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Re: Elmsbrook Ph4 (replan) – Energy and Sustainability

This supplementary statement has been prepared by AES Sustainability Consultants Ltd to accompany the previously submitted Energy and Sustainability statement dated 27th July 2023 and in response to feedback provided by Bioregional on behalf of Cherwell District Council.

A summary of responses is shown in the table below, following consultation and discussion of the points raised with the planning officer responsible for the scheme.

Bioregional comment	**Response**
Condition 14	
Fabric standards are 'sufficient but unambitious' and are worse than the notional specification, therefore there is 'significant margin for improvement'.	It is acknowledged that fabric standards could always be improved beyond a certain point through additional insulation or improved airtighteness, however there is a point at which the benefit of these measures is outweighed by the cost, or carbon reductions are more effectively delivered through alternative measures. As demonstrated by the carbon balance calculations, further fabric uplifts do not positively improve the zero carbon assessment. There are no absolute requirements to be met, and the repsonse indicates that the fabric measures are sufficient.
Utilisation of SAP 2012 carbon factors	The relevant carbon factors for the version of Building Regulations under which the development is registered have been utilised. If the development as a whole were to be recalculated under alternative carbon factors, the design level of CO_2 savings would not be delivered due to significantly lower grid emissions reducing the benefit of CHP and solar PV systems. Future parcels within NW Bicester will be registered to updated regulations and may seek alternative approaches as a result.
Applicant to revisit calculations to provide further justification on fabric standards and carbon balance	There is no minimum fabric standard set within policy. The overarching requirement is to deliver zero carbon development. As demonstrated, within the calculation methodology which must be applied, additional carbon reductions cannot be achieved through fabric and a reliance on renewable energy systems is therefore necessary. It should be noted that increased PV system sizes will positively impact the running costs of all dwellings to a much higher degree than the same expenditure on additional fabric measures.
PV-led approach to further carbon reductions is not compliant with Cherwell Policy ESD2 which requires applicants to follow energy hierarchy	Fabric measures have been adopted which exceed the Building Regulations standards, following the energy hierarchy approach. Neither CHP nor solar PV systems are being used to deliver Part L compliance, this statement is confirming that as the calculations are not improved through further fabric measures (as demonstrated) the only option is to utilise solar PV systems to deliver the required carbon reductions.
Why does table 9 contain the average TER rather than the average DER?	The TER is shown in order to present the baseline over which the reductions are calculated. The column 'emissions after PV' shows the effective DER after fabric, CHP and solar PV systems are accounted for.
Why have the figures changed from 170.99% to 167% reduction between original energy statement and current?	The figures now presented are based on the full SAP calculations, rather than a sample approach with one of each housetype undertaken with the original submission, based on planning stage information. The minor reduction in DER/TER is due to accounting for orientation and any dimensional changes to housetypes, however it should be noted that this is a relative reduction, and therefore where the TER is also reduced by accounting for orientation, the absolute carbon emissions will still reduce even where the percentage reduction appears to be slightly lower.

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Bioregional comment	**Response**
For unregulated emissions the figure has been adjusted down from SAP estimates by a third in common with previous application. Evidence should be provided to support this claim.	The reference to previous application may be disregarded, however the calculation has been retained as representative. SAP figures are excessively high.as they were established when average appliance efficiencies were significantly lower. A more accurate assessment of unregulated energy demand can be obtained from PHPP which aligns with best practise approaches promoted by LETI and others, enabling appliance specific details to be entered. This typically results in a figure around 20kWh/m^2/year, rather than circa 35kWh/m^2/year as calculated in SAP, which equates to over 40% reduction. It should also be acknowledged that Policy Bicester 1 notes "High quality exemplary development and design standards including zero carbon development, Code Level 5 for dwellings at a minimum" (ie the minimum standard excludes unregulated energy).
Condition 16	
Bioregional comment	**Response**
Some information provided although not clear how sustainable construction methods are integrated.	Crest Nicholson have been seeking to incorporate sustainable construction methodologies into their standard build approach for many years. A typical approach to assessing these measures would be to run an options appraisal at an early stage, to guide specification and procurement decisions and drive improvements over a baseline in terms of e.g. embodied carbon. Significant experience was gained during the build out of previous homes within the development, and as a result the developer made decisions from outset to make sustainable procurement choices. There was therefore no requirement to run an options analysis to guide as decisions already made to minimise, as shown by the embodied carbon assessment.
Embodied carbon assessment provided but only for one housetype. Justification required based on this being the worst performing. Carbon reduction measures are identified and it's not clear how the measures will actually be implemented. No quantifiable commitments. Further details on how low embodied energy and responsible sourcing has been prioritised.	Unclear how it can be more robustly demonstrated that 'worst performing' dwelling has been calculated without running the assessments for others, however the overall point remains that construction specification is consistent and therefore the indicative assessment undertaken appropriately demonstrates performance across the parcel. There is no minimum standard to be achieved, however this performance exceeds current best practise standards, equating to circa 360kgCO_2/m^2 for the assessed housetype, compared with the LETI Climate Emergency Design Guide figure of 500kgCO2/m^2 reducing to 300kgCO_2/m^2 by 2030.
Condition 24	
Bioregional comment	**Response**
Not clear how many PV panels and kWp proposed to each dwelling	A full PV schedule is available and is provided, which includes MCS calculations of output. It should be noted that the MCS calculated demonstrates a total CO_2 saving of 99,315kgCO_2/year, significantly higher than the SAP calculated figure of circa 95,000kgCO_2/year
Condition 28	Further info on Rainwater harvesting to be provided (separate cover)

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It is considered that the information provided within the previous energy and sustainability statement and further supported within this supplementary statement demonstrates that all applicable policy requirements and conditions have been complied with. Where specific standards are described – such as the zero carbon requirement – the calculations demonstrated that the combined approach to fabric, services and local renewable energy sources meet the required standard.

Where the requirements are less prescriptive – for example embodied carbon – the evidence provided demonstrates that the development meets best practice standards and therefore that measures have been incorporated to make appropriate specification and materials sourcing decisions throughout the design process.

Andrew McManus

Associate Director
OCDEA, Certified PassivHaus Consultant

Crest Nicholson - Bicester 3 & 4 - MCS Zone 1 - Rev CONS A **Date:** **09/03/2022**

Polts Unchanged **Replan Plots**

PLOT NO	ROOF INCLINE	VARIATION° FROM SOUTH	Cardinal Direction	OVERSHADING FACTOR	kWp	kWh	CO_2 EQUIVALENT
001	35	85	E/W	1	4.38	3508.38	1820.85
002	40	70	ESE/WSW	1	2.92	2467.40	1280.58
003	40	70	ESE/WSW	1	2.92	2467.40	1280.58
004	35	5	S	1	5.11	5023.13	2607.00
005	35	5	S	1	5.11	5023.13	2607.00
006	35	5	S	1	5.11	5023.13	2607.00
007	35	5	S	1	5.11	5023.13	2607.00
008	35	5	S	1	5.11	5023.13	2607.00
009 (006)	40	0	S	1	3.20	3152.00	1635.89
010 (007)	40	0	S	1	3.20	3152.00	1635.89
011 (008)	40	0	S	1	3.20	3152.00	1635.89
012 (009)	40	0	S	1	3.20	3152.00	1635.89
013	40	30	SSE/SSW	1	2.92	2794.44	1450.31
014	40	30	SSE/SSW	1	2.19	2095.83	1087.74
015	40	30	SSE/SSW	1	2.19	2095.83	1087.74
016	35	60	ESE/WSW	1	4.38	3880.68	2014.07
017	35	65	ESE/WSW	1	4.38	3810.60	1977.70
018	35	70	ESE/WSW	1	2.92	2493.68	1294.22
019	35	15	S	1	5.11	4992.47	2591.09
020	35	10	S	1	5.11	5012.91	2601.70
021	35	5	S	1	5.11	5023.13	2607.00
022	35	90	E/W	1	4.38	3429.54	1779.93
023	40	0	S	1	2.92	2876.20	1492.75
024	40	0	S	1	2.92	2876.20	1492.75
025	40	0	S	1	2.92	2876.20	1492.75
026	40	0	S	1	2.92	2876.20	1492.75
027	35	90	E/W	1	4.38	3429.54	1779.93
028	35	85	E/W	1	4.38	3508.38	1820.85
029	35	10	S	1	5.11	5012.91	2601.70
030	35	15	S	1	5.11	4992.47	2591.09
031	35	20	S	1	5.11	4966.92	2577.83
032	35	0	S	1	5.11	5028.24	2609.66
033	35	0	S	1	2.19	2154.96	1118.42
034	35	10	S	1	5.11	5012.91	2601.70
035	35	15	S	1	5.11	4992.47	2591.09
036	35	20	SSE/SSW	1	5.11	4966.92	2577.83
037	35	35	SSE/SSW	1	5.11	4849.39	2516.83
038	35	35	SSE/SSW	1	5.11	4849.39	2516.83
039	35	70	ESE/WSW	1	4.38	3740.52	1941.33
040	35	70	ESE/WSW	1	4.38	3740.52	1941.33
041	35	90	E/W	1	4.38	3429.54	1779.93
042	40	0	S	1	2.92	2876.20	1492.75
043	40	0	S	1	2.19	2157.15	1119.56
044	40	0	S	1	2.19	2157.15	1119.56
045	40	0	S	1	2.92	2876.20	1492.75
046	35	90	E/W	1	4.38	3429.54	1779.93
047	40	80	E/W	1	1.46	1179.68	612.25
048	35	75	E/W	1	4.38	3666.06	1902.69
049	40	70	ESE/WSW	1	1.46	1233.70	640.29
050	40	70	ESE/WSW	1	1.46	1233.70	640.29
051	35	65	ESE/WSW	1	4.38	3810.60	1977.70
052	40	65	ESE/WSW	1	1.46	1259.98	653.93
053	35	60	ESE/WSW	1	4.38	3880.68	2014.07
054	35	65	ESE/WSW	1	4.38	3810.60	1977.70
055	25	10	S	1	4.80	4617.60	2396.53
056	40	10	S	1	3.84	3770.88	1957.09
057	40	10	S	1	3.20	3142.40	1630.91
058	40	10	S	1	3.20	3142.40	1630.91
059	40	10	S	1	3.84	3770.88	1957.09
060	45	0	S	1	4.48	4390.40	2278.62
061	45	0	S	1	2.24	2195.20	1139.31
062	45	0	S	1	4.48	4390.40	2278.62
063	45	5	S	1	2.24	2195.20	1139.31
064	45	5	S	1	2.24	2195.20	1139.31
065	45	5	S	1	3.20	3136.00	1627.58
066	45	5	S	1	5.12	5017.60	2604.13
067	40	20	SSE/SSW	1	3.20	3113.60	1615.96
068	40	20	SSE/SSW	1	3.20	3113.60	1615.96
069	40	70	ESE/WSW	1	3.20	2704.00	1403.38
070	40	70	ESE/WSW	1	3.20	2704.00	1403.38
071	40	70	ESE/WSW	1	3.20	2704.00	1403.38

Crest Nicholson - Bicester 3 & 4 - MCS Zone 1 - Rev CONS A **Date:** **09/03/2022**

Polts Unchanged **Replan Plots**

PLOT NO	ROOF INCLINE	VARIATION° FROM SOUTH	Cardinal Direction	OVERSHADING FACTOR	kWp	kWh	CO_2 EQUIVALENT
072	45	35	SSE/SSW	1	5.12	4817.92	2500.50
073	45	35	SSE/SSW	1	3.20	3011.20	1562.81
074	40	15	S	1	2.56	2503.68	1299.41
075	40	15	S	1	3.20	3129.60	1624.26
076	40	15	S	1	3.20	3129.60	1624.26
077	45	5	S	1	5.12	5017.60	2604.13
078	40	15	S	1	3.20	3129.60	1624.26
079	40	15	S	1	3.20	3129.60	1624.26
080	40	15	S	1	2.56	2503.68	1299.41
081	40	15	S	1	3.20	3129.60	1624.26
082	40	15	S	1	3.20	3129.60	1624.26
083	25	10	S	1	4.80	4617.60	2396.53
084	45	10	S	1	3.84	3751.68	1947.12
085	30	0	S	1	4.48	4376.96	2271.64
086	30	0	S	1	4.48	4376.96	2271.64
087	30	0	S	1	2.24	2188.48	1135.82
088	30	0	S	1	2.24	2188.48	1135.82
089	25	10	S	1	4.80	4617.60	2396.53
090	25	10	S	1	4.48	4309.76	2236.77
091	30	15	S	1	4.34	4214.14	2187.14
092	40	15	S	1	3.00	2934.00	1522.75
093	40	15	S	1	2.40	2347.20	1218.20
094	40	15	S	1	3.00	2934.00	1522.75
095	40	15	S	1	3.00	2934.00	1522.75
096	40	15	S	1	3.00	2934.00	1522.75
097	40	25	SSE/SSW	1	3.00	2898.00	1504.06
098	40	25	SSE/SSW	1	3.00	2898.00	1504.06
099	40	25	SSE/SSW	1	3.00	2898.00	1504.06
100	45	35	SSE/SSW	1	2.10	1976.10	1025.60
101	45	35	SSE/SSW	1	2.10	1976.10	1025.60
102	45	35	SSE/SSW	1	2.10	1976.10	1025.60
103	45	40	SE/SW	1	2.10	1950.90	1012.52
104	45	40	SE/SW	1	2.10	1950.90	1012.52
105	45	40	SE/SW	1	2.10	1950.90	1012.52
106	40	20	SSE/SSW	1	3.00	2919.00	1514.96
107	40	20	SSE/SSW	1	3.10	3016.30	1565.46
108	40	10	S	1	3.84	3770.88	1957.09
109	40	10	S	1	3.20	3142.40	1630.91
110	40	10	S	1	3.84	3770.88	1957.09
111	40	15	S	1	3.20	3129.60	1624.26
112	40	15	S	1	3.20	3129.60	1624.26
113	25	20	S	1	4.34	4144.70	2151.10
114	25	20	S	1	2.24	2139.20	1110.24
115	25	20	S	1	4.48	4278.40	2220.49
116	30	15	S	1	4.34	4214.14	2187.14
117	30	15	S	1	4.48	4350.08	2257.69
118	30	15	S	1	2.17	2107.07	1093.57
119	30	15	S	1	2.17	2107.07	1093.57
120	40	10	S	1	3.20	3142.40	1630.91
121	40	10	S	1	3.20	3142.40	1630.91
122	40	10	S	1	3.20	3142.40	1630.91
123	40	10	S	1	2.56	2513.92	1304.72
124	25	95	E/W	1	3.60	2840.40	1474.17
125	25	95	E/W	1	3.60	2840.40	1474.17
126	25	95	E/W	1	3.60	2840.40	1474.17
127	25	20	S	1	4.34	4144.70	2151.10
128	25	20	S	1	4.34	4144.70	2151.10
129	25	20	S	1	4.34	4144.70	2151.10
130	25	35	SSE/SSW	1	4.34	4066.58	2110.56
131	25	35	SSE/SSW	1	4.34	4066.58	2110.56
132	25	5	S	1	4.65	4482.60	2326.47
133	25	5	S	1	4.65	4482.60	2326.47
134	25	5	S	1	4.65	4482.60	2326.47
135	40	5	S	1	3.84	3778.56	1961.07
136	40	5	S	1	3.84	3778.56	1961.07
137	25	10	S	1	4.80	4617.60	2396.53
138	45	10	S	1	3.84	3751.68	1947.12
139	40	15	S	1	3.60	3520.80	1827.30
140	40	15	S	1	3.60	3520.80	1827.30
141	40	15	S	1	3.00	2934.00	1522.75
142	40	15	S	1	3.60	3520.80	1827.30
143	40	70	ESE/WSW	1	3.00	2535.00	1315.67
144	40	70	ESE/WSW	1	3.60	3042.00	1578.80

Crest Nicholson - Bicester 3 & 4 - MCS Zone 1 - Rev CONS A **Date:** **09/03/2022**

Polts Unchanged **Replan Plots**

PLOT NO	ROOF INCLINE	VARIATION° FROM SOUTH	Cardinal Direction	OVERSHADING FACTOR	kWp	kWh	CO_2 EQUIVALENT
145	40	15	S	1	3.00	2934.00	1522.75
146	40	15	S	1	3.00	2934.00	1522.75
147	40	5	S	1	3.00	2952.00	1532.09
148	40	5	S	1	3.00	2952.00	1532.09
149	40	5	S	1	3.00	2952.00	1532.09
150	40	10	S	1	3.00	2946.00	1528.97
151	40	10	S	1	3.00	2946.00	1528.97
152	40	10	S	1	3.00	2946.00	1528.97
153	45	25	SSE/SSW	1	2.70	2592.00	1345.25
154	45	25	SSE/SSW	1	2.70	2592.00	1345.25
155	45	25	SSE/SSW	1	2.70	2592.00	1345.25
156	45	35	SSE/SSW	1	2.10	1976.10	1025.60
157	45	35	SSE/SSW	1	2.10	1976.10	1025.60
158	45	35	SSE/SSW	1	2.10	1976.10	1025.60
159	25	20	SSE/SSW	1	4.50	4297.50	2230.40
160	40	10	S	1	3.00	2946.00	1528.97
161	40	10	S	1	3.00	2946.00	1528.97
162	40	10	S	1	3.00	2946.00	1528.97
163	30	10	S	1	4.20	4090.80	2123.13
164	30	10	S	1	4.20	4090.80	2123.13
165	45	5	S	1	3.60	3528.00	1831.03
166	45	5	S	1	4.80	4704.00	2441.38
167	25	0	S	1	4.50	4338.00	2251.42
168	40	0	S	1	3.00	2955.00	1533.65
169	40	0	S	1	3.00	2955.00	1533.65
170	40	0	S	1	3.00	2955.00	1533.65
171	40	0	S	1	3.00	2955.00	1533.65
172	25	10	S	1	4.20	4040.40	2096.97
173	25	10	S	1	2.10	2020.20	1048.48
174	25	10	S	1	4.20	4040.40	2096.97
175	30	20	S	1	4.20	4057.20	2105.69
176	30	20	S	1	4.20	4057.20	2105.69
177	30	20	S	1	2.10	2028.60	1052.84
178	30	20	S	1	4.20	4057.20	2105.69
179	25	20	SSE/SSW	1	4.50	4297.50	2230.40
180	25	20	SSE/SSW	1	4.20	4011.00	2081.71
181	40	0	S	1	3.60	3546.00	1840.37
182	40	0	S	1	3.00	2955.00	1533.65
183	40	0	S	1	3.60	3546.00	1840.37
184	45	0	S	1	3.60	3528.00	1831.03
185	45	5	S	1	4.80	4704.00	2441.38
186	45	20	S	1	3.60	3481.20	1806.74
187	45	25	SSE/SSW	1	4.80	4608.00	2391.55
188	25	45	SE/SW	1	4.50	4135.50	2146.32
189	25	45	SE/SW	1	4.50	4135.50	2146.32
190	45	45	SE/SW	1	3.00	2748.00	1426.21
191	45	45	SE/SW	1	4.80	4396.80	2281.94
192	30	35	SSE/SSW	1	4.20	3969.00	2059.91
193	30	35	SSE/SSW	1	4.20	3969.00	2059.91
194	30	35	SSE/SSW	1	4.20	3969.00	2059.91
195	30	70	ESE/WSW	1	3.00	2577.00	1337.46
196	45	25	SSE/SSW	1	3.60	3456.00	1793.66
197	45	25	SSE/SSW	1	4.80	4608.00	2391.55
198	45	25	SSE/SSW	1	3.60	3456.00	1793.66
199	45	20	S	1	4.80	4641.60	2408.99
200	40	15	S	1	3.00	2934.00	1522.75
201	40	15	S	1	3.00	2934.00	1522.75
202	30	5	S	1	4.20	4099.20	2127.48
203	30	5	S	1	2.10	2049.60	1063.74
204	30	5	S	1	4.20	4099.20	2127.48
205	45	15	S	1	4.80	4670.40	2423.94
206	45	20	S	1	3.60	3481.20	1806.74
207	45	25	SSE/SSW	1	3.60	3456.00	1793.66
208	40	70	ESE/WSW	1	3.60	3042.00	1578.80
209	45	20	SSE/SSW	1	3.00	2901.00	1505.62
210	45	20	SSE/SSW	1	3.00	2901.00	1505.62
211	40	55	ESE/WSW	1	3.60	3222.00	1672.22
212	45	20	SSE/SSW	1	4.80	4641.60	2408.99
213	45	20	SSE/SSW	1	3.60	3481.20	1806.74
214	40	70	ESE/WSW	1	3.84	3244.80	1684.05
215	45	20	S	1	3.60	3481.20	1806.74
216	40	75	E/W	1	3.00	2481.00	1287.64
217	40	15	S	1	3.60	3520.80	1827.30

Crest Nicholson - Bicester 3 & 4 - MCS Zone 1 - Rev CONS A **Date:** **09/03/2022**

Polts Unchanged **Replan Plots**

PLOT NO	ROOF INCLINE	VARIATION° FROM SOUTH	Cardinal Direction	OVERSHADING FACTOR	kWp	kWh	CO_2 EQUIVALENT
218	45	60	ESE/WSW	1	3.20	2780.80	1443.24
219	40	10	S	1	3.84	3770.88	1957.09
220	40	5	S	1	3.84	3778.56	1961.07
221	45	15	S	1	3.84	3736.32	1939.15
222	45	20	S	1	5.12	4951.04	2569.59
223	45	15	S	1	3.84	3736.32	1939.15
224	45	25	SSE/SSW	1	3.84	3686.40	1913.24
225	40	80	E/W	1	3.20	2585.60	1341.93
226	30	75	E/W	1	3.84	3240.96	1682.06
227	30	50	SE/SW	1	3.20	2924.80	1517.97
228	45	25	SSE/SSW	1	3.00	2880.00	1494.72
394	35	70	ESE/WSW	1	4.38	3740.52	1941.33
395	35	75	E/W	1	4.38	3666.06	1902.69
396	35	10	S	1	5.11	5012.91	2601.70
Totals					832.32	788522.53	409243.19

The Performance of solar PV systems is impossible to predict with certainty due to the variability in the amount of solar radiation (sunlight) from location to location and from year to year. This estimate, based upon the MCS procedure, is given as guidance only. It should not be considered as a guarantee of performance.

This system performance calculation has been undertaken using estimated values for array orientation, inclination or shading. Actual performance may be significantly lower or higher if the characteristics of the installed system vary from the estimated results.