

About Southern Energy Consultants Ltd

Southern Energy Consultants Ltd are a construction consultancy specialising in sustainability, energy conservation, the application of renewable technologies and statutory utilities infrastructure design and management. As a consultancy we do not sell or have financial interest in any products so are able to take an objective view of developments to assist developers with incorporating cost effective and practical solutions.

Our services include Planning Energy Statements, energy calculations for Building Regulation compliance, Code for Sustainable Homes assessments and utilities design and management. Our team of consultants include registered SAP, SBEM and Code for Sustainable Homes assessors, Planning Specialists, Renewable Energy Specialists, CAD Specialist, Utilities Specialists and Civil Engineers.

Within SEC Ltd we have over 25 years experience working with and for National Developers, Construction and Design and Build Contractors we apply our expertise not only to assist with developers understanding of new energy and sustainability obligations but also in a way that ensures that the needs and responsibilities of all stakeholders are wholly respected.

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1.0 Introduction

- 1.1 This Energy and Sustainability Statement has been commissioned by Persimmon Homes (the Applicant) and carried out by Southern Energy Consultants as part of a comprehensive analysis of available opportunities to reduce carbon dioxide emissions and energy consumption across Phase 5 of their development at Littlehampton. The site falls under Arun District Council jurisdiction and Phase 5 includes 260 dwellings of mixed type and tenure (20% affordable).
- 1.2 The Littlehampton site obtained outline planning permission (Application Reference: LU/47/11) in 2013, which was subsequently amended under a S73 Application (Application Reference: LU/182/15/PL). The outline consent includes approval for up to 1,260 dwellings and various non-residential buildings, including schools, community centre and a commercial hub. The Phase 5 application covers an area of approximately 8 hectares and is located on land immediately to the east of the proposed Central Wetland Area.
- 1.3 This Statement's main focus is to provide a response to Planning Condition 31 of the Outline Consent (LU/47/11). Condition 31 is entitled 'Energy' and states the following:

"At least 10% of the energy supply of the development shall be secured from decentralised and renewable or low carbon energy sources (as described in the glossary at Annex 2 of the National Planning Policy Framework, March 2012). Details and a timetable of how this is to be achieved for each phase or sub phase of development, including details of physical works on site, shall be submitted to and approved in writing by the Local Planning Authority before any development in that phase or sub phase begins. The development shall be implemented in accordance with the approved details and timetable and retained as operational thereafter, unless otherwise agreed in writing by the Local Planning Authority."

Strategy and Planning Background

- 1.4 The Applicant intends to deliver a 10% reduction in site-wide carbon dioxide emissions, with respect to the standard set by Part L1a of Building Regulations, through the adoption of best practice energy efficiency measures and installation of renewable energy technologies. The Applicant's proposed approach for minimising greenhouse gas emissions from the new dwellings in Phase 5 of the Littlehampton development is supported by national planning policy guidance and will help to

reduce fuel bills for future occupants. At a national level, planning policy guidance is stimulated by the Climate Change Act (2008) and fully espoused within the National Planning Policy Framework (2019) (NPPF). The Climate Change Act requires the UK Government to “ensure that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline”. This legal commitment sets the overriding objective for sustainable energy provision in the UK: the reduction of carbon dioxide emissions.

1.5 In 2019, the revised NPPF was published. This document asserts that:

“At the heart of the NPPF is a presumption in favour of sustainable development which should be seen as a golden thread running through both plan-making and decision-taking. For decision-taking this means:

- *Approving development proposals that accord with the development plan without delay; and*
- *Where the development plan is absent, silent or relevant, policies are out-of-date granting permission unless*
 - *Any adverse impacts of doing so would significantly and demonstrably outweigh the benefits when assessed against the policies in this Framework taken as a whole; or*
 - *Specific policies in this Framework indicate development should be restricted.”*

1.6 The NPPF proceeds to state that:

“To support the move to a low carbon future, local planning authorities should:

- *Plan for new development in locations and ways which reduce greenhouse gas emissions;*
- *Actively support energy efficiency improvements to existing buildings”*

Objectives

1.7 In the light of the requirements set by Planning Condition 31 and the NPPF, this Statement will set out an array of best practice energy efficiency proposals and renewable energy installations, sufficient for the 260 dwellings proposed across Phase 5 of the Littlehampton development to deliver reductions in carbon dioxide emissions of 10% compared to a Part L1a (2013) compliant baseline.

Structure

- 1.8 Section 2 of this Statement calculates the carbon dioxide emissions baseline using the Standard Assessment Procedure (SAP), outlines the Applicant's energy efficiency measures for complying with and bettering the baseline standard, considers the most suitable renewable energy technology for the site, and finally demonstrates how renewable energy technologies will deliver the sought after 10% reduction across Phase 5 of the Littlehampton development. Sections 3 to 7 of this Statement then articulate the Applicant's general commitments with respect to maximising the overall sustainability performance of the scheme.

2.0 Emissions Baseline and Energy Efficiency Proposals

Building Regulations (2013) Baseline

- 2.1 In order for an energy assessment to be conducted, a Building Regulation (2013) baseline for carbon dioxide emissions must first be calculated for the 260 dwellings. The predicted emissions for the dwellings include all sources from hot water, space heating and fixed electrical items. The baseline has been calculated by an accredited energy assessor using SAP (2012) methodology and Elmhurst approved software. This baseline will then be used as a standard to demonstrate the reductions that will result from energy efficiency measures and renewable energy technologies. The Building Regulation (2013) baseline for the development identifies predicted carbon dioxide emissions, relative to each dwelling type's Target Emission Rate, of **407,605 kgCO₂/year**. Table 1 below sets out the baseline emissions for each dwelling type and in aggregate, with detailed examples of SAP calculations provided in the Appendix to this Statement.

Table 1: Baseline Carbon Dioxide Emissions (kgCO₂/year) for Phase 5, Littlehampton

	Number of Dwellings	Emissions (kgCO ₂ /year)	Total Emissions (kgCO ₂ /year)
Private			
Alnmouth	6	1,142	6,852
Danbury	11	1,392	15,312
Wareham	19	1,467	27,873
Sherwood	22	1,531	33,682

Charnwood	41	1,704	69,864
Saunton	42	1,731	72,702
Ashdown	8	1,755	14,040
Greenwood	2	1,996	3,992
Whiteleaf (+ bay)	9	2,044	18,396
Whiteleaf	10	2,035	20,350
Kielder	2	2,179	4,358
Marylebone	2	2,299	4,598
2B FOG	1	1,311	1,311
2B3P flat (average)	9	1,167	10,503
2B4P flat (average)	24	1,244	29,856
Sub-total		208	333,689
Affordable			
3B4P House	16	1,509	24,144
2B3P flat (average)	6	1,198	7,188
2B4P flat (average)	12	1,244	14,928
2B4P House	16	1,481	23,696
4B5P House	2	1,980	3,960
Sub-total		52	73,916
TOTAL		260	407,605

- 2.2 In accordance with the Applicant's intentions set out in the Introduction, this Statement will now continue by detailing the range of best practice energy efficiency measures and renewable energy technologies to deliver a reduction of at least 10% compared to the baseline scenario. This amounts to a required reduction of at least **40,761 kgCO₂/year**.

Best Practice Energy Efficiency Measures

- 2.3 As a first energy efficiency measure, the proposed dwellings will incorporate sufficient insulation in the building envelope (walls, roofs, floors and glazing) to achieve average U-values considerably better than the limiting standards demanded by Part L1a of 2013 Building Regulations. Table 2 below illustrates the proposed U-values and the limiting area-weighted values set by Part L1a of 2013 Building Regulations.

Table 2: Insulation Enhancement Proposals for Main Thermal Elements

Thermal Element	Maximum Area-Weighted U-value (W/m ² K) Allowable Under 2013 Building Regulations	Applicant's Proposed U-value (W/m ² K) Required To Meet 2013 Building Regulations Baseline	% Improvement On 2013 Allowable U-Value Standard
Main external walls (houses)	0.30	0.28	6.67
Main external walls (apartments)	0.30	0.26	13.33
Roof (joists)	0.20	0.15	25.00
Roof (rafters)	0.20	0.19	5.00
Ground floor	0.25	0.16-0.18	28.00-36.00
Windows	2.00	1.40	30.00

- 2.4 The Applicant intends to meet the U-value performance standards detailed in Table 2 through the following construction specification for the main thermal elements:

Table 3: Fabric Enhancement Construction Specification

Thermal Element	Proposed U-value (W/m ² K) required to Meet 2013 Building Regulations Baseline	Construction Measures
Main external walls (houses)	0.28	Space 4 timber frame construction including mineral wool insulation, plus either a reflective breather membrane or reflective vapour barrier.
Main external walls (apartments)	0.26	Masonry construction, including outer leaf or 100mm brick or external cladding on medium density blocks, 100mm cavity fully filled with Knauf Supafil 34 insulation ('k' value of 0.034),

		100mm aircrete blocks ('k' value of 0.19).
Roof (joists)	0.15	One layer of 100mm mineral wool insulation ('k' value of 0.044) quilt laid between ceiling joists and one layer of 200mm mineral wool ('k' value of 0.044) laid over to provide a total thickness of 300mm.
Roof (rafters)	0.19	Space 4 cassette roof system.
Ground floor	0.16-0.18	Beam and block construction to include 75mm Kingspan Thermawall TF70 insulation ('k' value of 0.022).
Windows	1.40	BFRC, PVC-U double glazed, soft-coated with 'g' value of 0.260.

Heating and Controls

- 2.5 The Applicant proposes the installation of Ideal Logic Combi ESP1 35 gas boilers, which possess a SEDBUK (2009) efficiency of 89%. All dwellings will benefit from efficient heating controls, including Time and Temperature Zone Controls and optimum start thermostats. Due to the former, it will be possible for the future homeowners to co-ordinate the heating performance of at least two distinct zones within their property. Thermostatic radiator valves will be provided to all radiators as a form of localised heating controls.

Ventilation and Air Tightness

- 2.6 Ventilation to all dwellings will be provided via highly efficient intermittent extract fans. Air tightness standards will be improved by the Applicant adopting a mixture of 'Space4' (houses), Aircrete Product Association (apartments) and Accredited Construction details for non-repeating thermal bridges, which are typically far superior to the default psi value standards assumed by SAP (2012). Each dwelling's design air permeability will be reduced from 10 m³/hm² to 5 m³/hm² to further lower space heating requirements.

Internal Lighting

- 2.7 All of the Applicant's internal lighting throughout the development will be of the dedicated low energy type. Although not assessed within the Building Regulations calculation, external lighting will

also be low energy and some will be controlled through PIR sensors or daylight cut-off devices to minimise use and promote the security of the development.

Emissions After Energy Efficiency Proposals

- 2.8 The energy efficiency measures detailed in Paragraphs 2.4 to 2.8 will reduce the predicted carbon dioxide emissions at the Littlehampton, Phase 5 development from **407,605 kgCO₂/year** to **399,045 kgCO₂/year**. This is a reduction of **8,560 kgCO₂/year**, or **2.10%**. A further reduction in emissions of at least **32,201 kgCO₂/year** must be secured via the installation of renewable energy technologies in order to deliver a 10% reduction compared to the baseline case.

Feasibility of Renewable Energy Technologies

- 2.9 This section of the Statement conducts a thorough review of the renewable energy and low carbon technologies that could theoretically be applied to Phase 5 of the Littlehampton development. Renewable energy is defined as *“those energy flows that occur naturally and repeatedly in the environment – from the wind, the fall of water, the movement of oceans, from the sun and also from biomass”* (London Plan, 2008). This definition has been widened by the UK Government through the use of the term ‘Low or Zero Carbon Technologies’ (LZC), which include heat pumps and gas-fired CHP – technologies not always considered as being renewable. The technologies to be evaluated in this Statement are as follows:

- Combined Heat and Power
- Biomass
- Heat pumps (ground source and air source)
- Hydroelectric power
- Wind energy
- Solar thermal panels
- Solar photovoltaic panels

Combined Heat and Power

- 2.10 CHP is a form of decentralised energy generation that generally uses gas to generate electricity for local consumption, reducing the need for grid electricity and its associated high carbon dioxide emissions. As the CHP system is close to the point of energy demand, it is possible to use the heat that is generated during the electricity generation process. As both the electricity and heat from the

generator is used, the efficiency of the system is increased above that of a conventional power plant where the heat is not utilised. CHP is suitable for dense, mixed-use developments where there is a high, constant and varied heat demand. This is not the case for Phase 5 of the Littlehampton development, which is residential and only incorporates a total of forty-six dwellings. In addition, as there are no other CHP networks in the vicinity of the development with which to forge a connection, this is not a suitable technology for the development.

Biomass

- 2.11 Biomass community heating is an alternative to conventional fossil fuel heating but, as per the reasons used against the installation of gas-fuelled CHP, should be discounted as an option for the proposed dwellings. Biomass boilers within individual dwellings are usually installed with a standard gas boiler as back-up in case the occupier runs out of fuel. Although they are reducing in size, they are still large enough to require a dedicated room with additional space for the fuel – there is insufficient space available for such infrastructure in the majority of proposed dwelling types, especially the apartments. The management of fuel deliveries and ash dispersal is also complex, necessitating a dedicated operative as opposed to residents of the future dwellings. Furthermore, the emissions of Nitrous Oxide and particulate matter that are associated with biomass installations would have the capacity to worsen local air pollution.

Ground and Air Source Heat Pumps (GSHPs)

- 2.12 Neither of these technologies has been considered for implementation at Littlehampton due to their higher carbon dioxide emissions compared to the proposed gas boiler specification. Although both technologies are renowned for delivering reductions in carbon dioxide emissions, they do so from a much higher baseline than when gas is the specified fuel for space heating and hot water generation. Electricity consumption is also associated with much higher Nitrous Oxide emissions than Class 5 gas boilers.

Hydroelectric power

- 2.13 Hydroelectric power plants generate electricity using the gravitational force of flowing or falling water. However, there are no rivers of sufficient scale in the vicinity of the Littlehampton development to facilitate a hydroelectric power installation.

Wind Turbines

- 2.14 Wind turbines are a modern, high-technology descendant of the windmills that have been around for centuries. In modern windmills the kinetic energy of the wind is used to turn a turbine to generate electricity as opposed to moving water or turning a grist mill wheel. A site with an average wind speed of 5m/s or more is generally considered to be suitable for installing a wind turbine. The average wind speed at the Littlehampton development is 4.5m/s at 10m AOD and is below the level required to generate significant carbon dioxide reductions or commercial take-up. The installation of a single, large wind turbine to serve the development would also be controversial due to the nature of the locality. Even if space could be found within the development to accommodate a very high (15-20m) turbine, their installation would then present a significant visual blight to neighbours.

Solar thermal and photovoltaic panels

- 2.15 Solar thermal heating panels contribute to the hot water demand of a dwelling. Water or glycol (heat transfer liquid) is circulated to roof level where it is heated using solar energy before being returned to a thermal store where heat is exchanged with water from the conventional system. The proposed dwellings generally contain suitable attributes (orientation, available roof-space and limited shadowing) for solar photovoltaic installations to be designed-in, although solar thermal installations are unsuitable. In part this is because the smaller dwelling types – for example, the Danbury – have very little space to accommodate a hot water cylinder, however, even if this was not the case, the technology is unable to deliver a 10% reduction in carbon dioxide emissions from the theoretical baseline – only around an 8% reduction on average can be obtained due to the limits of hot water demand. The specification of gas combination boilers also reduces the energy demand for heating and storing hot water.
- 2.16 However, there are few constraints on the capacity for solar photovoltaic panels to deliver reductions in emissions. For all dwellings on the site, roof-space is available at no worse than a west-east orientation, sufficient for solar photovoltaic installations to be effective at delivering emissions reductions. Further SAP calculations have been carried out, which show the reductions in emissions that could be secured given the installation of **56.44 kWp** of solar PV output, with priority given to installing arrays on seventeen optimally orientated (south-facing) dwellings. As shown in the marked-up layout of solar panel locations and additional calculations in the Appendix, these are Plots 8, 9, 10, 12-17, 101, 102, 105, 106 and 222-225.

Modelling of Solar PV Installations and Emissions Reductions

- 2.17 Further SAP calculations have been carried out to model the effects on site-wide emissions of introducing 56.44 kWp of solar PV panels to Phase 5 of the Littlehampton development. Overall, the introduction of 56.44 kWp of solar PV output to optimally orientated dwellings will reduce emissions across the site by **32,435 kgCO₂/year**. In addition, to the reductions secured via best practice energy efficiency measures, which were **8,560 kgCO₂/year**, this amasses to a total reduction of **40,955 kgCO₂/year**.
- 2.18 Compared to baseline emissions of **407,605 kgCO₂/year**, this is equivalent to an overall reduction in emissions of **10.06%**. This is summarised in Table 4 overleaf. At the detailed design stage, the number of installations may reduce due to optimisation of plot design and the rated output of the specified panels, however, the reduction in carbon dioxide emissions will remain the same.

Table 4: Emissions Reduction from Energy Efficiency Measures and Solar PV Installations – Phase 5, Littlehampton

	Emissions (kgCO ₂ /year)
Baseline	407,605
Reduction from energy efficiency measures	(8,560)
Reduction from 56.44 kWp solar PV output	(32,435)
Total reduction	(40,955)
Emissions after reductions	366,650
Overall percentage reduction from baseline	10.06%

3.0 Layout, Access and Landscaping

- 3.1 The quantum of development and height and scale of the new dwellings has taken into account the prevailing characteristics of communities adjacent to the site. Two-and-a-half and three storey dwellings are located on the central spine road and most two storey homes closer to the periphery. Buildings are massed to enable them to be articulated in a sensitive manner with respect to the street scene, whilst enabling the land to be maximised with respect to its potential to provide much needed accommodation for people of all ages, including young families and the elderly.

- 3.2 The Applicant's movement strategy for Phase 5 seeks to integrate with existing and future phases, linking to cycle and pedestrian paths. Key desire lines connect to earlier phases, the Central Woodland and pedestrian paths. Access to the development parcels will be taken from the proposed new spine road, which will then transition into the minor access roads and private drives.
- 3.3 All houses will be provided with fully accessible private space in the form of rear gardens. Access to the private and communal green spaces will be facilitated in accordance with the principles of inclusive design. The following measures will be introduced to ensure that those with mobility difficulties can access all areas of the development:
- A pedestrian friendly environment
 - Carefully designed landscaping
- 3.4 The Applicant's commitment to inclusivity will be demonstrated through their attitude towards movement and equality. The Applicant will ensure that the development is scaled appropriately so as to respond to the needs of all of its users. They will incorporate the requirements of the Equality Act (2010) into their design, making reasonable adjustments to enable disabled access, regularly reviewing whether the buildings are accessible and effective, and providing necessary design adjustments where it is practicable to do so.
- 3.5 It is important that future residents feel secure and free from the fear of crime. The Applicant and their design team will pay particular attention to the passive surveillance of streets, communal spaces and parking areas. Generous rear garden depths will ensure substantial separation distances between the Applicant's proposed dwellings, minimising overlooking. The design proposals also integrate sound urban design principles in locating circulation routes so that they are overlooked by ground floor active windows from habitable rooms, maximising the surveillance of the public realm. Security standards in respect of external doors and windows in the dwellings will comply with the requirements set out in AD Q: Security – Dwellings.
- 3.6 Dwellings have been afforded generous set-backs from the road and are open and largely laid to lawn with shrub planting. Extensive soft landscaping will be used to provide 'defensible' areas to the front and flanks of dwellings, and this approach will contribute to the sustainable management of surface water runoff on site.

- 3.7 All dwellings will be provided with secure cycle storage facilities in either communal stores, garages or sheds. This will help to promote sustainable travel to employment and amenity sites in the local area. In addition, the use of sustainable modes of transport will be further encouraged through the provision of 209 electric car charging points to communal parking spaces and houses with on-plot parking. Overall, Phase 5 will be provided with 547 car parking spaces in accordance with the requirements set out in Arun District Council's Parking Standards Supplementary Guidance (January 2020).
- 3.8 The landscaping proposals for Phase 5 have been developed with reference to its natural features, ecological habitats and opportunities for ecological enhancement. The Applicant's emphasis is on identifying opportunities to enhance the ecological value of the site and deliver a net gain in biodiversity. Indigenous trees, hedges and native plant species will be introduced to supplement the existing landscaping, encouraging the development of local biodiversity. The following measures will be adopted by the Applicant:
- Planting within swales.
 - Wetland areas to include aquatic plants, reeds and rushes.
 - A tree-lined spine road.
 - Tree planting at the top of the bank to provide an edge to the development and the wetland area.
 - Provision of parkland areas, where retained trees are supplemented with new native shrub and tree planting.
 - Long grass and species rich grass and wildflowers will be introduced to the parkland areas.
 - Pedestrian paths.

4.0 Materials

- 4.1 While a major consideration in materials selection is maintaining a distinct and local architectural style (such as the use of traditional red brick), from a sustainability perspective the Applicant is equally committed to minimising the environmental impact of the materials used over the lifetime of the building – from manufacture, to eventual demolition, to disposal. All four architectural character areas proposed for Phase 5 will mix contemporary and modern design features, whilst seeking to integrate with green lines and the wetland zone. For building materials, the Applicant will,

in the main, specify 'A+' or 'A' rated materials using the online BRE Green Guide to Housing Specification, with all materials rated at least 'C'.

- 4.2 Wherever feasible, the Applicant will commit to using materials that are locally sourced, from renewable sources and recycled from the demolition of existing buildings on site. Innovative techniques for the recycling of materials on site will be employed, including re-use of hardcore and chipping wood for footpaths. The use of recycled materials (e.g. crushed concrete from waste used for hard-standing or recycled fibreglass insulation) has zero embodied energy impact, other than that expended in their processing or transport.
- 4.3 The Applicant will also endeavour to employ local labour wherever possible, minimising transport distances and related greenhouse gas emissions.

5.0 Noise and Dust Pollution

- 5.1 Mitigation measures will be investigated during the M&E design and construction phase to ensure that the baseline ambient noise levels are not overtly increased by the proposed development.
- 5.2 The development will generate an increase in the amount of traffic in comparison to existing traffic levels on nearby roads. In order to best mitigate the development's contribution to local air pollution, the Applicant is specifying Class 5 gas boilers for Nitrous Oxide emissions. Furthermore, best practice mitigation procedures will be adopted on-site during the construction phase, which will include the following measures:
- Dampening and sweeping roadways
 - Covering vehicles and skips when loaded with material
 - Locating stock piles to take into account the prevailing wind
 - Sealing and replanting completed earthworks as early as practicable
 - Using low emission vehicles and plant equipment
- 5.3 Air intakes and outlets within the proposed dwellings will all avoid any sources of external pollution in order to avoid internal air pollution.

6.0 Recycling and Waste Management

- 6.1 The Applicant's proposals have allocated sufficient space within external storage areas to satisfy the Arun District Council's waste bin specification for the deposition of general refuse, recyclable waste and garden waste respectively.
- 6.2 All dwellings will be provided with segregated internal recycling bins in the kitchen to facilitate the recycling of various waste streams. In addition, all houses will be provided with small internal caddy bins for the transfer of compostable waste; private gardens will be provided with composting bins.
- 6.3 The Applicant will ensure that best practice procedures are followed on site in relation to the segregation of various waste streams, setting appropriate targets for reduction, recycling and re-use with respect to each of these.

7.0 Avoiding Flooding and Water Use

- 7.1 The proposed development at Littlehampton has a low risk of flooding according to the Environment Agency's flood mapping system. Although the proposed development is already located in Flood Zone 1, the Applicant will implement a drainage strategy that seeks to utilise the natural drainage features of the site and, in so doing, encourage percolation rather than runoff. For all storm events up to the 1 in 100 year flood (including a 40% allowance for climate change and an allowance for urban creep), rates of surface water runoff will be no more than their pre-development levels. This objective will be facilitated in part through Phase 5's Central Wetland Area and the swale network.
- 7.2 During the construction phase, the Applicant will adopt best practice procedures on site in relation to the potential for water pollution. Detailed procedural guidance will be disseminated to site operatives having been prepared in accordance with Environment Agency advice.
- 7.3 In terms of internal potable water consumption, The Applicant is committed to delivering performance of not more than 110 litres per person per day in all dwellings (see calculation in Appendix), which is considerably lower than the 125 litres per person per day requirement under Approved Document G of the Building Regulations. In order to meet these targets, a combination of

reduced-flow taps and showers, dual-flush toilets and moderately sized baths will be installed. In addition, all houses and apartments will be provided with water butts to help conserve supplies, especially for the purposes of irrigating gardens during the increasingly dry summers in the south-east of England.

8.0 Conclusion

- 8.1 This Energy and Sustainability Statement has set out the Applicant's detailed energy strategy pertaining to Phase 5 of their development at Littlehampton. The Applicant intends to deliver a sustainable development by providing a range of accommodation for individuals of all ages – from first-time buyers to families. The design of the new dwellings will reflect the character of other communities in the local area, while the provision of extensive areas of green and wetland space for leisure and relaxation will encourage the community to integrate and flourish, and help to advance the ecological prosperity and vibrancy of the area.
- 8.2 The energy strategy has been developed to comply in full with the requirements of Planning Condition 31 and the NPPF by delivering a 10% reduction in carbon dioxide emissions compared to the target standard set by Part L1a of Building Regulations (2013). The focus of the strategy has been to first reduce energy consumption at the point of demand by introducing a robust fabric specification and efficient heating and ventilation systems. Secondly, renewable energy installations, in the form of **56.44 kWp** of solar PV output, will be installed to further reduce carbon dioxide emissions on a site-wide basis. SAP calculations, carried out by an accredited energy assessor, have verified that the Applicant's proposed approach will deliver a **10.06%** reduction in carbon dioxide emissions compared to the baseline scenario. Once the dwellings are built, as built compliance reports will be compiled to verify that the development has been built out in accordance with the energy efficiency measures and renewable energy installations proposed in this Statement.
- 8.3 Additional sustainability measures proposed by the Applicant will ensure that biodiversity flourishes, whilst waste and water is managed and consumed efficiently. Emphasis is placed on reducing the generation and consumption of waste and water resources, respectively, at the point of demand and during construction activities.

Appendix

Solar PV Panel Location Plan

Viridian Solar – Solar PV Emissions Reduction Calculation

Internal potable water efficiency – Part G calculation

Solar PV Energy Calculation



Littlehampton Phase 5 - Persimmon

Project Postcode BN17
Irradiation Zone Zone 2 - Brighton

MIS 3002 Methodology

Array 1											
House type	Elevation	Plot	Annual Energy Saving kWh	Annual CO2 Saving kgCO2	PV16-340-G1W	kWp	Roof Orientation deg from S	Tilt Angle deg from horiz	Overshading Factor	Kk kWh / kWp	Annual Energy kWh
Sherwood	Rear	8	3,828	1,987	10	3.400	10	35	1	1126	3,828
Whiteleaf	Rear	9	4,525	2,348	12	4.080	25	40	1	1109	4,525
Whiteleaf	Rear	10	4,525	2,348	12	4.080	25	40	1	1109	4,525
Charnwood	Rear	12	2,957	1,534	8	2.720	35	40	1	1087	2,957
Whiteleaf	Rear	13	4,435	2,302	12	4.080	35	40	1	1087	4,435
Kielder	Rear	14	4,435	2,302	12	4.080	35	35	1	1087	4,435
Kielder	Rear	15	4,521	2,346	12	4.080	25	35	1	1108	4,521
Sherwood	Rear	16	3,767	1,955	10	3.400	25	35	1	1108	3,767
Sherwood	Rear	17	3,767	1,955	10	3.400	25	35	1	1108	3,767
Danburry	Rear	101	3,052	1,584	8	2.720	15	35	1	1122	3,052
Danburry	Rear	102	3,052	1,584	8	2.720	15	35	1	1122	3,052
Danburry	Rear	105	3,036	1,575	8	2.720	20	35	1	1116	3,036
Danburry	Rear	106	3,036	1,575	8	2.720	20	35	1	1116	3,036
Sherwood	Rear	222	3,767	1,955	10	3.400	25	35	1	1108	3,767
Danburry	Rear	223	3,014	1,564	8	2.720	25	35	1	1108	3,014
Danburry	Rear	224	3,014	1,564	8	2.720	25	35	1	1108	3,014
Sherwood	Rear	225	3,767	1,955	10	3.400	25	35	1	1108	3,767
TOTAL			62,496	32,435							
TARGET*				32,201							
			kWh	kgCO2							

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 is based upon the Government's standard assessment procedure for the energy rating of buildings (SAP) and is given as guidance only. It should not be considered as a guarantee of performance.

* TARGET - Email 15/03/21 - Steve Smith - Southern Energy Consultants Ltd



Note:

Viridian Solar has produced this design based on information and drawings supplied by the client. It remains the client's responsibility to ensure that shading from nearby buildings and trees does not affect the system.

Weight of solar panels:

PV16 (Fusion PV) 21kg

Where the panels are fitted into a pitched tiled/slate roof, they sit directly on the roof battens with a uniformly distributed load of 13kg per m² for PV16. Therefore, they almost certainly weigh less than the roof covering they are replacing. Roof structure modifications are unlikely to be necessary.

Setting Out:

Roof Installation typically starts with the bottom left panel. Setting out dimensions are given to the bottom left corner of this panel. Please refer to Viridian Installation Guides and standard roofing practices

Notes:



Denotes location of PV array

Source Drawing

Rev.		Date	
PERSIMMON Together, we make a home Persimmon Homes Thames Valley Persimmon House, Knoll Road, Canterbury, Surrey GU13 3TQ Tel: 01276 808060			
Site:	Phase 5 Littlehampton	Date:	April 2021
Scale:	1:500 @ A0P	Draw No:	546_PL_100a
Drawing Title:	Site Layout - Information Parcels D1 & E1		
Drawing Status:	PRELIMINARY	Drawn:	AT
		Checked:	RC
		Rev:	-



Viridian Solar
Atlas Building, 68 Stirling Way
Papworth Everard, Cambs.

Tel: 01480 839 865
enquiries@viridiansolar.co.uk
www.viridiansolar.co.uk

TITLE Viridian Clearline Fusion PV
Site Plan for
Littlehampton Phase 5
Persimmon

DRAWN NP **CHECKED** N/A

DRAWING NUMBER 16344 / SK1 **Sheet Number** 1 of 3

DATE 24.03.21 **SCALE** NTS

Viridian Solar has produced this design based on information and drawings supplied by the client. It remains the client's responsibility to ensure that shading from nearby buildings and trees does not affect the system.

PV16 (Fusion PV)	21kg
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Source Drawing

Rev	-		Date
 PERSIMMON Together, we make a home			
Persimmon Homes Thames Valley Persimmon House, Kool Road Camberley, Surrey GU15 3TQ Tel: 01276 898800			
Site:		Date:	
Phase 5		April 2021	
Littlehampton		Scale:	
		1:500 @ A0	
		Dwg No:	
		546_NL_100a	
Drawing Title:		Site Layout - Information	
		Parcels D1 & E1	
Drawing Status:		Drawn: AT Checked: RC	
PRELIMINARY		Rev:	



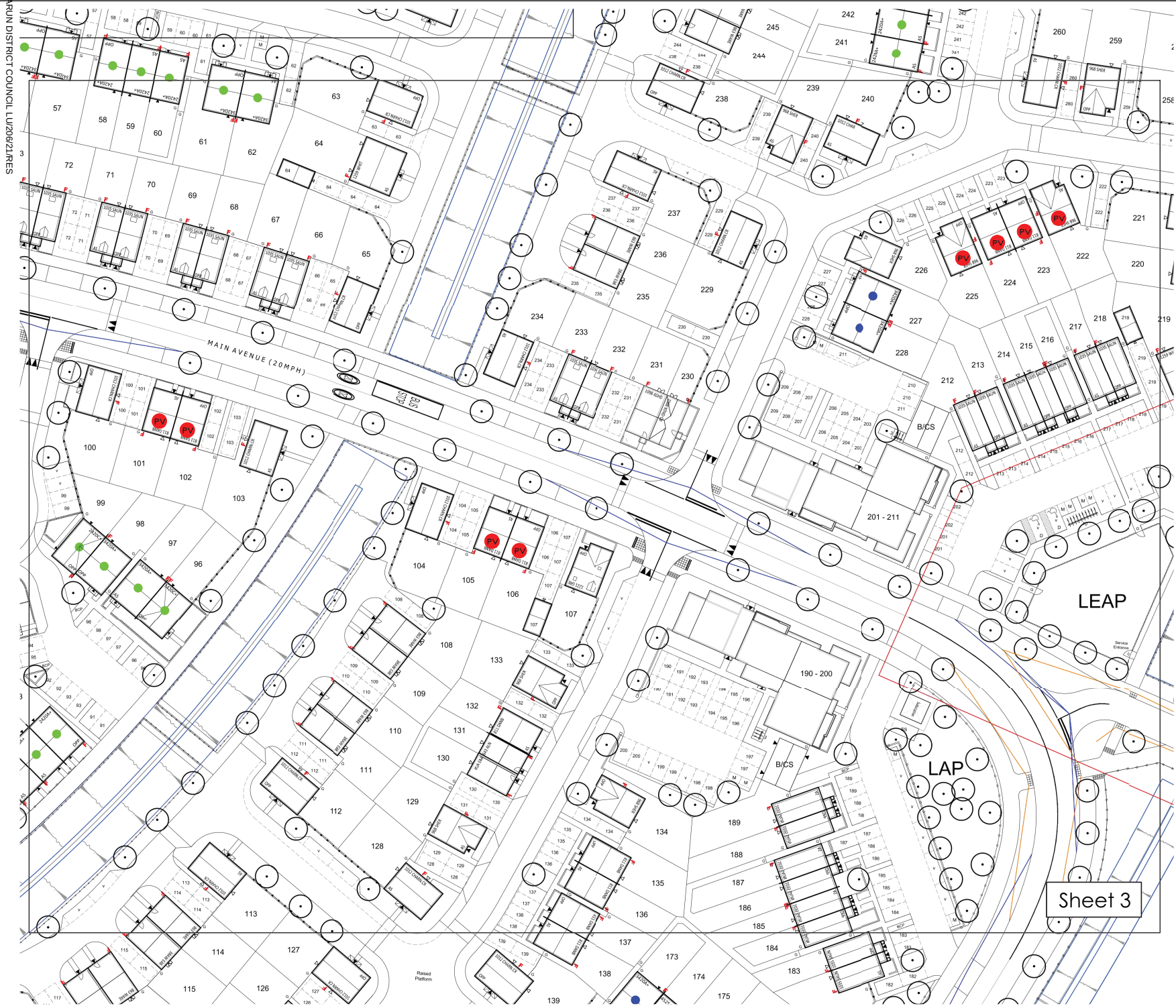
Tel: 01480 839 865
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TITLE	Viridian Clearline Fusion PV Site Plan for Littlehampton Phase 5 Persimmon
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DRAWN	NP	CHECKED	N/A
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DRAWING NUMBER	Sheet Number
16344 / SK1	2 of 3

DATE	24.03.21	SCALE	NTS
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Note:

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Source Drawing

 PERSIMMON Together, we make a home Persimmon Homes Thames Valley Persimmon House, Knoll Road, Canterbury, Surrey GU15 3TJ Tel: 01276 808065	
S/N: Phase 5 Littlehampton	Date: April 2021 Scale: 1:500 @ A0P DWG No: 546_PL_100a
Drawing Title: Site Layout - Information Parcels D1 & E1	
Drawing Status: PRELIMINARY	Drawn: AT Checked: RC Rev:



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TITLE Viridian Clearline Fusion PV Site Plan for Littlehampton Phase 5 Persimmon			
DRAWN NP		CHECKED N/A	
DRAWING NUMBER 16344 / SK1		Sheet Number 3 of 3	
DATE 24.03.21		SCALE NTS	

Job no: 3668
 Date: 27/05/2021
 Calculated by: S.R.Smith
 Client: Persimmon Homes Thames Valley
 Development name: Littlehampton Phase 5



WATER EFFICIENCY CALCULATOR FOR NEW DWELLINGS - (BASIC CALCULATOR)

		Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7		Type 8		Type 9		Type 10	
House Type:		Type 1		Type 2		Type 3		Type 4		Type 5		Type 6		Type 7		Type 8		Type 9		Type 10	
Description:		All																			
Installation Type	Unit of measure	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day	Capacity/ flow rate	Litres/ person/ day
Is a dual or single flush WC specified?		Dual		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Click to Select		Click to Select		Click to Select	
WC	Full flush volume	4	5.84		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
	Part flush volume	2.6	7.70		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Taps (excluding kitchen and external taps)	Flow rate (litres / minute)	5	9.48		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Are both a Bath & Shower Present?		Bath & Shower		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Bath	Capacity to overflow	193	21.23		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Shower	Flow rate (litres / minute)	8	34.96		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Kitchen sink taps	Flow rate (litres / minute)	6	13.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a washing machine been specified?		No		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Washing Machine	Litres / kg		17.16		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a dishwasher been specified?		No		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Dishwasher	Litres / place setting		4.50		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Has a waste disposal unit been specified?		No		Select option:		No		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:		Select option:	
Water Softener	Litres / person / day		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00		0.00
Calculated Use		113.9		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
Normalisation factor		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91		0.91	
Code for Sustainable Homes	Total Consumption	103.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
	Mandatory level	Level 3/4		-		-		-		-		-		-		-		-		-	
Building Regulations 17.K	External use	5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0		5.0	
	Total Consumption	108.6		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0		0.0	
	17.K Compliance?	Yes		-		-		-		-		-		-		-		-		-	

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ARUN DISTRICT COUNCIL LU/206/21/RES



Southern Energy
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