated.

2.3 It is assumed that further detailed analysis will be carried out should the planning application be successful.

3. THE SITE

3.1 The proposed development is a three property terrace of 4 storey dwellings consisting of approximately 945m^2 of residential accommodation. The proposed site is in an established urban area and is surrounded by residential property of similar height.

4. ENERGY DEMAND AND CO_2 EMISSIONS

4.1 The properties have been assessed using SAP modelling to show compliance with Part L 2013.

4.2 This resulted in the following two scenarios for energy demands and CO_2 emissions.

Part L Compliance Standards

- Energy Consumption – 74325 kWh per annum
- CO_2 Emissions – 22201 kgCO_2 per annum

Specification

4.3 The Part L Compliance scenario is based on the following specification:

- Thermal bridging;
  Use of Accredited Construction Details for Thermal Bridging
  Lintels achieve Psi Value of 0.05 W/mK
- Air Permeability 5 $m^3/(h.m^2)$ at 50 Pa (with an air pressure test)

External walls

- Uvalue = 0.20 W/mK
- Party Wall – cavity wall filled and sealed

Roof

- Uvalue = 0.16 W/mK

Ground Floor

- Uvalue = 0.16 W/mK
- Door Uvalues = 1.60 W/mK (whole area Uvalue – including frame)
- Window rooflight Uvalues = 1.40 W/mk (whole area Uvalue – including frame)

Lighting

- Internal lighting; Low energy light fittings are installed as follows; 100% light fittings

Heating

- Mains Gas Valliant Ecotec GB 656 boiler: radiator heating with full time and temperature zone control with boiler interlock, delayed start thermostat and flow temperature <= 35 degrees

- Secondary heating – no specified

Hot water

- Cylinder 300 litres, 80mm insulation, pipes insulated, independent time and temperature control
- Water use is assumed to less than 125 litres per person per day – in line with Part G

Ventilation

- 4 extract fans

Total Energy Demand & CO_2 Emissions

Scenario – (Part L Compliance)

- Thermal Consumption = 54038 kWh per year
- Non-thermal Consumption = 20287 kWh per year

Total Energy Demand = 74325 kWh per year
CO_2 Emissions = 22201 kgCO_2 per year

- Appendix 1 provides a summary of SAP workings
- Appendix 2 provides SAP worksheets

5. OPTIONS FOR ENERGY SUPPLY

5.1 The remainder of the report explores how the CO_2 emissions might be reduced by 20% through the implementation of renewable energy technologies.

Bassline

5.2 74325 kWh and 22201 kgCO_2, from the previous selection, are taken as the bassline consumption and emission figures.

Solar Hot Water

5.3 We receive sufficient sunshine to provide up to 70% of our domestic hot water needs from a well designed solar thermal installation.

5.4 There are two main types of systems which could be considered – the flat plate collectors or the evacuated tube collectors. Solar hot water system savings range from around 454 kilowatt hours (kWh)/year/m^2 for flat plate collectors to 582 kWh/year/m^2 for an evacuated tube system.

5.5 Panels for the solar system would be located on the roof close to the calorifiers. The additional roof loadings would require confirmation from Structural Engineers that the roofs would be capable of withstanding the weight imposed by the equipment. For this system all necessary pumping and control equipment would be located adjacent to the calorifiers.

5.6 The topography of a site and its immediate surroundings will influence the potential for solar water heating. Relevant factors such as overshading will compromise efficiencies, but as the buildings surrounding the site are of a similar height there appears to be little potential for overshading from the south by other buildings.

1. Occupancy
   The viability of solar thermal systems is very much influenced by predicted occupancy and use of the property during the summer months. As the property is likely to be fully occupied throughout the year, the demand for domestic hot water would be consistent and suitable for taking advantage of peak solar energy supply in the summer months.

2. Area of collectors

The area of south facing, sloping roof available for solar collectors is more than adequate to provide for the hot water demand of the properties.

5.7 The property was modelled using SAP 2012 software with the following specification of solar thermal panel;

- 4.0m of south facing flat plate solar collector for each dwelling

5.8 This provided the following outcome.

5.9 12m^2 of solar thermal panels could produce 6.23% of energy demands in the property as assessed in kWh or 4.36% as assessed in CO_2 emissions.

5.10 Appendix 1 provides a summary of SAP workings, showing how the % reduction figures have been arrived at.

5.11 Appendix 2 shows SAP worksheet for Solar Hot Water modelling.

5.12 Further information on solar hot water systems and installers can be found at the; Solar Trade Association (www.solartradeassociation.org.uk).

Photovoltaics

5.13 Photovoltaic systems generate electricity from the sun with any excess generation having the potential to be sold to the National Grid. Ideally photovoltaic panels should face between south-east and south-west at an elevation of about 30-40 degrees.

5.14 The average installed cost is around £1,000 to £2,000 per kWp (KiloWatt Peak), with a 1kWp system generating 700 – 750 kWh of electricity per year and taking between 8 and 10m^2 of panel area.

5.15 SAP modelling has shown that 3.4kWp of Polycrystalline PV panels per property, would contribute 11.85% of total energy demands in kWh or 20.59% when measured in CO_2 emissions.

5.16 PV could play a significant role in achieving the 20% target.

5.17 Appendix 1 provides a summary of SAP workings, showing how the % reduction figures have been arrived at.

5.18 Appendix 2 shows SAP worksheet for Solar photovoltaic.

Heat Pump Technology

5.19 Ground source heat pumps are used to extract heat from the ground to provide space and water heating. Similarly, Air Source Heat Pumps are used to take heat from the air.

5.20 Heat pumps take in heat at a low temperature and release it at a higher temperature. The measure of efficiency is given by the Co-efficient of Performance (CoP), which is defined as the ratio of heat output divided by energy input.

5.21 Heat pumps provide water for heating and/or hot water service. The temperature of the water they supply varies between 35ºC and 55ºC although some models exist which can exceed this. This system is suitable for underfloor heating systems and for providing initial heating for a HWS calorifier. A Heat Pump system may also need to be supplemented by heating either from gas or electricity but this would depend on the system design.

5.22 For many heat pump systems, supplementary heating would be required in order to enable the HWS water to be stored at 65ºC in order to comply with current Legionella requirements. Although this would again come down to the choice of system as some are capable of achieving higher temperatures.

5.23 While many heat pumps use electricity, the renewable energy component is considered as the heat extracted from the heat source (e.g. ground), less the primary energy input.

5.24 For this development heat pumps might be used to supply energy for hot water provision and space heating.

Ground Source Heat Pump

5.25 Modelling the property with SAP shows that 51.95% of energy demand could be delivered by GSHP with Co-efficient of Performance (CoP) = 3.2 when measured as kWh but only 16.52% when measured as CO_2.

5.26 This is because the ratio of renewable heat gained from GSHP to electricity used (~3.0:1) is similar to the ratio of CO_2 emitted from gas when compared with electricity (2.6:1). Therefore, while less kWh of electricity are consumed compared with kWh of gas in the baseline scenario, the emissions associated with the production of electricity almost outweigh the benefits.

5.27 While providing a proportion of total energy demand from heat pump technologies would be viable, achieving the 20% renewable target would be less well suited to this technology.

5.28 In addition, there would be difficulty in finding adequate heat sources due to the lack of ground area around the property. Given the physical restrictions of this site it is unlikely that these boreholes could be located within the development boundaries.

5.29 Appendix 1 provides a summary of SAP workings, showing how the % reduction figures have been arrived at.

5.30 Appendix 2 shows SAP worksheet for Ground Source Heat Pump modelling.

Air Source Heat Pump

5.31 Modelling the property with SAP shows that 44.80% of energy demand could be delivered by ASHP when measured as kWh but CO_2 emissions would increase by 4.09%.

5.32 This is because the ratio of renewable heat gained from ASHP to electricity used (~2.0:1) is less than the ratio of CO_2 emitted from gas when compared with electricity (2.6:1). Therefore, while less kWh of electricity is consumed compared with kWh of gas in the baseline scenario, the emissions associated with the production of electricity outweigh the benefits.

5.33 ASHP would not be suitable for this property.

5.34 Appendix 1 provides a summary of SAP workings, showing how the % reduction figures have been arrived at.

5.35 Appendix 2 shows SAP worksheet for Air Source Heat Pump modelling.

5.36 For further information on Ground Source Heat Pumps you could contact:

The National Energy Foundation
The National Energy Centre
Davy Avenue
Knowlhill
Milton Keynes. MK5 8NG
www.gshp.org.uk

The UK Heat Pump Network
www.heatpumpnet.org.uk

The Heat Pump Association
www.feta.co.uk/hpa/

Small Scale Wind

5.37 Wind energy is one of the most cost effective methods of renewable power generation. The electricity can either link to the grid or charge batteries. Wind turbines work best in open areas and are less viable in high density urban areas. Small turbines can be mounted on building roofs, although this would require the involvement of structural engineers to ensure turbine loads would be supported on the building structure.

5.38 Recent research has shown that the output from urban wind turbines generally doesn't fulfil theoretical potential. This should be considered if pursuing this technology.

5.39 Wind turbines are visible and as such provide a visible sign of a commitment to sustainable energy.

5.40 The viability of wind energy is largely determined by the wind speed and quality at a given site.

5.41 It is highly likely that localised turbulence in and around the site would produce yields significantly lower than those suggested on the Department of Energy & Climate Change website.

5.42 If this option was to be taken further, measurement of wind on site would have to be carried out rather than basing assessment on database figures.

5.43 It is extremely unlikely that wind turbines would make any meaningful contribution toward the 20% reduction in CO_2 emissions from this development.

Biomass

5.44 Biomass can be burnt directly to provide heat in buildings. Wood can come in the form of logs, chips or pellets, with the latter having the greatest energy density and their associated boiler having the greatest controllability and potential for automatic feeding. Biomass is normally considered a carbon neutral fuel as the carbon dioxide emitted on burning has been recently absorbed from the atmosphere.

5.45 Biomass heating can theoretically be used in any building requiring heat however, there are some practicality issues in relation to storage of fuel.

5.46 SAP modelling provided the following outcome. It would provide 76% of total energy demand in kWh or provide a 41.04% reduction in CO_2.

5.47 20% of the total energy demand could be achieved by installing a biomass boiler.

5.48 A limiting factor for this development is likely to be space for the storage of biofuel.

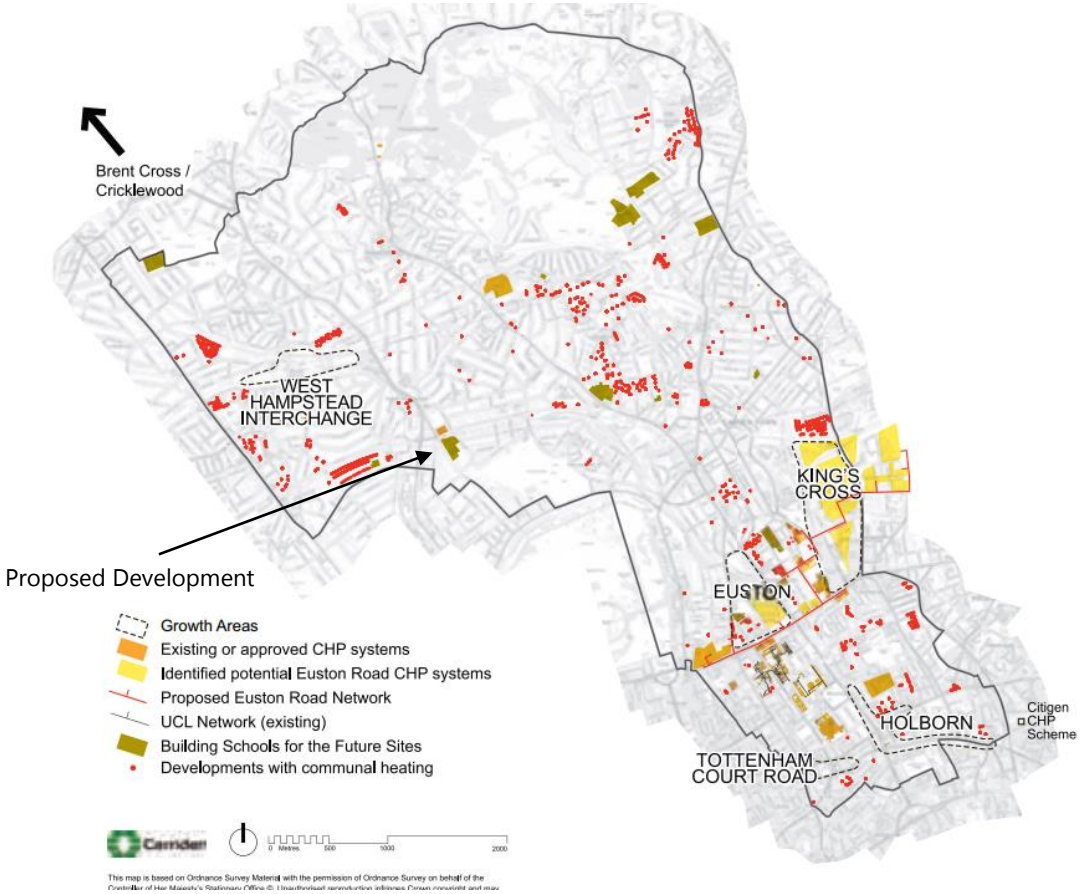
5.49 It would appear from the site that storage fuel is likely to present a problem and biomass is unlikely to reduce CO_2 emissions by 20%.

5.50 Appendix 1 provides a summary of SAP workings, showing how the % reduction figures have been arrived at.

5.51 Appendix 2 shows SAP worksheet for Biomass modelling.

District Heating

5.52 There are no district heating mains in the vicinity of the development. The following map shows existing community heating sites. The arrow highlights the location of the proposed development.


Brent Cross /
Cricklewood
WEST
HAMPSTEAD
INTERCHANGE
KING'S
CROSS
EUSTON
HOLBORN
Citigen
CHP
Scheme
TOTTENHAM
COURT ROAD
Proposed Development
Growth Areas
Existing or approved CHP systems
Identified potential Euston Road CHP systems
Proposed Euston Road Network
UCL Network (existing)
Building Schools for the Future Sites
Developments with communal heating

6. CONCLUSION

6.1 The thermal and electrical demands of the project have been derived using SAP modelling and from this the outline viability of various RE technologies has been considered.

By Technology

Solar Thermal

6.2 Solar Thermal systems were found to be unlikely to deliver the required 20% of energy supply due to the limited area of south facing roof in proportion to the scale of hot water demand. They could however contribute a small proportion towards the overall target.

Photovoltaics

6.3 Photovoltaic (PV) was found to be suitable to reduce CO_2 emissions by 20% of total energy demand.

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6.4 Ground Source Heat Pump technologies could contribute a sizable proportion of the overall energy demands, but CO_2 savings would be unlikely to achieve the required reduction.

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6.5 Small scale wind could provide some electrical supply in conjunction with other technologies but the practical output of such systems has been shown to fall short of theoretical power production.

Biomass

6.6 Biomass might be able to provide a significant contribution towards the 20% target, although storage of fuel would present a logistical barrier.

District Heating

6.7 There is no opportunity for district heating adjacent to this development.

Overall

6.8 SAP modelling has shown that the following technology would be the preferred option in contributing to the 20% CO_2 target.

6.9 3.4 kWp per property of Photovoltaic Panels

- Total CO_2 displaced by the above = 4571 $kgCO_2$
- Total CO_2 emissions from development = 22201 $kgCO_2$
- Percentage displaced by the above = 20.59%

7. ASSUMPTIONS

7.1 The outcomes of this report are based on the assumption that further detailed analysis will be carried out should the planning application be successful.

7.2 The calculation of energy demand has been based on Part L1A compliance.

8. REFERENCES

- SAP 2012 Modelling software
  London Borough of Camden Policy CS13

Appendix 1

SAP Workings

APPENDIX 1 SAP Workings

Part L Compliant

Survey reference	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
Left	339.84	16051.89	2937.12	75.00	840.67	N/A	19904.68	3467.21	634.42	38.93	436.31	4576.86	8.54	2902.34	0.58	195.41	22.59	22.59	7674.60
Mid	305.50	13134.65	2924.83	75.00	786.35	N/A	16920.83	2837.08	631.76	38.93	408.11	3915.89	8.98	2741.89	0.64	194.33	22.43	22.43	6852.11
Right	339.84	16051.89	2937.12	75.00	840.67	N/A	19904.68	3467.21	634.42	38.93	436.31	4576.86	8.54	2902.34	0.58	195.41	22.59	22.59	7674.60
Total	985.18	45238.43	8799.07	225.00	2467.68	0.00	56730.18	9771.50	1900.60	116.78	1280.73	13069.60	26.06	8546.56	1.79	585.14	67.60	67.60	22201.31

elec conv	Energy from cooking	Energy From Appliance	Total Thermal	Total Non-thermal	Total kWh
0.519	376.5087	5592.169	54037.50	20287.49	74325.00
0.519	374.4288	5283.031			
Total	1127.446	16467.37			

APPENDIX 1 SAP Workings

Part L Compliant

Survey reference	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	CO2 savings from energy saving technologies	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
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Mid	305.50	13134.65	2924.83	75.00	786.35	N/A	16920.83	2837.08	631.76	38.93	408.11	0.00	3915.89	8.98	2741.89	0.64	194.33	22.43	22.43	6852.11
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Total	985.18	45238.43	8799.07	225.00	2467.68	0.00	56730.18	9771.50	1900.60	116.78	1280.73	0.00	13069.60	26.06	8546.56	1.79	585.14	67.60	67.60	22201.31

	elec conv	Energy from cooking	Energy From Appliance
	0.519	376.5087	5592.169
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Total		1127.446	16467.37

	Total Thermal	Total Non-thermal	Total
	54037.50	20287.49	74325.00

Solar Thermal 4 m2

Solar Left	339.84	16173.28	1199.14	125	840.6659	N/A	18338.09	3493.429	259.0143	64.875	436.3056	0	4253.623	8.5403	2902.34	0.58	195.41	19.95	19.95	7351.37
Solar Mid	305.5	13253.28	1190.903	125	786.3483	N/A	15355.53	2862.708	257.2351	64.875	408.1148	0	3592.932	8.9751	2741.89	0.64	194.33	20.08	20.08	6529.15
Solar Right	339.84	16173.28	1199.14	125	840.6659	N/A	18338.09	3493.429	259.0143	64.875	436.3056	0	4253.623	8.5403	2902.34	0.58	195.41	19.95	19.95	7351.37
Total	985.18	45599.84	3589.18	375.00	2467.68	0.00	52031.70	9849.56	775.26	194.63	1280.73	0.00	12100.18	26.06	8546.56	1.79	585.14	59.97	59.97	21231.89

	Total CO2 Part L	Total CO2 PV	Difference in CO2 from Part L to PV	% Reduction
Left	7674.60	7351.37	323.23	4.21
Mid	6852.11	6529.15	322.96	4.71
Right	7674.60	7351.37	323.23	4.21
Total	22201.31	21231.89	969.42	4.37

	Total Thermal	Total Non-thermal	Total
	49189.02	20437.49	69626.51

reduction in kWh	4698.48
% reduction in kWh	6.321539

APPENDIX 1 SAP Workings

Part L Compliant

Survey reference	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	CO2 savings from energy saving technologies	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
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Total	985.18	45238.43	8799.07	225.00	2467.68	0.00	56730.18	9771.50	1900.60	116.78	1280.73	0.00	13069.60	26.06	8546.56	1.79	585.14	67.60	67.60	22201.31

	elec conv	Energy from cooking	Energy From Appliance
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Total		1127.446	16467.37

	Total Thermal	Total Non-thermal	Total kWh
	54037.50	20287.49	74325.00

PV Panels 3.4kWp L & R & Mid

PV Left	339.84	16051.89	2937.117	75	840.6659	-2936.31	16968.37	3467.209	634.4173	38.925	436.3056	-1523.94	3052.914	8.5403	2902.34	0.58	195.41	19.95	19.95	6150.66
PV Mid	305.5	13134.65	2924.835	75	786.3483	-2936.31	13984.52	2837.083	631.7643	38.925	408.1148	-1523.94	2391.944	8.9751	2741.89	0.64	194.33	19.49	19.49	5328.17
PV Right	339.84	16051.89	2937.117	75	840.6659	-2936.31	16968.37	3467.209	634.4173	38.925	436.3056	-1523.94	3052.914	8.5403	2902.34	0.58	195.41	19.95	19.95	6150.66
Total	985.18	45238.43	8799.069	225	2467.68	-8808.92	47921.26	9771.502	1900.599	116.775	1280.726	-4571.83	8497.772	26.0557	8546.564	1.7861	585.1446	59.3818	59.3818	17629.48

	Total CO2 Part L	Total CO2 PV	Difference in CO2 from Part L to PV	% Reduction
Left	7674.60	6150.66	1523.94	19.85697
Mid	6852.11	5328.17	1523.94	22.2405
Right	7674.60	6150.66	1523.94	19.85697
Total	22201.31	17629.48	4571.83	**20.59261**

	Total Thermal	Total Non-thermal	Total
	54037.50	20287.49	74325.00
reduction in kWh		8808.92	
% reduction in kWh		11.85	

APPENDIX 1 SAP Workings

Part L Compliant

Survey reference	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	CO2 savings from energy saving technologies	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
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0.519	374.4288	5283.031
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Total	1127.446	16467.37

Total Thermal	Total Non-thermal	Total
54037.50	20287.49	74325.00

Ground Source Heat Pump

GSHP Left	339.84	4382.011	1103.05	0	840.6659	N/A	6325.726	2274.263	572.4829	0	436.3056	0	3283.052	8.5403	2902.34	0.58	195.41	19.95	19.95	6380.80
GSHP Mid	305.5	3584.464	1094.378	0	786.3483	N/A	5465.191	1860.337	567.9824	0	408.1148	0	2836.434	8.9751	2741.89	0.64	194.33	20.08	20.08	5772.66
GSHP Right	339.84	4382.011	1103.05	0	840.6659	N/A	6325.726	2274.263	572.4829	0	436.3056	0	3283.052	8.5403	2902.34	0.58	195.41	19.95	19.95	6380.80
Total	985.18	12348.49	3300.48	0.00	2467.68	0.00	18116.64	6408.86	1712.95	0.00	1280.73	0.00	9402.54	26.06	8546.56	1.79	585.14	59.97	59.97	18534.25

	Total CO2 Part L	Total CO2 GSHP	Difference in CO2 from Part L to GSHP	% Reduction
Left	7674.60	6380.80	1293.81	16.86
Mid	6852.11	5772.66	1079.45	15.75
Right	7674.60	6380.80	1293.81	16.86
Total	22201.31	18534.25	3667.06	16.52

Total Thermal	Total Non-thermal	Total
15648.96	20062.49	35711.46

reduction in kWh	38613.54
% reduction in kWh	51.95

APPENDIX 1 SAP Workings

Part L Compliant

Survey reference	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	CO2 savings from energy saving technologies	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
Left	339.84	16051.89	2937.12	75.00	840.67	N/A	19904.68	3467.21	634.42	38.93	436.31	0.00	4576.86	8.54	2902.34	0.58	195.41	22.59	22.59	7674.60
Mid	305.50	13134.65	2924.83	75.00	786.35	N/A	16920.83	2837.08	631.76	38.93	408.11	0.00	3915.89	8.98	2741.89	0.64	194.33	22.43	22.43	6852.11
Right	339.84	16051.89	2937.12	75.00	840.67	N/A	19904.68	3467.21	634.42	38.93	436.31	0.00	4576.86	8.54	2902.34	0.58	195.41	22.59	22.59	7674.60
Total	985.18	45238.43	8799.07	225.00	2467.68	0.00	56730.18	9771.50	1900.60	116.78	1280.73	0.00	13069.60	26.06	8546.56	1.79	585.14	67.60	67.60	22201.31

	elec conv	Energy from cooking	Energy From Appliance
	0.519	376.5087	5592.169
	0.519	374.4288	5283.031
	0.519	376.5087	5592.169
Total		1127.446	16467.37

Total Thermal	Total Non-thermal	Total
54037.50	20287.49	74325.00

Air Source Heat Pump

ASHP Left	339.84	5341.597	2007.616	0	840.6659	N/A	8189.879	2772.289	1041.952	0	436.3056	0	4250.547	8.5403	2902.34	0.58	195.41	19.95	19.95	7348.29
ASHP Mid	305.5	4271.736	1993.637	0	786.3483	N/A	7051.722	2217.031	1034.698	0	408.1148	0	3659.844	8.9751	2741.89	0.64	194.33	20.08	20.08	6596.07
ASHP Right	339.84	5341.597	2007.616	0	840.6659	N/A	8189.879	2772.289	1041.952	0	436.3056	0	4250.547	8.5403	2902.34	0.58	195.41	19.95	19.95	7348.29
Total	985.18	14954.93	6008.87	0.00	2467.68	0.00	23431.48	7761.61	3118.60	0.00	1280.73	0.00	12160.94	26.06	8546.56	1.79	585.14	59.97	59.97	21292.65

	Total CO2 Part L	Total CO2 ASHP	Difference in CO2 from Part L to ASHP	% Reduction
Left	7674.60	7348.29	326.31	4.25
Mid	6852.11	6596.07	256.04	3.74
Right	7674.60	7348.29	326.31	4.25
Total	22201.31	21292.65	908.66	4.09

Total Thermal	Total Non-thermal	Total
20963.80	20062.49	41026.29

reduction in kWh	33298.70
% reduction in kWh	44.80

APPENDIX 1 SAP Workings

Part L Compliant

Survey reference	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
Left	339.84	16051.89	2937.12	75.00	840.67	N/A	19904.68	3467.21	634.42	38.93	436.31	4576.86	8.54	2902.34	0.58	195.41	22.59	22.59	7674.60
Mid	305.50	13134.65	2924.83	75.00	786.35	N/A	16920.83	2837.08	631.76	38.93	408.11	3915.89	8.98	2741.89	0.64	194.33	22.43	22.43	6852.11
Right	339.84	16051.89	2937.12	75.00	840.67	N/A	19904.68	3467.21	634.42	38.93	436.31	4576.86	8.54	2902.34	0.58	195.41	22.59	22.59	7674.60
Total	985.18	45238.43	8799.07	225.00	2467.68	0.00	56730.18	9771.50	1900.60	116.78	1280.73	13069.60	26.06	8546.56	1.79	585.14	67.60	67.60	22201.31

	elec conv	Energy from cooking	Energy From Appliance
	0.519	376.5087	5592.169
	0.519	374.4288	5283.031
	0.519	376.5087	5592.169
Total		1127.446	16467.37

	Total Thermal	Total Non-thermal	Total
	54037.50	20287.49	74325.00

Biomass

	Total floor area	Main Heating 1 fuel requirement	Water Heating fuel requirement	Pumps and fans requirement	Lighting requirement	Electricity generated by PV	Total delivered energy	CO2 from Main Heating 1	CO2 from DHW	CO2 from pumps and fans	CO2 from lighting	Total regulated kg/year	CO2 from Appliances kg/m2/year	CO2 from Appliances kg/year	CO2 from Cooking kg/m2/yr	CO2 from Cooking kg/yr	Net CO2 emissions	Total CO2 emissions	Total CO2 Reg & non reg
Bio Left	339.84	20541.32	3194.518	30	840.6659	N/A	24606.5	801.1114	124.5862	15.57	436.3056	1377.573	8.5403	2902.34	0.58	195.41	19.95	19.95	4475.32
Bio Mid	305.5	16778.99	3172.275	30	786.3483	N/A	20767.62	654.3807	123.7187	15.57	408.1148	1201.784	8.9751	2741.89	0.64	194.33	20.08	20.08	4138.01
Bio Right	339.84	20541.32	3194.518	30	840.6659	N/A	24606.5	801.1114	124.5862	15.57	436.3056	1377.573	8.5403	2902.34	0.58	195.41	19.95	19.95	4475.32
Total	985.18	57861.63	9561.31	90.00	2467.68	0.00	69980.62	2256.60	372.89	46.71	1280.73	3956.93	26.06	8546.56	1.79	585.14	59.97	59.97	13088.64

	Total CO2 Part L	Total CO2 Biomass	Difference in CO2 from Part L to Biomass	% Reduction
Left	7674.60	4475.32	3199.28	41.69
Mid	6852.11	4138.01	2714.10	39.61
Right	7674.60	4475.32	3199.28	41.69
Total	22201.31	13088.64	9112.67	41.05

	Total Thermal	Total Non-thermal	Total
	67422.94	20152.49	87575.43

reduction in kWh	-13250.44
% reduction in kWh	-17.83
biomas % of energy demand	76.99

Appendix 2

SAP Worksheets

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Left
Survey Reference: 01 Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	87 B	**CO2 Emissions (t/year):**	3.79	**DER:**	13.47 Pass	**TER:**	13.48	**Percentage DER<TER:**	0.05 %
Environmental:	85 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	13.48 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	13.47 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%

Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Left
Survey Reference: 01 Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 87 B **CO2 Emissions (t/year):** 3.79 **DER:** 13.47 Pass **TER:** 13.48 **Percentage DER<TER:** 0.05 %
Environmental: 85 B **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 91	B 88

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Mid
Survey Reference: 01 Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	3.22	**DER:**	12.82 Pass	**TER:**	12.89	**Percentage DER<TER:**	0.54 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:**	44.83 Pass	**TFEE:**	51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	12.89 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	12.82 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.30 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	44.83 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%

Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	36.96 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Mid
Survey Reference: 01 Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 88 B **CO2 Emissions (t/year):** 3.22 **DER:** 12.82 Pass **TER:** 12.89 **Percentage DER<TER:** 0.54 %
Environmental: 86 B **General Requirements Compliance:** Pass **DFEE:** 44.83 Pass **TFEE:** 51.30 **Percentage DFEE<TFEE:** 12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	27.00	91.80	2.60
1st Storey:	27.00	68.72	3.20
2nd Storey:	27.00	72.49	3.00
3rd Storey:	27.00	72.49	2.90

7.0 Living Area 64.78

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		70.20	70.20
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		245.70	206.85

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		131.30

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		91.80	87.96

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		91.80

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					36.96	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No

17.0 Thermal Bridging: Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	17.70	0.050	Yes
Table K1 - Approved	E3 Sill	16.80	0.040	Yes
Table K1 - Approved	E4 Jamb	65.80	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	Yes
Table K1 - Approved	E6 Intermediate floor within a dwelling	54.00	0.070	No
Table K1 - Default	E15 Flat roof with parapet	27.00	0.560	No
Table K1 - Approved	E18 Party wall between dwellings	46.80	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	10.58	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	21.48	0.000	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	

19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00

External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	

29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 91	B 90

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Right
Survey Reference: 01 Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	87 B	**CO2 Emissions (t/year):**	3.79	**DER:**	13.47 Pass	**TER:**	13.48	**Percentage DER<TER:**	0.05 %
Environmental:	85 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	13.48 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	13.47 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%

Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Right
Survey Reference: 01 Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 87 B **CO2 Emissions (t/year):** 3.79 **DER:** 13.47 Pass **TER:** 13.48 **Percentage DER<TER:** 0.05 %
Environmental: 85 B **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 91	B 88

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Left
Survey Reference: Solar Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	3.46	**DER:** 12.52 Pass	**TER:** 13.48	**Percentage DER<TER:**	7.09 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	13.48 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	12.52 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

Solar water heating

Dedicated solar storage volume:	150 litres	
Minimum:	88 litres	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Solar water heating	

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Left
Survey Reference: Solar Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	3.46	**DER:** 12.52 Pass	**TER:** 13.48	**Percentage DER<TER:**	7.09 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	Yes
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	4.00
Area Type	Aperture
Panel Type	Flat plate, glazed
n0, a1, a2, A/G ratio	0.75, 6.00, 0.0050, 0.90
Orientation	South
Elevation	30°
Overshading	None Or Little
Solar Storage Volume	150.00
Pump electrically powered	Yes
Combined Cylinder	Yes
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 91	B 89

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Mid
Survey Reference: Solar Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	2.89	**DER:**	11.76 Pass	**TER:**	12.89	**Percentage DER<TER:**	8.76 %
Environmental:	87 B	**General Requirements Compliance:**	Pass	**DFEE:**	44.83 Pass	**TFEE:**	51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	12.89 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	11.76 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.30 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	44.83 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

Solar water heating

Dedicated solar storage volume:	150 litres	
Minimum:	87 litres	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	36.96 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Solar water heating	

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Mid
Survey Reference: Solar Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	2.89	**DER:**	11.76 Pass	**TER:**	12.89	**Percentage DER<TER:**	8.76 %
Environmental:	87 B	**General Requirements Compliance:**	Pass	**DFEE:**	44.83 Pass	**TFEE:**	51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	27.00	91.80	2.60
1st Storey:	27.00	68.72	3.20
2nd Storey:	27.00	72.49	3.00
3rd Storey:	27.00	72.49	2.90

7.0 Living Area	64.78
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		70.20	70.20
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		245.70	206.85

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		131.30

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		91.80	87.96

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		91.80

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					36.96	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No

17.0 Thermal Bridging: Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	17.70	0.050	Yes
Table K1 - Approved	E3 Sill	16.80	0.040	Yes
Table K1 - Approved	E4 Jamb	65.80	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	Yes
Table K1 - Approved	E6 Intermediate floor within a dwelling	54.00	0.070	No
Table K1 - Default	E15 Flat roof with parapet	27.00	0.560	No
Table K1 - Approved	E18 Party wall between dwellings	46.80	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	10.58	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	21.48	0.000	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	

19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00

External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	Yes
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	

29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	4.00
Area Type	Aperture
Panel Type	Flat plate, glazed
n0, a1, a2, A/G ratio	0.75, 6.00, 0.0050, 0.90
Orientation	South
Elevation	30°
Overshading	None Or Little
Solar Storage Volume	150.00
Pump electrically powered	Yes
Combined Cylinder	Yes
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	A 92	B 91

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Right
Survey Reference: Solar Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	3.46	**DER:** 12.52 Pass	**TER:** 13.48	**Percentage DER<TER:**	7.09 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	13.48 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	12.52 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

Solar water heating

Dedicated solar storage volume:	150 litres	
Minimum:	88 litres	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Solar water heating	

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Right
Survey Reference: Solar Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 88 B **CO2 Emissions (t/year):** 3.46 **DER:** 12.52 Pass **TER:** 13.48 **Percentage DER<TER:** 7.09 %
Environmental: 86 B **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	Yes
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	4.00
Area Type	Aperture
Panel Type	Flat plate, glazed
n0, a1, a2, A/G ratio	0.75, 6.00, 0.0050, 0.90
Orientation	South
Elevation	30°
Overshading	None Or Little
Solar Storage Volume	150.00
Pump electrically powered	Yes
Combined Cylinder	Yes
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 91	B 89

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Left
Survey Reference: PV Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	93 A	**CO2 Emissions (t/year):**	2.18	**DER:** 8.98 Pass	**TER:** 13.48	**Percentage DER<TER:**	33.36 %
Environmental:	91 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	13.48 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	8.98 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%

Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Photovoltaic array	

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Left
Survey Reference: PV Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 93 A **CO2 Emissions (t/year):** 2.18 **DER:** 8.98 Pass **TER:** 13.48 **Percentage DER<TER:** 33.36 %
Environmental: 91 B **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	One Dwelling
Apportioned KWh/Year	

PV Cells kW Peak	Orientation	Elevation	Overshading
3.40	South	30°	None Or Little

34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

None

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Mid
Survey Reference: PV Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	94 A	**CO2 Emissions (t/year):**	1.61	**DER:** 7.83 Pass	**TER:** 12.89	**Percentage DER<TER:**	39.25 %
Environmental:	92 A	**General Requirements Compliance:**	Pass	**DFEE:** 44.83 Pass	**TFEE:** 51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	12.89 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	7.83 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.30 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	44.83 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%

Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	36.96 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Photovoltaic array	

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Mid
Survey Reference: PV Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 94 A **CO2 Emissions (t/year):** 1.61 **DER:** 7.83 Pass **TER:** 12.89 **Percentage DER<TER:** 39.25 %
Environmental: 92 A **General Requirements Compliance:** Pass **DFEE:** 44.83 Pass **TFEE:** 51.30 **Percentage DFEE<TFEE:** 12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	27.00	91.80	2.60
1st Storey:	27.00	68.72	3.20
2nd Storey:	27.00	72.49	3.00
3rd Storey:	27.00	72.49	2.90

7.0 Living Area 64.78

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		70.20	70.20
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		245.70	206.85

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		131.30

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		91.80	87.96

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		91.80

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					36.96	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No

17.0 Thermal Bridging: Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	17.70	0.050	Yes
Table K1 - Approved	E3 Sill	16.80	0.040	Yes
Table K1 - Approved	E4 Jamb	65.80	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	Yes
Table K1 - Approved	E6 Intermediate floor within a dwelling	54.00	0.070	No
Table K1 - Default	E15 Flat roof with parapet	27.00	0.560	No
Table K1 - Approved	E18 Party wall between dwellings	46.80	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	10.58	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	21.48	0.000	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	

19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00

External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	

29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	

31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	

32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	One Dwelling
Apportioned KWh/Year	

PV Cells kW Peak	Orientation	Elevation	Overshading
3.40	South	30°	None Or Little

34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations
None

Further measures to achieve even higher standards
None

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Right
Survey Reference: PV Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	93 A	**CO2 Emissions (t/year):**	2.18	**DER:**	8.98 Pass	**TER:**	13.48
Environmental:	91 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53

Percentage DER<TER: 33.36 %
Percentage DFEE<TFEE: 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Mains gas	
Fuel factor:	1.00 (mains gas)	
Target Carbon Dioxide Emission Rate (TER)	13.48 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	8.98 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoTEC VU GB 656/4-5-H Efficiency: 88.7% SEDBUK2009 Minimum: 88.0%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Nominal cylinder loss: 2.55 kWh/day Permitted by DBSCG 2.86	OK
Primary pipework insulated:	Yes	OK

6 Controls

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

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%

Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Photovoltaic array	

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Right
Survey Reference: PV Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 93 A **CO2 Emissions (t/year):** 2.18 **DER:** 8.98 Pass **TER:** 13.48 **Percentage DER<TER:** 33.36 %
Environmental: 91 B **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	15993
Fuel Type	Mains gas
Main Heating	BGB
TestMethod	
SAP Code	102
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	89.7
In Summer	79.0
Model Name	
Manufacturer	
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	Balanced
Smoke Control Area	
Fan Assisted Flue	Yes
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Foam
Insulation Thickness	
Cylinder Volume	300.00
Loss (kwh/day)	
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	One Dwelling
Apportioned KWh/Year	

PV Cells kW Peak	Orientation	Elevation	Overshading
3.40	South	30°	None Or Little

34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

None

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Left
Survey Reference: GSHP Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	2.77	**DER:**	9.66 Pass	**TER:**	20.04	**Percentage DER<TER:**	51.79 %
Environmental:	89 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Electricity	
Fuel factor:	1.55 (electricity)	
Target Carbon Dioxide Emission Rate (TER)	20.04 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	9.66 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Heat pump with radiators or underfloor - Electric Vaillant geoTHERM exclusive 10 kW VWS 103/2	
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		

Overshading:	Average
Windows facing South:	39.60 m^2, No overhang
Air change rate:	8.00 ach
Blinds/curtains:	None

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Left
Survey Reference: GSHP Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	2.77	**DER:**	9.66 Pass	**TER:**	20.04	**Percentage DER<TER:**	51.79 %
Environmental:	89 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area	61.38
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	100083
Fuel Type	Electricity
Main Heating	PER
TestMethod	
SAP Code	221
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	436.1
In Summer	202.5
Model Name	
Manufacturer	
Controls	CHD Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	
Sap Code	2207
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Internal Store
Cylinder Stat	
Cylinder In Heated Space	
Independent Time Control	
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	A 92	A 92

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Mid
Survey Reference: GSHP Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	89 B	**CO2 Emissions (t/year):**	2.38	**DER:**	9.28 Pass	**TER:**	19.08	**Percentage DER<TER:**	51.36 %
Environmental:	90 B	**General Requirements Compliance:**	Pass	**DFEE:**	44.83 Pass	**TFEE:**	51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Electricity	
Fuel factor:	1.55 (electricity)	
Target Carbon Dioxide Emission Rate (TER)	19.08 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	9.28 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.30 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	44.83 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Heat pump with radiators or underfloor - Electric Vaillant geoTHERM exclusive 10 kW VWS 103/2	
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		

Overshading:	Average
Windows facing South:	36.96 m^2, No overhang
Air change rate:	8.00 ach
Blinds/curtains:	None

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Mid
Survey Reference: GSHP Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	89 B	**CO2 Emissions (t/year):**	2.38	**DER:**	9.28 Pass	**TER:**	19.08	**Percentage DER<TER:**	51.36 %
Environmental:	90 B	**General Requirements Compliance:**	Pass	**DFEE:**	44.83 Pass	**TFEE:**	51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	27.00	91.80	2.60
1st Storey:	27.00	68.72	3.20
2nd Storey:	27.00	72.49	3.00
3rd Storey:	27.00	72.49	2.90

7.0 Living Area	64.78
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		70.20	70.20
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		245.70	206.85

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		131.30

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		91.80	87.96

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		91.80

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					36.96	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No

17.0 Thermal Bridging: Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	17.70	0.050	Yes
Table K1 - Approved	E3 Sill	16.80	0.040	Yes
Table K1 - Approved	E4 Jamb	65.80	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	Yes
Table K1 - Approved	E6 Intermediate floor within a dwelling	54.00	0.070	No
Table K1 - Default	E15 Flat roof with parapet	27.00	0.560	No
Table K1 - Approved	E18 Party wall between dwellings	46.80	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	10.58	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	21.48	0.000	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	

19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00

External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	100083
Fuel Type	Electricity
Main Heating	PER
TestMethod	
SAP Code	221
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	434.5
In Summer	202.5
Model Name	
Manufacturer	
Controls	CHD Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	
Sap Code	2207
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	

29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Internal Store
Cylinder Stat	
Cylinder In Heated Space	
Independent Time Control	
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	A 93	A 93

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Right
Survey Reference: GSHP Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	2.77	**DER:** 9.66 Pass	**TER:** 20.04	**Percentage DER<TER:**	51.79 %
Environmental:	89 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Electricity	
Fuel factor:	1.55 (electricity)	
Target Carbon Dioxide Emission Rate (TER)	20.04 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	9.66 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Heat pump with radiators or underfloor - Electric Vaillant geoTHERM exclusive 10 kW VWS 103/2	
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	No cylinder	

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	No cylinder	

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		

Overshading:	Average
Windows facing South:	39.60 m^2, No overhang
Air change rate:	8.00 ach
Blinds/curtains:	None

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Right
Survey Reference: GSHP Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	88 B	**CO2 Emissions (t/year):**	2.77	**DER:**	9.66 Pass	**TER:**	20.04	**Percentage DER<TER:**	51.79 %
Environmental:	89 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area	61.38
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	100083
Fuel Type	Electricity
Main Heating	PER
TestMethod	
SAP Code	221
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	436.1
In Summer	202.5
Model Name	
Manufacturer	
Controls	CHD Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	
Sap Code	2207
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	<= 35°C
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Internal Store
Cylinder Stat	
Cylinder In Heated Space	
Independent Time Control	
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	A 92	A 92

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Left
Survey Reference: ASHP Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	85 B	**CO2 Emissions (t/year):**	3.61	**DER:** 12.51 Pass	**TER:** 20.04	**Percentage DER<TER:**	37.56 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Electricity	
Fuel factor:	1.55 (electricity)	
Target Carbon Dioxide Emission Rate (TER)	20.04 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	12.51 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Heat pump with radiators or underfloor - Electric Mitsubishi ECODAN 8.5kW PUHZ-W85VHA(2)-BS	
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.00 kWh/day Permitted by DBSCG 2.06	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Left
Survey Reference: ASHP Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	85 B	**CO2 Emissions (t/year):**	3.61	**DER:**	12.51 Pass	**TER:**	20.04	**Percentage DER<TER:**	37.56 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area	61.38
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	100061
Fuel Type	Electricity
Main Heating	PET
TestMethod	
SAP Code	224
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	351.3
In Summer	198.9
Model Name	
Manufacturer	
Controls	CHD Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	
Sap Code	2207
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	Normal (> 45°C)
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£119	B 86	B 88
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 90	B 91

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Mid
Survey Reference: ASHP Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	86 B	**CO2 Emissions (t/year):**	3.11	**DER:**	11.98 Pass	**TER:**	19.08	**Percentage DER<TER:**	37.21 %
Environmental:	87 B	**General Requirements Compliance:**	Pass	**DFEE:**	44.83 Pass	**TFEE:**	51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Electricity	
Fuel factor:	1.55 (electricity)	
Target Carbon Dioxide Emission Rate (TER)	19.08 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	11.98 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.30 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	44.83 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Heat pump with radiators or underfloor - Electric Mitsubishi ECODAN 8.5kW PUHZ-W85VHA(2)-BS	
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.00 kWh/day Permitted by DBSCG 2.06	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	36.96 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Mid
Survey Reference: ASHP Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 86 B **CO2 Emissions (t/year):** 3.11 **DER:** 11.98 Pass **TER:** 19.08 **Percentage DER<TER:** 37.21 %
Environmental: 87 B **General Requirements Compliance:** Pass **DFEE:** 44.83 Pass **TFEE:** 51.30 **Percentage DFEE<TFEE:** 12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	27.00	91.80	2.60
1st Storey:	27.00	68.72	3.20
2nd Storey:	27.00	72.49	3.00
3rd Storey:	27.00	72.49	2.90

7.0 Living Area	64.78
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		70.20	70.20
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		245.70	206.85

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		131.30

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		91.80	87.96

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		91.80

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					36.96	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No

17.0 Thermal Bridging: Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	17.70	0.050	Yes
Table K1 - Approved	E3 Sill	16.80	0.040	Yes
Table K1 - Approved	E4 Jamb	65.80	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	Yes
Table K1 - Approved	E6 Intermediate floor within a dwelling	54.00	0.070	No
Table K1 - Default	E15 Flat roof with parapet	27.00	0.560	No
Table K1 - Approved	E18 Party wall between dwellings	46.80	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	10.58	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	21.48	0.000	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	

19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00

External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	100061
Fuel Type	Electricity
Main Heating	PET
TestMethod	
SAP Code	224
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	356.8
In Summer	198.9
Model Name	
Manufacturer	
Controls	CHD Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	
Sap Code	2207
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	Normal (> 45°C)
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	

29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£119	B 87	B 88
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 91	A 92

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Right
Survey Reference: ASHP Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	85 B	**CO2 Emissions (t/year):**	3.61	**DER:** 12.51 Pass	**TER:** 20.04	**Percentage DER<TER:**	37.56 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:** 48.84 Pass	**TFEE:** 55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Electricity	
Fuel factor:	1.55 (electricity)	
Target Carbon Dioxide Emission Rate (TER)	20.04 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	12.51 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Heat pump with radiators or underfloor - Electric Mitsubishi ECODAN 8.5kW PUHZ-W85VHA(2)-BS	
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.00 kWh/day Permitted by DBSCG 2.06	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Right
Survey Reference: ASHP Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	85 B	**CO2 Emissions (t/year):**	3.61	**DER:**	12.51 Pass	**TER:**	20.04	**Percentage DER<TER:**	37.56 %
Environmental:	86 B	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area	61.38
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Database
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	100061
Fuel Type	Electricity
Main Heating	PET
TestMethod	
SAP Code	224
Efficiency (Split Efficiences) %	
Efficiency (Split Efficiences) %	
In Winter	351.3
In Summer	198.9
Model Name	
Manufacturer	
Controls	CHD Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	
Sap Code	2207
Burner Control	
Boiler Compensator	
HETAS approved System	
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	Radiators
Underfloor Heating	
Flow Temperature	Normal (> 45°C)
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£119	B 86	B 88
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 90	B 91

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Left
Survey Reference: Bio Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	81 B	**CO2 Emissions (t/year):**	1.19	**DER:**	4.05 Pass	**TER:**	13.42	**Percentage DER<TER:**	69.83 %
Environmental:	95 A	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Wood Pellets (bulk)	
Fuel factor:	1.00 (wood pellets)	
Target Carbon Dioxide Emission Rate (TER)	13.42 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	4.05 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Wood pellets (bulk) Data from manufacturer . . Efficiency: 75% Minimum: 75%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.00 kWh/day Permitted by DBSCG 2.87	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Main heating fuel:	wood pellets (bulk)

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Left
Survey Reference: Bio Left
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 81 B **CO2 Emissions (t/year):** 1.19 **DER:** 4.05 Pass **TER:** 13.42 **Percentage DER<TER:** 69.83 %
Environmental: 95 A **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Manufacturer
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage	No
System	
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	
Fuel Type	
Main Heating	BUC
TestMethod	
SAP Code	153
Efficiency (Manufacturer) %	75.0
Efficiency (Manufacturer) %	
In Winter	
In Summer	
Model Name	.
Manufacturer	.
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	Yes
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	No
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	
Underfloor Heating	
Flow Temperature	
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£76	B 82	A 96
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 85	A 99

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Mid
Survey Reference: Bio Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	82 B	**CO2 Emissions (t/year):**	1.04	**DER:** 3.93 Pass	**TER:** 12.83	**Percentage DER<TER:**	69.37 %
Environmental:	96 A	**General Requirements Compliance:**	Pass	**DFEE:** 44.83 Pass	**TFEE:** 51.30	**Percentage DFEE<TFEE:**	12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Wood Pellets (bulk)	
Fuel factor:	1.00 (wood pellets)	
Target Carbon Dioxide Emission Rate (TER)	12.83 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	3.93 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	51.30 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	44.83 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Wood pellets (bulk) Data from manufacturer . . Efficiency: 75% Minimum: 75%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.00 kWh/day Permitted by DBSCG 2.87	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	36.96 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Main heating fuel:	wood pellets (bulk)

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Mid
Survey Reference: Bio Mid
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 82 B **CO2 Emissions (t/year):** 1.04 **DER:** 3.93 Pass **TER:** 12.83 **Percentage DER<TER:** 69.37 %
Environmental: 96 A **General Requirements Compliance:** Pass **DFEE:** 44.83 Pass **TFEE:** 51.30 **Percentage DFEE<TFEE:** 12.60 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, Mid-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	27.00	91.80	2.60
1st Storey:	27.00	68.72	3.20
2nd Storey:	27.00	72.49	3.00
3rd Storey:	27.00	72.49	2.90

7.0 Living Area	64.78
8.0 Thermal Mass Parameter	Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		70.20	70.20
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		245.70	206.85

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		131.30

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		91.80	87.96

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		91.80

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					36.96	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No

17.0 Thermal Bridging: Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	17.70	0.050	Yes
Table K1 - Approved	E3 Sill	16.80	0.040	Yes
Table K1 - Approved	E4 Jamb	65.80	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	27.00	0.160	Yes
Table K1 - Approved	E6 Intermediate floor within a dwelling	54.00	0.070	No
Table K1 - Default	E15 Flat roof with parapet	27.00	0.560	No
Table K1 - Approved	E18 Party wall between dwellings	46.80	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	10.58	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	21.48	0.000	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	

19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00

External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Manufacturer
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	
Fuel Type	
Main Heating	BUC
TestMethod	
SAP Code	153
Efficiency (Manufacturer) %	75.0
Efficiency (Manufacturer) %	
In Winter	
In Summer	
Model Name	.
Manufacturer	.
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	Yes
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	Yes
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	
Underfloor Heating	
Flow Temperature	
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	
HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	

29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£76	B 84	A 96
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 87	A 99

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Building Regulation Compliance

Property Reference: Right
Survey Reference: Bio Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating:	81 B	**CO2 Emissions (t/year):**	1.19	**DER:**	4.05 Pass	**TER:**	13.42	**Percentage DER<TER:**	69.83 %
Environmental:	95 A	**General Requirements Compliance:**	Pass	**DFEE:**	48.84 Pass	**TFEE:**	55.53	**Percentage DFEE<TFEE:**	12.06 %

CfSH Results	**Version:**	**ENE1 Credits:**	N/A	**ENE2 Credits:**	N/A	**ENE7 Credits:**	N/A	**CfSH Level:**	N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

1a TER and DER

Fuel for main heating:	Wood Pellets (bulk)	
Fuel factor:	1.00 (wood pellets)	
Target Carbon Dioxide Emission Rate (TER)	13.42 kg/m^2	
Dwelling Carbon Dioxide Emission Rate (DER)	4.05 kg/m^2	OK

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	55.53 kWh/m^2	
Dwelling Fabric Energy Efficiency (DFEE)	48.84 kWh/m^2	OK

2 Fabric U-values

Element	Average	Highest	
External wall	0.20 (max. 0.30)	0.20 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.16 (max. 0.25)	0.16 (max. 0.70)	OK
Roof	0.16 (max. 0.20)	0.16 (max. 0.35)	OK
Openings	1.41 (max. 2.00)	1.60 (max. 3.30)	OK

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals:	5.00 (design value)	
Maximum	10.0	OK

4 Heating efficiency

Main heating system:	Boiler system with radiators or underfloor - Wood pellets (bulk) Data from manufacturer . . Efficiency: 75% Minimum: 75%	OK
Secondary heating system:	None	

5 Cylinder insulation

Hot water storage	Measured cylinder loss: 2.00 kWh/day Permitted by DBSCG 2.87	OK
Primary pipework insulated:	Yes	OK

6 Controls

Space heating controls:	Time and temperature zone control	OK
Hot water controls:	Cylinderstat	OK
	Independent timer for DHW	OK

7 Low energy lights

Percentage of fixed lights with low-energy fittings:	100%	
Minimum	75%	OK

8 Mechanical ventilation

Not applicable

9 Summertime temperature

Overheating risk (Thames Valley):	Not significant	OK
Based On:		
Overshading:	Average	
Windows facing South:	39.60 m^2, No overhang	
Air change rate:	8.00 ach	
Blinds/curtains:	None	

10 Key features

Party wall U-value	0.00 W/m^2K
Main heating fuel:	wood pellets (bulk)

Third Stone Ltd
10 Denton Drive
West Bridgford
Nottingham
NG2 7FS

Summary Information

Property Reference: Right
Survey Reference: Bio Right
Property:

Issued on Date: 04.Apr.2016
Prop Type Ref:

SAP Rating: 81 B **CO2 Emissions (t/year):** 1.19 **DER:** 4.05 Pass **TER:** 13.42 **Percentage DER<TER:** 69.83 %
Environmental: 95 A **General Requirements Compliance:** Pass **DFEE:** 48.84 Pass **TFEE:** 55.53 **Percentage DFEE<TFEE:** 12.06 %

CfSH Results **Version:** **ENE1 Credits:** N/A **ENE2 Credits:** N/A **ENE7 Credits:** N/A **CfSH Level:** N/A

Surveyor: Richard Holmes, Tel: 0115 9231707 Surveyor ID: 4477-0001
Address: Denton Drive, West Bridgford, Nottingham, NG2 7FS
Client:

Software Version: Elmhurst Energy Systems SAP2012 Calculator (Design System) version 3.05r04
SAP version: SAP 2012, Regs Region: England (Part L1A 2013), Calculation Type: New Build (As Designed)

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Orientation	South
1.0 Property Type	House, End-Terrace
2.0 Number of Storeys	4
3.0 Date Built	2016
3.0 Property Age Band	
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Basement:	39.11	104.83	2.60
1st Storey:	38.51	87.87	3.20
2nd Storey:	32.77	73.57	3.00
3rd Storey:	32.77	73.57	2.90

7.0 Living Area 61.38

8.0 Thermal Mass Parameter Simple calculation - Medium

9.0 External Walls

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Basement	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		101.68	101.68
Main	Cavity wall; dense plaster, lightweight aggregate block, filled cavity, any outside structure	0.20		316.58	275.09

9.1 Party walls

Description	Construction	Kappa	Area
Party Wall 1	Dense plaster both sides. lightweight aggregate blocks, cavity or cavity fill		66.08

10.0 External Roofs

Description	Construction	U-Value	Kappa	Gross Area	Nett Area
Flat	Plasterboard, insulated flat roof	0.16		104.83	100.99

10.1 Party Ceilings

Description	Construction	Kappa	Area
Party Ceilings 1	Other		87.87
g and 1	Concrete floor slab, carpeted		160.00

11.0 HeatLoss Floors

Description	Construction	U-Value	Kappa	Area
Basement	Slab on ground, screed over insulation	0.16		104.83

11.1 Party Floors

Description	Construction	Kappa	Area
2 1 and g	Precast concrete planks floor, screed, carpeted		236.00

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	Solar Trans	Frame Type	Frame Factor	U value
Door	Manufacturer	Solid Door							1.60
Windows	Manufacturer	Window	Double glazed			0.76		0.70	1.40
Rooflight	Manufacturer	Roof Window	Double glazed			0.76		0.70	1.40

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width	Height	Count	Area	Curtain Closed
Door	Solid Door	[2] Main	South							1.89	
Windows	Window	[2] Main	South	None	0.00					39.60	
RL	Roof Window	[1] Flat	Horizontal	None						3.84	

14.0 Conservatory	None
15.0 Draught Proofing	100
16.0 Draught Lobby	No
17.0 Thermal Bridging	Calculate Bridges

17.1 List of Bridges

Source Type	Bridge Type	Length	Psi	Imported
Independently assessed	E1 Steel lintel with perforated steel base plate	18.90	0.050	Yes
Table K1 - Approved	E3 Sill	18.00	0.040	Yes
Table K1 - Approved	E4 Jamb	70.20	0.050	Yes
Table K1 - Approved	E5 Ground floor (normal)	38.51	0.160	No
Table K1 - Default	E22 Basement floor	39.11	0.070	No
Table K1 - Approved	E6 Intermediate floor within a dwelling	65.54	0.070	No
Table K1 - Default	E15 Flat roof with parapet	32.57	0.560	No
Table K1 - Approved	E16 Corner (normal)	26.00	0.090	No
Table K1 - Approved	E17 Corner (inverted - internal area greater than external area)	2.60	-0.090	No
Table K1 - Approved	E18 Party wall between dwellings	23.40	0.060	Yes
Table K1 - Default	P1 Party wall - Ground floor	5.29	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	10.74	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	5.37	0.240	No

18.0 Pressure Testing	Yes
Designed q50	5.00
Property Tested ?	
As Built q50	
Same As Designed ?	
19.0 Mechanical Ventilation	
Mechanical Ventilation System Present	No
Approved Installation	
Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00
Mechanical Ventilation data Type	
Type	
MV Reference Number	
Configuration	
MVHR Duct Insulated	
Manufacturer SFP	
Duct Type	
MVHR Efficiency	
Wet Rooms	
Brand, Model	

20.0 Fans, Open Fireplaces, Flues

	MHS	SHS	Other	Total
Number of Chimneys	0		0	0
Number of open flues	0		0	0
Number of intermittent fans				4
Number of passive vents				0
Number of flueless gas fires				0

21.0 Cooling System	No

22.0 Lighting	
Internal	
Total number of light fittings	20
Total number of L.E.L. fittings	20
Percentage of L.E.L. fittings	100.00
External	
External lights fitted	No
Light and motion sensors	
23.0 Electricity Tariff	Standard
24.0 Heating Systems	
Main Heating 1	Manufacturer
Description	
Percentage of Heat	100 %
Main Heating 2	None
Description	
Percentage of Heat	%
Community Heating	
Secondary Heating	None
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery	No
Instantaneous System 1	
Waste Water Heat Recovery	No
Instantaneous System 2	
Waste Water Heat Recovery Storage System	No
Solar Panel	No
25.0 Main Heating 1	
Database Ref. No.	
Fuel Type	
Main Heating	BUC
TestMethod	
SAP Code	153
Efficiency (Manufacturer) %	75.0
Efficiency (Manufacturer) %	
In Winter	
In Summer	
Model Name	.
Manufacturer	.
Controls	CBI Time and temperature zone control
PCDF Controls	0
Delayed Start Stat	Yes
Sap Code	2110
Burner Control	
Boiler Compensator	
HETAS approved System	No
Oil Pump Inside	
FI Case	
FI Water	
Flue Type	
Smoke Control Area	Unknown
Fan Assisted Flue	
Is MHS Pumped	Pump in heated space
Heat Emitter	
Underfloor Heating	
Flow Temperature	
Electric CPSU Temperature	
Combi boiler type	
Combi keep hot type	
Combi store type	
27.0 Community Heating	
Space Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Controls	
SAP Code	
Water Community Heating	
PCDF Index	
Distribution Loss	
Distribution Loss Value	
Charging Linked To Heat Use	
28.0 Secondary Heating	
Description	
SHS efficiency %	
SAP Code	

HETAS Approved System	
Smoke Control Area	
Test Method	
Manufacturer	
Model Name	
29.0 Water Heating	HWP From main heating 1
Water use <= 125 litres/person/day	Yes
SAP Code	901
Immersion Heater	
Summer Immersion	
Suplementary Immersion	
Immersion Only Heating Hot Water	
29.1 Flue Gas Heat Recovery System	
Database ID	
Brand Model	
Details	
29.2 Waste Water Heat Recovery System	
Total rooms with shower and/or bath	
30.0 Hot Water Cylinder	Hot Water Cylinder
Cylinder Stat	Yes
Cylinder In Heated Space	Yes
Independent Time Control	Yes
Insulation Type	Measured Loss
Insulation Thickness	
Cylinder Volume	175.00
Loss (kwh/day)	2.00
Pipes insulation	Fully insulated primary pipework
In Airing Cupboard	
31.0 Solar Panel	
Solar Panel Area	
Area Type	
Panel Type	
n0, a1, a2, A/G ratio	
Orientation	
Elevation	
Overshading	
Solar Storage Volume	
Pump electrically powered	
Combined Cylinder	
32.0 Thermal Store	None
Thermal Store Pipework	
33.0 Photovoltaic Unit	
Apportioned KWh/Year	
34.0 Wind Turbines	
Terrain Type	Urban
Wind Turbines	
Count	
Apportioned Kwh/year	
Rotor Diameter	
Hub Height	
35.0 Small-scale Hydro	
Electricity Generated	
Description	
Apportioned kWh/Year	

Recommendations

None

Further measures to achieve even higher standards

Solar water heating	£4,000 - £6,000	£76	B 82	A 96
Solar photovoltaic panels, 2.5 kWp	£5,000 - £8,000	£279	B 85	A 99