elmhurst energy

SAP Report Submission for Building Regulations Compliance

Client:

Project: Plot 098

Contact: Benjamin Wood
Benjamin Wood
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Report Issue Date: 15/03/2021

EXCELLENCE IN ENERGY ASSESSMENT

THERMAL BRIDGING
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	007818 - Plot 098	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2328-Semi-MT
Property	Plot 098		

SAP Rating	84 B	**DER**	17.35	**TER**	19.05
Environmental	87 B	**% DER<TER**	8.94		
CO_2 Emissions (t/year)	1.07	**DFEE**	45.56	**TFEE**	53.32
General Requirements Compliance	Pass	**% DFEE<TFEE**	14.54		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

	Junction detail	Source Type	Psi (W/mK)	Length (m)	Result	Reference
External wall	E2 Other lintels (including other steel lintels)	Independently assessed	0.040	10.07	0.40	
External wall	E3 Sill	Independently assessed	0.027	7.26	0.20	
External wall	E4 Jamb	Independently assessed	0.029	15.60	0.45	
External wall	E5 Ground floor (normal)	Independently assessed	0.049	24.60	1.21	
External wall	E6 Intermediate floor within a dwelling	Independently assessed	0.003	24.60	0.07	
External wall	E10 Eaves (insulation at ceiling level)	Independently assessed	0.083	9.25	0.77	
External wall	E12 Gable (insulation at ceiling level)	Independently assessed	0.054	8.05	0.43	
External wall	E16 Corner (normal)	Independently assessed	0.050	9.99	0.50	
External wall	E18 Party wall between dwellings	Table K1 - Default	0.120	9.99	1.20	
Party wall	P1 Party wall - Ground floor	Table K1 - Default	0.160	8.05	1.29	
Party wall	P2 Party wall - Intermediate floor within a dwelling	Table K1 - Default	0.000	8.05	0.00	
Party wall	P4 Party wall - Roof (insulation at ceiling level)	Table K1 - Default	0.240	8.05	1.93	

Total: 8.45 **W/mK:**

Y-Value: 0.053 **W/m²K:**

FULL SAP CALCULATION PRINTOUT
Calculation Type: New Build (As Designed)

Design SAP
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REGULATIONS COMPLIANCE REPORT - Approved Document L1A, 2013 Edition, England

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DWELLING AS DESIGNED

Semi-Detached House, total floor area 74 m²

This report covers items included within the SAP calculations.
It is not a complete report of regulations compliance.

1a TER and DER
Fuel for main heating:Mains gas
Fuel factor:1.00 (mains gas)
Target Carbon Dioxide Emission Rate (TER) 19.05 kgCO□/m²
Dwelling Carbon Dioxide Emission Rate (DER) 17.35 kgCO□/m²OK

1b TFEE and DFEE
Target Fabric Energy Efficiency (TFEE)53.3 kWh/m²/yr
Dwelling Fabric Energy Efficiency (DFEE)45.6 kWh/m²/yrOK

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	OK
Party wall	0.00 (max. 0.20)	-	OK
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	OK
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	OK
Openings	1.22 (max. 2.00)	1.40 (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 ecoFIT sustain 830 VUW 306/6-3 (H-GB)
Combi boiler
Efficiency: 89.3% SEDBUK2009
Minimum: 88.0% OK

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

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 North East: 1.76 m², No overhang
Windows facing South East: 6.66 m², No overhang
Windows facing North West: 3.80 m², No overhang
Air change rate: 8.00 ach
Blinds/curtains: None

10 Key features
Party wall U-value 0.00 W/m²K
Roof U-value 0.09 W/m²K
Door U-value 1.00 W/m²K

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	37.2100	(1b)	x 2.3900	(2b) =	88.9319	(1b) - (3b)
First floor	37.2100	(1c)	x 2.6000	(2c) =	96.7460	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.4200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) =		185.6779	(5)

2. Ventilation rate

	main heating		secondary heating		other		total		m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40	=	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20	=	0.0000	(6b)
Number of intermittent fans							3 * 10	=	30.0000	(7a)
Number of passive vents							0 * 10	=	0.0000	(7b)
Number of flueless gas fires							0 * 40	=	0.0000	(7c)

			Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30.0000	/ (5) =	0.1616	(8)
Pressure test			Yes	
Measured/design AP50			5.0000	
Infiltration rate			0.4116	(18)
Number of sides sheltered			2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =		0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =		0.3498	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4460	0.4373	0.4285	0.3848	0.3761	0.3323	0.3323	0.3236	0.3498	0.3761	0.3936	0.4111	(22b)
Effective ac	0.5995	0.5956	0.5918	0.5740	0.5707	0.5552	0.5552	0.5524	0.5612	0.5707	0.5774	0.5845	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
Half Glazed Door			2.1000	1.0000	2.1000			(26a)
Windows (Uw = 1.20)			8.4400	1.1450	9.6641			(27)
Patio Door (Uw = 1.40)			3.7800	1.3258	5.0114			(27)
Ground Floor			37.2100	0.1400	5.2094	75.0000	2790.7500	(28a)
External Wall	86.3900	14.3200	72.0700	0.2400	17.2968	60.0000	4324.2000	(29a)
Cold Roof	37.2100		37.2100	0.0900	3.3489	9.0000	334.8900	(30)
Total net area of external elements Aum(A, m2)			160.8100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		42.6306			(33)
Party Wall 1			40.1900	0.0000	0.0000	45.0000	1808.5500	(32)
GF			58.1200			9.0000	523.0800	(32c)
FF			85.6400			9.0000	770.7600	(32c)
FF			37.2100			18.0000	669.7800	(32d)
GF			37.2100			18.0000	669.7800	(32e)

Heat capacity Cm = Sum(A x k)	(28)...(30) + (32) + (32a)...(32e) =	11891.7900 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K		159.7929 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)		8.4512 (36)
Total fabric heat loss	(33) + (36) =	51.0818 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	36.7321	36.4954	36.2634	35.1737	34.9698	34.0207	34.0207	33.8450	34.3863	34.9698	35.3823	35.8135	(38)
Heat transfer coeff	87.8138	87.5772	87.3452	86.2555	86.0516	85.1025	85.1025	84.9267	85.4681	86.0516	86.4640	86.8952	(39)
Average = Sum(39)m / 12 =												86.2545	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1800	1.1768	1.1737	1.1590	1.1563	1.1435	1.1435	1.1412	1.1485	1.1563	1.1618	1.1676	(40)
HLP (average)												1.1590	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.3485 (42)
Average daily hot water use (litres/day)	89.9765 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	98.9741	95.3751	91.7760	88.1770	84.5779	80.9788	80.9788	84.5779	88.1770	91.7760	95.3751	98.9741	(44)
Energy conte	146.7758	128.3710	132.4674	115.4883	110.8138	95.6239	88.6096	101.6808	102.8952	119.9144	130.8959	142.1445	(45)

CALCULATION OF DWELLING EMISSIONS FOR REGULATIONS COMPLIANCE 09 Jan 2014

Energy content (annual)											Total = Sum(45)m =	1415.6806	(45)
Distribution loss (46)m = 0.15 x (45)m													
	22.0164	19.2557	19.8701	17.3232	16.6221	14.3436	13.2914	15.2521	15.4343	17.9872	19.6344	21.3217	(46)
Water storage loss:													
Total storage loss													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	1.6706	1.4080	1.3981	1.1711	1.0778	0.8905	0.8252	0.9890	1.0434	1.2656	1.4357	1.6179	(61)
Total heat required for water heating calculated for each month													
	148.4464	129.7790	133.8655	116.6594	111.8916	96.5144	89.4348	102.6698	103.9386	121.1800	132.3316	143.7624	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	148.4464	129.7790	133.8655	116.6594	111.8916	96.5144	89.4348	102.6698	103.9386	121.1800	132.3316	143.7624	(64)
								Total per year (kWh/year) = Sum(64)m =				1430.4735	(64)
Heat gains from water heating, kWh/month													
	49.2206	43.0354	44.3949	38.6926	37.1150	32.0176	29.6690	34.0561	34.4735	40.1879	43.8818	47.6675	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.1919	17.0461	13.8628	10.4950	7.8452	6.6232	7.1566	9.3025	12.4857	15.8535	18.5034	19.7253	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	207.3859	209.5379	204.1149	192.5700	177.9965	164.2996	155.1492	152.9971	158.4201	169.9651	184.5385	198.2355	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	(71)
Water heating gains (Table 5)													
	66.1567	64.0407	59.6706	53.7398	49.8858	44.4688	39.8777	45.7743	47.8799	54.0160	60.9470	64.0693	(72)
Total internal gains													
	353.9618	351.8520	338.8756	318.0320	296.9548	276.6189	263.4107	269.3012	280.0130	301.0619	325.2161	343.2573	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.7600	11.2829	0.6300	0.7000	0.7700	6.0689	(75)
Southeast	2.8800	36.7938	0.6300	0.7000	0.7700	32.3847	(77)
Northwest	3.8000	11.2829	0.6300	0.7000	0.7700	13.1032	(81)
Southeast	3.7800	36.7938	0.6300	0.7000	0.7700	42.5049	(77)

Solar gains	94.0616	166.5899	244.8506	331.7339	397.4482	405.9572	386.6489	335.8828	274.6645	188.6780	113.8238	79.7467	(83)
Total gains	448.0234	518.4419	583.7262	649.7660	694.4030	682.5761	650.0596	605.1840	554.6775	489.7399	439.0400	423.0040	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000	(85)
Utilisation factor for gains for living area, nil,m (see Table 9a)													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6168	37.7185	37.8186	38.2964	38.3871	38.8153	38.8153	38.8956	38.6492	38.3871	38.2040	38.0145	
alpha	3.5078	3.5146	3.5212	3.5531	3.5591	3.5877	3.5877	3.5930	3.5766	3.5591	3.5469	3.5343	
util living area													
	0.9891	0.9810	0.9637	0.9208	0.8324	0.6867	0.5394	0.5907	0.8048	0.9434	0.9820	0.9911	(86)
MIT	19.2069	19.4193	19.7645	20.2154	20.6082	20.8657	20.9578	20.9413	20.7468	20.2369	19.6433	19.1709	(87)
Th 2	19.9361	19.9386	19.9411	19.9529	19.9551	19.9654	19.9654	19.9673	19.9615	19.9551	19.9507	19.9460	(88)
util rest of house													
	0.9867	0.9768	0.9552	0.9012	0.7894	0.6068	0.4273	0.4789	0.7401	0.9255	0.9772	0.9890	(89)
MIT 2	17.5467	17.8565	18.3565	19.0040	19.5364	19.8555	19.9430	19.9333	19.7274	19.0469	18.1921	17.5006	(90)
Living area fraction									fLA = Living area / (4) =			0.3265	(91)
MIT	18.0888	18.3668	18.8162	19.3995	19.8864	20.1854	20.2744	20.2624	20.0603	19.4354	18.6659	18.0460	(92)
Temperature adjustment												-0.1500	
adjusted MIT	17.9388	18.2168	18.6662	19.2495	19.7364	20.0354	20.1244	20.1124	19.9103	19.2854	18.5159	17.8960	(93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9799	0.9670	0.9414	0.8849	0.7790	0.6127	0.4454	0.4957	0.7364	0.9104	0.9678	0.9832	(94)
Useful gains	439.0066	501.3326	549.5395	574.9509	540.9726	418.2035	289.5622	300.0133	408.4610	445.8504	424.9130	415.8943	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1197.6742	1166.2465	1062.6623	892.7029	691.5436	462.5635	299.9317	315.2840	496.5955	747.3966	987.0685	1190.1150	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	564.4488	446.8221	381.7633	228.7814	112.0248	0.0000	0.0000	0.0000	0.0000	224.3504	404.7519	576.0203	(98)
Space heating												2938.9629	(98)
Space heating per m2											(98) / (4) =	39.4916	(99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)	0.0000	(201)
Fraction of space heat from main system(s)	1.0000	(202)
Efficiency of main space heating system 1 (in %)	90.2000	(206)
Efficiency of secondary/supplementary heating system, %	0.0000	(208)
Space heating requirement	3258.2737	(211)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	564.4488	446.8221	381.7633	228.7814	112.0248	0.0000	0.0000	0.0000	0.0000	224.3504	404.7519	576.0203	(98)
Space heating efficiency (main heating system 1)													
	90.2000	90.2000	90.2000	90.2000	90.2000	0.0000	0.0000	0.0000	0.0000	90.2000	90.2000	90.2000	(210)
Space heating fuel (main heating system)													
	625.7747	495.3682	423.2409	253.6380	124.1960	0.0000	0.0000	0.0000	0.0000	248.7255	448.7272	638.6034	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	148.4464	129.7790	133.8655	116.6594	111.8916	96.5144	89.4348	102.6698	103.9386	121.1800	132.3316	143.7624	(64)
Efficiency of water heater												76.2000	(216)
(217)m	86.8763	86.6181	86.0935	84.9303	82.6152	76.2000	76.2000	76.2000	76.2000	84.7398	86.2936	87.0072	(217)
Fuel for water heating, kWh/month													
	170.8710	149.8290	155.4886	137.3589	135.4371	126.6593	117.3684	134.7372	136.4023	143.0024	153.3504	165.2305	(219)
Water heating fuel used												1725.7351	(219)
Annual totals kWh/year													
Space heating fuel - main system												3258.2737	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												338.9354	(232)
Total delivered energy for all uses												5397.9442	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3258.2737	0.2160	703.7871	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	1725.7351	0.2160	372.7588	(264)
Space and water heating			1076.5459	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	338.9354	0.5190	175.9074	(268)
Total CO2, kg/year			1291.3784	(272)
Dwelling Carbon Dioxide Emission Rate (DER)			17.3500	(273)

16 CO2 EMISSIONS ASSOCIATED WITH APPLIANCES AND COOKING AND SITE-WIDE ELECTRICITY GENERATION TECHNOLOGIES

DER		17.3500	ZC1
Total Floor Area	TFA	74.4200	
Assumed number of occupants	N	2.3485	
CO2 emission factor in Table 12 for electricity displaced from grid	EF	0.5190	
CO2 emissions from appliances, equation (L14)		16.5134	ZC2
CO2 emissions from cooking, equation (L16)		2.3564	ZC3
Total CO2 emissions		36.2198	ZC4
Residual CO2 emissions offset from biofuel CHP		0.0000	ZC5
Additional allowable electricity generation, kWh/m²/year		0.0000	ZC6
Resulting CO2 emissions offset from additional allowable electricity generation		0.0000	ZC7
Net CO2 emissions		36.2198	ZC8

CALCULATION OF TARGET EMISSIONS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
CALCULATION OF TARGET EMISSIONS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)		Storey height (m)		Volume (m3)	
Ground floor	37.2100 (1b)	x	2.3900 (2b)	=	88.9319	(1b) - (3b)
First floor	37.2100 (1c)	x	2.6000 (2c)	=	96.7460	(1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	74.4200					(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	=	185.6779	(5)

2. Ventilation rate

	main heating		secondary heating		other		total	m3 per hour	
Number of chimneys	0	+	0	+	0	=	0 * 40 =	0.0000	(6a)
Number of open flues	0	+	0	+	0	=	0 * 20 =	0.0000	(6b)
Number of intermittent fans							3 * 10 =	30.0000	(7a)
Number of passive vents							0 * 10 =	0.0000	(7b)
Number of flueless gas fires							0 * 40 =	0.0000	(7c)

		Air changes per hour	
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =	30.0000 / (5) =	0.1616	(8)
Pressure test		Yes	
Measured/design AP50		5.0000	
Infiltration rate		0.4116	(18)
Number of sides sheltered		2	(19)
Shelter factor	(20) = 1 - [0.075 x (19)] =	0.8500	(20)
Infiltration rate adjusted to include shelter factor	(21) = (18) x (20) =	0.3498	(21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000	(22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750	(22a)
Adj infilt rate	0.4460	0.4373	0.4285	0.3848	0.3761	0.3323	0.3323	0.3236	0.3498	0.3761	0.3936	0.4111	(22b)
Effective ac	0.5995	0.5956	0.5918	0.5740	0.5707	0.5552	0.5552	0.5524	0.5612	0.5707	0.5774	0.5845	(25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K	
TER Semi-glazed door			2.1000	1.2000	2.5200			(26a)
TER Opening Type (Uw = 1.40)			12.2200	1.3258	16.2008			(27)
Ground Floor			37.2100	0.1300	4.8373			(28a)
External Wall	86.3900	14.3200	72.0700	0.1800	12.9726			(29a)
Cold Roof	37.2100		37.2100	0.1300	4.8373			(30)
Total net area of external elements Aum(A, m2)			160.8100					(31)
Fabric heat loss, W/K = Sum (A x U)			(26)...(30) + (32) =		41.3680			(33)

Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K	250.0000	(35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)	9.7290	(36)
Total fabric heat loss (33) + (36) =	51.0970	(37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(38)m	36.7321	36.4954	36.2634	35.1737	34.9698	34.0207	34.0207	33.8450	34.3863	34.9698	35.3823	35.8135	(38)
Heat transfer coeff	87.8290	87.5924	87.3604	86.2707	86.0668	85.1177	85.1177	84.9419	85.4833	86.0668	86.4792	86.9104	(39)
Average = Sum(39)m / 12 =												86.2697	(39)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
HLP	1.1802	1.1770	1.1739	1.1592	1.1565	1.1437	1.1437	1.1414	1.1487	1.1565	1.1620	1.1678	(40)
HLP (average)												1.1592	(40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31	(41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy	2.3485 (42)
Average daily hot water use (litres/day)	89.9765 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Daily hot water use	98.9741	95.3751	91.7760	88.1770	84.5779	80.9788	80.9788	84.5779	88.1770	91.7760	95.3751	98.9741	(44)
Energy conte	146.7758	128.3710	132.4674	115.4883	110.8138	95.6239	88.6096	101.6808	102.8952	119.9144	130.8959	142.1445	(45)
Energy content (annual)										Total = Sum(45)m =		1415.6806	(45)
Distribution loss (46)m = 0.15 x (45)m	22.0164	19.2557	19.8701	17.3232	16.6221	14.3436	13.2914	15.2521	15.4343	17.9872	19.6344	21.3217	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage													

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	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	50.4361	43.8987	46.7681	43.4845	43.1000	39.9348	41.2659	43.1000	43.4845	46.7681	47.0343	50.4361	(61)
Total heat required for water heating calculated for each month													
	197.2119	172.2697	179.2355	158.9728	153.9138	135.5586	129.8755	144.7808	146.3797	166.6825	177.9302	192.5807	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
								Solar input (sum of months) = Sum(63)m =				0.0000	(63)
Output from w/h													
	197.2119	172.2697	179.2355	158.9728	153.9138	135.5586	129.8755	144.7808	146.3797	166.6825	177.9302	192.5807	(64)
								Total per year (kWh/year) = Sum(64)m =				1955.3917	(64)
Heat gains from water heating, kWh/month													
	61.4120	53.6580	55.7374	49.2710	47.6206	41.7786	39.7792	44.5839	45.0838	51.5636	55.2815	59.8721	(65)

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5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	117.4242	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5													
	19.1919	17.0461	13.8628	10.4950	7.8452	6.6232	7.1566	9.3025	12.4857	15.8535	18.5034	19.7253	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5													
	207.3859	209.5379	204.1149	192.5700	177.9965	164.2996	155.1492	152.9971	158.4201	169.9651	184.5385	198.2355	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5													
	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	34.7424	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)													
	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	-93.9394	(71)
Water heating gains (Table 5)													
	82.5430	79.8483	74.9159	68.4319	64.0062	58.0259	53.4666	59.9245	62.6164	69.3059	76.7798	80.4732	(72)
Total internal gains													
	370.3481	367.6596	354.1209	332.7242	311.0751	290.1759	276.9997	283.4514	294.7495	316.3517	341.0490	359.6613	(73)

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6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W	
Northeast	1.7600	11.2829	0.6300	0.7000	0.7700	6.0689	(75)
Southeast	6.6600	36.7938	0.6300	0.7000	0.7700	74.8895	(77)
Northwest	3.8000	11.2829	0.6300	0.7000	0.7700	13.1032	(81)

Solar gains	94.0616	166.5899	244.8506	331.7339	397.4482	405.9572	386.6489	335.8828	274.6645	188.6780	113.8238	79.7467	(83)
Total gains	464.4097	534.2494	598.9715	664.4581	708.5233	696.1331	663.6486	619.3342	569.4140	505.0297	454.8728	439.4080	(84)

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7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)

Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	58.8422	59.0012	59.1579	59.9051	60.0470	60.7166	60.7166	60.8422	60.4569	60.0470	59.7607	59.4642	
alpha	4.9228	4.9334	4.9439	4.9937	5.0031	5.0478	5.0478	5.0561	5.0305	5.0031	4.9840	4.9643	
util living area													
	0.9976	0.9948	0.9869	0.9592	0.8798	0.7187	0.5502	0.6067	0.8485	0.9743	0.9951	0.9982	(86)
MIT	19.7406	19.8965	20.1511	20.4878	20.7769	20.9438	20.9881	20.9811	20.8653	20.4920	20.0563	19.7151	(87)
Th 2	19.9359	19.9384	19.9410	19.9527	19.9550	19.9653	19.9653	19.9672	19.9613	19.9550	19.9505	19.9458	(88)
util rest of house													
	0.9968	0.9930	0.9821	0.9436	0.8346	0.6269	0.4281	0.4824	0.7767	0.9615	0.9931	0.9976	(89)
MIT 2	18.2624	18.4914	18.8626	19.3502	19.7350	19.9277	19.9609	19.9594	19.8526	19.3650	18.7340	18.2322	(90)
Living area fraction										fLA = Living area / (4) =		0.3265	(91)
MIT	18.7451	18.9502	19.2833	19.7217	20.0752	20.2595	20.2963	20.2930	20.1833	19.7330	19.1658	18.7164	(92)
Temperature adjustment												0.0000	
adjusted MIT	18.7451	18.9502	19.2833	19.7217	20.0752	20.2595	20.2963	20.2930	20.1833	19.7330	19.1658	18.7164	(93)

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8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9955	0.9907	0.9781	0.9393	0.8405	0.6547	0.4683	0.5233	0.7942	0.9580	0.9909	0.9965	(94)
Useful gains	462.3132	529.2873	585.8836	624.1517	595.5204	455.7930	310.7566	324.0736	452.2092	483.7987	450.7507	437.8812	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
	1268.6990	1230.6906	1116.7547	933.5918	720.8233	481.7244	314.6226	330.6772	520.0183	786.0471	1043.4406	1261.6258	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh													
	599.9510	471.3430	394.9681	222.7968	93.2254	0.0000	0.0000	0.0000	0.0000	224.8728	426.7367	612.8660	(98)
Space heating												3046.7598	(98)
Space heating per m2											(98) / (4) =	40.9401	(99)

8c. Space cooling requirement

Not applicable

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

Fraction of space heat from secondary/supplementary system (Table 11)												0.0000	(201)
Fraction of space heat from main system(s)												1.0000	(202)
Efficiency of main space heating system 1 (in %)												93.4000	(206)
Efficiency of secondary/supplementary heating system, %												0.0000	(208)
Space heating requirement												3262.0555	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement													
	599.9510	471.3430	394.9681	222.7968	93.2254	0.0000	0.0000	0.0000	0.0000	224.8728	426.7367	612.8660	(98)
Space heating efficiency (main heating system 1)													
	93.4000	93.4000	93.4000	93.4000	93.4000	0.0000	0.0000	0.0000	0.0000	93.4000	93.4000	93.4000	(210)
Space heating fuel (main heating system)													
	642.3459	504.6499	422.8780	238.5405	99.8130	0.0000	0.0000	0.0000	0.0000	240.7632	456.8915	656.1734	(211)
Water heating requirement													
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating													
Water heating requirement													
	197.2119	172.2697	179.2355	158.9728	153.9138	135.5586	129.8755	144.7808	146.3797	166.6825	177.9302	192.5807	(64)
Efficiency of water heater												80.3000	(216)
(217)m	87.6719	87.4557	86.9849	85.9009	83.8331	80.3000	80.3000	80.3000	80.3000	85.8057	87.1736	87.7607	(217)
Fuel for water heating, kWh/month													
	224.9430	196.9794	206.0536	185.0654	183.5954	168.8152	161.7379	180.2998	182.2910	194.2557	204.1103	219.4383	(219)
Water heating fuel used												2307.5850	(219)
Annual totals kWh/year													
Space heating fuel - main system												3262.0555	(211)
Space heating fuel - secondary												0.0000	(215)
Electricity for pumps and fans:													
central heating pump												30.0000	(230c)
main heating flue fan												45.0000	(230e)
Total electricity for the above, kWh/year												75.0000	(231)
Electricity for lighting (calculated in Appendix L)												338.9354	(232)
Total delivered energy for all uses												5983.5758	(238)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year	
Space heating - main system 1	3262.0555	0.2160	704.6040	(261)
Space heating - secondary	0.0000	0.0000	0.0000	(263)
Water heating (other fuel)	2307.5850	0.2160	498.4384	(264)
Space and water heating			1203.0423	(265)
Pumps and fans	75.0000	0.5190	38.9250	(267)
Energy for lighting	338.9354	0.5190	175.9074	(268)
Total CO2, kg/m2/year			1417.8748	(272)
Emissions per m2 for space and water heating			16.1656	(272a)
Fuel factor (mains gas)			1.0000	
Emissions per m2 for lighting			2.3637	(272b)
Emissions per m2 for pumps and fans			0.5230	(272c)
Target Carbon Dioxide Emission Rate (TER) = (16.1656 * 1.00) + 2.3637 + 0.5230, rounded to 2 d.p.			19.0500	(273)

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	007818 - Plot 098	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2328-Semi-MT
Project	Plot 098		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	**DER**	17.35	**TER**	19.05
Environmental	87 B	**% DER<TER**	8.94		
CO_2 Emissions (t/year)	1.07	**DFEE**	45.56	**TFEE**	53.32
General Requirements Compliance	Pass	**% DFEE<TFEE**	14.54		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

Building Elements

Roof 007818 - Cold Roof

Roof Type: Pitched Roof, insulated flat ceiling

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Standard cavity**				
	Main construction	50	0.3125	0.1600	100.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 2	**Crown Loft Roll 40**				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	**Crown Loft Roll 40**				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**Crown Loft Roll 40**				
	Main construction	150	0.0400	3.7500	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 5	**Plasterboard, standard**				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1000	

Total resistance: **Upper limit =** 11.610 m² K/W **Lower limit =** 11.610 m² K/W **Average =** 11.610 m² K/W

Total correction = 0.0031 m² K/W **U-value (unrounded) =** 0.09 W/m² K

Unheated space: None

Total thickness: 513 mm **U-value: 0.09 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	007818 - Plot 098	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2328-Semi-MT
Project	Plot 098		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	**DER**	17.35	**TER**	19.05
Environmental	87 B	**% DER<TER**	8.94		
CO_2 Emissions (t/year)	1.07	**DFEE**	45.56	**TFEE**	53.32
General Requirements Compliance	Pass	**% DFEE<TFEE**	14.54		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

Building Elements

Wall 007818 - External Wall

Wall Type: Standard Wall

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.0400	
Layer 1	**Brick, outer leaf**				
	Main construction	100	0.7700	0.1299	82.81
	Main construction	100	0.9407	0.1063	17.19
Layer 2	**URSA Cavity BATT 32**				
	Main construction	100	0.0320	3.1250	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 3	**Thermalite Shield**				
	Main construction	100	0.1500	0.6667	93.43
	Main construction	100	0.8803	0.1136	6.57
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**airspace/plaster dabs**				
	Main construction	15	0.0882	0.1700	80.00
	Main construction	15	0.0882	0.1700	20.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 5	**Plasterboard, standard**				
	Main construction	12.5	0.2100	0.0595	100.00
Int surface				0.1300	

Total resistance: **Upper limit =** 4.276 m² K/W **Lower limit =** 4.155 m² K/W **Average =** 4.215 m² K/W

Total correction = 0.0056 m² K/W **U-value (unrounded) =** 0.24 W/m² K

Unheated space: None

Total thickness: 328 mm **U-value: 0.24 W/m² K** **Kappa: n/a**

U-VALUE CALCULATOR REPORT

Design SAP
elmhurst energy

Property Reference	007818 - Plot 098	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2328-Semi-MT
Project	Plot 098		
Calculation Type	New Build (As Designed)		

SAP Rating	84 B	**DER**	17.35	**TER**	19.05
Environmental	87 B	**% DER<TER**	8.94		
CO_2 Emissions (t/year)	1.07	**DFEE**	45.56	**TFEE**	53.32
General Requirements Compliance	Pass	**% DFEE<TFEE**	14.54		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

Building Elements

Floor 007818 - Ground Floor

Floor Type: Suspended Floor
Area = 37.21 m², Perimeter = 17.30 m, Wall thickness = 275.00 mm, Soil: Unknown
Depth of underfloor space below ground:0.200 m Floor wind shielding: Average (suburban)
Floor height above ground:h = 0.200 m
U-value of walls above ground:Uw = 1.500 m
Ventilation openings per perimeter length:e = 0.0015 %
Mean wind speed:v = 5.000 m/s
Resistance on solum:Rg = 0.000 m²K/W

Layer	Description	Thickness (mm)	Conductivity (W/m²K)	Resistance (m²K/W)	Fraction (%)
Ext surface				0.1700	
Layer 1	**Standard cavity**				
	Main construction	50	0.2381	0.2100	50.00
	Main construction	50	1.3500	0.0370	50.00
	Corrections - Cavity Unventilated, Emissivity: Normal				
Layer 2	**Blockwork, dense**				
	Main construction	100	1.5900	0.0629	77.78
	Main construction	100	1.3500	0.0741	22.22
Layer 3	**Celotex XR4000**				
	Main construction	120	0.0220	5.4545	100.00
	Corrections - Air Gap: Level 1, Fasteners: None or plastic				
Layer 4	**Screed**				
	Main construction	75	1.1500	0.0652	100.00
Int surface				0.1700	

Total resistance: **Upper limit =** 6.047 m² K/W **Lower limit =** 5.988 m² K/W **Average =** 6.018 m² K/W

Total correction = 0.0082 m² K/W **U-value (unrounded) =** 0.14 W/m² K

Unheated space: None

Total thickness: 345 mm **U-value: 0.14 W/m² K** **Kappa: n/a**

BASIC COMPLIANCE REPORT
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

Property Reference	007818 - Plot 098	**Issued on Date**	15/03/2021
Assessment Reference	Rev A	**Prop Type Ref**	007818-SAP-2328-Semi-MT
Property	Plot 098		

SAP Rating	84 B	**DER**	17.35	**TER**	19.05
Environmental	87 B	**% DER<TER**	8.94		
CO_2 Emissions (t/year)	1.07	**DFEE**	45.56	**TFEE**	53.32
General Requirements Compliance	Pass	**% DFEE<TFEE**	14.54		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

SUMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	19.05	$kgCO_2/m^2$	
Dwelling Carbon Dioxide Emission Rate (DER)	17.35	$kgCO_2/m^2$	Pass
	-1.70 (-8.9%)	$kgCO_2/m^2$	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	53.32	$kWh/m^2/yr$	
Dwelling Fabric Energy Efficiency (DFEE)	45.56	$kWh/m^2/yr$	
	-7.7 (-14.4%)	$kWh/m^2/yr$	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.14 (max. 0.25)	0.14 (max. 0.70)	Pass
Roof	0.09 (max. 0.20)	0.09 (max. 0.35)	Pass
Openings	1.22 (max. 2.00)	1.40 (max. 3.30)	Pass

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	Pass

Limiting System Efficiencies

4 Heating efficiency

Main heating system	Boiler system with radiators or underfloor - Mains gas Data from database Vaillant ecoFIT sustain 830 VUW 306/6-3 (H-GB) Combi boiler Efficiency: 89.3% SEDBUK2009 Minimum: 88.0%		Pass
Secondary heating system	None		

5 Cylinder insulation

Hot water storage	No cylinder		

6 Controls

Space heating controls	Time and temperature zone control		Pass
Hot water controls	No cylinder		
Boiler interlock	Yes		Pass

7 Low energy lights

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

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (Thames Valley)	Not significant	Pass

Based on:

Overshading	Average	
Windows facing North East	1.76 m², No overhang	
Windows facing South East	6.66 m², No overhang	
Windows facing North West	3.80 m², No overhang	
Air change rate	8.00 ach	
Blinds/curtains	None	

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type	U-value		
Filled Cavity with Edge Sealing	0.00	W/m²K	Pass

Air permeability and pressure testing

3 Air permeability

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

10 Key features

Party wall U-value	0.00	W/m²K
Roof U-value	0.09	W/m²K
Door U-value	1.00	W/m²K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

SUMMARY FOR INPUT DATA
Calculation Type: New Build (As Designed)

Design SAP
elmhurst energy

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General Requirements Compliance	Pass	**% DFEE<TFEE**	14.54		

Assessor Details	Mr. Paul Bainbridge, Paul Bainbridge, Tel: 01904 674890, paul.bainbridge@thefesgroup.com	**Assessor ID**	p717-0001
Client	Larkfleet Group		

SUMMARY FOR INPUT DATA FOR: New Build (As Designed)

Orientation	North West
Property Tenure	Unknown
Transaction Type	New dwelling
Terrain Type	Suburban
1.0 Property Type	House, Semi-Detached
2.0 Number of Storeys	2
3.0 Date Built	2020
4.0 Sheltered Sides	2
5.0 Sunlight/Shade	Average or unknown

6.0 Measurements

	Heat Loss Perimeter	Internal Floor Area	Average Storey Height
Ground Floor:	17.30 m	37.21 m²	2.39 m
1st Storey:	17.30 m	37.21 m²	2.60 m

7.0 Living Area	24.30	m²
8.0 Thermal Mass Parameter	Precise calculation	
Thermal Mass	159.79	kJ/m²K

9.0 External Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
External Wall	Cavity Wall	Cavity wall : plasterboard on dabs, AAC block, filled cavity, any outside structure	0.24	60.00	86.39	72.07

9.1 Party Walls

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Party Wall 1	Filled Cavity with Edge Sealing	Plasterboard on dabs mounted on cement render on both sides, AAC blocks, cavity	0.00	45.00	40.19

9.2 Internal Walls

Description	Construction	Kappa (kJ/m²K)	Area (m²)
GF	Plasterboard on timber frame	9.00	58.12
FF	Plasterboard on timber frame	9.00	85.64

10.0 External Roofs

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Gross Area (m²)	Nett Area (m²)
Cold Roof	External Plane Roof	Plasterboard, insulated at ceiling level	0.09	9.00	37.21	37.21

10.2 Internal Ceilings

Description	Construction	Kappa (kJ/m²K)	Area (m²)
GF	Plasterboard ceiling, carpeted chipboard floor	9.00	37.21

11.0 Heat Loss Floors

Description	Type	Construction	U-Value (W/m²K)	Kappa (kJ/m²K)	Area (m²)
Ground Floor	Ground Floor - Solid	Suspended concrete floor, carpeted	0.14	75.00	37.21

11.2 Internal Floors

Description	Construction	Kappa (kJ/m²K)	Area (m²)
FF	Plasterboard ceiling, carpeted chipboard floor	18.00	37.21

12.0 Opening Types

Description	Data Source	Type	Glazing	Glazing Gap	Argon Filled	G-value	Frame Type	Frame Factor	U Value (W/m²K)
Half Glazed Door	Manufacturer	Half Glazed Door	Double Low-E Soft 0.05			0.63		0.70	1.00
Windows	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.20
Patio Door	Manufacturer	Window	Double Low-E Soft 0.05			0.63		0.70	1.40
Rooflights	Manufacturer	Roof Window	Double Low-E Soft 0.05			0.63		0.70	1.20

13.0 Openings

Name	Opening Type	Location	Orientation	Curtain Type	Overhang Ratio	Wide Overhang	Width (m)	Height (m)	Count	Area (m²)	Curtain Closed
Front Entrance	Half Glazed Door	[1] External Wall	North West							2.10	
Front Windows	Window	[1] External Wall	North West	None	0.00					3.80	
Rear Windows	Window	[1] External Wall	South East	None	0.00					2.88	
Patio Doors	Window	[1] External Wall	South East	None	0.00					3.78	
LHS Windows	Window	[1] External Wall	North East	None	0.00					1.76	

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	E2 Other lintels (including other steel lintels)	10.07	0.040	No
Independently assessed	E3 Sill	7.26	0.027	No
Independently assessed	E4 Jamb	15.60	0.029	No
Independently assessed	E5 Ground floor (normal)	24.60	0.049	No
Independently assessed	E6 Intermediate floor within a dwelling	24.60	0.003	No
Independently assessed	E10 Eaves (insulation at ceiling level)	9.25	0.083	No
Independently assessed	E12 Gable (insulation at ceiling level)	8.05	0.054	No
Independently assessed	E16 Corner (normal)	9.99	0.050	No
Table K1 - Default	E18 Party wall between dwellings	9.99	0.120	No
Table K1 - Default	P1 Party wall - Ground floor	8.05	0.160	No
Table K1 - Default	P2 Party wall - Intermediate floor within a dwelling	8.05	0.000	No
Table K1 - Default	P4 Party wall - Roof (insulation at ceiling level)	8.05	0.240	No

Y-value	0.053	W/m²K
18.0 Pressure Testing	Yes	
Designed AP_{50}	5.00	m³/(h.m²) @ 50 Pa
Property Tested ?		

As Built AP_{50}		$m^3/(h.m^2)$ @ 50 Pa

19.0 Mechanical Ventilation

Summer Overheating

Windows open in hot weather	Windows fully open
Cross ventilation possible	Yes
Night Ventilation	No
Air change rate	8.00

Mechanical Ventilation

Mechanical Ventilation System Present	No

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				3
Number of passive vents				0
Number of flueless gas fires				0

21.0 Fixed Cooling System	No	

22.0 Lighting

Internal

Total number of light fittings	1	
Total number of L.E.L. fittings	1	
Percentage of L.E.L. fittings	100.00	%

External

External lights fitted	No	

23.0 Electricity Tariff	Standard	

24.0 Main Heating 1	Database	
Percentage of Heat	100	%
Database Ref. No.	17959	
Fuel Type	Mains gas	
Main Heating	BGW	
SAP Code	104	
In Winter	90.2	
In Summer	76.2	
Controls	CBI Time and temperature zone control	
PCDF Controls	0	
Delayed Start Stat	Yes	
Sap Code	2110	
Flue Type	Balanced	
Fan Assisted Flue	Yes	
Is MHS Pumped	Pump in heated space	
Heat Emitter	Radiators	
Flow Temperature	Normal (> 45°C)	
Combi boiler type	Standard Combi	
Combi keep hot type	None	

25.0 Main Heating 2	None	

Community Heating	None
28.0 Water Heating	HWP From main heating 1
Water Heating	Main Heating 1
Flue Gas Heat Recovery System	No
Waste Water Heat Recovery Instantaneous System 1	No
Waste Water Heat Recovery Instantaneous System 2	No
Waste Water Heat Recovery Storage System	No
Solar Panel	No
Water use <= 125 litres/person/day	Yes
SAP Code	901
29.0 Hot Water Cylinder	None

Recommendations

Lower cost measures

None

Further measures to achieve even higher standards

	Typical Cost	Typical savings per year	Ratings after improvement SAP rating	Environmental Impact
Solar water heating	£4,000 - £6,000	£30	B 85	
	Typical Cost	**Typical savings per year**	**Ratings after improvement SAP rating**	**Environmental Impact**
Solar photovoltaic panels, 2.5 kWp	£3,500 - £5,500	£345	A 96	