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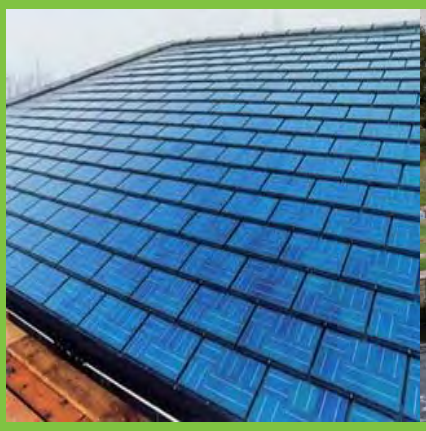
Renewable and Low Carbon Study for the East Hampshire District

Final Report
Prepared by LUC in association with Ricardo Energy and Environment
November 2018



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Contents

Figures

Where necessary addition figures (b) have been provided to provide greater clarity on the areas within East Hampshire which have been assessed, excluding the South Downs National Park.

1. Executive Summary and Introduction

Executive Summary

i. This Renewable and Low Carbon Energy Study was undertaken to inform the emerging East Hampshire Local Plan. The objectives of the study were to:

- Assess the technical potential for renewable energy within the District and where different renewable energy technologies and low carbon sources are most suitable within the District.
- Undertake a landscape sensitivity assessment for various scales of wind and solar energy development.
- Assess the options for enhanced building energy performance standards in East Hampshire.
- Recommend appropriate policy options in relation to renewable and low carbon energy for the Local Plan.

ii. The Council recognises the need to provide a positive framework for renewable and low carbon energy generation (which can have environmental, economic, social and other benefits). However, the development of energy generating installations within the District needs to be managed carefully to achieve the greatest contribution towards energy needs, while at the same time ensuring that the important characteristics of the environment and landscape are not unacceptably harmed.

iii. A review of the recent trends in East Hampshire was undertaken and this found that carbon emissions to have fallen 21.7% between 2005 and 2015. This has been driven by improving energy efficiency and the decarbonisation of the electricity supply. There is 31MW of renewable electricity generating capacity in East Hampshire, all of which is solar PV. In addition, there are 168 residential renewable heat installations and nearly 7MW of non-domestic renewable heat capacity.

iv. The Study reviewed the technical potential for following renewable and low carbon energy technologies within the District:

- Wind turbines.
- Stand-alone photovoltaic (PV) solar arrays (ie not building mounted solar PV).
- Small scale hydro.
- Energy from waste.
- Renewable and low carbon heat.
- Biomass.
- Microgeneration technologies.

v. There is technical potential to deliver around 630MW of electricity from **wind turbines** in the District with the greatest potential for small and medium wind turbines as there are less constraints to these size of turbines. In reality, the 'deployable potential' for wind (ie what is actually possible to deliver) is significantly lower due to: the lack of financial support for wind turbines development at the present time; grid connection difficulties; and national planning policy which has made it harder for developers to obtain permission for schemes, unless it can be clearly evidenced that the proposal lies within an area of suitability for wind and the scheme has the backing of the local community.

vi. The study estimates that there is a technical potential to deliver around 2,064 MW of electricity from **solar PV arrays** within the District. This is clearly a significant resource and a considerable overestimate of what could actually be delivered within the District. Levels of solar irradiance vary gradually across England with sunny southern regions favoured, but the difference across East Hampshire is small. The aspect, orientation and slope of the land, as well as shading, can have a greater influence on overall energy production. Again, the main issues affecting the deployment of solar energy schemes within East Hampshire are linked to grid connection issues and the significant reduction in financial incentives in recent years. The cost of solar has however fallen dramatically and some solar farm developers are actively pursuing subsidy free schemes.

vii. One of the key factors determining the acceptability or otherwise of both wind turbines and solar PV arrays is their potential impacts on the local landscape. Different landscapes present different opportunities for renewable energy, and landscape sensitivity studies can assist both planners and developers in identifying what scale of development may be appropriate in which areas. This approach is endorsed by the National Planning Policy Guidance (NPPG) which states that *"landscape character areas could form the basis for considering which technologies at which scale may be appropriate in different types of location."* A landscape sensitivity study was therefore undertaken assessing the sensitivity of East Hampshire's landscape to wind and solar developments of varying types and scales. The sensitivity study concluded that large scale wind turbines and solar energy developments could not be accommodated within the District without resulting in potentially significant landscape effects. This is primarily as a result of:

- the relatively settled nature of, and frequent human scale features within the landscape;
- the frequent trees and woodland within the landscape;
- the strongly rural character of the landscape with high levels of relative tranquillity;
- high levels of intervisibility across the landscape from the downland areas;
- the proximity and contribution landscapes make in the setting of views from the South Downs National Park and Surrey Hills AONB; and
- the continuation of character of these nationally protected landscapes into the study area.

viii. Areas in the north of the District, Lasham and the Northern Wey Valley, tend to have lower levels of sensitivity to wind and solar energy development, as they have less association and intervisibility with the South Downs National Park. In contrast, those areas such as Ludshott, Bramshott Commons and Whitehill to Liphook have higher levels of sensitivity due to the presence of extensive tracts of internationally designated heathland and their location adjacent to the South Downs National Park and Surrey Hills AONB.

ix. **Run-of-river hydropower** is where river water passes through a turbine before being returned to the watercourse. There are a small number of sites along the River Wey where run-of-river hydropower could be developed. While a detailed assessment of the resource and the site's ecology would be required, these sites have technical potential for 209-610kW of generating capacity. These relatively small opportunities are well suited to community energy projects.

x. **Energy from Waste technology** that reduces our historic reliance on landfill can, with the right waste, generate low carbon electricity. Hampshire County Council is responsible for waste management and there is currently at least 45.5MW of operational or consented energy from waste capacity across the county. Hampshire now sends little untreated municipal waste to landfill and significant new energy from waste capacity is now unlikely to be constructed in East Hampshire.

xi. **Renewable and low carbon heat** can be generated by a range of technologies including biomass boilers, heat pumps, solar thermal as well as larger communal heating systems providing heat to whole neighbourhoods via district heating. While there are three technically feasible district heating schemes in East Hampshire, they are not all likely to be deliverable in the short term and represent longer-term strategic opportunities. Homeowners and businesses will continue to install individual renewable heating systems in existing buildings where it makes sense for them and opportunities arise, particularly where they are not connected to the gas grid.

xii. East Hampshire's woodlands are a valuable **biomass** resource. Bringing more woodland into active management can provide a sustainable wood fuel supply, helping to grow the rural economy as well as providing a richer and more varied habitat for wildlife. There is technical potential for 5,611 oven dried tonnes per year of sustainable local supply which could meet the heat requirements of approximately 7,294 new houses.

xiii. The technical potential for **micro renewables** (ie solar PV and solar thermal, ground source heat pumps, air source heat pumps, micro wind, micro gas CHP etc) is only limited by the number of existing buildings within the District as most dwellings will be suitable for some sort of microgeneration technology. The limiting issue is therefore primarily the cost of installation. Based on previous uptake within the District, the greatest potential for micro-generation installations will be for solar and heat projects. The recent changes to funding streams (Feed in Tariff) however have created policy uncertainty and have generated concerns within micro renewable industry, slowing their current installation rates.

xiv. The final section of the report reviews the various planning policy approaches that could be incorporated within the emerging Local Plan in relation to renewable and low carbon energy. This includes a consideration of:

- Enhanced energy standards.
- Separation distances.
- Criteria based policies.
- Areas of suitability for wind.
- Energy opportunity maps.
- Allocation of sites.
- Community renewables.
- Local development orders.

xv. These are discussed in turn, with conclusions provided of the relative the strengths and weaknesses of each policy approach. With specific regard to **enhanced building energy performance standards,** the study recommends that a 19% reduction in emissions over the current Building Regulations (2013) should be required for new homes and BREEAM Very Good for non-domestic buildings.

1 Introduction

1.1 LUC and Ricardo were commissioned in July 2018 by East Hampshire District Council to undertake a Renewable and Low Carbon Energy Study. The study seeks to provide a robust evidence base to underpin planning policies relating to renewable and low carbon energy generation and low carbon development within the emerging Local Plan. The objectives of the study were to:

- Assess the technical potential for renewable and low carbon energy within East Hampshire.
- Identify where different renewable energy technologies and low carbon sources are most suitable.

1.2 This report fulfils these objectives and highlights the potential policy options that could be considered by East Hampshire District Council in the review of their Local Plan.

Background to the study

1.3 East Hampshire District Council is in the early stages of their Local Plan Review. The Council's Local Development Scheme (published in 2018) sets out the programme for the Local Plan Review, planned over the next two years, with a view to submission to the Secretary of State in early 2020 and adoption in late 2020/early 2021.

1.4 The new Local Plan will address and manage the needs for new development over the plan period of 2017-2036 for the parts of the District that sit outside of the South Downs National Park. The single plan will supersede the adopted Local Plan, which is composed of three separate documents:

- Local Plan: Second Review (2006) (Saved Policies).
- Local Plan: Joint Core Strategy (2014).
- Local Plan: Housing and Employment Allocations Plan (2016).

1.5 East Hampshire District is faced with a wide range of challenges arising from a changing climate. Balancing the need to make a meaningful contribution towards reducing harmful emissions from energy use (through cleaner energy production) with the management of the landscape is one of these key challenges. The National Planning Policy Framework (NPPF, 2018) makes it clear that local authorities should take a positive approach towards renewable and low carbon developments. One of the core objectives that underpins the NPPF is:

> "*an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including…mitigating and adapting to climate change, including moving to a low carbon economy."* [Para 8].

1.6 It also states that local planning authorities should:

> "*provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts)*" [Para 151].

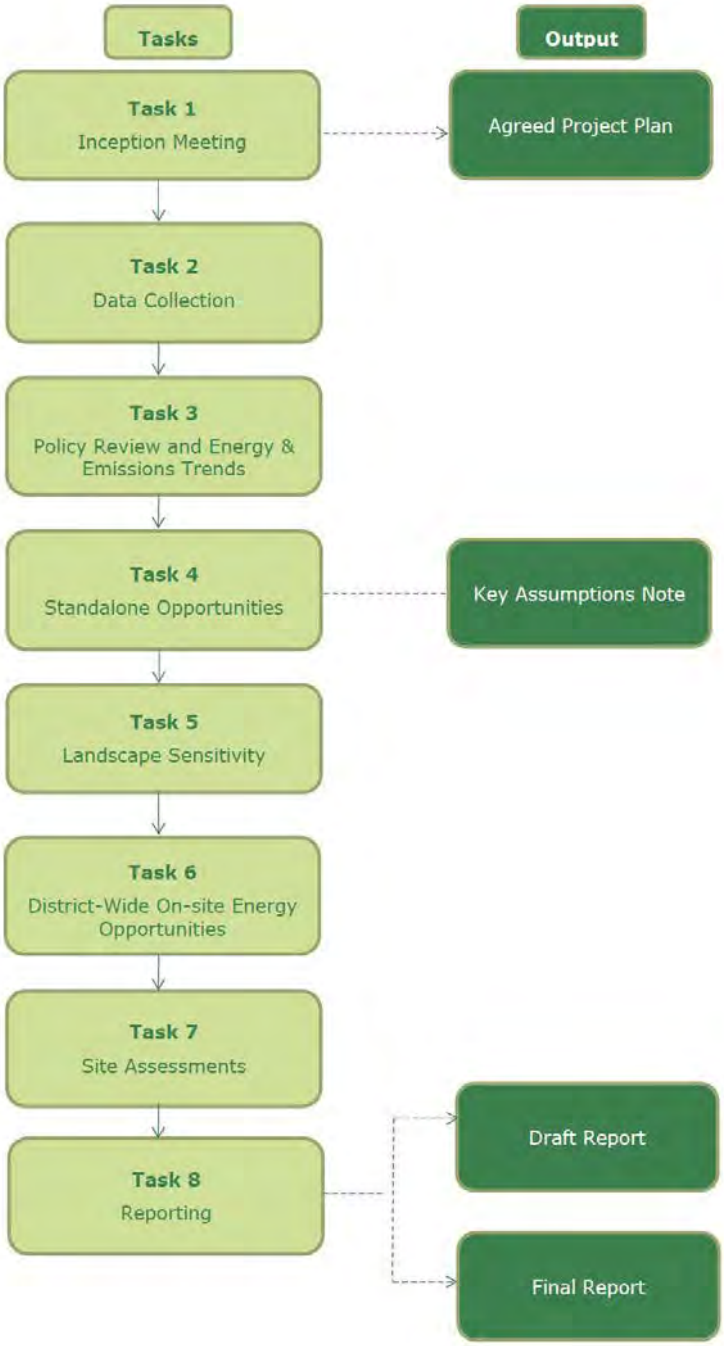
1.7 The Council recognises the need to provide a positive framework for renewable and low carbon energy generation (which can have environmental, economic, social and other benefits). However, the development of energy generating installations within the District needs to be managed carefully to achieve the greatest contribution towards energy needs, while at the same time ensuring that the important characteristics of the environment and landscape are not unacceptably harmed.

1.8 This study provides the comprehensive, objective and independent evidence to develop this positive framework, setting out an assessment of the technical potential for renewable energy within the District and the potential policy options that could be included in the emerging Local Plan to encourage the development of sustainable energy generation in the most appropriate locations.

Study approach

1.9 The study involved eight main tasks, as set out in **Figure 1.1** below:

Figure 1.1: Summary of Key project tasks and outcomes



1.10 A summary of the tasks undertaken is provided in **Table 1.1** below:

Table 1.1: Summary of Key Study Tasks

Key Tasks	Detail
Task 1: Inception meeting	An inception meeting was held with Council officers in July 2018 to agree the scope of the study.
Task 2: Data collection	Background documentation was collected to build a comprehensive starting point for the energy evidence base as well as the energy consumption, generation and emissions baseline.
Task 3: Policy review and energy and emissions trends	A review was undertaken of the relevant background information to the study. This included: • A review of the policy context for renewable energy and landscape at the national, regional and local level (see **Chapters 2 and 3**). • A review of the recent trends in emissions and renewable energy installations in East Hampshire (See **Chapter 4**).
Task 4: Assessing the opportunities for standalone low carbon and renewable technologies	An assessment was undertaken of the technical potential for renewable and low carbon energy within the District (see **Chapter 5**). A key assumptions note was produced setting out the assumptions used to undertake the assessment. This was sent to the Council for review prior to commencing the assessment.
Task 5: Landscape sensitivity assessment	A landscape sensitivity study was undertaken assessing the sensitivity of East Hampshire's landscape to wind and solar developments of varying types and scales (see **Chapter 6**).
Task 6: District-wide on-site energy opportunities	An assessment of the potential for enhanced energy performance standards in East Hampshire was undertaken (see **Chapter 7**).
Task 7: Reporting	The findings of the study are set out within this report.

1.11 A more detailed explanation of the methodologies used is provided in the relevant chapters (as outlined below).

Report structure

1.12 The remainder of this report is structured as follows:

- **Chapter 2 and 3** provide a review of the policy context in relation to renewable and low carbon energy and landscape matters.
- **Chapter 4** provides a review of the recent trends in emissions and renewable energy installations in East Hampshire.
- **Chapter 5** sets out the findings of assessment of technical potential for renewable and low carbon energy.
- **Chapter 6** sets out the findings of the landscape sensitivity assessment for wind and solar developments.
- **Chapter 7** sets out the findings of the potential for setting enhanced energy performance standards.
- **Chapter 8** outlines the potential planning policy options for the emerging Local Plan.

2. Renewable and Local Carbon Policy Context

2 Renewable and Local Carbon Policy Context

Introduction

2.1 This chapter provides a review of the policy framework and background documentation of relevance to the study in relation to renewable and low carbon energy. This includes a summary of the relevant international, national and local planning policies and strategies.

International and European Legislation and Policy

2.2 At the Kyoto conference of the United Nations Framework Convention on Climate Change in December 1997, most industrialised countries agreed to reduce emissions of the six principal man-made greenhouse gases to 5.2% below 1990 levels over the period 2008-2012. The UK agreed to a reduction target of 12.5%. The **Kyoto Protocol** became a legally binding treaty on 16th February 2005. The Doha Climate Change Conference in December 2012 led to the adoption of an amendment to the Kyoto Protocol establishing a second round of binding greenhouse gas emission targets for Europe, Australia and a handful of other developed countries.

2.3 The Paris Agreement was adopted through the twenty first session of the Conference of Parties (COP21) in December 2015. On 5th October 2016, the threshold for entry into force of the Paris Agreement was achieved, with at least 55 countries, which account for at least 55% of the world's greenhouse gas emissions, ratifying the Agreement. The **Paris Agreement** entered into force on 4th November 2016 and the UK ratified the Agreement on 18th November 2016. Article 2 of the Paris Agreement sets out the ambition of holding the increase of global average temperature to *"well below 2°C"* and to pursue efforts to limit temperature increase to 1.5 °C. It was acknowledged that to achieve these ambitions, there is a requirement to ensure Parties reach global peaking of greenhouse gas emissions as soon as possible and do so by employing means that allow pathways toward *"low greenhouse gas emissions and climate-resilient development"*.

2.4 In April 2009, the European Union adopted the **Directive on Renewable Energy** (2009/28/EC), which set targets for all Member States such that the EU will reach a 20% share of energy from renewable sources by 2020. The UK's binding target is to meet 15% of its energy generation from renewable sources by 2020 (this includes electricity, transport and heat). Article 22 of the Directive requires Member States to submit a report every two years to the European Commission (EC) on progress in the promotion and use of energy from renewable sources. The UK's first progress report on the Promotion and Use of Energy from Renewable Sources for the UK (2011) was delivered in December 2011 and showed that renewable energy accounted for 54TWh (3.3%) of the UK's total energy consumption in 2010 – an increase of 27% over a two year period. Subsequent reports delivered in 2014 and 2016 saw significant increases in the proportion of the UK's energy production coming from renewable resources - 4.2% of the UK's total energy consumption in 2012 and 6.3% in 2014.

National Legislation

2.5 The **Planning and Compulsory Purchase Act** (2004) sets out the structure of the local planning framework for England, including the duty on plan-making to mitigate and adapt to climate change. In other words, local planning authorities must make positive and proactive policies and decisions which contribute to the mitigation of, and adaptation to, climate change – polices and decisions that make measurable, ongoing reductions in carbon emissions reported in Council's annual monitoring reports. This legislation is supported by national planning policy and guidance set out below.

2.6 The **Climate Change Act** (2008) was passed, restating the UK Government's commitment to renewables in the move towards a low carbon economy. The Act commits the UK Government to reduce UK carbon emissions by at least 80% by 2050 (from 1990 levels). As part of the Act, the Committee on Climate Change is required to report annually to Parliament on the progress made in reducing carbon emissions in line with the **UK Climate Change Programme** (2006) which includes a range of measures to be implemented at both the international and national levels including annual progress reports to be presented to Parliament on emissions reductions and domestic climate change adaptation. The Committee on Climate Change 2017 progress report on meeting carbon budgets showed that overall progress has been good. Economy-wide emissions fell by 6% in 2016 and UK greenhouse gas emissions are about 42% lower than in 1990. However, the report notes that progress is stalling. Since 2012, emissions reductions have been largely confined to the power sector, whilst emissions from transport and building stock are rising. The report recognises that there is now an urgent need for effective new strategies and policies to ensure emissions continue to fall in line with the commitments agreed by Parliament.

2.7 The **Planning Act** (2008) introduced a new planning regime for nationally significant infrastructure projects (NSIPs), including energy generation plants of capacity greater than 50 megawatts (50 MW). In 2011 six **National Policy Statements** (NPSs) for Energy were published. The energy NPSs are designed to ensure that major energy planning decisions are transparent and are taken against a clear policy framework, by setting out national policy against which proposals for major energy projects will be determined by the National Infrastructure Directorate (NID) (formerly the Infrastructure Planning Commission or IPC). The Overarching National Policy Statement for Energy (EN-1) sets out national policy for energy infrastructure and describes the need for new national significant energy infrastructure projects. EN-3 (NPS for Renewable Energy Infrastructure) then provides the primary basis for decisions by the NID on applications it receives for nationally significant renewable energy infrastructure, providing guidance on various technologies and their potential for significant effects. In 2016 onshore wind installations above 50MW were removed from the NSIP regime, and such applications are now dealt with by local planning authorities, based on the NPPF and associated Ministerial statements.

2.8 The **Planning and Energy Act** (2008) enables local planning authorities to set requirements for energy use and energy efficiency in local plans, including a proportion of energy used in development to be generated from renewable and low carbon sources in the locality of the development. Such requirements can relate to specific types and scales of development but also broad areas within a local planning authority's area of influence, such as areas with optimal conditions for decentralised heat networks. The Act also enabled local authorities to require standards for energy efficiency in new buildings beyond those in the Building Regulations. However, in 2015 the energy efficiency requirements were proposed to be repealed, to effectively make the Building Regulations the sole authority regarding energy efficiency standards for residential development, and leaving local authorities no longer able to set their own energy efficiency standards. However, while the power was removed in principle, the Government has not yet produced a commencement date for repealing these powers, which therefore remain in place. More detail on the ability of local authorities to set higher building energy performance standards is provided in **Chapter 5.**

2.9 The **Neighbourhood Planning Act** (2017) strengthens the powers of neighbourhood plans, but also creates a new legal duty on local planning authorities to set out their strategic priorities and express them in a strategic plan. Details on how this principle has been articulated in national planning policy are set out in further detail below.

National Planning Policy

National Planning Policy Framework (NPPF)

2.10 The Government published an updated and revised NPPF in July 2018, which sets out the environmental, social and economic planning policies for England. The July 2018 NPPF replaced the original version published in March 2012. Central to the NPPF policies is a presumption in favour of sustainable development, that development should be planned for positively and individual proposals should be approved wherever possible. One of the overarching objectives that underpins the NPPF is set out in Paragraph 8: "*an environmental objective – to contribute to protecting and enhancing our natural, built and historic environment; including …mitigating and adapting to climate change, including moving to a low carbon economy*."

2.11 The revised NPPF supports the contents of the Neighbourhood Planning Act (2017) by making explicit reference to the need for local planning authorities to work with duty to cooperate partners on strategic priorities (paragraph 24) and defined strategic policies that make sufficient provision for climate change mitigation and adaptation (paragraph 20). These amendments provide a clear policy framework for local planning authorities to work collaboratively with partners and neighbours to tackle climate change mitigation and adaptation at a strategic scale and over the longer term.

2.12 Paragraph 149 of the NPPF states "*Plans should take a proactive approach to mitigating and adapting to climate change…in line with the objectives and provisions of the Climate Change Act 2008*". Paragraph 151 states that "*To help increase the use and supply of renewable and low carbon energy and heat, plans should:*

a) *provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*

b) *consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*

c) *identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers."*

2.13 Paragraph 152 states that local planning authorities should "support community-led initiatives for renewable and low carbon energy, including developments outside areas identified in local plans or other strategic policies that are being taken forward through neighbourhood planning."

2.14 In addition, when determining planning applications, local planning authorities should view sustainable developments favourably. Paragraph 154 states that "…planning applications for renewable and low carbon development…should not be required to demonstrate the overall need for renewable or low carbon energy…and approve the application if its impacts are (or can be made) acceptable."

Planning Practice Guidance (PPG)

2.15 The Government published national Planning Practice Guidance (PPG) to support the delivery of the NPPF in 2014, and regularly updates guidance in light of changes in relevant international and nation policy and legislation. The key elements of the PPG of relevance to this Study are set out below.

2.16 Paragraph 001 states that: "*planning has an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable."*

2.17 Paragraph 003 states that "*all communities have a responsibility to help increase the use and supply of green energy, but this does not mean that the need for renewable energy automatically overrides environmental protections and the planning concerns of local communities. As with other types of development, it is important that the planning concerns of local communities are properly heard in matters that directly affect them.*

Local and neighbourhood plans are the key to delivering development that has the backing of local communities. When drawing up a Local Plan local planning authorities should first consider what the local potential is for renewable and low carbon energy generation. In considering that potential, the matters local planning authorities should think about include:

- *the range of technologies that could be accommodated and the policies needed to encourage their development in the right places;*
- *the costs of many renewable energy technologies are falling, potentially increasing their attractiveness and the number of proposals;*
- *different technologies have different impacts and the impacts can vary by place;*
- *the UK has legal commitments to cut greenhouse gases and meet increased energy demand from renewable sources. Whilst local authorities should design their policies to maximise renewable and low carbon energy development, there is no quota which the Local Plan has to deliver."*

2.18 The role community led renewable energy initiatives have is outlined in paragraph 004, which states that they "*are likely to play an increasingly important role and should be encouraged as a way of providing positive local benefit from renewable energy development…Local planning authorities may wish to establish policies which give positive weight to renewable and low carbon energy initiatives which have clear evidence of local community involvement and leadership."*

2.19 Paragraph 033 states that: "*when considering applications for wind energy development, local planning authorities should (subject to the transitional arrangement) only grant planning permission if:*

- the development site is in an area identified as suitable for wind energy development in a Local or Neighbourhood Plan; and
- following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing.

Whether the proposal has the backing of the affected local community is a planning judgement for the local planning authority."

2.20 In terms of identifying suitable areas for wind energy development, Planning Practice Guidance, paragraph 005 states that: "*There are no hard and fast rules about how suitable areas for renewable energy should be identified, but in considering locations, local planning authorities will need to ensure they take into account the requirements of the technology and, critically, the potential impacts on the local environment, including from cumulative impacts. There is a methodology available from the Department of Energy and Climate Change's website on assessing the capacity for renewable energy development which can be used and there may be existing local assessments. However, the impact of some types of technologies may have changed since assessments were drawn up (e.g. the size of wind turbines has been increasing). In considering impacts, assessments can use tools to identify where impacts are likely to be acceptable. For example, landscape character areas could form the basis for considering which technologies at which scale may be appropriate in different types of location."*

2.21 Paragraph 008 also explains that: "*local planning authorities should not rule out otherwise acceptable renewable energy developments through inflexible rules on buffer zones or separation distances. Other than when dealing with set back distances for safety, distance of itself does not necessarily determine whether the impact of a proposal is unacceptable."*

National Strategies and Guidance

2.22 The **UK Renewable Energy Strategy** (2009) sets out how the UK will achieve its legally-binding target of generating 15% of its energy needs from renewable sources by 2020 in line with the EU **Directive on Renewable Energy** (2009/28/EC). Whereas the Government had been working towards a UK 2020 target of 20% of electricity coming from renewable sources, the lead scenario in the Renewable Energy Strategy is that this figure has to be raised dramatically, in light of the less mature markets in renewable heat and transport fuel. The strategy suggests that the UK may need more than 30% of electricity and 12% of heat to be generated by renewable sources in order to meet the overall energy target.

2.23 The UK Renewable Energy Strategy (2009) was subsequently supported by the **UK Renewable Energy Action Plan** in 2010 and the **UK Renewable Energy Roadmap** in 2011. The Action Plan outlines the electricity, heating, cooling and transport technologies that are expected to deliver the 15% renewable energy target by 2020. The Roadmap outlines the deployment of renewable energy throughout the UK, and focuses on the eight technologies that are considered to have the greatest potential, one of which is onshore wind energy. The key actions in this area that are set out in the Roadmap include increasing overall grid capacity and upgrading transmission capacity, and co-funding the development of technical solutions to issues that can affect the viability of onshore wind farms, such as interference with aviation radar.

2.24 The **Clean Growth Strategy** was published in 2017 setting out a range of policies and proposals to increase the rate of reduction in carbon emissions. This includes investment in 'Green Finance', improve business and industry energy efficiency, improve housing energy efficiency, rolling out low carbon heating, accelerating the shift to low-carbon transport and further investment in electricity storage and transportation, nuclear power and renewable power.

2.25 In January 2018 the UK Government published the **25 Year Environment Plan**. The Plan sets out what the Government plans to do to improve the environment, within a generation. Although the plan does not directly address renewable energy, it does highlight the need to generate cleaner, more sustainable sources of energy.

East Hampshire District Council Adopted Development Plan

2.26 As outlined in **Chapter 1,** the East Hampshire Development Plan currently comprises of three adopted documents:

- Local Plan: Second Review (2006) (Saved Policies).
- Local Plan: Joint Core Strategy (2014).
- Local Plan: Housing and Employment Allocations Plan (2016).

2.27 The Local Plan: Second Review (2006) and the Local Plan: Joint Core Strategy (2014) cover the area of East Hampshire District, including the South Downs National Park. The Local Plan: Housing and Employment Allocations only covers the area of East Hampshire District outside the South Downs National Park, as the South Downs National Park Authority is in the process of preparing a separate Local Plan for the whole of the South Downs National Park.

2.28 The emerging South Downs National Park Local Plan will therefore replace the Local Plan: Second Review (2006) and the Local Plan: Joint Core Strategy (2014) in the parts of East Hampshire District within the National Park, and the emerging East Hampshire District Local Plan will replace the Local Plan: Second Review (2006), Local Plan: Joint Core Strategy (2014) and Local Plan: Housing and Employment Allocations Plan (2016) across the remainder of the District.

Local Plan: Second Review (2006) (Saved Policies)

2.29 The Local Plan: Second Review was adopted in March 2006 and remains part of the existing adopted Development Plan. Some of the policies within the plan were removed in April 2009 by the Government Office for the South East and some policies were replaced by the adopted Joint Core Strategy. The key policy of relevance to the generation of renewable and low carbon energy is **Policy E2 Renewable Energy** which sets out that planning permission will be granted for development for the generation of electricity from renewable resources provided that it would not harm landscape, adversely affect neighbouring occupiers, result in inconvenience or danger on public highways, prejudice the strategic objectives of a strategic local gap, cause electromagnetic disturbance, or cause potential danger to public safety.

Local Plan: Joint Core Strategy (2014)

2.30 The Local Plan: Joint Core Strategy (also known as the Part 1 Local Plan) was adopted in May 2014. The Joint Core Strategy includes an objective to maximise the proportion of energy generated from renewable sources, within environmental constraints, and plans that new technologies will help to reduce carbon emissions from new and existing development and that new buildings will perform well in renewable energy generation. Policies of relevance to renewable energy include **Policy CP24 Sustainable Construction** which sets out that planning permission will be granted for developments which on completion provide at least 10% of energy demand from decentralised and renewable or low carbon energy sources (if possible, including connections to a district heating system). Additionally, the policy requires that major areas of development must ensure that their on-site renewable or low carbon energy production and resource efficiency is maximised.

2.31 The Core Strategy outlines how Whitehill & Bordon was identified by the Department of Communities and Local Government in 2009 as a potential location for an Eco-town. The regeneration of MoD and local authority land at Whitehill & Bordon is guided by several policies specific to this location, including CSWB6 and CSWB7.

2.32 **Policy CSWB6 Sustainable Construction** states that development will include the provision of localised energy centres and help the eco-town to de-carbonise the energy infrastructure by employing such solutions as biomass and energy from waste systems, decentralised heat and power networks and smart grids. The policy also requires that development proposals must connect to any District heating systems, or have the infrastructure to connect if this is not yet installed. It states that developments which are not connecting to the district system should provide alternative low carbon heating solutions.

2.33 **Policy CSWB7 Waste** states that planning applications should include a sustainable waste and resource plan and that this should consider the use of locally generated waste as part of the energy solution for the town.

Local Plan: Housing and Employment Allocations Plan (2016)

2.34 The Local Plan: Housing and Employment Allocations Plan (also known as the Part 2 Local Plan) was adopted in April 2016. The plan identified specific sites to deliver the housing and employment targets set out in the Core Strategy, and provides guidance for the development of these sites.

2.35 The plan itself does not explicitly set out policies addressing energy and renewable or low carbon energy generation. However, the accompanying Sustainability Appraisal (2015) notes that generally '*larger schemes will lead to economies of scale that mean that development viability increases, and there is greater potential for developers to fund decentralised heat/power generation and a district heating network.*' The report also states that '*an ideal scheme would involve a combined heat and power (CHP) generation plant fuelled by biomass, and such schemes are generally understood to potentially become viable where development is at a scale of c.500 homes*.'

Neighbourhood Plans

2.36 There are several adopted neighbourhood plans within East Hampshire District: Alton Neighbourhood Development Plan; Bentley Neighbourhood Plan; and Medstead and Four Marks Neighbourhood Plan. These are all plans for neighbourhoods located outside of the South Downs National Park. None of these plans set out policies in relation to renewable and low carbon energy generation.

Local Strategies and Guidance

East Hampshire District Council Energy Strategy 2014-2019

2.37 The Energy Strategy aims to help the Council deliver a low-carbon, energy efficient, economically vibrant community. The objectives of the strategy include increasing the amount of renewable energy generation and developing the Council's commercial provision of energy and related services.

2.38 The strategy proposes to create an energy centre to manage the commercial elements of the strategy and bringing together the specialist skills, experience and know-how to deliver the wider programme. This will include the creation of a renewable heat strategy that will explore the provision of an advice, supply, fit and maintenance package for renewable heat technologies using Renewable Heat Incentive payments.

2.39 The strategy outlines the Council's plan to develop an urban solar farm but utilising presently unused roofs and investing in energy generation across council buildings and on new builds. The strategy also states that the Council will work in partnership with community groups to ensure that East Hampshire benefits from Government schemes like the Rural Community Energy Fund.

2.40 The strategy sets out that East Hampshire District Council will form relationships with the private sector and local energy generation projects, creating a Multi-Utility Service Company (MUSCo). The MUSCo will enable the Council to earn income and provide residents with reasonably priced energy. Commercial partnerships and energy generation initiatives will ensure that the MUSCo supplies as much renewable energy as possible. Contracts will be sufficiently flexible to enable growing amounts of locally generated energy.

Heat Masterplan for East Hampshire (2015)

2.41 A heat mapping appraisal was undertaken by Peter Brett Associates and published in August 2015. This focussed on identifying the best locations in East Hampshire for technically feasible and economically viable renewable heat projects.

2.42 The study highlighted that only 1% of the energy currently supplied in East Hampshire is supplied by biomass and biofuel sources. The study explored the opportunities for East Hampshire District Council to grow this significantly through supporting the development of biomass fuel supply chains to support low carbon heat network development.

2.43 The heat mapping appraisal was used to identify and select a number of key opportunities for developing urban and rural heat networks across the District, including:

- Whitehill & Bordon town centre regeneration;
- Horndean sustainable urban extension;
- Alton leisure centre anchor load and town centre regeneration;
- Penns Place connection of the Taro Centre and EHDC's Offices (within the South Downs National Park);
- Strategic Village Growth associated with villages off gas grid; and
- Rural Community Networks connection high demand properties off gas grid.

2.44 Three priority heat network opportunities were identified by the study and recommended for further detailed study:

- **Penns Place (within the South Downs National Park):** A heat network connection for East Hampshire Council's offices at Penns Place to the Taro Leisure Centres. Potential onward connection to future development sites in Petersfield.
- **Whitehill & Bordon:** A town centre heat network as part of the town's regeneration.
- **Alton Leisure Centre:** A heat network between Alton leisure centre (due for refurbishment), the community hospital and the proposed 'Treloar' residential development south west growth of Alton.

2.45 The study also identified that there is potential for developing rural community heat networks associated with dense heat loads in villages, and highlights there are a number of other opportunities that the Council could explore associated with strategic growth.

2.46 The report provided four recommendations for next steps:

- Recommendation 1: Carry out feasibility studies at EHDC Priority sites (see below).
- Recommendation 2: Further explore the potential of rural heat networks.
- Recommendation 3: Biomass market supply chain study.
- Recommendation 4: Influencing East Hampshire Energy Infrastructure Masterplanning.

Heat Techno-Economic Feasibility Studies (2016)

2.47 Following the 2015 Heat Masterplan for East Hampshire and the recommendations made by this, East Hampshire District Council published the Heat Techno-Economic Feasibility Studies in 2016.

2.48 Feasibility studies were undertaken for the three priority opportunities identified in the 2015 Heat Masterplan (see above) and these determined that the three proposed projects are all technically viable.

2.49 The report found that, of the range of low-carbon heat technologies assessed, three are technically viable:

- Biomass heating.
- Gas-Combined Heat and Power (CHP).
- Ground Source Heat Pumps (GSHP) (albeit with GSHP taking a more limited role).

2.50 It also concluded that biomass heating and gas-CHP were the two most commercially viable options at the time of writing.

2.51 Risks and opportunities were also identified for the projects:

- **Penns Place (within the South Downs National Park):** A time limited opportunity was identified to secure an £800,000 index-linked RHI income stream over 20 years before the end of 2016.
- **Whitehill & Bordon:** The regeneration projects offered an attractive heat (and power) load and density over time, and a combination 'gas-CHP and biomass' investment offered low-risk technologies, strong CO_2 reductions and an attractive rate of return. It was also concluded that the heat load offered a 'moderate' risk to investment, as it would likely change from the estimates set out in the report.
- **Alton Leisure Centre:** This project required strong emphasis on the use of gas-CHP to become viable. A biomass only investment with assumed lower rates of RHI support was deemed to be uneconomic against the Council's investment criteria.

2.52 The report also concluded that the projects offer a combined CO_2 reduction potential of 45-69% (8,160-13,165 tCO_2/yr).

3. Landscape Character and Policy Context

3 Landscape Character and Policy Context

Introduction

3.1 This chapter provides a review of the policy framework and background documentation of relevance to the study in relation to landscape. The landscape sensitivity assessment within **Chapter 6** of this report has been informed by the landscape policy context and characterisation work that has been carried out as part of the East Hampshire Landscape Character Assessment (2006) as summarised within this chapter.

Landscape Character of East Hampshire

3.2 East Hampshire District is situated in the south of England and covers an area of 51,443 ha[1] with a total population of 119,392[2]. Approximately 60% of the District is covered by the South Downs National Park. The emerging East Hampshire District Local Plan will only cover those parts of the District outside of the South Downs National Park. Therefore, the below context covers those parts of the District outside of the South Downs National Park.

3.3 The District contains four different National Character Areas (NCAs):

- The **Wealden Greensand Character Area** (NCA 120)[3] covers the part of the District to the north and northeast of the National Park. This area is made up of woodland, as well as '*river valleys and mixed farming*', and is adjacent to the Surrey Hills AONB. The area contains both '*internationally and nationally designated sites alongside numerous local sites and other non-designated semi-natural habitats*'. This area '*remains essentially rural, with only small market towns*' and development pressures are likely to pose significant challenges within this area, with '*increasing demands on water resources, the landscape, biodiversity and the sense of place*'. A key driver for landscape change within the area is the requirement for increasing renewable energy generation, which could '*result in pressure for wind farm developments and increased pressure for the growth of biomass crop*'.
- The **South Downs Character Area** (NCA 125)[4] covers the majority of the part of the District to the south of the National Park. This area in East Hampshire comprises the southern extent of the South Downs and 'enclosure and remoteness can be found in woodland and even in close proximity to urban areas'. 'Farming has shaped the NCA over centuries' and this area includes predominantly arable farmland. Opportunities within the area include 'providing local sources of renewable fuels'. A key driver for change in the area is development pressure, however this also offers opportunities for 'well-designed developments that contribute to landscape and settlement character and utilise sustainable technologies such as renewable energy supply'.

[1] Office for National Statistics (2018) Standard Area Measurements (2016) for Administrative Areas in the United Kingdom. Available at: https://ons.maps.arcgis.com/home/item.html?id=a79de233ad254a6d9f76298e666abb2b

[2] Office for National Statistics (2018) Estimates of the population for the UK, England and Wales, Scotland and Northern Ireland: Mid-2017. Available at: https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates

[3] Natural England (2013) NCA Profile 120: Wealden Greensand. Available at: http://publications.naturalengland.org.uk/publication/5331490007154688?category=587130

[4] Natural England (2013) NCA Profile 125: South Downs. Available at: http://publications.naturalengland.org.uk/publication/7433354?category=587130

- The **South Hampshire Lowland Character Area** (NCA 128)[5] covers the southeast of the District to the south of the National Park. This area comprises a '*low-lying plain*' and contains '*a mixture of farmland, particularly pasture, and woodland*'. Almost half of the woodland in this area is '*designated ancient woodland*', including '*legacy of the Forest of Bere*'. The area faces many challenges, particularly ongoing development, and '*this will need to be implemented sensitively in order to safeguard not only the designated sites within the NCA but also the important adjacent sites*' such as the South Downs National Park.
- The **Hampshire Downs Character Area** (NCA 130)[6] covers the part of the District to the north and northwest of the National Park. This area is an 'elevated, open, rolling landscape dominated by large arable fields with low hedgerows on thin chalk soils, scattered woodland blocks (mostly on clay with- flint caps) and shelterbelts'. The hedgerows in this area are 'often overgrown' and the area includes some 'larger blocks of woodland'. Main challenges facing the area include 'high levels of population and economic growth' within the urban areas in this area, and 'their associated demands for water, traffic levels on major trunk roads crossing the Downs, and further intensification of farming'. A key driver for landscape change within the area is the requirement for increasing renewable energy generation, which could 'increase demand for biomass from woodland, solar farms, wind turbines and energy crops' which may 'pose threats to sensitive habitats and landscape'.

3.4 The Surrey Hills Area of Outstanding Natural Beauty (AONB) is located adjacent to the north-eastern border of the District.

3.5 The area of the District to the south of the South Downs National Park lies within the South Downs NCA and the South Hampshire Lowland NCA. It is relatively flat and the land generally rises northwards towards the National Park. This part of the District contains the settlement of Horndean and is crossed by the A3/A3(M). The village of Rowlands Castle is located in the east of this area of the District and is surrounded by agricultural land, a golf course, the Forest of Bere and Soughleigh Forest.

3.6 The area of the District to the northeast of the National Park lies within the Wealden Greensand NCA. Land within this area generally rises towards the Surrey Hills AONB to the east with a wooded valley extending through Grayshott marking the route of Cooper's Stream. The A3 crosses the south of this area and the A325 crosses the west, whilst the South Wey river passes through the centre of the area. The majority of the area is occupied by agricultural land. The settlement of Bordon occupies much of the east of the area, and includes significant areas of industrial development, and the area also includes the smaller settlements of Headley, Liphook and Grayshott.

3.7 The area of the District to the north/northwest of the National Park lies predominantly within the Hampshire Downs NCA, however the eastern part of this area is within the Wealden Greensand NCA. The settlement of Alton is located in the centre of this area within a 'bowl', with higher land surrounding this. The North Wey river flows to the northeast from Alton and is bound by a wide gentle valley. Tributaries to this river cut through the higher land to the north, south and west. This part of the District is dominated by agricultural land. The A31 passes through this area from southwest to northeast, and the A339 connects from the northwest to Alton. In addition to Alton, key settlements within this area include Beech, Medstead and Four Marks.

3.8 Conservation Areas are designated areas of special architectural or historic interest, the character of which it is desirable to preserve and enhance. There are 23 Conservation Areas located within the parts of East Hampshire District outside of the National Park and the landscape features that contribute to the characters of these areas are protected by local policy.

[5] Natural England (2013) NCA Profile 128: South Hampshire Lowland. Available at: http://publications.naturalengland.org.uk/publication/5925881990086656?category=587130
[6] Natural England (2013) NCA Profile 130: Hampshire Downs. Available at: http://publications.naturalengland.org.uk/publication/6738147345956864?category=587130

National Planning Policy

3.9 One of the overarching objectives that underpins the NPPF is "*an environmental objective - to contribute to protecting and enhancing our natural, built and historic environment".*

3.10 In support of this, paragraph 170 of the NPPF requires the planning system to contribute to and enhance the natural and local environment by protecting and enhancing valued landscapes. Paragraph 20 of the NPPF also requires that strategic policies should make sufficient provision for conservation and enhancement of the natural, built and historic environment, including landscapes.

3.11 Although not within a National Park or an Area of Outstanding Natural Beauty, the parts of the District being considered within this study are adjacent to these designations. Paragraph 172 of the NPPF requires great weight to be given to conserving landscape and scenic beauty in National Parks and Areas of Outstanding Natural Beauty, which have the highest status of protection in relation to landscape and scenic beauty.

3.12 Paragraph 151 of the NPPF states that plans should help increase the use and supply of renewable and low carbon energy and heat, and should '*provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts)*'.

3.13 The NPPF also promotes good design and states in paragraph 127 that *"Planning policies and decisions should ensure that developments…are sympathetic to local character and history, including the surrounding built environment and landscape setting".*

East Hampshire District Council Adopted Development Plan

Local Plan: Second Review (2006) (Saved Policies)

3.14 The Local Plan: Second Review policies of relevance to landscape include:

- **Policy E2** states that planning permission for the generation of electricity from renewable resources would only be granted if the development would not harm the special landscape quality of the East Hampshire AONB (now the South Downs National Park) or views into or out of it, or harm the attractive landscape of areas outside the AONB.
- **Policy HE4** states that development within a Conservation Area will only be permitted where landscape features contributing to the character of appearance of the area are protected.

Local Plan: Joint Core Strategy (2014)

3.15 The Joint Core Strategy includes an objective to conserve and enhance landscape quality, distinctiveness and character in the wider landscape. The Joint Core Strategy policies of relevance to landscape include:

- **Policy CP20 Landscape** states that the special characteristics of the District's natural environment will be conserved and enhanced. The policy also sets out the requirements of new development with regards to landscape, including the requirements for developments to protect and enhance local distinctiveness, sense of place and tranquillity by applying the principles set out in the District's Landscape Character Assessments, including the Community/Parish Landscape Character Assessments; protect and enhance settlements in the wider landscape, land at the urban edge and green corridors extending into settlements; protect and enhance natural and historic features which contribute to the distinctive character of the District's landscape; incorporate appropriate new planting to enhance the landscape setting of the new development; and maintain, manage and enhance the green infrastructure networks.
- **Policy CP30 Historic Environment** sets out the requirements for development proposals with regard to the District's historic environment, and requires new development to reflect national policies in respect of design, landscape, townscape and historic heritage.

Local Plan: Housing and Employment Allocations Plan (2016)

3.16 The Housing and Employment Allocations Plan contains allocations for the development of housing and employment. While some allocation policies make reference to the need for measures to mitigate and enhance landscape features, there are no references to sites in landscapes of particular sensitivity to renewable and low carbon energy technologies.

East Hampshire Neighbourhood Plans

3.17 There are several adopted neighbourhood plans within East Hampshire District which contain policies designed to conserve and enhance the District's landscapes.

Alton Neighbourhood Development Plan 2011 – 2028 (2015)

3.18 Alton is located in the part of the District to the northwest of the South Downs National Park. Neighbourhood Development Plan policies of relevance to landscape include:

- **DE1 Town setting and natural assets** states that developments that impact the setting of Alton within the surrounding landscape need to ensure that this setting is maintained. It also requires that developments that impact on key views and gateways into and out of the town, in particular from the National Park to the south, must demonstrate how they have responded positively to these views and gateways.
- **DE2 Building design and town character** requires developments seek exemplary standards of design and architecture with a high quality external appearance that respects those characteristics of its setting. It also states that development should seek to maintain and wherever possible enhance the character of its locality, and that building heights should be carefully considered in respect of their impact on the skyline of the town, landscape and street scene.

Bentley Neighbourhood Plan 2015-2028 (2016)

3.19 Bentley is located in the north of the District, outside of the South Downs National Park. Neighbourhood Development Plan **Policy 2 Design and Development Principles** states that the scale, density, massing, height, design, layout and materials of development proposals should reflect the historic character and scale of the buildings and landscape features of Bentley Parish.

Medstead and Four Marks Neighbourhood Plan 2015-2028 (2016)

3.20 Medstead and Four Marks are located in the part of the District to the northwest of the South Downs National Park. There are no policies included within this plan that make explicit consideration of landscape.

South Downs Local Plan Pre-Submission

3.21 The South Downs National Park Local Plan Pre-Submission was produced in September 2017. In preparation for the Local Plan a *Renewable Energy & Low Carbon Study* was conducted setting out some of the key issues with renewable and low carbon energy technologies within and within view of the National Park to inform policies in the Local Plan. The South Downs Local Plan Pre-Submission policies of relevance include:

- **Strategic Policy SD4: Landscape Character** this states that development proposals will only be permitted where they conserve and enhance landscape character by demonstrating that: they are informed by landscape character, reflecting the context and type of landscape in which the development is located; and the design, layout and scale of proposals conserve and enhance existing landscape and seascape character features which contribute to the distinctive character, pattern and evolution of the landscape.

- **Strategic Policy SD6: Safeguarding Views** this states that development proposals will only be permitted where they preserve the visual integrity, identity and scenic quality of the National Park, in particular by conserving and enhancing key views and views of key landmarks within the National Park and do not result in adverse cumulative impacts within views.
- **Strategic Policy SD7: Relative Tranquillity** this states that development proposals will only be permitted where they conserve and enhance relative tranquillity and should consider the following impacts: direct impacts that the proposals are likely to cause by changes in the visual and aural environment in the immediate vicinity of the proposals; indirect impacts that may be caused within the National Park that are remote from the location of the proposals themselves such as vehicular movements; and experience of users of the Public Right of Way network and other publicly accessible locations.
- **Development Management Policy SD51: Renewable Energy** this states that development proposals for renewable energy schemes that contribute towards reducing greenhouse gas emissions and moving towards a carbon neutral National Park will be permitted after a suitable site specific analysis. Also, development proposals for small-scale individual wind turbines and freestanding solar arrays serving individual properties or small groups of properties will be permitted where: they are suitably sited and screened and clearly associated with the buildings or properties that they are intended to serve; they are appropriate in scale to the property being served; and there is no unacceptable adverse impact on local amenity or conflict with public safety.

Landscape Assessments

East Hampshire Landscape Character Assessment 2005-2006

3.22 LUC produced a landscape character assessment (LCA) on behalf of the Council in 2006. The assessment covered the entire District, inclusive of the South Downs National Park. The objective of the assessment was to assess the landscape character of East Hampshire.

3.23 The landscape classification defines 10 generic landscape types, which are sub-divided into 26 individual geographic character areas. The assessment provides a detailed description of the character and key characteristics of each area, identifies the landscape and visual sensitives of each area, and provides landscape strategies and guidelines for each of the areas. This assessment has been used to inform the landscape sensitivity assessment set out in chapter 6.

East Hampshire Landscape Capacity Study (2013)

3.24 In 2013, the Council published a Landscape Capacity Assessment. This focuses on the landscape and visual sensitivities of all the District's settlements and where housing development could be undertaken without causing significant and detrimental damage to the District's landscapes. The study focussed on Strategic Housing Land Availability Assessment (SHLAA) sites at Alton, Four Marks, Liphook, Clanfield, Rowlands Castle and Horndean, with those settlements within the National Park being addressed separately.

East Hampshire Landscape Capacity Study (2018)

3.25 As part of the evidence base to support the new Local Plan, a new Landscape Capacity Study has been prepared. This follows on from the existing Landscape Capacity Study 2013, and assesses the relative capacity of the landscape to accommodate housing development at a strategic scale. This covers land outside of the settlement boundaries within the East Hampshire Planning Authority area only (excluding the South Downs National Park).

Hampshire County Integrated Character Assessment (2010)

3.26 The Hampshire Integrated Character Assessment provides a framework for more detailed local character assessments, such as at district level. This provides an overview of the landscape within Hampshire, as well as details of landscape character types and landscape character areas, as well as townscape assessments. The assessment details the characteristics of the county's

townscapes, landscape character types and landscape character areas, as well as identifies the forces for changes within the landscape character areas and the threats and opportunities presented by these.

Rowlands Castle Landscape Character Assessment (2012)

3.27 Rowlands Castle Parish is located in the part of the District to the south of the South Downs National Park.

3.28 This Local Landscape Character Assessment was published in 2012 and aims to record and emphasise those aspects of the landscape of Rowlands Castle Parish that are distinctive and special. The assessment builds on the 2006 East Hampshire District Landscape Character Assessment which identifies two broad landscape character types and eight landscape character areas. The assessment evaluates the major landscape and visual sensitivities of each and provides strategy guidelines for their management and development. Four key management themes emerged from the assessment, including the conservation of vistas and the diversity and tranquillity of the landscape.

South Downs National Park Integrated Landscape Character Assessment (Updated) (2011)

3.29 Although the South Downs National Park Integrated Landscape Character Assessment gives consideration to the land within the South Downs National Park, which is excluded from this renewable energy and low carbon study, the Park lies directly adjacent to this Study area. The assessment highlights that "*it is local, regional, national and wider forces beyond the national park that are driving changes within the South Downs*", and therefore "*it is vital that all local, regional and national policies consider the implications of change beyond the national park boundary on its distinctive character and qualities.*" The assessment notes that in response to climate change and the need to move to renewable energy resources, there may be pressure for further development with potential landscape impacts. [7]

The Surrey Hills Area of Outstanding Natural Beauty Management Plan 2014-2019

3.30 The Surrey Hills Area of Outstanding Natural Beauty Management Plan 2014-2019 policies of relevance include two Land Use Planning Management Policies:

- **LU2** sets out that development will respect the special landscape character of the locality, giving particular attention to potential impacts on ridgelines, public views, tranquillity and light pollution. The proposed use and colour of external building materials will be strictly controlled to avoid buildings being conspicuous in the landscape.
- **LU5** sets out that development that would spoil the setting of the AONB, by harming public views into or from the AONB, will be resisted.[8]

Wind and Solar Sensitivity Assessment

3.31 The existing landscape policy provisions go some way to protect these landscapes, however the existing Local Landscape Character Assessment and Landscape Capacity Study were not prepared to specifically consider renewable energy developments and in particular wind and turbines and solar developments which can have significant landscape impacts.

3.32 The landscape sensitivity assessment within **Chapter 6** of this report has been informed by the East Hampshire Landscape Character Assessment (2006) and takes due cognisance of the 'landscape and visual sensitivities' as identified within this.

[7] South Downs Integrated Landscape Character Assessment (Updated) Technical Report,, 2011
[8] Surrey Hills Area of Outstanding Natural Beauty Management Plan 2014-2019

4. Emissions Trends Review

4 Emissions Trends Review

Introduction

4.1 This chapter provides an overview of national energy generation and emissions trends over recent years and discusses the trends in relation to East Hampshire. A review of existing renewable energy installations within East Hampshire is also set out.

Emission Trends

4.2 The UK's greenhouse gas emissions fell by 2.6% in 2017 continuing a long downward trajectory[9]. Emissions have fallen 43% since 1990, about halfway to the 2050 target, even while the economy has been growing and population rising. The decrease in emissions is primarily the product of two key trends. We are consuming less energy and the electricity supply is becoming less carbon intense.

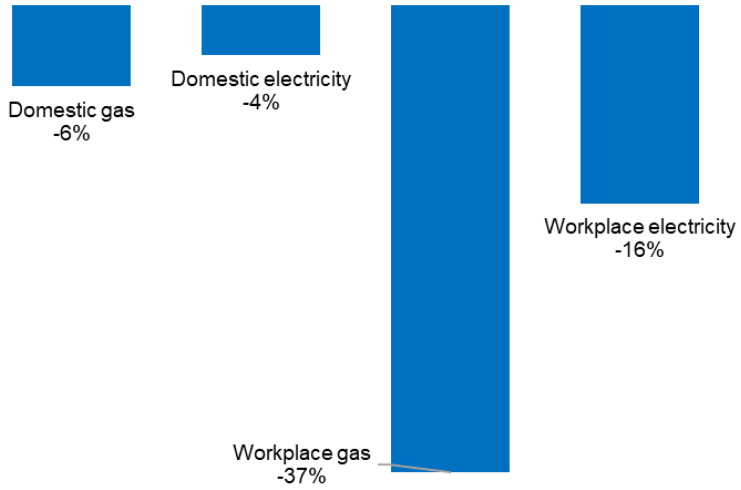
Energy consumption

4.3 Energy consumption is estimated to have fallen 11% since 1990. This has resulted from improvements in technology and a decline in the relative importance of energy intensive industries. The carbon intensity of the electricity supply fell 7.6% between 2016 and 2017 as renewable output increased and coal generation dropped 28%.

4.4 In 2016, East Hampshire's electricity consumption was estimated to be 433 GWh with a further 733 GWh demand for gas. 83% of gas demand and 55% of electricity demand comes from domestic uses, with the remainder used in commerce and industry.

4.5 Energy demand is falling in East Hampshire[10]. Gas consumption is down 13% and electricity demand down 10% between 2010 and 2016, despite a 7% increase in the population over the same period. The downward trend is consistent across both homes and workplaces.

Figure 4.1: Change in East Hampshire total energy consumption between 2010 and 2016



[9] 2017, ONS, UK Greenhouse Gas Emissions, Provisional Figures Statistical Release
[10] https://www.gov.uk/Government/publications/sub-national-electricity-and-gas-consumption-statistics-analysis-tool

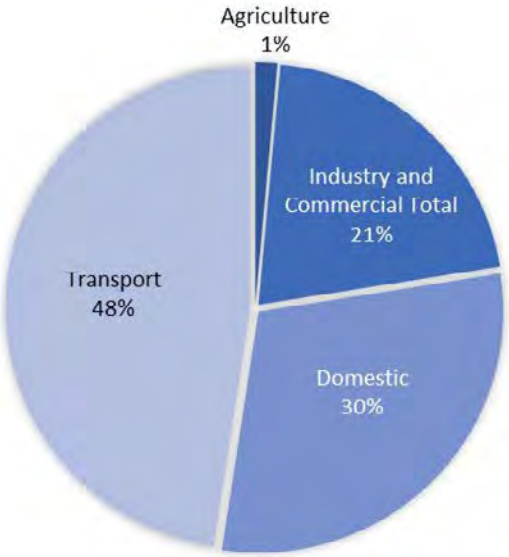
4.6 Falling workplace energy consumption has been most pronounced and is associated with improved efficiency and changes in the structure of the economy. The changes in home consumption can be attributed to energy efficiency improvements as well as improved appliance, lighting and boiler efficiency.

Carbon emissions

4.7 East Hampshire's carbon emissions fell 21.7% between 2005 and 2015[11] to 746.5 $ktCO_2$ (thousand tonnes of carbon dioxide). This can be attributed to falling local energy consumption combined with the decarbonisation of the electricity supply and switching away from dirtier coal and oil heating systems.

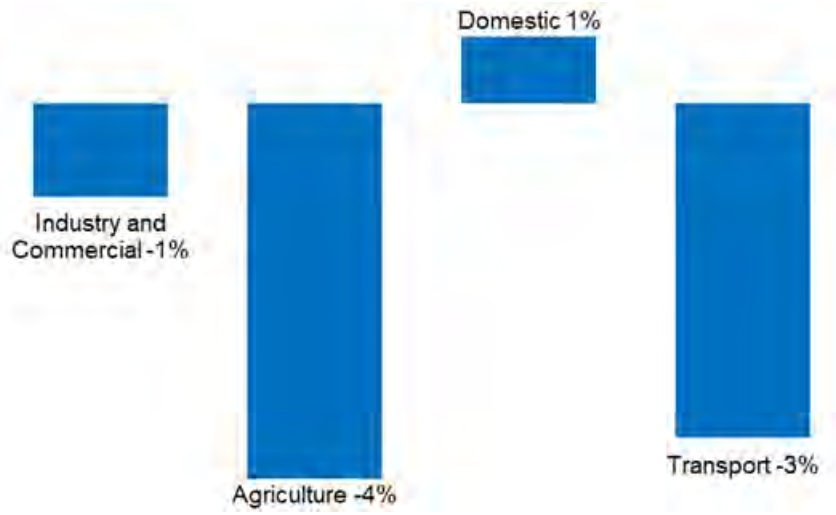
4.8 The source of emissions in 2015 came from industry and commercial (21%), domestic uses (30%) and transport (48%), with a small amount (1%) from agriculture.

Figure 4.2: Source of total emissions in East Hampshire 2015



4.9 Since 2005, emissions have fallen fastest from industry and commercial uses. There have also been large reductions in domestic energy use with smaller reductions in transport and agriculture emissions.

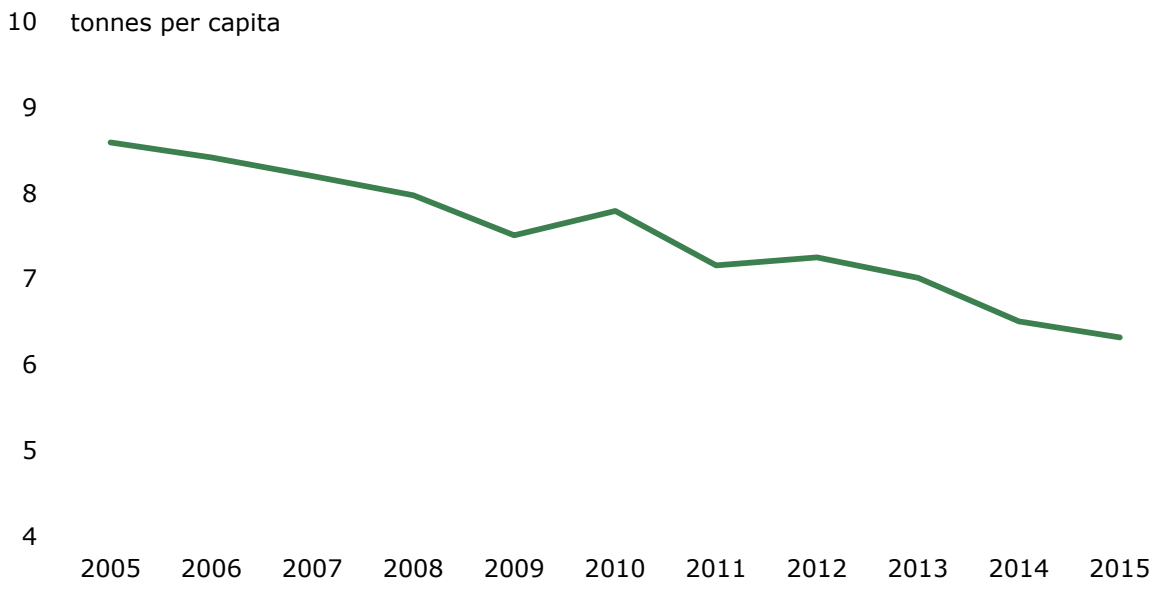
Figure 4.3: Change in carbon emissions in East Hampshire by sector between 2005 and 2015



[11] Carbon dioxide (CO2) is the main greenhouse gas, accounting for about 81 per cent of the UK greenhouse gas emissions in 2015.

4.10 The local population increased by about 7% over the same period. As a result, per capita emissions have fallen 26% to 6.3 tonnes. This is marginally above the UK average which is 5.9 tonnes per capita.

Figure 4.4: Per capita carbon emissions in East Hampshire between 2005 and 2015



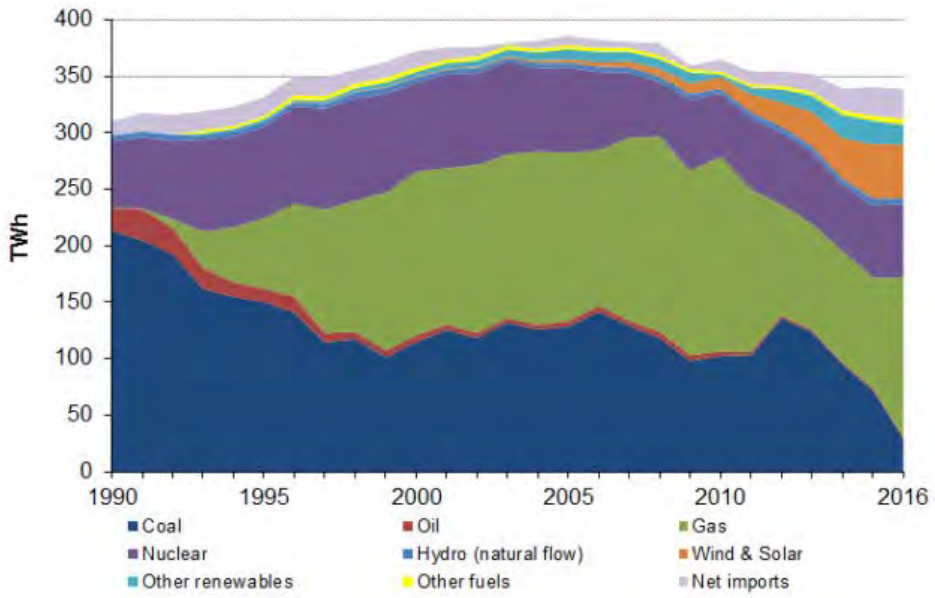
4.11 The evidence indicates that the changes in energy consumption and emissions patterns in East Hampshire reflect the broader national trend of sustained reduction though with marginally above average carbon emissions. This reduction can be attributed both to the impact of the changing nature of industry, the economy and the energy sector, as well as local efforts to increase energy efficiency and to add renewable energy generation capacity, which is discussed below.

Renewable Electricity

4.12 UK renewable generation (hydro, wind, solar and bioenergy) increased by 19% between 2016 and 2017 (to 99.3 TWh). This was driven by increased renewable capacity and more favourable weather conditions[12]. Low carbon generation (nuclear and renewable) supplied more than half (50.4%) of all electricity for the first time. Planned renewable capacity additions over the coming years and the Government's commitment to ending the use of unabated coal by 2025 will mean that this trend is likely to continue[13].

[12] 2018, BEIS, Provisional 2017 electricity statistics
[13] 2018, BEIS, Implementing the end of unabated coal by 2025

Figure 4.5: UK electricity supplied by fuel type 1990-2016



4.13 The extent of the electricity system transformation was symbolically marked in April 2017, with the first 24-hour period without coal powered generation since the first coal power station opened in 1882.

Renewable energy installations in East Hampshire

4.14 Information on renewable energy installations in East Hampshire has been collated using public datasets corroborated with information held by the Council. Key data sources include:

- Renewable Energy Planning Database.
- RESTATS renewable energy statistics.
- Ofgem's FIT and RHI installation datasets.
- East Hampshire's District planning portal.

4.15 The existing installations set out below are standalone renewable energy developments, small roof mounted installations and small renewable heating systems are discussed separately under the section on Microgeneration Technologies in **Chapter 5** of this report.

Total installed renewable electricity capacity

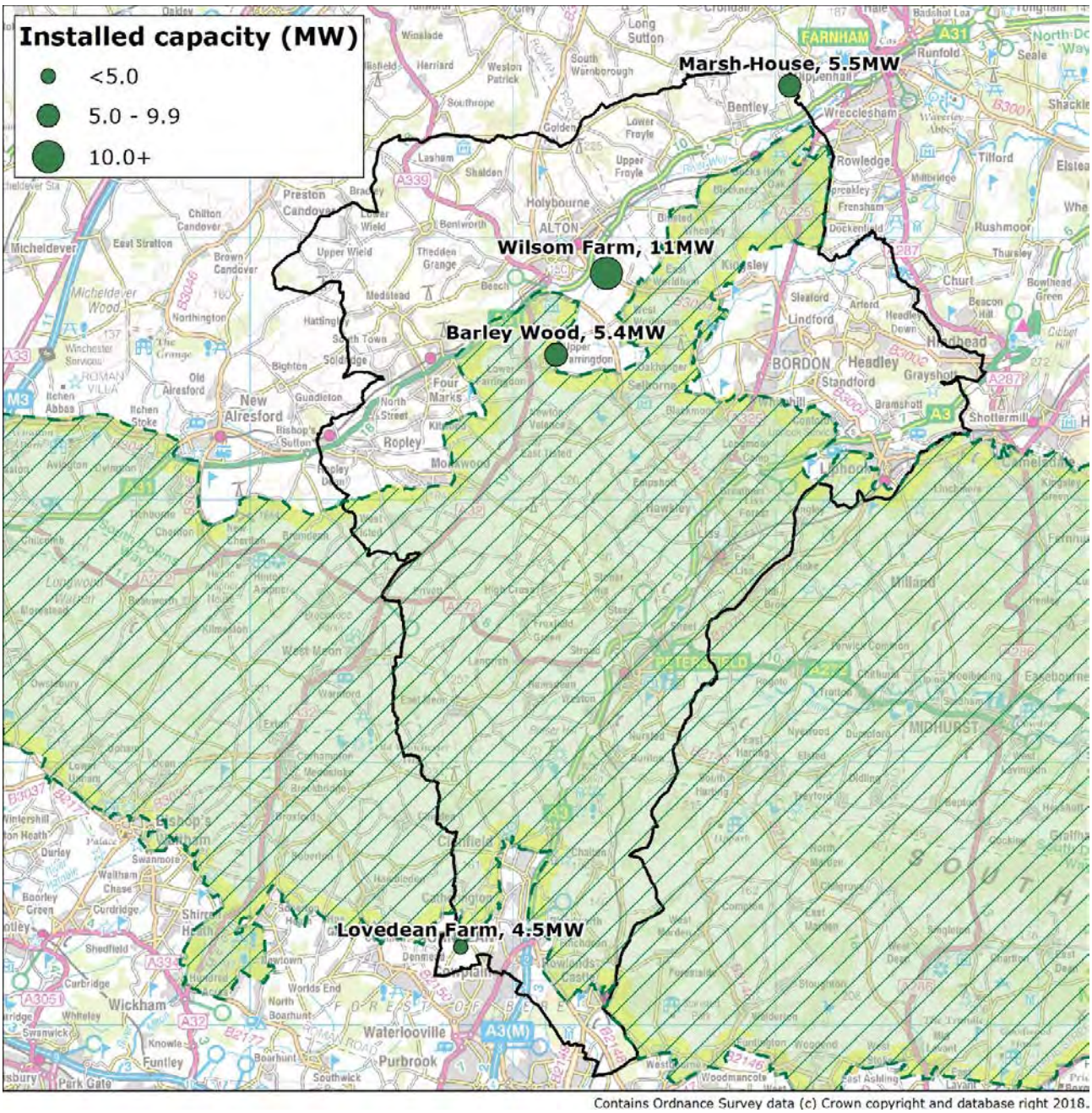
4.16 The capacity of renewable electricity generators in East Hampshire is 26.4MW which is made up of four operational solar farms as of Summer 2018. The majority of this was installed between 2013 and 2016.

4.17 **Table 4.1** and **Figure 4.6** provide further details on the capacity and location of the five operational solar farms within East Hampshire.

Table 4.1: Existing standalone operational solar PV installations in East Hampshire

Name/location	Capacity (MW)
Barley Wood Farm Lane, Farringdon	5.4
Lovedean Farm, Horndean	4.5
Marsh House Solar Park, Bentley	5.5
Wilsom Farm, East Worldham	11

Figure 4.6: Location of the consented solar sites within East Hampshire District (green area denotes South Downs National Park)



4.18 Planning consent was granted in 2014 for a 5MW standalone solar farm at Sickles Lane, Kingsley but it was not developed and the permission expired in 2017.

Wind Power

4.19 There are no commercial-scale or small-scale wind turbines installed within East Hampshire. The majority of the UK's onshore wind turbines are installed in regions with strong winds and low population density. BEIS statistics from 2016 indicate that Scotland accounts for 57% of the UK's onshore wind farm capacity, with England accounting for 25%. Of England's regions, Yorkshire and the Humber, the East of England and North West together account for over half of the capacity. The South East, including Hampshire account for just 4% or 100MW of installed wind capacity. There are currently only three small-scale wind installations in the whole of Hampshire (all single turbines), with a combined capacity of less than 1.5MW in total.

5. Renewable and Low Carbon Energy Potential

5 Renewable and Low Carbon Energy Potential

Introduction

5.1 This chapter sets out the results of the assessment of the technical potential for renewables within the District of East Hampshire. The 'technical potential' is the total amount of renewable energy that could be delivered in the area based on a number of assumptions regarding the amount of resource and space. The chapter also includes a discussion of the issues that will affect what could be realistically delivered within the District. This includes the consideration of factors such as such as planning, economic viability and grid connection. It does not take into account landscape sensitivity to wind and large scale solar developments which is considered separately in **Chapter 6** of this report.

Background

5.2 The assessment of technical potential is based upon a refined version of the DECC Methodology – *Renewable and Low Carbon Energy Capacity Methodology for the English Regions* (2010)[14], which was prepared by SQW and LUC. This provides guidance on how to assess the technical potential for renewable and low carbon based on the use of a number of defined data sources and parameters/ assumptions for each technology. These data sources and assumptions were reviewed and refined as part of this study to ensure that the assessment reflects the local characteristics of East Hampshire.

5.3 Where relevant, the results set out in this chapter have been presented in terms of:

- Installed capacity (MW).
- Generation capacity (GW/h) for electricity and heat as appropriate.

5.4 Where possible spatial data has been used to identify the locations/ areas with most potential for specific technologies. However, it is not possible to identify locations for all types of renewable energy as many technologies such as building integrated solar, heat pumps, farm-scale anaerobic digestion (AD) and biomass can be located in nearly all areas.

Results of Technical Potential Assessment

5.5 The following section provides a summary of the technical potential for each technology type, in the following format:

- Brief description of the technology.
- Existing projects within East Hampshire.
- Main assumptions used to calculate the technical potential.
- Results and commentary on technical potential and issues affecting deployment.

[14] In March 2010, DECC published a methodology for quantifying the opportunities and constraints for deploying renewables and low carbon energy in the English Regions. The purpose of this methodology was to ensure that a consistent approach was used for the assessment of resource potential across the English regions. The methodology sets out a series of assumptions for calculating the technical potential for renewable energy within a region. It did not provide assumptions for assessing the 'deployable potential'.

Wind Energy

Description of technology

5.6 On-shore wind power is an established and proven technology with thousands of installations currently deployed across many countries. The UK has the largest wind energy resource in Europe.

5.7 Wind power uses energy from the wind to turn a rotor connected to an electrical generator. Although there are no rigid categories relating to the scale of wind turbines, for the purpose of this study, four size categories have been considered as follows:

- Small (<40m).
- Medium (40-80m).
- Large (80-120m).
- Very large (120-160m).

Table 5.1: Typical capacity and height of wind turbines

Scale	Typical Turbine Installed Capacity	Typical Turbine Height (to blade tip)
Small	500kW	<40m
Medium	900kW	40-80m
Large	2.5MW	80-120m
Very Large	4.0MW	120m->160m

5.8 Most very large, large and medium scale wind turbine developments are connected to the national grid. Medium and small scale turbines tend to provide electricity for single premises (e.g. a farm) or be connected to the grid directly for export. The number of turbines used per site ranges from the deployment of single turbines up to large groups of turbines (known as wind farms) capable of generating tens of megawatts. The amount of energy that turbines generate depends primarily on wind speed but will be limited by the maximum output (kW/ MW) of the individual turbine.

Current wind development in East Hampshire

5.9 As detailed in **Chapter 4**, there are no existing wind turbine developments within East Hampshire.

Assumptions used to calculate technical potential

5.10 The assessment of technical potential for very large, large, medium and small turbines was undertaken using GIS (Geographical information Systems) involving spatial mapping of the key constraints and opportunities. The assessment identified the areas with potential viable wind speeds and the number of turbines that could be theoretically deployed within these areas. A series of constraints relating to physical features and environmental/heritage protection were then removed.

5.11 The following key constraints and opportunities were considered. Please note: a discussion of micro generation is set out in the section later in this chapter.

Table 5.2: Wind Energy Assumptions

Parameter	Assumption	Data source	Justification and notes
Opportunities			
Wind speed (see **Figure 5.5: Wind Speed** which show the range of wind speeds found in East Hampshire)	All areas with wind speed 5 m/s at 45m above ground level (agl)	NOABL Industry practice	All of East Hampshire meets and exceeds the minimum requirement of 5m/s. Depending on the size of the turbine used the requirements for certain wind speeds change. Some turbine manufacturers produce models which cater for lower wind speed environments and the configuration of certain turbine models can be altered to improve yield in lower wind speed environments. As Government policy could change in the future, and technological advances in turbines could improve, lower wind speed conditions can be considered. Therefore, a 5m/s threshold has been set to account for any future developments. Sites below 5m/s would be considered uneconomically viable for a developer.
Wind turbine size (See **Figure 5.11: Opportunity for Wind Development** which show all the opportunity areas within East Hampshire for each turbine size assessed)	Assess four turbine sizes: • Very large (120-160m+ tip height) • Large (80-120m tip height) • Medium (40-80m tip height) • Small (<40m tip height)	LUC Research into turbine manufacturers BEIS renewable energy planning database and other databases containing information on wind turbine applications	There are no standard categories for wind turbine sizes. Research conducted found that manufacturers will typically produce a number of models that fall into the assessed categories as well as the ability to change the configuration of turbine components to create custom sizes. A review of wind turbine applications across the UK showed tip heights ranging from less than 20m up to 160m +, with larger turbine models in demand from developers to counter reductions in subsidies. The majority of operational and planned turbines range between 80m and 130m. Smaller turbines (those in the medium to small category) are typically used for single turbine developments
Wind turbine density (See **Figure 5.11: Opportunity for Wind Development** which show all the opportunity areas within East Hampshire for each turbine size assessed)	• Very large: 4 turbines per km² • Large: 4 turbines per km² • Medium 10 turbines per km² • Small: 50 turbines per km²	Industry practice	The rotor diameter of a candidate turbine is used to determine spacing between turbines to ensure operational efficiency. At a minimum this will be 5x spacing. Factors such as prevailing wind direction are taken into account and turbine spacing will typically be agreed between developer and manufacturer prior to planning permission being sought. The density calculation will not take into account the site shape and minimum site size. It is assumed that if a parcel of land is considered suitable for a range of turbine sizes the largest turbine size will be used.

Parameter	Assumption	Data source	Justification and notes
Exclusions			
Biodiversity (see **Figure 5.6: Nature Designations** showing all designated areas within East Hampshire)	International designations: • Special Protection Areas There are no other Internationally designated sites within East Hampshire boundary National designations: • Sites of Special Scientific Interest • National Nature Reserves *(none within East Hampshire boundary)*	Natural England	As protected by: Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, commonly known as the Habitats Directive. Wildlife and Countryside Act 1981. Conservation of Habitats and Species Regulations 2010 (as amended).
	Other designations: • Ancient woodland • Local Nature Reserves • Sites of Importance for Nature Conservation	Natural England East Hampshire District Council	National Planning Policy Framework. Natural Environment and Rural Communities Act 2006.
Cultural heritage (see **Figure 5.7: Heritage designations** showing all designated features and areas within East Hampshire)	Designated sites • World Heritage Sites *(none within East Hampshire boundary)* • Registered Parks and Gardens • Scheduled Monuments • Listed Buildings • Registered Battlefields *(none within East Hampshire boundary)*	Historic England	National Planning Policy Framework. The Convention Concerning the Protection of the World Cultural and Natural Heritage. National Heritage Act 1983. Ancient Monuments and Archaeological Areas Act of 1979. Planning (Listed Buildings and Conservation Areas) Act 1990. *Note: A 5m buffer has been applied to Listed Buildings, providing a footprint to a point dataset. This is not intended to identify a 'setting' zone.*
	Other cultural heritage considerations: • Conservation Areas	East Hampshire District Council	National Planning Policy Framework. Planning (Listed Buildings and Conservation Areas) Act 1990.
Roads (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. These constraints have been applied for all turbine size categories and the buffer distances reduced accordingly)	Roads with a buffer of the height of the turbine (to blade tip height) +50m	Ordnance Survey VectorMap District. Note: single and dual carriageways extracted and separated out from main dataset. In order to create a footprint from the road centrelines data, it was assumed that single carriageways were 10m in width and dual carriageways were 20m in width.	This buffer is applied as a safety consideration.

Parameter	Assumption	Data source	Justification and notes
Railways (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. These constraints have been applied for all turbine size categories and the buffer distances reduced accordingly)	Railways with a buffer of the height of the turbine (to blade tip height) + 50m	Ordnance Survey VectorMap District. Note: In order to create a footprint from the railway centrelines data, it was assumed that railways were 15m in width.	This buffer is applied as a safety consideration.
Transmission lines (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. These constraints have been applied for all turbine size categories and the buffer distances reduced accordingly)	Major transmission lines with a buffer of the height of the turbine (to blade tip height) +50m.	National Grid	This buffer is applied as a safety consideration.
Public rights of way (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. These constraints have been applied for all turbine size categories and the buffer distances reduced accordingly)	Public Rights of Way and Bridleways with a buffer of the height of the turbine (to blade tip height) +50m.	East Hampshire District Council Note: In order to create a footprint from the railway centrelines data, it was assumed that Public Rights of Way and Bridleways were 2m in width.	This buffer is applied as a safety consideration.
Noise and visual amenity (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. These constraints have been applied for all turbine size categories and the buffer distances reduced accordingly)	Residential and commercial buffer zones - Residential and commercial properties with a buffer to exclude areas within which it would be categorically impossible to meet the ETSU-R-97 noise limits for small and medium turbines: • Small: 200m for residential, 150m for commercial • Medium: 200m for residential, 150m for commercial and highly unlikely to meet the ETSU-R-97 noise limits for, large and very large turbines: • Large: 500m for residential, 200m for commercial • Very large: 600m for residential, 300m for commercial For properties outside of (but close to) the District Boundary, indicative buffers	East Hampshire District Council Local Land and Property Gazetteer (LLPG) Residential and Commercial address points OS OpenMapLocal Buildings layer for buildings adjacent to the District Boundary	The two main issues that determine the acceptable separation distance between residential properties and wind energy developments are visual amenity and noise. Commercial-scale wind turbines are large structures and can have an effect on visual amenity from residential properties. All wind turbines also generate sound during their operation. As such, appropriate distances should be maintained between wind turbines and sensitive receptors to protect residential amenity. The key question however is whether buffer distances should be applied (to take account of noise issues) when identifying suitable areas for wind energy developments. In order to secure planning permission, wind turbine applications have to provide evidence that they adhere to the required noise thresholds set out in the ETSU Guidance – The Assessment and Rating of Noise from Wind Farms (1995). Based on the opinion of acoustic specialists, buffers have been defined for areas within which it would categorically not be possible to meet the ETSU-R-97 noise limits. For

Parameter	Assumption	Data source	Justification and notes
	have been applied to the available property/buildings data. As it is not possible to differentiate between residential or commercial properties within the publicly available data, it has been assumed that all properties are residential.		large and very large turbines, an additional buffer has been applied to rule out areas within which it would be highly unlikely, but not categorically impossible, to site wind turbines and still meet ETSU-R-97 noise limits. Shadow flicker has not been considered as a constraint in this study as modern turbines are now equipped with the technology to be able to turn off when shadow flicker is predicted to occur.
Future developments (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. This constraint has been applied for all turbine size categories)	Strategic Housing Land Availability Assessment sites	East Hampshire District Council	Sites allocated for development with planning permission granted are excluded.
Water environment (see **Figure 5.8 and Figure 5.9** which show the constraints for small and very large turbines respectively. This constraint has been applied for all turbine size categories).	Rivers and waterbodies with a 50m buffer.	Ordnance Survey VectorMap District: Surface Water Area	A 50m buffer has been applied around all rivers and waterbodies to take account of good practice such as pollution control during construction.
Slope (see **Figure 5.10** which show the constraints for small and very large turbines respectively. This constraint has been applied for all turbine size categories).	Slopes greater than 15 degrees.	Ordnance Survey Terrain50	This is a development/operational constraint. Developers have indicated that this is the maximum slope they would consider for development. Although theoretically possible to develop on areas exceeding 15° slopes, turbine manufacturers are unlikely to allow turbine component delivery to sites where this is exceeded.
MOD training (Not shown on figure, but have been considered as an exclusion when determining the unconstrained areas for wind energy development in **Figures 12-15**)	MOD Training Areas	East Hampshire District Council	This is applied as a safety consideration.

Parameter	Assumption	Data source	Justification and notes
NATS/ MOD (Not considered as an absolute constraint therefore will not affect the availability of opportunity areas for wind development) (see **Figure 5.16** showing areas within the 17km Blackbushe, 17km Chichester/Goodwood, 30km Farnborough and 30km Southampton Aerodrome Safeguarding Areas)	Guidance includes the following safeguarding areas: • 30km for aerodromes with a surveillance radar facility. • 17km for non-radar equipped aerodromes with a runway of 1,100 m or more, or 5km for those with a shorter runway. • 4km for non-radar equipped unlicensed aerodrome with a runway of more than 800m or 3km with a shorter runway. • 10km for the air-ground-air communication stations and navigation aids. • 15 nautical miles (nm) for secondary surveillance radar.	NATS/MOD	Further consultation between potential developers and NATS is required to determine if there is any impact from a proposed development.

5.12 The potential impact of wind turbines on the landscape is a key issue which can significantly affect where turbines are located. This has not been considered as part of the technical assessment but is assessed within **Chapter 6** of this report.

Results

Technical potential

5.13 **Table 5.3** below provides a summary of the technical potential for wind energy within the District. The analysis examined the potential for very large, large, medium and small turbines and where potential existed for more than one size of turbines, it was assumed that the larger turbines would take precedence – i.e. to calculate the maximum technical potential.

Table 5.3: Summary of Technical Potential for Wind Energy

Resource	(MW)	(GWh)
Very large	53.84	81.12
Large Wind	51.10	76.99
Medium Wind	244.71	368.72
Small Wind	281.22	423.72
Total – electricity[15]	**630.88**	**2381.5**

[15] 1. Area of unconstrained land is treated as a single block of land. This is not the case in reality.
2. Density of turbines per square km is based on having 5 rotor diameters between turbines.
3. Typical turbine dimensions based on consultation with developers and manufacturers as well as other studies.
5. Land available for large turbines will also be suitable for medium and small turbines.
6. Land available for medium turbines will also be suitable for small turbines.
7. For these calculations, it is assumed that developers would choose the largest turbine size suitable for each parcel of land.
8. GWh calculated using the formula MW x 8760 x capacity factor/1000.
9. Capacity factor figure obtained from BEIS FiT load factors, calculated at 17.2%.

5.14 **Figure 5.11** shows the areas which have technical potential for wind energy for each category of turbine size. Please note that this assessment does not provide a sufficient evidence base for the actual siting and delivery of wind turbines but gives a high level assessment of potential areas that could be analysed in more detail.

5.15 In order to calculate the technical potential a series of opportunity and constraints maps were produced. **Figure 5.5** shows the wind speed within the District at 45m above ground level (agl). All areas within the District have wind speeds in excess of the minimum cut off of 5m/s with the highest wind speeds in the west of the District and the lowest wind speeds in the east. Wind speeds of 5m/s or above at hub height are needed to operate wind turbines efficiently, although many developers would not look to develop sites at the present time at sites with wind speeds lower than 7m/s or even higher than that.

5.16 It is important to acknowledge that macro scale wind data (such as NOABL[16]) which was used for this assessment can be inaccurate at the site specific level and therefore can only give a high level assessment of potential within the area. Developers looking at specific sites (particularly for large scale turbines) will normally require wind speeds to be accurately monitored using anemometers for an extended period of time, typically at least one-two years.

5.17 The results show that there is a total technical potential to deliver around 630MW of electricity from wind power in the District with the greatest potential for small and medium wind turbines as there are less constraints to these size of turbines in relation to proximity to dwellings. In reality, the deployable potential for wind is significantly lower.

5.18 The technical wind opportunity map for East Hampshire (see **Figure 5.11**) indicates that there are pockets of land throughout the District that have the technical potential for very large, large, medium and small scale wind turbines.

5.19 The maps show negligible land availability in the more built up areas of the District including Alton, Whitehill & Bordon, Lindford and Horndean. There is greatest potential for large and very large turbines in the more rural areas to the north and north west of the District (see **Figures 5.14-5.15**), where there are fewer property and infrastructure constraints (see **Figures 5.8 and 5.9**). There are significant areas of rural farmland throughout the District which are technically suitable for medium and small scale wind (see **Figures 5.12 and 5.13**).

5.20 The assessment of technical potential has not considered aviation constraints as detailed consultation with the MOD and NATS/NERL is needed on a site by site basis to ascertain if it is likely to be significant concern or not. **Figure 5.16** illustrates that the whole of the north of the District and parts of the west lie within 30km of either Farnborough or Southampton airport and radar interference could be a constraint for large and very large turbines. The very north and the south east parts of the District also lie within 17km of Blackbushe and Chichester/Goodwood aerodromes. A clearer understanding of these issues is required at the site specific level to determine their applicability and as such aviation constraints have not been used to rule out areas of potential as part of this technical assessment.

[16] NOABL (National Oceanic and Atmospheric Administration (NOAA) Boundary Layer) wind speed database developed by ETSU for the DTI (Department of Trade and Industry) in 1997. This provides an estimated wind speed for a 1 km square at 10 m, 25 m and 45 m above ground level. The wind speed data in the ETSU NOABL database is the result of an air flow model that estimates the effect of topography on wind speed. There is no allowance for the effect of local thermally driven winds such as sea breezes or mountain/valley breezes or local roughness such as buildings and trees which can have a considerable effect on wind speeds.

Issues affecting deployment

Subsides

5.21 The main issues affecting the deployment of wind energy schemes are linked to the significant reduction in financial incentives in recent years, most notably the closure of the Renewables Obligation to onshore wind schemes in May 2016 and all wind schemes in March 2017. The Renewables Obligation was designed to encourage generation of electricity from eligible renewable sources in the UK. The Renewables Obligation has since been replaced by the more competitive Contracts for Difference scheme. Both onshore and offshore wind schemes are eligible for the scheme. Following consultation, the Government now intends to legislate to differentiate Remote Island Wind from other onshore wind projects; however, this will not affect schemes within the study area.

5.22 In addition to the closure of the Renewables Obligation, the Government's Feed-in Tariff scheme designed to encourage uptake of a range of small-scale renewable and low-carbon electricity generation technologies has been cut a number of times. Cuts to wind tariff rates were made in 2011, 2012, 2015 and 2016. On 19th July 2018 the Department of Business Energy and Industrial Strategy (BEIS) published a consultation in which they stated their intention to close the FIT scheme to new applicants from 1st April 2019, barring several exceptions.

Planning

5.23 Although the English planning system supports the delivery of all types of renewable energy technology within the country, in June 2015, National Planning Practice Guidance was updated to state that "*when considering applications for wind energy development, local planning authorities should (subject to the transitional arrangement) only grant planning permission if:*

- *the development site is in an area identified as suitable for wind energy development in a Local or Neighbourhood Plan; and*
- *following consultation, it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing.*
- *Whether the proposal has the backing of the affected local community is a planning judgement for the local planning authority."*

5.24 This new planning policy approach has made it harder for developers to obtain permission for schemes, unless it can be clearly evidenced that the proposal lies within an area of suitability for wind and the community backs the scheme. In combination with the cut to subsides, this has meant that very few wind energy applications are being submitted anywhere in England at the present time as developers seek to invest in other locations such as Scotland where there is no such planning restrictions in place.

Grid Connection

5.25 Another significant barrier to the development of renewable and low carbon energy schemes within the UK includes grid connection constraints and a lack of grid capacity. Despite significant ongoing investment in the National Grid, the country's private sector Distribution Network Operators (DNOs), which carry electricity from main grid to commercial and domestic users, continue to be slow in permitting and facilitating new grid connections, connections which often come at significant cost to the new energy generators, including costs for any necessary network reinforcements.

5.26 Scottish & Southern Energy Networks is the DNO in East Hampshire and they publish high-level information on the potential for new renewable schemes to connect to the distribution network. This indicates that the majority of East Hampshire is grid constrained at both the transmission and distribution level. Transmission constraints are related to national network capacity while distribution constraints reflect local network capacity issues.

5.27 The distribution network in the northern parts of East Hampshire are connected to the national electricity transmission system at Fleet, in Hart. This Grid Supply Point is transmission constrained which has a knock-on impact on its downstream substations at Alton and Bordon which are both transmission and distribution constrained. Only Wrecclesham which is across the Surrey border is not distribution constrained. The southern parts of East Hampshire are served by the Lovedean Grid Supply Point which is currently transmission constrained. Its downstream substations at Horndean and Petersfield are both transmission and distribution constrained.

5.28 **Table 5.4** below presents the network infrastructure's distribution network capacity, the capacity of generation already connected to it and the available distribution headroom for new connections.

Table 5.4: Capacity for connecting new grid connections to the distribution network in East Hampshire

Name	Type	Distribution capacity MW	Connected generation MW	Available headroom MW
Fleet	Grid Supply Point	1460	322.48	1890.90
Lovedean	Grid Supply Point	780	345	1021
Alton & Fernhurst	Bulk Supply Point	200	108.62	0
Alton	Primary substation	45.00	0.00	0.00
Alton Local	Primary substation	40.00	1.43	0.00
Bordon	Primary substation	26.00	5.04	0.00
Langley Court	Primary substation	24.00	0.00	0.00
Petersfield	Primary substation	30.00	0.25	0.00
Wrecclesham	Primary substation	30.00	0.00	33.90
Horndean	Primary substation	30.00	4.00	0.00

5.29 Grid reinforcements would be needed before large renewable generators could be connected. National Grid are proposing to increase the capacity of the high voltage overhead lines between, Fleet and Lovedean which could address the transmission constraint potentially allowing additional generation to connect. The reinforcements are scheduled to be completed by 31st October 2024. It should be noted that this is a snapshot and changes to demand, generation and infrastructure can all change the constraints identified.

Solar Arrays

Description of technology

5.30 In addition to PV modules associated with built development, there are a large number of solar PV arrays or solar farms within in the UK. Free-standing solar PV arrays consist of panels that are usually mounted around 0.7m-3m above ground level allowing the growth of vegetation beneath and between the arrays and the associated grazing of stock. Panels are arranged in groups or 'arrays' of around 20 panels. The panels are encased in an aluminium frame, supported by aluminium or steel stands, and positioned at a fixed angle between 20-40 degrees from the horizontal, generally south facing. These arrays usually take the form of a linear rack of panels. These arrays or linear racks are usually sited in parallel rows with gaps between the rows for access and to prevent shading of adjacent rows. They therefore do not cover a whole field.

5.31 A 5 MW development would typically require a site of approximately 10-15 hectares, but there are proposals in England for schemes of up to 350 MW (Cleve Hill in Kent). The output of a typical panel used would be approximately 200 watts, so a 1 MW solar farm would require 250 racks containing 20 panels in each rack. Like wind turbine schemes, solar PV developments are usually given planning permission for 25 years.

Current solar energy development in East Hampshire

5.32 As outlined in **Chapter 4**, there are currently four solar PV arrays operational in East Hampshire, As the area suitable for solar development in East Hampshire is significantly constrained by the South Downs National Park (SDNP) most of the solar development is to the north and south of the SDNP boundary. The largest development is at Wilsom Farm near Alton in the north of the boundary area. The existing schemes have a combined installed capacity of 27.4 MW.

Assumptions used to calculate technical potential

5.33 The assessment of technical potential for solar arrays was undertaken using GIS (Geographical Information Systems) involving spatial mapping of the key constraints and opportunities. The assessment identified the areas with potential suitable solar insolation and then a series of constraints relating to physical features and environmental/heritage protection was removed.

5.34 The key constraints and opportunities considered are set out in **Table 5.5**. A discussion of solar in relation to micro generation is set out later in this chapter.

Table 5.5: Solar Energy Assumptions

Parameter	Assumption	Data source	Justification and Notes
Opportunities			
Solar output	• Average annual generation of 935 kWh/kWp for a south facing 30-degree system in East Hampshire.	Helioscope modelling.	All areas within East Hampshire boundary considered theoretically suitable for solar development. South facing slopes free of constraint are the most optimal locations.
Solar farm size	• Minimum solar farm size of 0.5 MW and a maximum solar farm size of 350 MW.	Proposed 350 MW Cleve Hill solar farm would be the largest in the UK.	
Solar density	• Assumes a density of approximately 9MW/km^2 (approximately 0.56km^2 per 5 MW scheme).	Solar Trade Association.	The density calculation will not take into account the site shape and minimum site size.
Exclusions			
Physical, Land Use and Infrastructure	• Roads • Railways • Major overhead transmission lines • Public Rights of Way and Bridleways • Rivers and waterbodies • Airfields and airports, should be taken into consideration, due to potential for glare, but no buffer applied due to site specific nature of this consideration unless NATS layer indicates it is	• Roads: OS VectorMap District. • Note: single and dual carriageways extracted and separated out from main dataset. In order to create a footprint from the road centrelines data, it was assumed that single carriageways were 10m in width and dual carriageways were 20m in width. • Railways: OS	• Physical features taken into account which prevent the development of solar PV. No requirement for safety buffers. • Operation mineral sites buffered to account for dust emissions which will affect the generation output. Research has shown that 98% of airborne dust settles within 250m of the emission source. • Agricultural Land Use a consideration, preserving

Parameter	Assumption	Data source	Justification and Notes
	an exclusion zone. (None within East Hampshire) • MOD training areas (not shown on mapping but taken into consideration when determining opportunity areas for solar) • Operational Minerals Sites with 250m buffer • Agricultural land use classifications grades 1, 2. [Ground Mounted Solar PV projects, over 50kWp, should ideally utilise previously developed land, brownfield land, contaminated land, industrial land or agricultural land preferably of classification 3b, 4, and 5]	VectorMap District • Note: In order to create a footprint from the railway centrelines data, it was assumed that railways were 15m in width. • Other Datasets: National Grid, East Hampshire District Council, NATS, MOD, Natural England.	grade 1 and 2 land for such uses as food production. Further investigation will be required on grade 3 land (as shown on **Figure 5.17**) to determine suitability for a proposed development.
Natural environment	• Special Areas of Conservation • Special Protection Areas • Ramsar (None with East Hampshire boundary) • Sites of Special Scientific Interest • National Nature Reserves • Sites of Importance for Nature Conservation • Local Nature Reserves • Ancient woodland • Other woodland areas	• Natural England, Defra Spatial data layers, East Hampshire District Council, Forestry commission,	As protected by: Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora, commonly known as the Habitats Directive. Directive 2009/147/EC of the European Parliament and of the Council on the conservation of wild birds, commonly known as the Birds Directive. Conservation of Habitats and Species Regulations 2010 (as amended). Wildlife and Countryside Act 1981. Conservation of Habitats and Species Regulations 2010 (as amended). National Planning Policy Framework. Natural Environment and Rural Communities Act 2006.
Historic environment	• Scheduled monuments • World heritage sites *(None with the East Hampshire boundary)* • Registered battlefields *(None with East Hampshire boundary)* • Registered parks and gardens • Listed buildings • Conservation Areas • Archaeological Interest Sites • Archaeological Alert Sites	• Historic England, East Hampshire District Council	• National Planning Policy Framework. • The Convention Concerning the Protection of the World Cultural and Natural Heritage. • National Heritage Act 1983. • Ancient Monuments and Archaeological Areas Act of 1979. • Planning (Listed Buildings and Conservation Areas) Act 1990. *Note: A 5m buffer has been applied to Listed Buildings, providing a footprint to a point*

Parameter	Assumption	Data source	Justification and Notes
			dataset. This is not intended to identify a 'setting' zone.
Terrain	• Slope and aspect – exclude areas with north-east to north-west aspect and inclinations greater than 3 degrees, exclude all areas greater than 15 degrees	• Ordnance Survey Terrain 50	• Although possible to develop Solar PV installations on slopes facing north-east to north-west it would be uneconomically viable. However, those slopes that are north facing and below 3° are considered, as generation output will not be significantly affected.
Built up environment areas	• Settlements	• Office of National Statistics • East Hampshire District Council	• 20m exclusion zone around settlements applied to account for shading effect of buildings • Sites allocated for development with planning permission granted considered as an exclusion

Solar Resource

5.35 Levels of solar irradiance vary gradually across England with sunny southern regions favoured, but the difference across East Hampshire is small. The aspect, orientation and slope of the land, as well as shading, can have a greater influence on overall energy production. While it is important for developers to take account of the available solar resource, it is not a critical issue in deciding where solar farms may be appropriate within the District.

'Hard' Constraints

5.36 Solar farms have been built alongside airports, motorways, railway lines, and roads, and within woodland clearings and on standing water bodies, such as lakes. As such, very few truly hard constraints exist for solar. Exclusion buffers around nearby infrastructure are therefore of very little value. Hard constraints are limited to existing developed areas as demolition costs are likely to render a scheme financially unviable. Developers will also normally avoid encroaching on to public rights of way due to the risks and delays involved in applying to divert or extinguish them.

5.37 There are only two small aerodromes within East Hampshire, Lasham & Colemore Common. Outside of the District Council boundary there is another small aerodrome approximately 1.5km to the south east outside the District as well as a larger RAF aerodrome, Odiham, approximately 3.5km to the north outside the District, which may be impacted by glare from a solar farm.

Best and Most Versatile Land

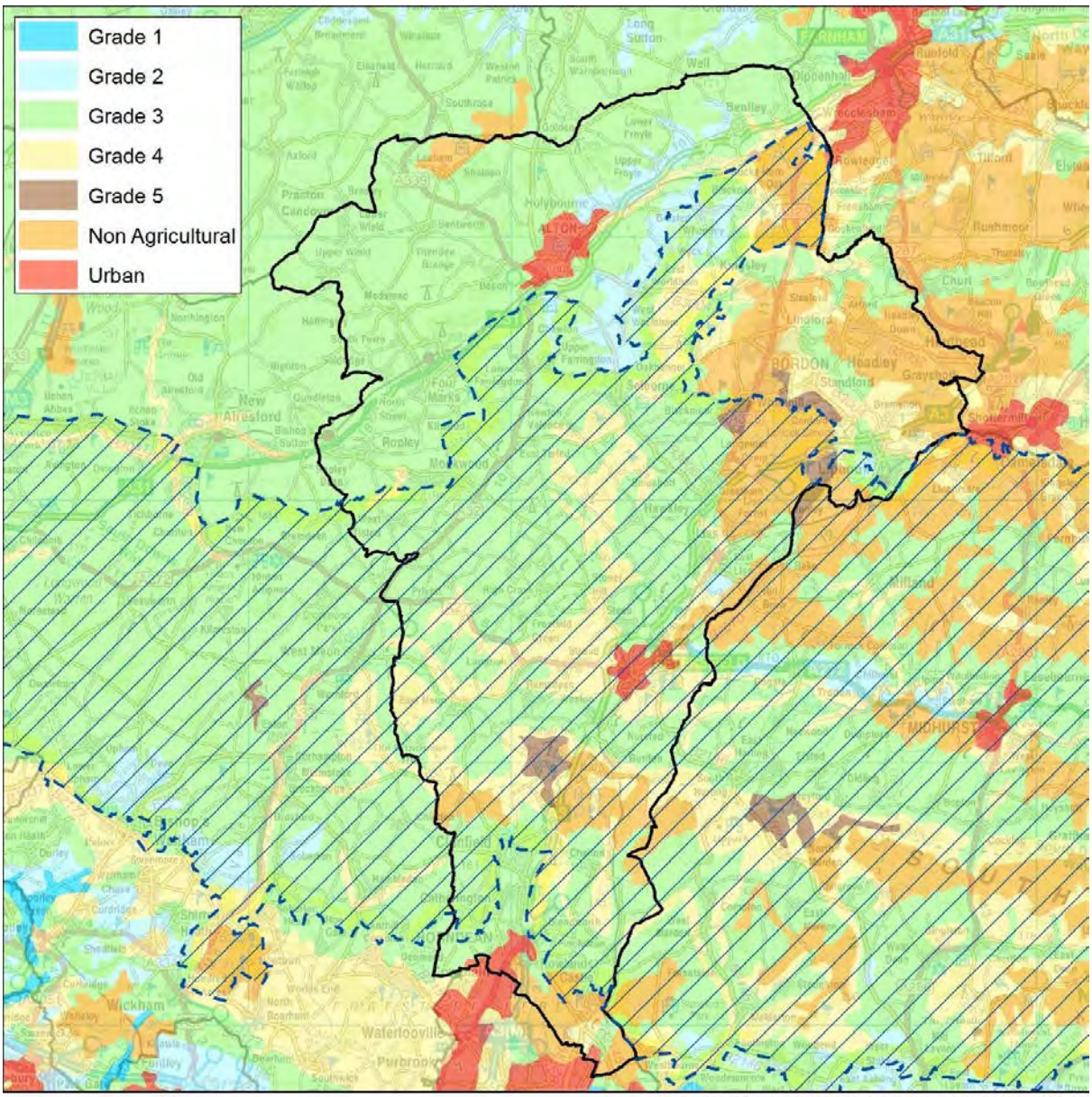
5.38 The draft NPPF states that "*Where significant development of agricultural land is demonstrated to be necessary, areas of poorer quality land should be preferred to those of a higher quality",* which is defined as land in grades 1, 2 and 3a of the Agricultural Land Classification.

5.39 The Written Ministerial Statement Solar energy: protecting the local and global environment (HCWS488) states that any proposal for a solar farm involving the best and most versatile agricultural land would need to be justified by the most compelling evidence.

5.40 The DEFRA agricultural land classification data, which only provides a broad indication of the land classification, indicates that East Hampshire is comprised primarily of grade 3 land, with some small areas of higher quality grade 2 (**Figure 5.1**). The national classification map does not normally differentiate between 3a and 3b land, but the difference is important since the latter is not "*best and most versatile*". Therefore, without an on site-specific Agricultural Land Classification (ALC) it is not possible to conclude with any certainty the extent to which best and

most versatile land is a constraint. For the purposes of this assessment, it is assumed that Grade 3 land does not present a constraint to solar farm development, subject to a site-specific ALC survey being carried out.

Figure 5.1: Agricultural land classification in East Hampshire (DEFRA)



Results

Technical Potential

5.41 **Table 5.6** below provides a summary of the technical potential for electricity generation from large scale solar PV arrays within the District.

Table 5.6: Summary of Technical Potential for Large Scale Solar PV Arrays

Resource	(MW)	(GWh)
Total - electricity	**2,064**	**18,083**

5.42 The assessment estimates that there is a technical potential of around 2,064 MW of electricity that could be generated from large scale PV arrays within the District. This is clearly a significant resource and a considerable overestimate of what could actually be delivered within the District. A summary of the areas that are unconstrained for solar developments is shown in **Figure 5.19.**

Issues affecting deployment

Subsides

5.43 The main issues affecting the deployment of solar energy schemes are linked to the significant reduction in financial incentives in recent years, most notably the closure of the Renewables Obligation to >5 MW solar PV schemes in March 2015, followed by <5 MW solar PV schemes in March 2016 and all solar schemes in March 2017. The Renewables Obligation was designed to encourage generation of electricity from eligible renewable sources in the UK. The Renewables Obligation has since been replaced by the more competitive Contracts for Difference scheme. Solar schemes are eligible for the scheme. In addition to the closure of the Renewables Obligation, the Government's Feed-in Tariff scheme designed to encourage uptake of a range of small-scale renewable and low-carbon electricity generation technologies has been cut a number of times. 50 kW solar PV schemes were made not eligible for the scheme in August 2011. Further cuts to solar PV tariff rates were made in 2011, 2012 and 2015 and 2016. On 19 July 2018 the Department of Business Energy and Industrial Strategy (BEIS) published a consultation in which they stated their intention to close the FIT scheme to new applicants from 1st April 2019, barring several exceptions.

5.44 The cost of solar has however fallen dramatically in recent years. On 26 September 2017, Clayhill solar farm, located in Milton Keynes, was officially opened which is the first subsidy free solar farm in England. It includes 10 MW of solar PV co-located with 5 energy storage units totalling 6 MW. Several other solar farm developers are also actively progressing with sites. The number of solar array applications has however decreased significantly since the loss of subsides and it remains to be seen the extent to which developers will pursue subsidy free schemes.

Grid Connection

5.45 Another significant barrier to the development of renewable and low carbon energy schemes within the UK includes grid connection constraints and a lack of grid capacity. Despite significant ongoing investment in the National Grid, the country's private sector Distribution Network Operators (DNOs), which carry electricity from main grid to commercial and domestic users, continue to be slow in permitting and facilitating new grid connections, connections which often come at significant cost to the new energy generators, including costs for any necessary network reinforcements.

Hydro

Description of technology

5.46 Hydropower generates electricity from the kinetic energy stored within flowing and falling water. Given the geography of East Hampshire, only run-of-river hydropower is likely to be practical. In run-of-river schemes, the water is taken directly from the river, passed through a turbine which generates renewable electricity and returned to the watercourse. Other types of hydropower plant, such as impoundment dams and pumped systems, are more common in mountainous regions where water falls from greater heights.

5.47 Run-of-river systems are designed to ensure that the river maintains its normal flow above minimum levels; protecting the river's ecological functions. Run-of-river hydro schemes do not impound the river so are unlikely to have any role in flood management. The key elements of a scheme are a water source with sufficient flow and head, an inlet pipeline (penstock) to direct water, turbine generating equipment and housing, a tailrace to return water to the watercourse, and electricity transmission equipment.

5.48 Run-of-river hydro schemes normally have a limited visual impact on the landscape because only the powerhouse, intake and possibly the penstock are visible. Both the turbine house and intake are relatively small structures and can be designed sympathetically with the local environment. In addition, new infrastructure can often be constructed around existing river infrastructure such as weirs and locks.

Current hydro development in East Hampshire

5.49 The main tributaries within the East Hampshire District Council area are the River Wey, Meon and Rother, providing opportunities for small-scale run of river turbines.

5.50 There are currently no operational hydro schemes in East Hampshire and there are no known schemes in development.

Assumptions used to calculate technical potential

5.51 The Environment Agency published maps in 2009 showing where there might be opportunities for small-scale hydropower across the UK, considering both generating capacity and potential environmental sensitivity based upon modelled fish population data and Special Areas of Conservation (SAC)[17]. While the maps are indicative only, they provide an initial assessment of the hydro resource as well as the constraints and opportunities. Opportunities are typically where existing barriers along the watercourse, such as weirs and locks, could be refurbished to include a hydro turbine. This would limit any additional impact on the surroundings or the river's ecology.

Results

Technical potential

5.52 **Figure 5.20** identifies the potential hydropower sites in the South East Region. Those estimated to have the greatest potential generating capacity are located along the River Wey. There are a number of small (0-10 kW) potential sites across central and northern East Hampshire.

5.53 **Figure 5.22** highlights potential "win-win" sites where hydropower could potentially be generated. These are sites which present an opportunity for medium to high power potential on heavily modified water bodies; sections of a river where natural conditions have been significantly altered. These are typically installations alongside weirs and locks which often create an opportunity to improve fish passage that can reconnect upstream ecosystems.

5.54 An assessment has been undertaken of the potential generating capacity and output from the development of all sites in **Table 5.7**. Given the information available, the estimate provides a broad range of generating capacity and outputs using industry standard capacity factor assumptions. Most mini-hydro power schemes are sized so that they operate at between 40% and 60% of their installed maximum capacity to reduce the strain on a turbine[18].

Table 5.7: Potential generation from run-of-river hydropower in East Hampshire

Category (kW)	No. of sites	Generating capacity (kW)	
		Min	Max
1 – 10	19	19	190
10 – 20	11	110	220
20 - 50	4	80	200
Total (kW)		**209**	**610**
Estimated capacity factor		40%	60%
Annual Energy Output (GWh)		**0.7**	**3.2**

[17] Mapping Hydropower Opportunities in England and Wales. Environment Agency. 2009. See also Mapping Hydropower Opportunities and Sensitivities in England and Wales, Technical Report, Final Report, February 2010.
[18] http://www.british-hydro.org/wp-content/uploads/2018/03/A-Guide-to-UK-mini-hydro-development-v3.pdf

5.55 It is estimated that the potential annual energy output of the potential hydropower sites in East Hampshire falls between 2.3 and 12.2 GWh. East Hampshire's total annual electrical energy consumption in 2016 was 691 GWh. Hydropower could therefore meet between 0.3-1.8% of local demand if all the sites were developed.

Issues affecting deployment

Subsidies

5.56 The financial viability of small scale hydro schemes has fallen with the progressive reduction in financial incentives available through the Government's Feed-in Tariff scheme, which was designed to encourage uptake of a range of small-scale renewable and low-carbon electricity generation technologies. On 19 July 2018 the Department of Business Energy and Industrial Strategy (BEIS) published a consultation in which they stated their intention to close the FIT scheme to new applicants from 1 April 2019.

Ecological Constraints

5.57 Ecological constraints and environmental sensitivity are critical considerations in the location of hydropower schemes. **Figure 5.21** indicates that most of the potential sites in East Hampshire are considered to have medium or high environmental sensitivity, including all the larger opportunities along the North Wey and the South Wey. Few are considered to be of low sensitivity.

Renewable and Low Carbon Heat

Description of technology

5.58 Renewable and low carbon heat can be generated by a range of technologies including biomass boilers, heat pumps, solar thermal and gas-fired combined heat and power (CHP). These can serve single homes or businesses through to communal heating systems providing heat to whole neighbourhoods with district heating.

5.59 District heating is the distribution of heat from a central energy centre which contains the heating system through a network of insulated pipes to homes and businesses. The large size of the heating system means that the plant can be more efficient. District heat networks can also make use of the waste heat from industrial processes or thermal power stations and can be used to provide space heating, hot water and heat for use in industrial processes.

Current renewable and low carbon heat in East Hampshire

5.60 Renewable heating is most attractive to households without a connection to the gas network due to the higher costs of electric and oil heating. In East Hampshire an estimated 84% of households are thought to be connected to the gas grid with areas with most off gas-grid homes found in a band between Ropley and Petersfield inside the South Downs National Park (**Figure 5.23**). Renewable Heat Installation (RHI) statistics indicate that there has been a good uptake of renewable heating across the whole of East Hampshire with 168 residential installations (13% of total residential installations) and nearly 7 MW of non-domestic capacity (13% of total non-domestic capacity). It should be noted that wood burning stoves and similar biomass secondary heating systems are not covered by RHI statistics.

5.61 Permitted development rights allow many building with integrated renewable and low carbon heating technologies to be installed without planning permission. It can therefore be expected that homeowners and businesses will continue to install renewable heating systems in existing buildings where it makes sense for them and opportunities arise. The Council can take a more active role in supporting renewable heat in new build homes.

Technical potential for low carbon heat in East Hampshire

5.62 The 2015 Heat Masterplan for East Hampshire (2015) stated that the energy demand in East Hampshire is primarily associated with small towns and villages with few areas of high heat density in the District. Anchor heat demands found in some of the larger towns are co-located in places with a number of Council owned assets, such as in Alton. The Heat Masterplan Report identifies three priority heat network development opportunities in the District:

- Council's office at Penns Place Petersfield - to the adjacent Taro Leisure Centre. Total heat demand for this network is estimated to be 2.7 million kWh_{th}.
- Whitehill & Bordon growth town - connecting municipal buildings and potentially the supermarket and leisure facilities. Total heat demand for this network is estimated to be 37 million kWh_{th}.
- Alton - linking together Alton leisure centre, community hospital and proposed Treloar residential development. Total heat demand for this network is estimated to be 3 million kWh_{th}.

5.63 The subsequent Heat techno-economic feasibility studies report (2016) provides more details of the opportunities presented by the three priority heat networks in East Hampshire. Biomass heating and gas CHP are identified as the most commercially viable options. All three projects were found to have modelled Internal Rates of Return of between 11% and 15% which is favourable when compared to the Council's benchmark of 7%. The primary risks to development identified were future grid electricity prices and the availability and tariff of the Renewable Heat Incentive. The three projects offered a significant opportunity to develop the wood fuel market in the District and to reduce carbon emissions.

5.64 Since these initial studies were undertaken the Council has looked to progress all three heating project Proposals for a gas-CHP fuelled district heating network serving the Whitehill and Bordon town centre which was granted planning permission in July 2018.The other opportunities are not being taken forward at present.

5.65 Reducing emissions from heating is the primary driver for new district heating schemes. However, as the electricity supply continues to decarbonise, the gap between the carbon intensity of electric heating and gas heating is closing. If current trends continue, the case for gas-fired CHP district heating becomes weaker and, in some contexts, individual electric heating systems will become increasingly preferable. The business case for investing in new networks must therefore take this into account. In the medium term, opportunities for using district heating based on lower carbon biomass CHP, large communal heat pumps or low carbon waste heat are likely to become of greater interest.

Energy from Waste

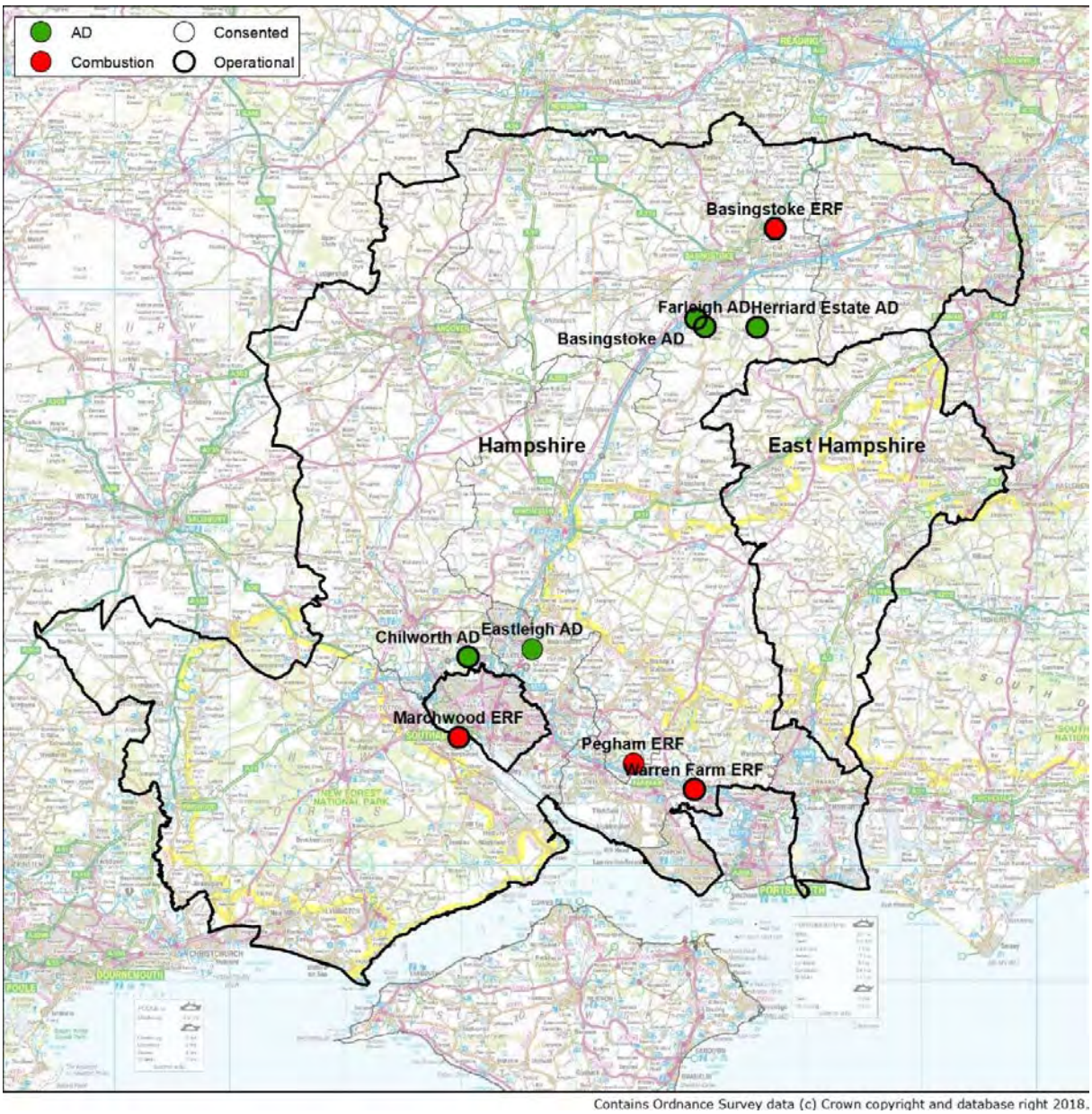
Description of technology

5.66 Our historic reliance on landfill to manage our waste is being replaced with a suite of more environmentally-friendly options. Today, waste management policy is guided by the waste hierarchy, which sets the order of preference, starting with waste prevention, reuse and recycling. What can't be recycled (the residual waste) could either go to energy recovery or as a last resort, landfill. Recovering energy from waste is prioritised over sending it to landfill because efficient conversion technologies can produce usable energy that, with the right waste, is a low carbon energy source.

Current energy from waste development in East Hampshire

5.67 The waste authority for East Hampshire is Hampshire County Council. East Hampshire District Council works with all Hampshire councils to coordinate waste management infrastructure across the County and the surrounding area through the Joint Municipal Waste Management Strategy. In 2013 the Hampshire Minerals and Waste Plan was submitted setting out the existing waste infrastructure and projections for increases in waste management capacity in future.

Figure 5.2: Operational and consented energy recovery sites in Hampshire



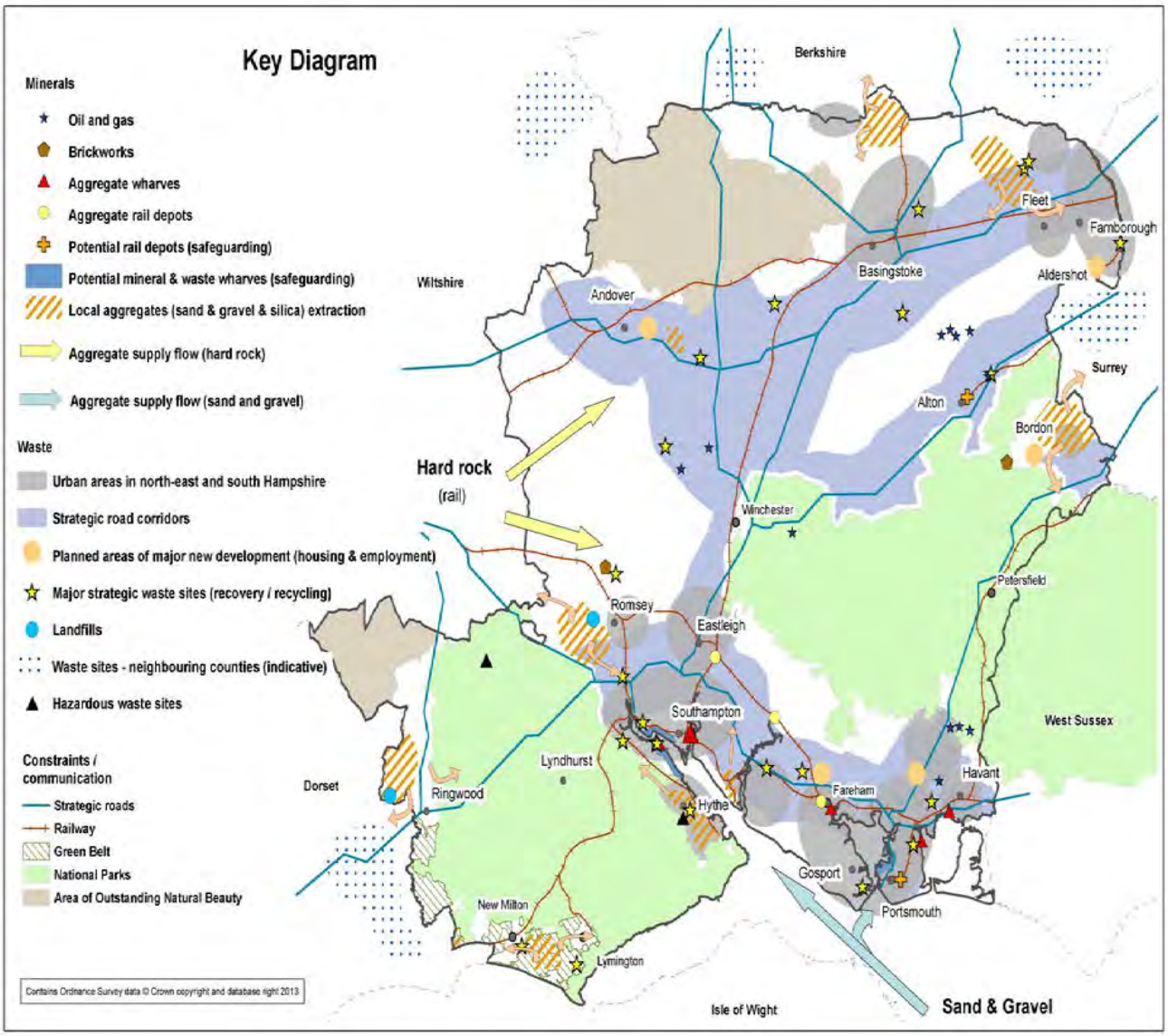
5.68 There is currently at least 45.5MW of operational or consented energy from waste (EfW) capacity in Hampshire which is set out in **Figure 5.2** based on Ricardo's FALCON waste tool data. There are no operating plants in East Hampshire but planning permission was granted in 2013 for a 1.2MW anaerobic digestion (AD) plant at Selbourne brickworks but was not commissioned. Marchwood ERF is the largest energy from waste scheme in the area with 17.5MW of capacity and is designed to take residual solid waste from over 22,000 Hampshire homes. As a result of these recent investments, Hampshire sends little untreated municipal waste to landfill.

Results

Technical potential

5.69 The Hampshire Minerals and Waste Plan states that while there is support for energy from waste, new facilities would be required and suitable sites may not be available. Consideration should be given to environmental impacts such as noise, dust and increased traffic movements. The Minerals and Waste Plan refrains from specifying specific development sites stating that this should be led by market forces. **Figure 5.3** however, does identify the major strategic waste sites, some of which may be suitable. Anaerobic digestion has been highlighted as a core focus for the Hampshire Authorities, specifically, to produce biogas for CHP and/or refined to produce biomethane for direct injection into the national gas network, or for use in transport fuels.

Figure 5.3: Strategic waste infrastructure from the Hampshire Minerals and Waste Plan – October 2013(Adopted) [19]



5.70 It is possible that new EfW proposals could come forward in East Hampshire to meet the need for additional waste capacity in line with waste policy in future. Policy 28 in the Minerals and Waste Plan provides high-level criteria for assessing the suitability of new energy recovery developments, namely:

- be used to divert waste from landfill and where other waste treatment options further up the waste hierarchy have been discounted; and
- wherever practicable, provide combined heat and power. As a minimum requirement the scheme should recover energy through electricity production and the plant should be designed to have the capability to deliver heat in the future; and
- provide sustainable management arrangements for waste treatment residues arising from the facility.

Issues affecting deployment

5.71 Energy from waste for East Hampshire should be viewed as part of the broader strategic waste management work that encompasses Hampshire County Council, Southampton, and Portsmouth. Specifically, Project Integra[20] was developed to tackle waste to landfill, promote recycling, AD and energy recovery. From this project three energy recovery facilities were developed in Hampshire: Integra South East at Portsmouth, Integra South West at Marchwood near Southampton and Integra North near Basingstoke. Integra South East can process 165,000 tonnes of waste per year which at any time can generate up to 14MW of electricity. Further development within East Hampshire should be evaluated within this regional network of energy recovery facilities to ensure adequate feedstocks are available.

Biomass

Description of technology

5.72 Biomass fuels can be used in heating and electricity generation. Heating is the most appropriate use for biomass in East Hampshire, using local woodland resources to meet all or part of a buildings heat demand. There are a number of boilers available on the market that are suitable to meet the heat demand of housing and small-scale community buildings (such as schools, sports centres, etc.)[21]. These boilers have a good commercial record within the UK. The fuels that they are able to take include logs, chips and wood pellets.

5.73 There has been some concern about emissions from domestic stoves and new requirements have been outlined in the Ecodesign Directive to address this issue[22]. By 2022, all wood burning stoves must adhere to these requirements. Boiler manufacturers will provide a specification for the fuel for their boiler and woodfuel suppliers are able to meet these standards with the fuel they supply.

[20] https://www.veolia.co.uk/hampshire/sites/g/files/dvc1796/files/document/2014/10/Portsmouth.pdf
[21] See http://www.yougen.co.uk/renewable-energy/Biomass+Boilers/ for a guide on biomass boilers
[22] See, for example: http://www.stoveindustryalliance.com/ecodesign-ready-stoves-and-air-quality/

Woodlands and forestry in East Hampshire

5.74 The majority of woodlands in East Hampshire are in private ownership and although some are neglected they are a valuable resource for wildlife, timber, wood fuel and access. Bringing woodland into active management could provide woodfuel, grow the rural economy, as well as providing a richer and more varied habitat for wildlife. Local woodlands could be used as an alternative source of wood fuel if there was sufficient demand and bringing them into active management could be shown to be economically viable.

5.75 There are 11,000 hectares of woodland in East Hampshire (inclusive of the South Downs National Park) covering 21% of the land area. 2,100 hectares are owned by the Forestry Commission, with the remaining 8,900 hectares in mostly private ownership. Ancient woodland accounts for 40% of woodland cover in the District and is important for nature conservation and rare species. The future management of this irreplaceable resource is uncertain[23].

5.76 Thinning, harvesting and coppicing trees can open the woodland floor to sunlight, which creates a richer habitat where a wider range of plants, animals and insects can flourish. Woodfuel production can be an important part of sustainable woodland management, while creating new revenue streams. The Forestry Commission's woodfuel strategy supports this, saying that 'the potential for woodfuel to underpin a new market for products from our woodland presents a unique opportunity for the UK to restore healthy woodland ecosystems based upon sustainable management'[24].

5.77 Biomass for wood fuel is highlighted throughout the pre-submission South Downs Local Plan as an opportunity for the area to meet the challenges of climate change and the resulting market forces. The Low Carbon and Renewable Energy Study[25] for the South Downs states that biomass has the potential to deliver over 210,000 MWh of heating, but that careful consideration and planning is required to safeguard the 'special character' of the National Park. Two of the landscape character types within East Hampshire's Landscape Character Assessment (2006) - 'Mixed Farmland and Woodland Vale' and 'Clay Plateau' (see **Figure 6.1**) indicate that improved management of woodlands for wood fuel development would have a positive impact on the area.

5.78 While woodlands are found across the whole District, the most extensive areas of woodland are within the north east and throughout the South Downs National Park. **Figure 5.24** shows the forested areas within the East Hampshire District Council area.

Wood fuels for bioenergy

5.79 The main local market for woodfuel is small scale wood use for heat. This splits into two subsets: domestic firewood use that is not eligible for the Renewable Heat Incentive (RHI), and small-scale woodfuel use that is eligible for the RHI. The domestic market is generally for seasoned logs and briquettes and the wood is referred to as **firewood**. In this case the firewood supplies some of the heat use in a domestic setting using stoves, open fires or range cookers, usually in locations away from the gas grid.

5.80 The RHI small scale market is more relevant to the use of boilers where heat is supplied to meet a significant proportion of the heat demand in a building or cluster of buildings. The fuel used may include seasoned logs but also wood pellets and wood chips. This wood is purposely produced for a **woodfuel** market and as outlined above, woodfuel use for the RHI must meet Government sustainability requirements. For small scale schemes this woodfuel is commonly sourced through the Biomass Suppliers List (BSL) mentioned above. Self-supply in farms and estates is also possible. Biomass is currently used for renewable heat in East Hampshire with eight suppliers registered on the Biomass Suppliers List (**Figure 5.24**). Five are located within the South Downs National Park, with the remaining three located close by. Over 40 other suppliers are within driving distance in surrounding districts at Winchester, Farnham and Havant amongst others.

[23] East Hampshire District Council (2013) Green Infrastructure Strategy 2011 - 2028

[24] From a Wildlife and Countryside Link statement supporting the Forestry Commissions Woodfuel Strategy

[25] AECOM (2013) South Downs National Park Renewable and Low Carbon Energy Study

Assumptions used to calculate technical potential

5.81 To estimate the potential wood fuel available from the woodland in East Hampshire the Forestry Commission standard estimates for wood fuel have been used. The assumptions are set out in **Table 5.8**.

Table 5.8: Biomass Wood fuel Assumptions

Parameter	Assumption
Estimate of Residues	• The Forestry Commission provides an estimate for the residues that are available for woodfuel in woodland. The residues are small roundwood that has no other market, thinnings and branches etc that have no other market. • It estimates that around 25% of the potential resource can be extracted from forest economically and practically. Typically, this equates to some 0.4 oven dried tonnes (odt)/ha for broad wood forests and 1.5 odt/ha for coniferous woodland. • The term 'oven dried wood' refers to wood with no water in it. Wood can have a moisture content between 40 and 60% at harvest, and around 30% after seasoning, so the actual tonnages of wood that would need to be transported would be higher (by at least 30%). In reality, wood fuel production depends on many factors, including forest ownership, terrain, management methods, equipment available, distance to woodfuel markets and competing uses for the wood, so the calculations provide an estimate only, not an accurate assessment.
Woodfuel	• The wood available for the woodfuel estimate above would come from the branches of trees, thinning of woodland, clearance of invasive species of no timber value and small round wood (<5cm) of little value in other timber markets.
Woodfuel Mix	• The woodland harvested would be 70% broadleaf and 30% coniferous.
Conversion factor	• 1 kg of dry wood fuel provides 5.2kWh of heat.
Average heat demand	• Average heat demand per house is: 4000kWh for new build and 12000kWh for existing houses[26].

Results

Technical Potential

5.82 The results are presented in **Table 5.9,** which shows that there is a considerable resource in the District that could be exploited in off gas grid areas for housing, or could be used in local council buildings, schools, village halls etc. **Table 5.9** shows the number of houses that could be heated using the heat demand assumptions set out in **Table 5.8.**

Table 5.9: Technical potential for the wood fuel resource in East Hampshire

Year	2018
Resource (oven dried tonnes per year, odt/y)	5,611
Number of **new houses** that could use this resource for all heat requirements	7,294
Number of **existing houses** that could use this resource for all heat requirements	2,431

[26] https://www.ofgem.gov.uk/gas/retail-market/monitoring-data-and-statistics/typical-domestic-consumption-values

Issues affecting deployment

5.83 There is potential to grow the wood fuel supply chain locally. Bringing more woodland into management can help create a sustainable woodfuel supply while also conservation goals. The major issue affecting deployment is the lack of mature woodfuel supply chains in the District that connect the management of woodland areas with woodfuel suppliers. However, there are regional woodfuel suppliers and these would be valuable in helping the development of the local woodfuel supply chain. As indicated in the Biomass Suppliers List (BSL) (**Figure 5.24**) there are a number of woodfuel suppliers in the area around East Hampshire. There is also potentially a good supply of woodfuel in East Hampshire and the estimates outlined in **Table 5.9** could be conservative, as there is potential for some of the local timber resource to be exploited as well, providing this does not compete with other timber markets.

Microgeneration technologies

Description of technology

5.84 Microgeneration is a term that is used to describe kW scale technology which as a result is usually deployed at the domestic level.

5.85 Solar thermal to produce domestic hot water was popular in the period before the introduction of the Feed-in Tariff, but this subsidy made it more attractive to use roof space for electricity generation. Now that the Feed-in-Tariff is being withdrawn, solar thermal is likely to make a comeback and Solar PV installations are on the decline. There are two kinds of solar thermal technology, one is a simple flat plate design, where a small volume of water/antifreeze mix is circulated over a black surface, contained by a glass plate. The second design uses evacuated glass tubes to increase the efficiency of thermal transmission to the circulating water. Both designs are closed systems and the heat is transferred to the domestic heating system but via either a second hot water tank or a specially designed hot water store. This requires the installation of additional pumps and controls. All of the estimations of solar PV potential apply to solar thermal in terms of the locations of the installations, whereas the efficiency of heat collection is largely down to the system design and the size of the demand being met as it is not possible to 'overspill' excess energy generation meaning that this energy is lost.

5.86 Micro hydro can be achieved using Archimedes screw type technology. This lends itself to low head systems where the volume of water flow is sufficient to support energy generation. The 'open' nature of these systems also present fewer issues when it comes to impact on fish, etc. but these considerations must be undertaken with the same rigour as for larger systems. In reality, the relatively low income from the smaller generation makes the cost of development more critical and limits the opportunities to apply this technology.

5.87 Building mounted wind was a technology that was promoted in the past, but less so now. This is because there are a number of issues with this technology. The first is that the wind speed at roof height in most domestic locations is too low and is well below the speed at which more efficient larger scale systems are considered to be economically viable. Another issue is that noise and vibration is transferred from the building mounted turbine into the building structure. As a result, micro wind is now almost exclusively confined to remote battery charging applications.

5.88 It is also worth noting that micro gas CHP was also under consideration at one point with British Gas briefly offering a domestic 'CHP Boiler'. This was based on a Sterling engine in which a gas is expanded by the heat of the boiler and this is used to drive a microgeneration. The issue with all Stirling engines is the need to contain a gas at high pressure in a system that rapidly heats and cools without leaks forming. For this reason, this technology has not advanced.

Current microgeneration development in East Hampshire

Small renewable electricity generators

5.89 The Feed-in Tariff (FIT) offers a premium payment per unit of electricity generated from renewable energy technologies. It is the principal financial mechanism supporting smaller renewable energy generators such as roof top solar PV. Since the incentive was introduced in April 2010 it has led to significant growth in small and medium scale renewable energy with 6 GW of capacity across more than 820,000 installations as of May 2018. The majority of these are rooftop solar PV arrays as well as around 7,500 wind installations and smaller volumes of AD, hydro and micro CHP.

5.90 Ofgem's recent quarterly Feed-in Tariff Installation Report (data to end June 2018) provides information about the installations in East Hampshire (including the South Downs National Park):

- There are 872 domestic solar PV installations, most of which are small arrays below 4 W that have been retrofitted to existing homes. They have a total generating capacity of 2.6MW and are located across the whole of East Hampshire, in both rural and urban areas.
- There are 19 non-domestic solar PV installations, which tend to be larger with a total capacity of 1.97MW. The majority of this capacity is associated with a large 1.1MW rooftop array at Whitman Laboratories in Petersfield (within the South Downs National Park).
- There is no hydro or micro-CHP in receipt of the FIT in East Hampshire.

Renewable heat installations

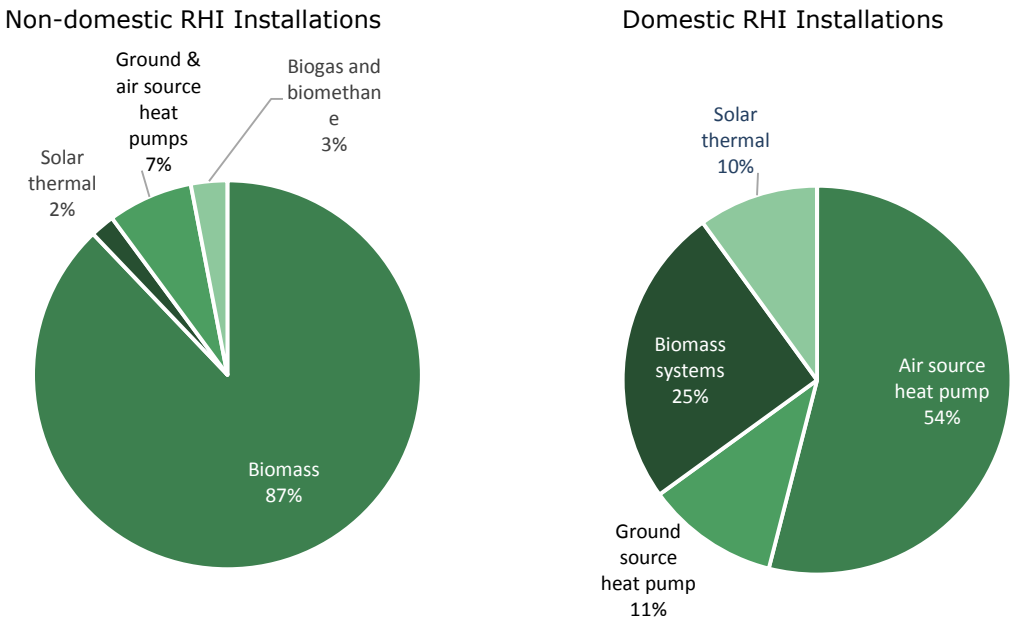
5.91 The Renewable Heat Incentive (RHI) is similar to the Feed in Tariff as it offers a payment per unit of heat generated in order to encourage both domestic and non-domestic switching to renewable heating. A range of technologies including solid biomass, biogas, solar thermal and heat pumps are eligible.

5.92 The RHI schemes are periodically revised to enhance installation standards and monitoring and adjust tariff rates. Recent changes to the non-domestic scheme addressed shortcomings which rewarded inefficient use of energy, particularly in drying agricultural products and wood fuel. The domestic scheme has been revised and has improved standards of heat pumps installations.

5.93 BEIS's monthly statistics for the RHI from July 2018 provides information on the uptake in East Hampshire. 168 domestic renewable heating installations have been installed since April 2014, which is 13% of all domestic RHI installations in Hampshire. A further 29 non-domestic systems are operating with a combined installed capacity of 6.9MW, which is 12% of all non-domestic installations in Hampshire.

5.94 While more detailed information about the technology and size of these installations is not available at local authority level, national data indicates that nearly 90% of non-domestic installations are biomass boilers (primarily with a capacity <200 kW_{th}) and over half of domestic systems are air source heat pumps, with ground source heat pumps, biomass boilers and solar thermal panels also present in significant proportions (**Figure 5.4**).

Figure 5.4: Renewable heat installations by technology type. National data from BEIS's monthly RHI statistics



Technical Potential

5.95 The technical potential for micro renewables is only limited by the number of existing buildings within the District as most dwellings will be suitable for some sort of microgeneration technology. The limiting issue is therefore primarily the cost of installation. Based on previous uptake within the District, the greatest potential for micro-generation installations will be for solar and heat projects.

Solar

5.96 There are 38,725 buildings on the Ordnance Survey data layer within East Hampshire. A number of these have been excluded from consideration as they are located within a Conservation Area, or because they are north facing and therefore less suitable for solar installations.

Table 5.10: Number of potential buildings suitable for solar development

Total Number of Buildings	Buildings within Conservation Areas	Buildings facing North	Buildings facing South West, South and South East
38,725	2,608	11,154	24, 963

5.97 The total technical potential for solar, assuming 100% of the buildings identified in **Table 5.10** are suitable for development is set out in **Table 5.11.**

Table 5.11: Annual potential output from Micro Solar generation in East Hampshire

Potential Buildings Suitable for Development	4kW Scale	6kW Scale	10kW Scale
24,963	175 GW	261 GW	435 GW

Heat

5.98 As previously outlined, 16% of properties in East Hampshire are not connected to the gas network which equates to approximately 6,196 buildings. These buildings would be a priority for developing heat systems, reducing electrical energy demand.

Issues affecting deployment

Subsides

5.99 On 19 July 2018 the Department of Business Energy and Industrial Strategy (BEIS) confirmed its intention to close the FIT scheme to new applicants from March 2019. The Government are exploring mechanisms to provide a route to market for small scale renewables. Actions could address regulatory barriers, giving access to additional revenue streams such as an export tariff. The changes have created policy uncertainty and have generated concerns within micro renewable industry, slowing their current installation rates.

Planning issues

5.100 The installation, replacement or alteration of solar panels, ground source heat pumps etc on or within the curtilage of a dwelling or building is considered to be 'permitted development' and therefore does not normally require planning consent. There are however a number of Conservation Areas within the District, within which installations may be restricted if they are considered to have a negative impact on the area.

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.5: Wind Speed

East Hampshire District Council boundary

South Downs national park

Wind speed at 45m above ground level (m/s)

7.8

5.4

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Wind_Speed_A3L 09/11/2018

Source: NOABL

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.6: Nature Designations

- East Hampshire District Council Boundary
- South Downs National Park
- Special Protection Area
- Local Nature Reserve
- Ancient woodland
- Site of Special Scientific Interest
- Site of Importance for Nature Conservation

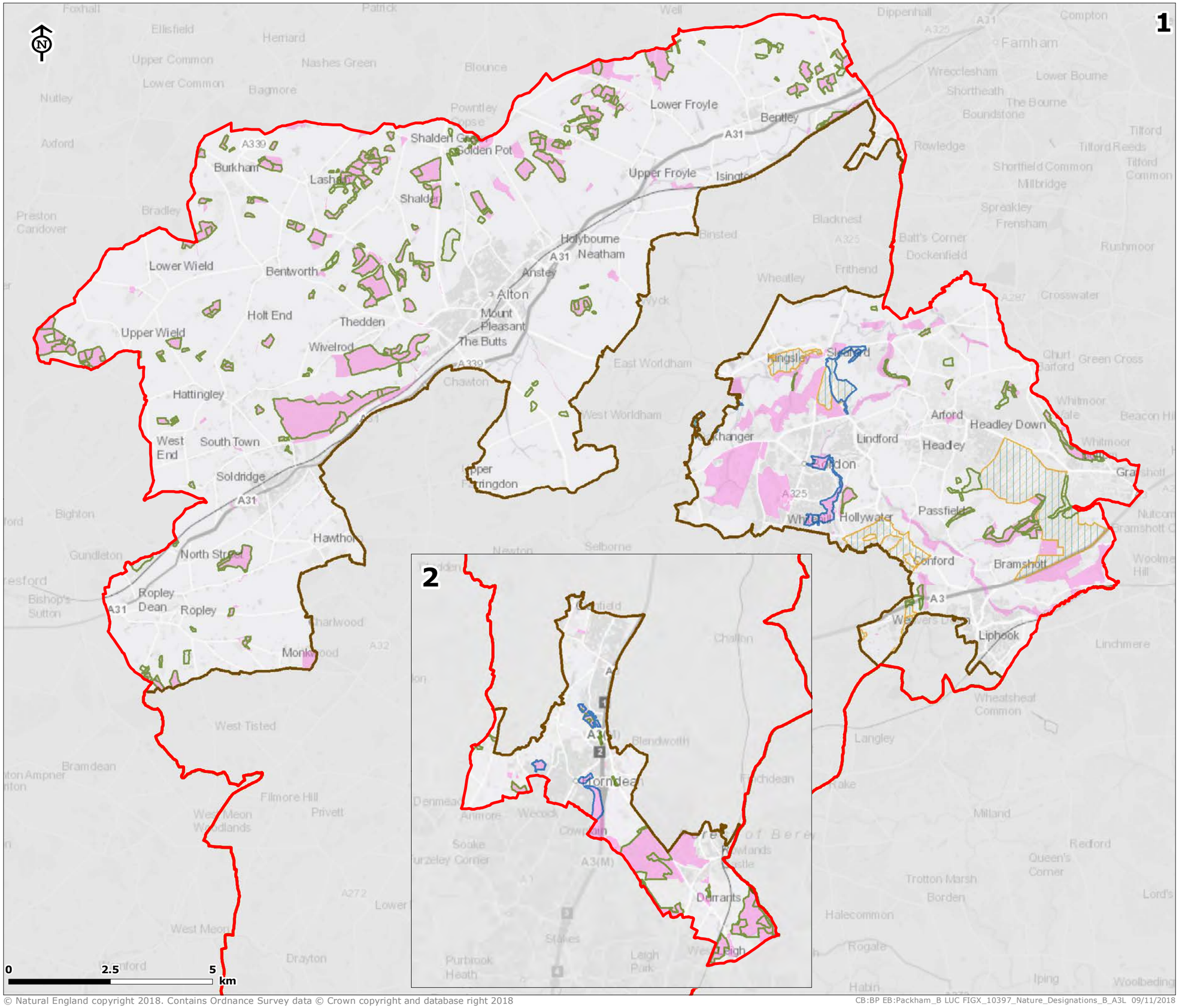
Map Scale @A3: 1:150,000

CB:BP EB:Packham_B LUC FIGX_10397_Nature_Designations_A3L 09/11/2018

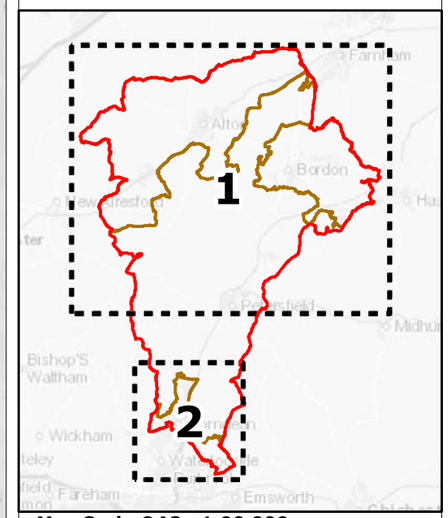
Source: Natural England, Hampshire District Council

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.6b: Nature Designations



Overview



- East Hampshire District Council boundary
- South Downs national park
- Special Protection area
- Local Nature Reserve
- Ancient woodland
- Site of Special Scientific Interest
- Site of Importance for Nature Conservation

Map Scale @A3: 1:90,000

CB:BP EB:Packham_B LUC FIGX_10397_Nature_Designations_B_A3L 09/11/2018

Source: Natural England, East Hampshire District Council

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.7: Heritage Designations

- East Hampshire District Council boundary
- Scheduled monument
- Registered parks and gardens
- Conservation area
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- South Downs national park

Map Scale @A3: 1:150,000

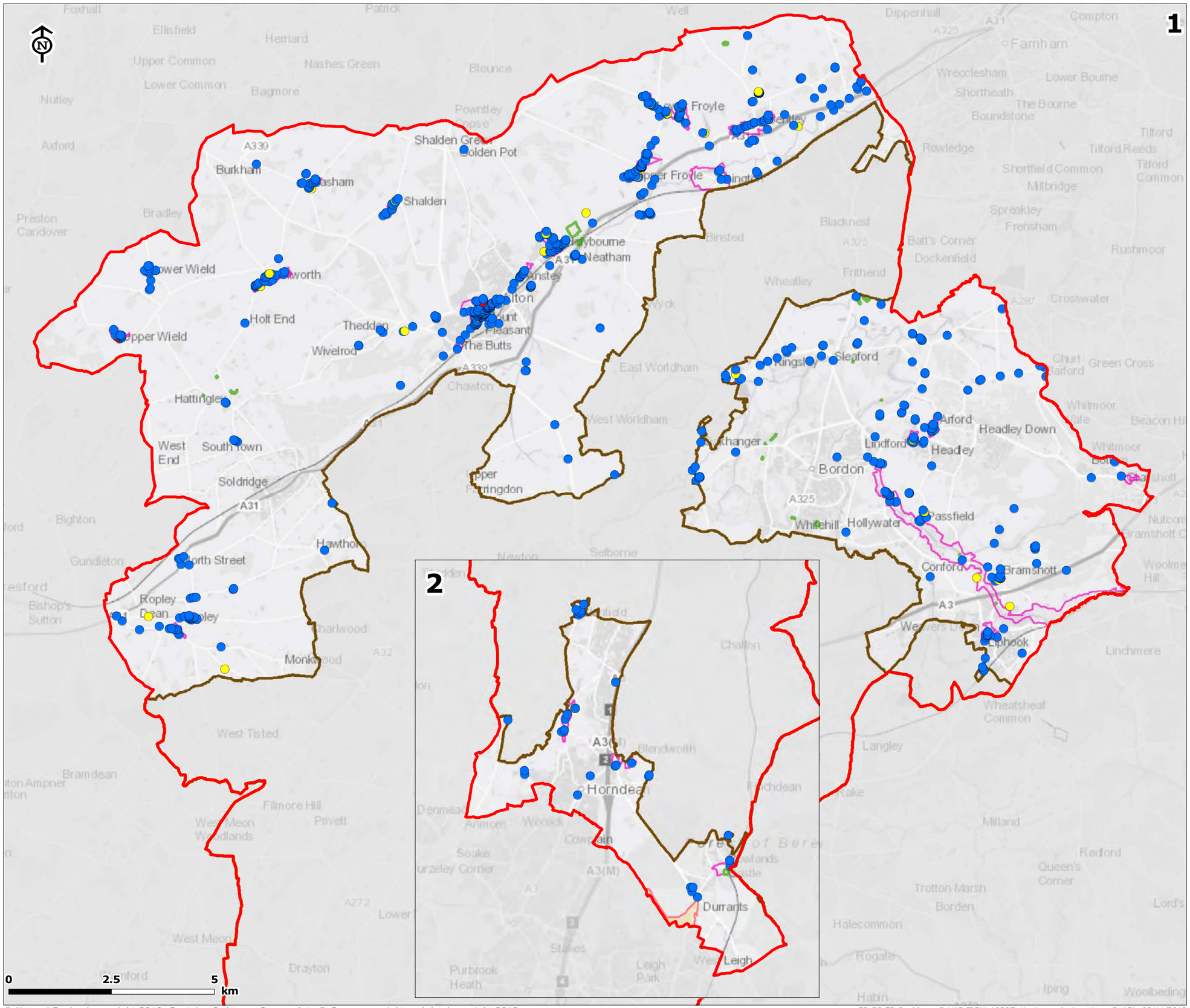
0 5 10 km

CB:LA EB:Packham_B LUC FIGX_10397_Heritage_designations_A3L 09/11/2018

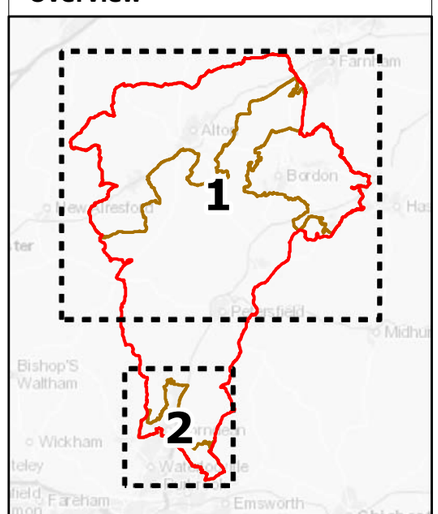
Source: Historic England, East Hampshire District Council

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.7b: Heritage Designations



Overview



- East Hampshire District Council boundary
- Scheduled monument
- Registered parks and gardens
- Conservation area
- Grade I Listed Building
- Grade II Listed Building
- Grade II* Listed Building
- South Downs national park

Map Scale @A3: 1:90,000

CB:BP EB:Packham_B LUC FIGX_10397_Heritage_designations_B_A3L 09/11/2018

Source: Historic England, East Hampshire District Council

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.8: Physical Constraints (Small Scale)

- East Hampshire District Council boundary
- Property noise
- Housing and employment allocated sites
- Roads with 90m
- Railways with 90m
- Overhead Lines with 90m buffer
- PRoW with 90m buffer
- Rivers with 50m
- Lakes with 50m
- Slope greater than 15 degrees
- South Downs national

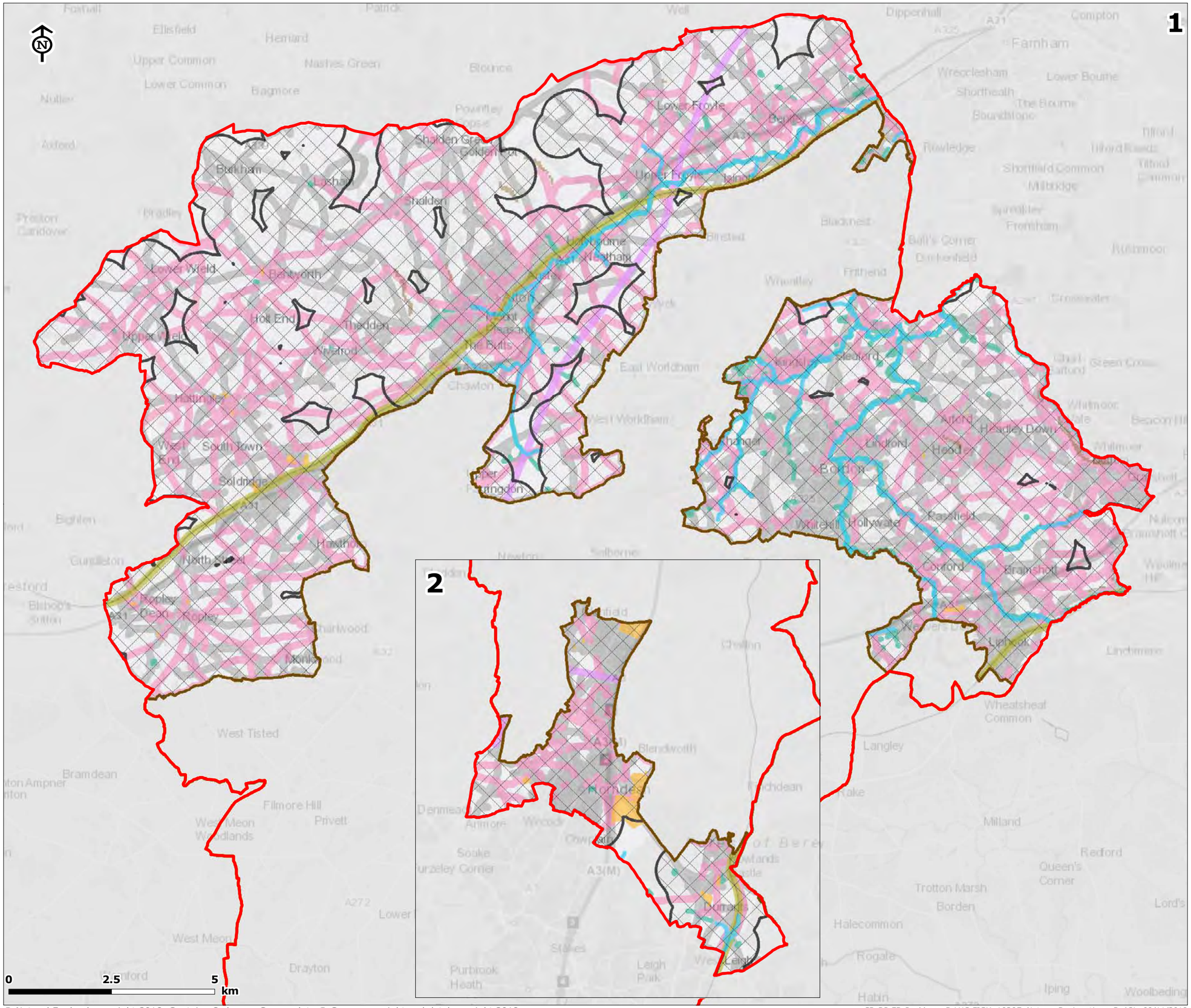
Map Scale @A3: 1:150,000

0 5 10 km

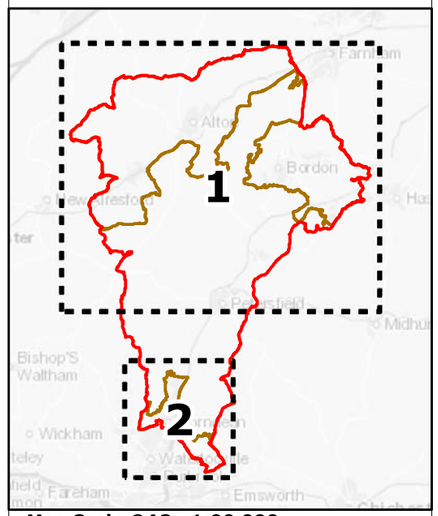
CB:LA EB:Packham_B LUC FIGX_10397_Physical_constraints_small_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.8b: Physical Constraints (Small Scale)



Overview



Map Scale @A3: 1:90,000

CB:BP EB:Packham_B LUC FIGX_10397_Nature_Designations_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.9: Physical Constraints (Very Large Scale)

- East Hampshire District Council Boundary
- Property noise buffer
- Housing and employment allocated sites
- Roads with 210m buffer
- Railways with 210m buffer
- Overhead Lines with 210m buffer
- Public Rights of Way with 210m buffer
- Rivers with 50m buffer
- Waterbodies with 50m buffer
- Slope greater than 15 degrees
- South Downs national park

Map Scale @A3: 1:150,000

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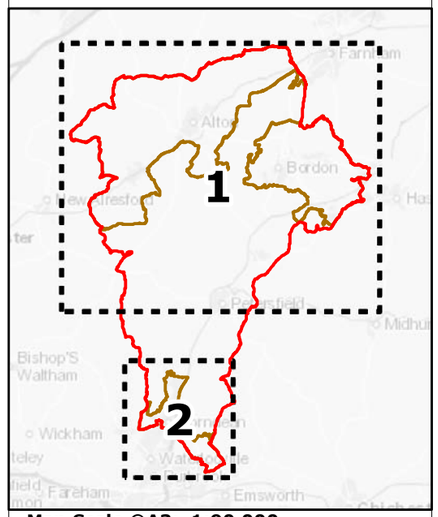
CB:LA EB:Packham_B LUC FIGX_10397_Physical_constraints_very_large_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.9b: Physical Constraints (Very Large Scale)

- East Hampshire District Council boundary
- Property noise buffer
- Housing and employment allocated sites
- Roads with 210m buffer
- Railways with 210m buffer
- Overhead Lines with 210m buffer
- Public Rights of Way with 210m buffer
- Rivers with 50m buffer
- Waterbodies with 50m buffer
- Slope greater than 15 degrees
- South Downs national park

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Physical_constraints_very_large_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.10: Slope

East Hampshire District Council boundary

Slope (degrees)

- 0° - <=3°
- >3° - <=6°
- >6° - <=9°
- >9° - <=12°
- >12° - <=15°
- >15° (Unsuitable)

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Slope_A3L 04/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.11: Opportunities for Wind Development (All Scales)

- East Hampshire District Council boundary
- Small turbines only (<40m tip height)
- Small to Medium turbines only (<40m - 80m tip height)
- Small to Large turbines only (<40m - 120m tip height)
- All turbine scales (up to 160m tip height)
- South Downs national park

Map Scale @A3: 1:150,000

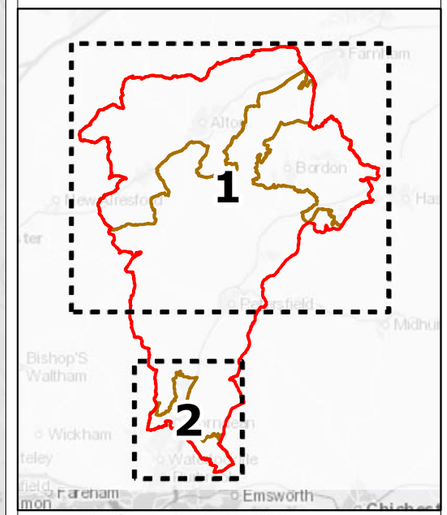
CB:LA EB:Packham_B LUC FIGX_10397_Opportunity_for_wind_dev_A3L 12/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.11b: Opportunities for Wind Development (All Scales)

- East Hampshire District Council Boundary
- Small turbines only (<40m tip height)
- Small to Medium turbines only (<40m - 80m tip height)
- Small to Large turbines only (<40m - 120m tip height)
- All turbine scales (up to 160m tip height)
- South Downs National Park

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Opportunity_for_wind_dev_B_A3L 23/11/2018

Figure 5.12: Opportunities and constraints for small scale wind development

East Hampshire District Council boundary

Unconstrained areas for small scale wind energy development

Constrained areas for small scale wind energy development

South Downs national park

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_small_wind_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.12b: Opportunities and constraints for small scale wind development

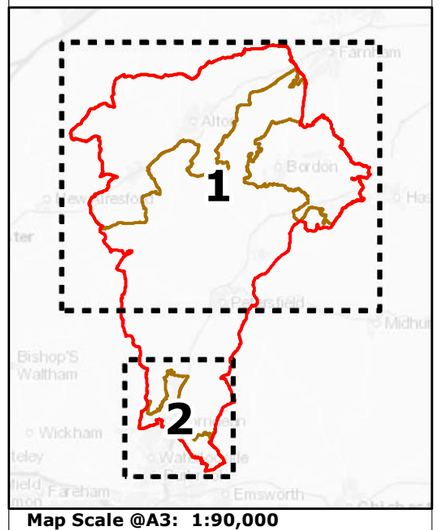
East Hampshire District Council boundary

Unconstrained areas for small scale wind energy development

Constrained areas for small scale wind energy development

South Downs national park

Overview



Map Scale @A3: 1:90,000

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CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_small_wind_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.13: Opportunities and constraints for medium scale wind development

East Hampshire District Council boundary

Unconstrained areas for medium scale wind energy development

Constrained areas for medium scale wind energy development

South Downs national park

Map Scale @A3: 1:150,000

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CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_medium_wind_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.13b: Opportunities and constraints for medium scale wind development

East Hampshire District Council boundary

Unconstrained areas for medium scale wind energy development

Constrained areas for medium scale wind energy development

South Downs national park

Overview

Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_medium_wind_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.14a: Opportunities and constraints for large scale wind development

East Hampshire District Council boundary

Unconstrained areas for large scale wind energy development

Constrained areas for large scale wind energy development

South Downs national park

Map Scale @A3: 1:150,000

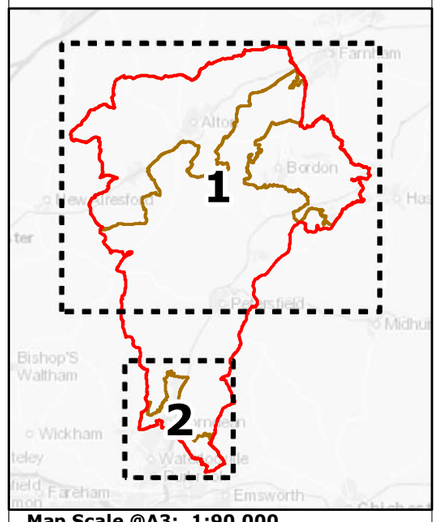
0 5 10 km

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.14b: Opportunities and constraints for large scale wind development

- East Hampshire District Council boundary
- Unconstrained areas for large scale wind energy development
- Constrained areas for large scale wind energy development
- South Downs national park

Overview



Map Scale @A3: 1:90,000

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CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_large_wind_B_A3L 09/11/2018

Figure 5.15: Opportunities and constraints for very large scale wind development

East Hampshire District Council boundary

Unconstrained areas for very large scale wind energy development

Constrained areas for very large scale wind development

South Downs national park

Map Scale @A3: 1:150,000

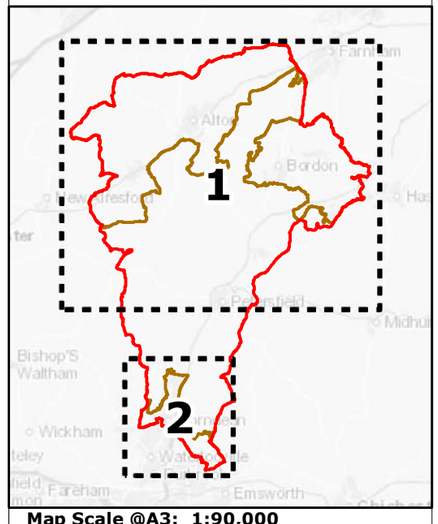
0 5 10 km

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.15b: Opportunities and constraints for large scale wind development

- East Hampshire District Council boundary
- Unconstrained areas for very large scale wind energy development
- Constrained areas for very large scale wind development
- South Downs national park

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_very_large_wind_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.16: Aviation constraint

East Hampshire District Council boundary

Aerodrome Safeguarding Areas

- Blackbushe (17km Buffer)
- Chichester/Goodwood (17km Buffer)
- Farnborough (30km Buffer)
- Southampton (30km Buffer)

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Aviation_constraints_A3L 09/11/2018

Source: Civil Aviation Authority

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.17: Opportunities and constraints for solar development

- East Hampshire District Council boundary
- Unconstrained areas for solar development
- Constrained areas for solar development
- South Downs national park

Map Scale @A3: 1:150,000

0 5 10 km

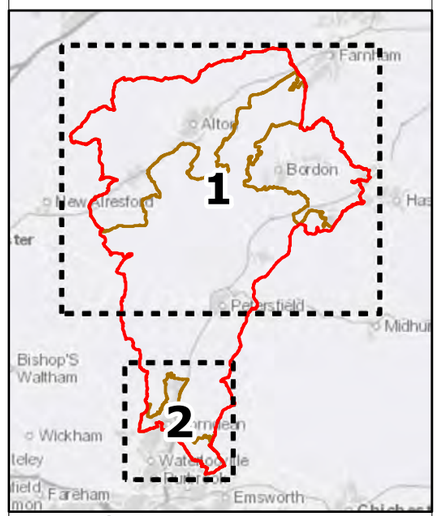
CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_solar_dev_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.17b: Opportunities and constraints for large scale wind development

- East Hampshire District Council boundary
- Unconstrained areas for solar development
- Constrained areas for solar development
- South Downs national park

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_and_constraints_for_solar_dev_B_A3L 09/11/2018

Figure 5.18: Additional constraints for solar development

- East Hampshire District Council boundary
- South Downs national park
- Settlements with 20m buffer
- Forestry and Woodland
- Slope greater than 15° or Slope facing NW through NE and greater than 3°
- Mineral Sites with 250m Buffer

Agricultural Land Classification

- Grade 2 (Excluded from opportunity areas)
- Grade 3 (Further investigation required to determine suitability, not excluded from opportunity areas)

Map Scale @A3: 1:150,000

Source: East Hampshire District Council, NE, FC

Renewable and Low Carbon Study for the East Hampshire District

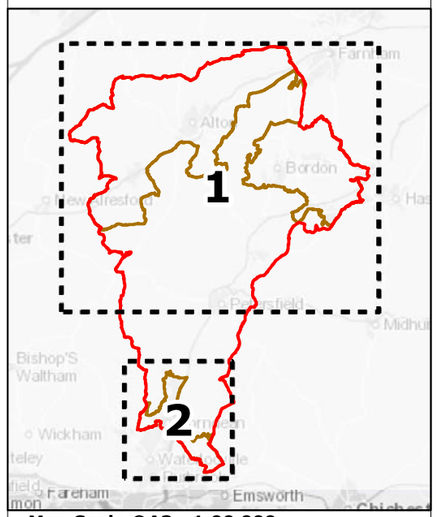
Figure 5.18b: Additional constraints for solar development

- East Hampshire District Council boundary
- South Downs national park
- Settlements with 20m buffer
- Forestry and Woodland
- Slope greater than 15° or Slope facing NW through NE and greater than 3°
- Mineral Sites with 250m Buffer

Agricultural Land Classification

- Grade 2 (Excluded from opportunity areas)
- Grade 3 (Further investigation required to determine suitability, not excluded from opportunity areas)

Overview



Map Scale @A3: 1:90,000

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Source: East Hampshire District Council, NE, FC

CB:BP EB:Packham_B LUC FIGX_10397_Additional_constraints_for_solar_A3L_B 23/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.18: Opportunities for solar development

East Hampshire District Council boundary

Unconstrained areas for solar development

South Downs national park

Map Scale @A3: 1:150,000

0 5 10 km

CB:LA EB:Packham_B LUC FIGX_10397_Opportunity_for_solar_dev_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

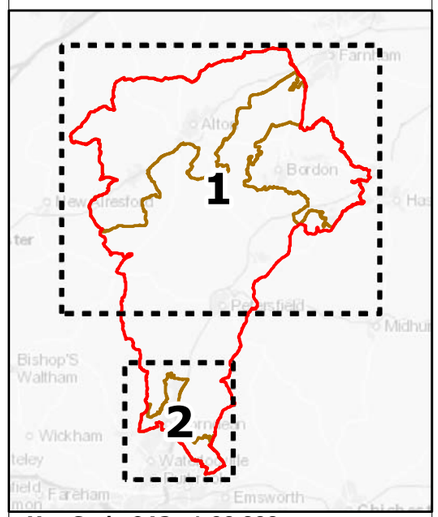
Figure 5.18b: Opportunities for solar development

East Hampshire District Council boundary

Unconstrained areas for solar development

South Downs national park

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Opportunity_for_solar_dev_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.20: Opportunities for hydropower development

East Hampshire District Council boundary

Watercourses and waterbodies

Potential Hydropower opportunity

Power Catergory

- 0 - 10 kW
- 10 - 20 kW
- 100 - 500 kW
- 20 - 50 kW

South Downs national park

0 5 10 km

Map Scale @A3: 1:150,000

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CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_for_Hydro_Power_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.20b: Opportunities for Hydropower development

East Hampshire District Council boundary

Watercourses and waterbodies

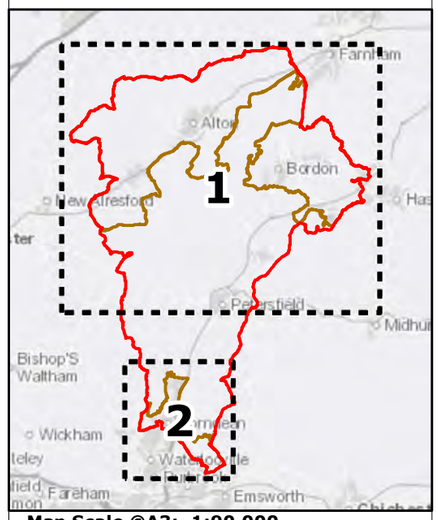
Potential Hydropower opportunity

Power Category

- 0 - 10 kW
- 10 - 20 kW
- 100 - 500 kW
- 20 - 50 kW

South Downs national park

Overview



Map Scale @A3: 1:90,000

LUC RICARDO East Hampshire District Council

CB:BP EB:Packham_B LUC FIGX_10397_Opportunities_for_Hydro_Power_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.21: Environmental sensitivity to hydropower development

East Hampshire District Council boundary

Watercourses and waterbodies

Potential Hydropower opportunity

Environmental sensitivity

- No sensitivity data
- Medium
- High

South Downs national park

Map Scale @A3: 1:150,000

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Renewable and Low Carbon Study for the East Hampshire District

Figure 5.21b: Environmental sensitivity to hydropower development

East Hampshire District Council boundary

Watercourses and waterbodies

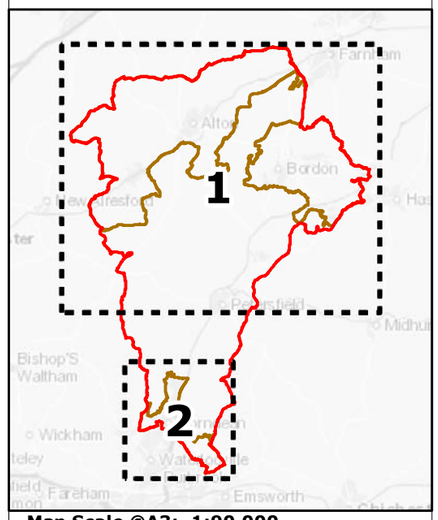
Potential Hydropower opportunity

Environmental sensitivity

- No sensitivity data
- Medium
- High

South Downs national park

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_13097_Environmental_sensitivity_to_hydro_power_B_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.22: Win-Win opportunities for hydropower development

East Hampshire District Council boundary

Watercourses and waterbodies

Potential Hydropower opportunity

Power Category

- 0 - 10 kW
- 10 - 20 kW
- 20 - 50 kW
- 100 - 500 kW

South Downs national park

0 5 10 km

Map Scale @A3: 1:150,000

CB:BP EB:Packham_B LUC FIGX_10397_Win_Win_Opportunities_for_Hydro_Power_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.22b: Win-win hydropower development opportunities

East Hampshire District Council boundary

Watercourses and waterbodies

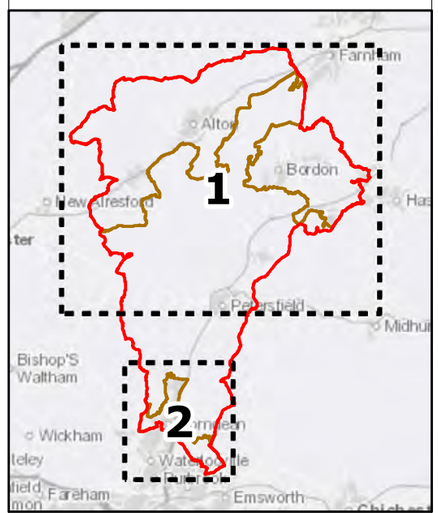
Potential Hydropower opportunity

Power Category

- 0 - 10 kW
- 10 - 20 kW
- 20 - 50 kW
- 100 - 500 kW

South Downs national park

Overview



Map Scale @A3: 1:90,000

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CB:BP EB:Packham_B LUC FIGX_10397_Win_Win_Opportunities_for_Hydro_Power_A3L_B 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.23: Off grid gas network

East Hampshire District Council boundary

South Downs national

Off grid household by LSOA (%)

0 -

20 -

40 -

60 -

80 -

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Off_Grid_Gas_Network_A3L 14/11/2018

Source: BEIS

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.23b: Off Grid Gas Network

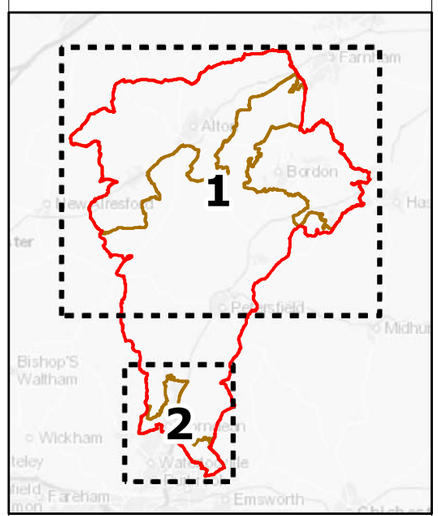
East Hampshire District Council boundary

South Downs national park

Off grid household by LSOA (%)

- 0 - 19
- 20 - 39
- 40 - 59
- 60 - 79
- 80 - 100

Overview



Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Off_Grid_Gas_Network_B_A3L 14/11/2018

Source: BEIS

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.24: Biomass suppliers and woodland within East Hampshire

- East Hampshire District Council boundary
- National forest inventory
- Biomass supplier
- South Downs national park

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Off_Grid_Gas_Network_A3L 09/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 5.24b: Biomass suppliers and woodland within East Hampshire

- East Hampshire District Council boundary
- National forest inventory
- Biomass supplier
- South Downs national park

Overview

Map Scale @A3: 1:90,000

CB:BP EB:Packham_B LUC FIGX_10397_Off_Grid_Gas_Network_B_A3L 09/11/2018

6. Landscape Sensitivity Assessment

6 Landscape Sensitivity Assessment

Introduction

6.1 This chapter set out the findings of an assessment that was undertaken to evaluate the sensitivity of the landscape within the District to wind turbine and solar energy developments.

6.2 The assessment provides guidance on:

- the key landscape issues associated with onshore wind and solar energy developments;
- the relative landscape sensitivities of different areas within the District to wind energy and solar developments.

Study area

6.3 The study focuses on the rural landscape of East Hampshire and the landscape character areas as identified in the East Hampshire Landscape Character Assessment (2006) (see **Figure 6.1**). It should be noted that parts of the South Downs National Park lie within East Hampshire. As any planning application for development in this area is made to the National Park Planning Authority, this landscape has not been appraised in terms of its sensitivity to wind and solar development. However, issues around inter-visibility between the landscape of the District and the National Park are discussed where applicable.

Approach to Assessment

6.4 The approach to the landscape sensitivity assessment has involved the following two key stages:

1. Identification of the key characteristics of wind and solar energy development and their potential effects on the landscape, to inform the development of a methodology for the assessment of landscape sensitivity;
2. Assessment of the sensitivity of the different landscape character types in East Hampshire to wind turbine and solar energy development at a range of scales.

6.5 These two stages are discussed in more detail in the following sections.

1) Potential effects of wind and solar energy development on the landscape

6.6 In order to minimise effects on the landscape through siting and design, it is important to first understand the characteristics of wind and solar energy development and how they may affect the landscape. The following section describes the features of these developments and considers the potential impacts on the landscape.

6.7 In undertaking any landscape sensitivity assessments it is necessary to acknowledge that varying attitudes to wind and solar energy development are expressed by different individuals and constituencies. Aesthetic perceptions can be positive or negative depending on individual attitudes to the principle and presence of renewable energy.

General features of wind energy development

6.8 The key components of wind energy development are the wind turbines, which may be grouped together into a wind farm. The majority of wind turbines consist of horizontal-axis three-bladed turbines, mounted on a steel tower. Other turbines, including two bladed turbines and vertical axis turbines, are available but less commonly deployed. Wind turbines are generally given planning permission for 25 years, although re-powering may take place after this period has elapsed, subject to further permission.

6.9 The main visible components of a horizontal-axis wind turbine are:

- the tower, generally a tubular steel structure though lattice towers are occasionally used for smaller turbines;
- the nacelle, which contains the generating equipment; and
- the rotor blades, mounted on the hub at the front of the nacelle.

6.10 Depending on the scale and design of the turbine, the transformer may be located inside or outside the tower. If outside it will usually be contained in a small box-like structure adjacent to the tower base. The tower itself sits on a concrete foundation which is hidden from view underground.

6.11 Turbines are most commonly coloured light grey, which has been found to be less visually prominent when turbines are viewed against the sky. However, when turbines are seen against a land backdrop, which is common with smaller models, the light colour can make them appear more prominent.

6.12 Turbines are available in a wide range of sizes, from very small roof-mounted machines designed for domestic use, to large commercial structures. The tallest turbines currently operating in the UK are in the region of 160m to tip.

6.13 Besides overall size the proportions of a turbine can also vary, particularly the length of the blades in relation to the height of the tower, and the size and shape of the nacelle. Where particularly short blades are mounted on a tall tower, or where long blades are placed on a short tower, the turbine may appear unbalanced or top-heavy. Larger turbines with longer blades tend to have slower rotation speeds than smaller models.

6.14 In addition to the turbines themselves, developments involving large scale wind turbines typically require additional infrastructure as follows:

- road access to the site and on-site tracks able to accommodate the specialised heavy goods vehicles (HGVs) which are needed to transport the long turbine components and heavy construction cranes;
- a temporary construction compound and lay-down area for major components;
- construction of a buried concrete foundation and an area of hardstanding next to each turbine to act as a base for cranes during turbine erection;
- underground cables connecting the turbines (buried in trenches, often alongside tracks);
- one or more anemometer mast(s) to monitor wind direction and speed, usually a slender lattice tower of the same height as the turbine hubs; and
- a control building to enable monitoring and operation, often combined with a small substation.

6.15 For single turbines, the requirements will be less but still typically include road access, hardstanding and foundations.

6.16 Lighting requirements depend on aviation and can be required on turbines above 150m in height. However, aircraft warning lights can be infra-red and therefore not visible to the naked human eye. Lighting has not been considered as part of the landscape sensitivity study, although guidance advises that if lighting is required on turbines for aviation purposes, infra-red lighting should be adopted where possible to minimise visual impacts at night.

6.17 The District Network Operator (DNO) is responsible for establishing a connection between the substation and the national grid. For larger schemes this connection is usually routed via overhead cables on poles, but for smaller turbines may be routed underground. Since these are part of a separate consenting procedure, these connections have not been considered as part of the landscape sensitivity study.

Landscape effects of wind turbines

6.18 Wind turbines can be substantial vertical structures, and larger models will inevitably be highly visible within the landscape. The movement of the blades is a unique feature of wind energy developments, setting them apart from other tall structures in the landscape such as masts or pylons. Wind energy development may affect the landscape in the following ways:

- construction of large turbines and associated infrastructure may result in direct loss of landscape features;
- wind turbines are tall vertical features that may alter the perception of a landscape, potentially affecting the apparent scale of landforms;
- movement of rotor blades may affect characteristics of stillness and solitude, as well as drawing the eye to turbines which may be a relatively small feature in the landscape;
- the presence of turbines may increase the perceived human influence on the landscape, particularly in terms of overt modern development, and this can particularly affect landscapes which have a strong sense of naturalness or wild qualities, or which form a setting to heritage assets;
- wind turbines, even at relatively small sizes, can appear large in the context of human-scale features such as domestic buildings and trees – at the largest scales turbines can be perceived as 'overwhelming' when close to residential properties;
- turbines on skylines may compete with existing landmark features for prominence where prominent skylines or landmark features are characteristic of the landscape; and
- in order to be as efficient as possible, turbines are often placed in elevated locations, where they may affect views from wide areas.

General features of solar energy development

6.19 Free-standing solar PV developments consist of panels that are usually mounted around 0.7m-3m above ground level allowing the growth of vegetation beneath and between the arrays and the associated grazing of stock. Panels are arranged in groups or 'arrays' of around 20 panels. The panels are encased in an aluminium frame, supported by aluminium or steel stands, and positioned at a fixed angle between 20-40 degrees from the horizontal, facing south. Arrays usually take the form of a linear rack of panels. These arrays or linear racks are usually sited in parallel rows with gaps between the rows for access and to prevent shading of adjacent rows. They therefore do not cover a whole field. The actual arrangement of the arrays within the landscape varies from scheme-to-scheme (i.e. regular layouts versus more varied and irregular, depending on the site situation). Generally though, layouts of the solar arrays tend to be regular.

6.20 Photovoltaic technology requires absorption of sunlight to allow for the conversion of energy to take place and therefore very little light energy is lost through reflection. Glare is further minimised through the use of translucent coating materials to improve light transmittance through the glass. Nevertheless panels do change under different atmospheric conditions, tending to reflect the light and colour of the sky, and the appearance of the panels under different atmospheric conditions is an important consideration in terms of the visual effects of schemes.

6.21 Like wind turbine schemes, solar PV developments are usually given planning permission for 25 years. In addition to the panels themselves, solar developments typically require additional infrastructure as follows:

- road access to the site and on-site construction and permanent maintenance tracks;
- a substation which is often contained within a small building;
- a temporary construction compound for major components;
- permanent security fencing, CCTV and signage; and
- underground cables connecting the panels to the substation.

6.22 Lighting requirements depend on the required site security levels. However, it is unusual for permanent lighting to be proposed and developers often opt for a flood light near the substation for emergency use only.

Landscape effects of solar energy development

6.23 Solar energy developments can be substantial horizontal structures and can be highly visible and contribute to considerable change in the character of the landscape. Solar energy development may affect the landscape in the following ways:

- construction of solar panels and associated infrastructure may result in direct loss of landscape features such as hedgerows, woodland, farmland and other habitat;
- solar energy developments can cover large areas and the presence of solar panels may increase the perceived human influence on the landscape, particularly in terms of overt modern development, and this can particularly affect landscapes which have a strong sense of naturalness, or which form a setting to heritage assets; and
- at certain times of day and from certain viewing angles solar panels can reflect the sunlight, causing glint and glare which can draw the eye.

Typologies

6.24 A range of scales of development have been considered in the sensitivity assessment. The 'size' of a wind energy development can be defined by the number of turbines, the height of turbines, or by reference to installed capacity. Capacity is less useful in landscape terms as there are many combinations of different turbines which could give the same output. The number of turbines is an important factor in determining the suitability of a proposal in its host landscape. However, it is turbine height which is most likely to be the determining factor for the assessment of landscape sensitivity, since it is the scale of the turbine which generally defines whether or not it can be accommodated in the landscape. Where a large turbine cannot be accommodated due to incompatibility of scale, then this will apply whether one or many turbines are proposed.

6.25 The size of a solar energy development can also differ greatly, in terms of power output and area covered. Schemes in the UK range in area from less than 1 hectare, up to well over 100 hectares. However, it is highly unlikely that solar energy developments at the very large end of this spectrum would be proposed in East Hampshire due to the proximity of the South Downs National Park.

6.26 **Table 6.1** sets out the range of 'typologies' or 'development scenarios' considered in the assessment.

Table 6.1: Landscape sensitivity development scenarios

Typology	Definition
Wind	
Small-scale wind turbines (<40 metres)	Small-scale wind turbines (<40 metres)
Medium-scale wind turbines (40-80 metres)	Medium-scale wind turbines (40-80 metres)
Large-scale wind turbines (80-120 metres)	Large-scale wind turbines (80-120 metres)
Very large wind turbines (120-160 metres)	Very large wind turbines (120-160 metres)
Solar	
Small solar PV installation (<5 hectares)	Small solar PV installation (<5 hectares)
Medium solar PV installation (5-10 hectares)	Medium solar PV installation (5-10 hectares)
Large solar PV installation (10-20 hectares)	Large solar PV installation (10-20 hectares)
Very large solar PV installation (20-30 hectares)	Very large solar PV installation (20-30 hectares)

6.27 An assessment of sensitivity has been undertaken in relation to each of the above typologies. Further information is then presented to inform design guidance in terms of these typologies, and also in terms of the appropriate extent of solar energy development (area coverage) and wind farm size (turbine numbers).

2) Assessment of landscape sensitivity

6.28 There is currently no published method for evaluating sensitivity of different types of landscape. The method therefore builds on available guidance published by the Countryside Agency and Scottish Natural Heritage including the Landscape Character Assessment: Guidance for England and Scotland[27] and Topic Paper 6 that accompanies the Guidance,[28] as well as LUC's considerable experience from previous and ongoing studies of a similar nature.

6.29 Paragraph 4.2 of Topic Paper 6 states that:

"*Judging landscape character sensitivity requires professional judgement about the degree to which the landscape in question is robust, in that it is able to accommodate change without adverse impacts on character. This involves making decisions about whether or not significant characteristic elements of the landscape will be liable to loss... and whether important aesthetic aspects of character will be liable to change.*"

6.30 For the purposes of this study, we have defined 'sensitivity' as follows:

Sensitivity is the relative extent to which the character and quality of the landscape is susceptible to change as a result of wind and solar energy development.

6.31 Wind turbine and solar energy development will affect different characteristics of the landscape in different ways. It is therefore important to understand the nature and sensitivity of different components of landscape character, and to set these out and assess them in a consistent and transparent fashion. In order to do this, a set of criteria will be used to highlight specific landscape and visual characteristics which are most likely to be affected by wind and solar energy development.

Assessment criteria

6.32 **Table 6.2** sets out the criteria used to evaluate the sensitivity of landscape character types to wind turbine development, and the aspects of the landscape which were considered to indicate higher or lower sensitivity. **Table 6.3** sets out the alternative criteria used to evaluate the sensitivity of landscape character types to solar energy development, and the aspects considered to indicate higher or lower sensitivity. Where the criteria for solar energy developments are very similar to that identified for wind energy development, they are not repeated.

6.33 For each criterion, a short explanation is provided as to why it is indicative of sensitivity to the type of development proposed, and what key characteristics of the landscape will be considered. Information sources are given for each criterion. The examples provide more detail as to what level of sensitivity will be assessed for landscapes displaying certain characteristics: these are examples only, based on generic descriptions. The five defined levels form stages on a continuum, rather than clearly-separated categories. Any given landscape may or may not fit neatly into one category, and an element of professional judgement is therefore required.

[27] Countryside Agency and Scottish Natural Heritage (2002) *Landscape Character Assessment: Guidance for England and Scotland* CAX 84. Note this guidance has been superseded by Natural England Guidance however, Topic Paper 6 remains current and useful.
[28] The Countryside Agency and Scottish Natural Heritage (2004). *Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity.*

Wind Turbines

Table 6.2: Sensitivity assessment criteria for wind turbine development

Landform and scale				
A simple, smooth, gently sloping or flat landform is more likely to be able to accommodate wind energy development than a landscape with a dramatic rugged landform, distinct landform features and/or pronounced undulations. Larger scale landforms are likely to be less sensitive than smaller scale landforms since, in the latter case, turbines may appear out of scale, detract from visually important landforms and/or appear visually confusing due to turbines being at varying elevations. Information sources: Landscape Character Assessment; OS maps; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
An extensive flat lowland landscape or elevated plateau, often a larger scale landscape with no distinctive landform features.	A simple, gently rolling landscape, likely to be of medium-large scale, without distinctive landform.	An undulating landscape, perhaps also incised by valleys, likely to be of medium scale.	A landscape with distinct landform features, and/or irregular in topography (which may be large in scale), or a smaller scale landform.	A landscape with a distinctive, rugged landform or dramatic topographical features (which may be large in scale), or a small scale or intimate landform.

Land cover pattern and presence of human scale features				
Simple, regular landscapes with extensive areas of consistent land cover are likely to be less sensitive to wind energy development than landscapes with more complex or irregular land cover patterns, smaller and / or irregular field sizes, and landscapes with frequent human-scale features that are traditional to the landscape, such as red-brick villages, farmsteads, small farm woodlands, trees and hedges. This is because larger wind turbines may dominate traditional human scale features within the landscape. Information sources: Landscape Character Assessment; OS maps; aerial photography; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
An open, continuous landscape with uniform land cover and lacking in human-scale features.	A landscape of large open fields, little variety in land cover, with occasional human-scale features such as trees and domestic buildings.	A landscape with medium sized fields, some variations in land cover and presence of human-scale features such as trees and domestic buildings.	A landscape with irregular or small-scale fields, variety in land cover and presence of human-scale features such as trees and domestic buildings.	A landscape with a strong variety in land cover, and complex patterns, containing numerous human-scale features.

Tracks / transport pattern				
Landscapes that are devoid of tracks will be particularly sensitive to wind energy development because it will be more difficult to absorb permanent new tracks into the landscape without change to character in these areas. In addition, if a Landscape Character Area has a rural road network which contributes to landscape character (e.g. winding narrow lanes bounded by high hedgebanks or sunken lanes), this aspect of character may be affected by access works to enable HGVs carrying turbines to a site. This characteristic therefore also influences sensitivity. Information sources: East Hampshire Landscape Character Assessment; Ordnance survey basemaps showing presence of tracks; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		**Lower sensitivity**	**Lower sensitivity**	
e.g. a landscape containing existing roads and vehicular tracks, and no restrictions in terms of narrow hedged lanes	e.g. a landscape containing existing roads and vehicular tracks, and no restrictions in terms of narrow hedged lanes	e.g. a landscape containing existing roads and vehicular tracks, and no restrictions in terms of narrow hedged lanes	e.g. a landscape containing existing roads and vehicular tracks, and no restrictions in terms of narrow hedged lanes	e.g. a landscape containing existing roads and vehicular tracks, and no restrictions in terms of narrow hedged lanes

Skylines / intervisibility				
Prominent and distinctive and/or undeveloped skylines, or skylines with important landmark features, are likely to be more sensitive to wind energy development because turbines may detract from these skylines as features in the landscape, or draw attention away from existing landform or landmark features on skylines. Important landmark features on the skyline might include historic features or monuments as well as landforms. Where skylines are affected by development, e.g. through the presence of electricity pylons, the addition of turbines may lead to visual confusion, and as such this may not be a consistent indicator of reduced sensitivity. The relative visibility of a landscape may influence its sensitivity. An elevated landscape such as a hill range or plateau, which is viewed from other landscapes, may be more sensitive than an enclosed landscape, since any turbines will be more widely seen. Landscapes which have important visual relationships with other areas, for example where one area provides a backdrop to a neighbouring area, are considered more sensitive than those with few visual relationships. The extent of inter-visibility may be modified by the importance of these views to appreciation of the landscape, and whether adjacent landscapes provide a setting for one another. Information sources: Landscape Character Assessment; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
e.g. A landscape in which skylines are not prominent, and there are no important landmark features on the skyline. An enclosed, self-contained landscape, or one with weak connections to	e.g. A landscape in which skylines are simple, flat or gently convex and/or there are very few landmark features on the skyline – other skylines in adjacent LCTs may be more prominent. A landscape with	e.g. A landscape with some prominent skylines, but these are not particularly distinctive – there may be some landmark features on the skyline. A landscape which has some inter-visibility with	e.g. A landscape with prominent skylines that may form an important backdrop to views from settlements or important viewpoints, and/or with important landmark features. A landscape which is	e.g. A landscape with prominent or distinctive undeveloped skylines, or with particularly important landmark features on skylines. A landscape which has important visual relationships with

Skylines / intervisibility				
neighbouring areas.	limited connections to neighbouring areas, and/or where adjacent landscapes are not visually related.	neighbouring areas, and/or where relationships between adjacent landscapes are of more importance.	intervisible with several areas, and/or where adjacent areas are strongly interrelated.	one or more neighbouring areas.

Perceptual qualities				
Landscapes that are relatively remote or tranquil tend to be more sensitive to wind energy development, since turbines may be perceived as intrusive. Landscapes which are relatively free from overt human activity and disturbance, and which have a perceived naturalness or a strong feel of traditional rurality, will therefore be more sensitive. Qualities such as tranquillity can be found even in settled areas, where the influence of overtly modern development is reduced. Wind turbines will generally be less intrusive in landscapes which are strongly influenced by modern development, including settlement, industrial and commercial development and infrastructure. Information sources: Landscape Character Assessment; OS maps, fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
A landscape with much human activity and modern development, such as industrial areas.	A rural or semi-rural landscape with much human activity and dispersed modern development, such as settlement fringes.	A rural landscape with some modern development and human activity, such as intensive farmland.	A more naturalistic landscape and/or one with little modern human influence and development.	A tranquil landscape with little or no overt sign of modern human activity and development.

Historic Landscape Character				
Landscapes which contain important archaeological or historic features are likely to have a higher level of sensitivity to wind energy development. Historical features may be in the form of historic land cover types and field systems, areas of buried archaeology, historic designed landscapes such as Registered Parks and Gardens or structures designated for their historical significance. Landscapes which make a significant contribution to the setting of a historical feature or landscapes may also have higher sensitivity to wind energy development. Landscapes that are primarily of modern influence and origin will have a lower sensitivity to wind energy development. Information sources: Landscape Character Assessment, Scheduled Monuments, World Heritage Sites, Registered Battlefields, Conservation Areas, Listed Buildings, Registered Parks and Gardens.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
e.g. A landscape with no historical or archaeological interest	e.g. A landscape with no historical or archaeological interest	e.g. A landscape with no historical or archaeological interest	e.g. A landscape with no historical or archaeological interest	e.g. A landscape with no historical or archaeological interest

Scenic and special qualities				
Landscapes that have a high scenic quality will be more sensitive than landscapes of low scenic quality. Scenic qualities can include contrasts and combinations of landform and landcover which together contribute to attractive views. Scenic qualities may be recorded in the Landscape Character Assessment, or may be referenced in tourist material. Scenic viewpoints may be marked on Ordnance Survey maps. Scenic quality is also considered in the field. Information sources: Landscape Character Assessment; OS maps; tourist literature; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
A landscape without attractive character, with no pleasing combinations of features, visual contrasts and/or dramatic elements, such as industrial areas or derelict land.	A landscape of limited attractive character, with few pleasing combinations of features, visual contrasts and/or dramatic elements.	A landscape of intermittently attractive character, with occasional pleasing combinations of features, visual contrasts and/or dramatic elements.	A landscape of attractive character, with some pleasing combinations of features, visual contrasts and/or dramatic elements.	A landscape of consistently attractive character, with pleasing combinations of features, visual contrasts and/or dramatic elements.

Solar developments

6.34 The following alternative criteria, as outlined in **Table 6.3**, have been considered in relation to the landscape sensitivity for solar energy development. Where the criteria are very similar to that identified for wind energy development, they are not repeated here. It should also be noted that due to the horizontal nature of solar energy development, skylines are less of an important consideration when assessing landscape sensitivity.

Table 6.3: Sensitivity assessment criteria for solar energy development

Landform and scale				
A flat or gently undulating lowland landscape or extensive plateau is likely to be less sensitive to solar development than a landscape with prominent landforms and visible slopes, including coastal headlands. This is because arrays of solar panels will be less easily perceived in a flat landscape than on a slope, especially higher slopes. Larger scale landforms are also likely to be less sensitive than smaller scale landforms. Information sources: Landscape Character Assessment; OS maps; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
A lowland flat landscape or extensive plateau. Larger scale landscape.	A gently undulating lowland landscape or plateau.	An undulating landscape with hidden areas as well as some visible slopes.	A landscape with many prominent, visible slopes or an upland landscape.	Very steep landform and exposed, visible slopes. Smaller scale landscape.

Landform and scale				
Land cover pattern and presence of human scale features				
Since solar panels introduce a new land cover (of built structures) , landscapes containing existing hard surfacing or built elements (e.g. urban areas, brownfield sites or large-scale horticulture) are likely to be less sensitive to field-scale solar development than highly rural or naturalistic landscapes. Landscapes with small-scale, more irregular field patterns are likely to be more sensitive to the introduction of solar development than landscapes with large, regular scale field patterns because of the risk of diluting or masking the characteristic landscape patterns. This would be particularly apparent if development takes place across a number of adjacent fields where the field pattern is small and intricate (bearing in mind that the height of panels could exceed that of a hedge). Information sources: Landscape Character Assessment; OS Maps; aerial photography; fieldwork.				
Examples of sensitivity ratings				
Lower sensitivity		⟷		**Higher sensitivity**
Urban or 'brownfield' landscape. Large-scale, regular fields of mainly modern origin.	Area of large scale horticulture. Mainly defined by large, modern fields.	Rural landscape, perhaps with some brownfield sites or urban influences. Mixture of large-scale, modern fields and some smaller, more historic enclosure.	Rural landscape, perhaps with some areas of semi-natural land cover. Dominated by ancient, small-scale field patterns with a few isolated areas of modern enclosure.	Landscape dominated by semi-natural land cover. Where a field pattern exists this is characterised by small-scale, ancient fields.

Assessment method

6.35 The landscape sensitivity study is based on an evaluation of key aspects of the East Hampshire District Landscape Character Assessment (2005-2006). The key characteristics of each landscape character area (LCA) within East Hampshire (but outside of the South Downs National Park) were assessed against each of the criteria to arrive at a judgement as to their potential sensitivity to wind turbine and solar energy development.

6.36 Sensitivity is judged on a five-point scale from 'high' to 'low' as set out in **Table 6.4**. The process is based on professional judgement and the relative importance of each criterion varies between LCAs; key characteristics may identify where a particular criterion is more important, and should therefore be given greater weight in the judgement of sensitivity.

Table 6.4: Sensitivity definitions

Sensitivity Level	Definition
High	Key characteristics and qualities of the landscape are highly vulnerable to change from wind and solar energy development. Such development is likely to result in a significant change in character.
High-moderate	Key characteristics and qualities of the landscape are vulnerable to change from wind and solar energy development. There may be some limited opportunity to accommodate wind turbines/ solar panels without significantly changing landscape character. Great care would be needed in siting and design.
Moderate	Some of the key characteristics and qualities of the landscape are vulnerable to change. Although the landscape may have some ability to absorb wind and solar energy development, it is likely to cause a degree of change in character.

Sensitivity Level	Definition
	Care would be needed in siting and design.
Moderate-low	Fewer of the key characteristics and qualities of the landscape are vulnerable to change. The landscape is likely to be able to accommodate wind and solar energy development with limited change in character. Care is still needed when siting and designing to avoid adversely affecting key characteristics.
Low	Key characteristics and qualities of the landscape are robust in that they can withstand change from the introduction of wind turbines and solar panels. The landscape is likely to be able to accommodate wind and solar energy development without a significant change in character. Care is still needed when siting and designing these developments to ensure best fit with the landscape.

6.37 The assessment was carried out initially as a desk-based exercise, drawing on information in the 2006 landscape character assessment and other sources identified for each criterion. This was followed up with field work (undertaken in September 2018) to view each LCA in the field and make any additional observations. Field work was particularly important for criteria such as skylines and inter-visibility, which may not be consistently described in the available documentation, and also assists with verification of desk-based material.

6.38 The sensitivity assessment identifies the underlying sensitivity of the landscape, as it appears at the time of the survey. It therefore will consider operational development but not potential cumulative change.

Findings

6.39 The detailed assessments for each character are set out in **Appendix 1**.

6.40 For each area, the assessment provides:

- A map of the landscape character area and representative photographs.
- A summary description of the LCA.
- A description of the LCA against each of the assessment criteria.
- An overall judgement on landscape sensitivity for the LCA, in relation to each of the development scenarios /typologies.
- Notes on any variations in landscape sensitivity within the LCA.

6.41 **Table 6.5** summarises the findings of the sensitivity study for each LCA and in relation to each of the development scenarios, as described in detail above. **Figures 6.2-6.5** set out the findings of the landscape sensitivity assessment for each scale of wind development and **Figures 6.6-6.9** for each scale of solar development.

Table 6.5: Summary of Landscape Sensitivity Assessment Findings

Landscape Character Area	'Small' Wind	'Medium' Wind	'Large' Wind	'Very Large' Wind	'Small' Solar	'Medium' Solar	'Large' Solar	'Very Large' Solar
2b: Four Marks Clay Plateau	Moderate	Moderate / High	High	High	Low/ moderate	Moderate	Moderate / High	High
3a and 3f: Clanfield Downland Mosaic / Horndean-Clanfield Edge	Moderate	Moderate / High	Moderate / High	High	Low/ moderate	Moderate	Moderate / High	High
3d: Lasham	Low/ moderate	Moderate	Moderate / High	High	Moderate	Moderate	Moderate / High	High
3e: Ropley Downland Mosaic	Moderate	Moderate / High	High	High	Low/ moderate	Moderate	High	High
4b: Northern Wey Valley	Low/ moderate	Moderate	High	High	Low/ moderate	Moderate	Moderate / High	Moderate / High
6c: Worldham	Low/ moderate	Moderate	Moderate / High	High	Low/ moderate	Moderate	Moderate	Moderate / High
7b and 7c: Kingsley / Blackmoor and Alice Holt	Moderate	Moderate / High	High	High	Low/ moderate	Moderate	Moderate / High	High
8c: Whitehill to Liphook Farmland and Heath Mosaic	Moderate	Moderate / High	High	High	Moderate	Moderate / High	Moderate / High	High
9b: Ludshott and Bramshott Commons	Moderate / High	High	High	High	Moderate	Moderate / High	High	High
10a: Havant Thicket and Southleigh Forest	Moderate	Moderate / High	High	High	Moderate	Moderate	Moderate / High	High

6.42 The sensitivity study indicates that large scale wind turbines and solar energy developments could not be accommodated within the District without resulting in potentially significant landscape effects. This is primarily as a result of:

- the relatively settled nature of, and frequent human scale features within the landscape;
- the frequent trees and woodland within the landscape;
- the strongly rural character of the landscape with high levels of relative tranquillity;
- high levels of intervisibility across the landscape from the downland areas;
- the proximity and contribution landscapes make in the setting of views from the South Downs National Park and Surrey Hills AONB; and
- the continuation of character of these nationally protected landscapes into the study area.

6.43 Areas in the north of the District (e.g. LCA 3d: Lasham and 4b: Northern Wey Valley) tend to have lower levels of sensitivity to wind energy development, as they have less association and intervisibility with the South Downs National Park. These areas, along with LCA 6c: Worldham, have the most potential for wind and solar energy development.

6.44 LCAs 9b: Ludshott and Bramshott Commons and 8c: Whitehill to Liphook have higher levels of sensitivity to both wind and solar energy development due to the presence of extensive tracts of internationally designated heathland and their location adjacent to the South Downs National Park and Surrey Hills AONB.

Landscape Sensitivity and Technical Potential

6.45 The findings of the assessment of landscape sensitivity were overlaid with the assessment of technical potential for each scale of wind and solar development to identify 'areas of potential suitability'. Only those areas with a landscape sensitivity of *moderate, low/moderate* or *low* were included in this assessment. **Figures 6.10 and 6.11** show the results of the areas of potential for small and medium scale wind. No areas were identified in the assessment of moderate or lower landscape sensitivity to large or very large scale wind turbines. **Figures 6.12-6.14** show the results of the areas of potential for small, medium and large scale solar. No areas were identified in the assessment of moderate or lower landscape sensitivity to very large scale solar developments.

6.46 Further guidance on how these findings could be used to inform planning policy is contained in **Chapter 8**.

Figure 6.1: Landscape character areas in East Hampshire

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

- 2b: Four Marks Clay Plateau
- 3a: Clanfield Downland Mosaic
- 3d: Lasham
- 3e: Ropley
- 3f: Horndean - Clanfield Edge
- 4b: Northern Wey Valley
- 6c: Worldham
- 7b: Kingsley / Blackmoor
- 7c: Alice Holt
- 8c: Whitehill to Liphook Farmland and Heath Mosaic
- 9b: Ludshott and Bramshott Commons
- 10a: Havant Thicket and Southleigh Forest

Map Scale @A3: 1:150,000

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.2: Sensitivity to small scale wind turbine development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

2b: Four Marks

3a: Clanfield

3d: Lasham

3e: Ropley

3f: Horndean - Clanfield Edge

4b: Northern Wey Valley

6c: Worldham

7b: Kingsley / Blackmoor

7c: Alice Holt

8c: Whitehill to Liphook

9b: Ludshott and Bramshott Commons

10a: Havant Thicket and Southleigh Forest

Sensitivity level

Low/Moderate

Moderate

Moderate/High

Map Scale @A3: 1:150,000

0 5 10 km

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_small_scale_A3L 04/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.3: Sensitivity to medium scale wind turbine development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

2b: Four Marks

3a: Clanfield

3d: Lasham

3e: Ropley

3f: Horndean - Clanfield Edge

4b: Northern Wey Valley

6c: Worldham

7b: Kingsley / Blackmoor

7c: Alice Holt

8c: Whitehill to Liphook

9b: Ludshott and Bramshott Commons

10a: Havant Thicket and Southleigh Forest

Sensitivity level

Moderate

Moderate/High

High

Map Scale @A3: 1:150,000

LUC RICARDO East Hampshire District Council

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_medium_scale_wind_A3L 08/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.4: Sensitivity to large scale wind turbine development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

2b: Four Marks

3a: Clanfield

3d: Lasham

3e: Ropley

3f: Horndean - Clanfield Edge

4b: Northern Wey Valley

6c: Worldham

7b: Kingsley / Blackmoor

7c: Alice Holt

8c: Whitehill to Liphook

9b: Ludshott and Bramshott Commons

10a: Havant Thicket and Southleigh Forest

Sensitivity level

Moderate/High

High

Map Scale @A3: 1:150,000

LUC RICARDO East Hampshire District Council

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_large_scale_wind_A3L 04/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.5: Sensitivity to very large scale wind turbine development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

- 2b: Four Marks
- 3a: Clanfield
- 3d: Lasham
- 3e: Ropley
- 3f: Horndean - Clanfield Edge
- 4b: Northern Wey Valley
- 6c: Worldham
- 7b: Kingsley / Blackmoor
- 7c: Alice Holt
- 8c: Whitehill to Liphook
- 9b: Ludshott and Bramshott Commons
- 10a: Havant Thicket and Southleigh Forest

Sensitivity level

High

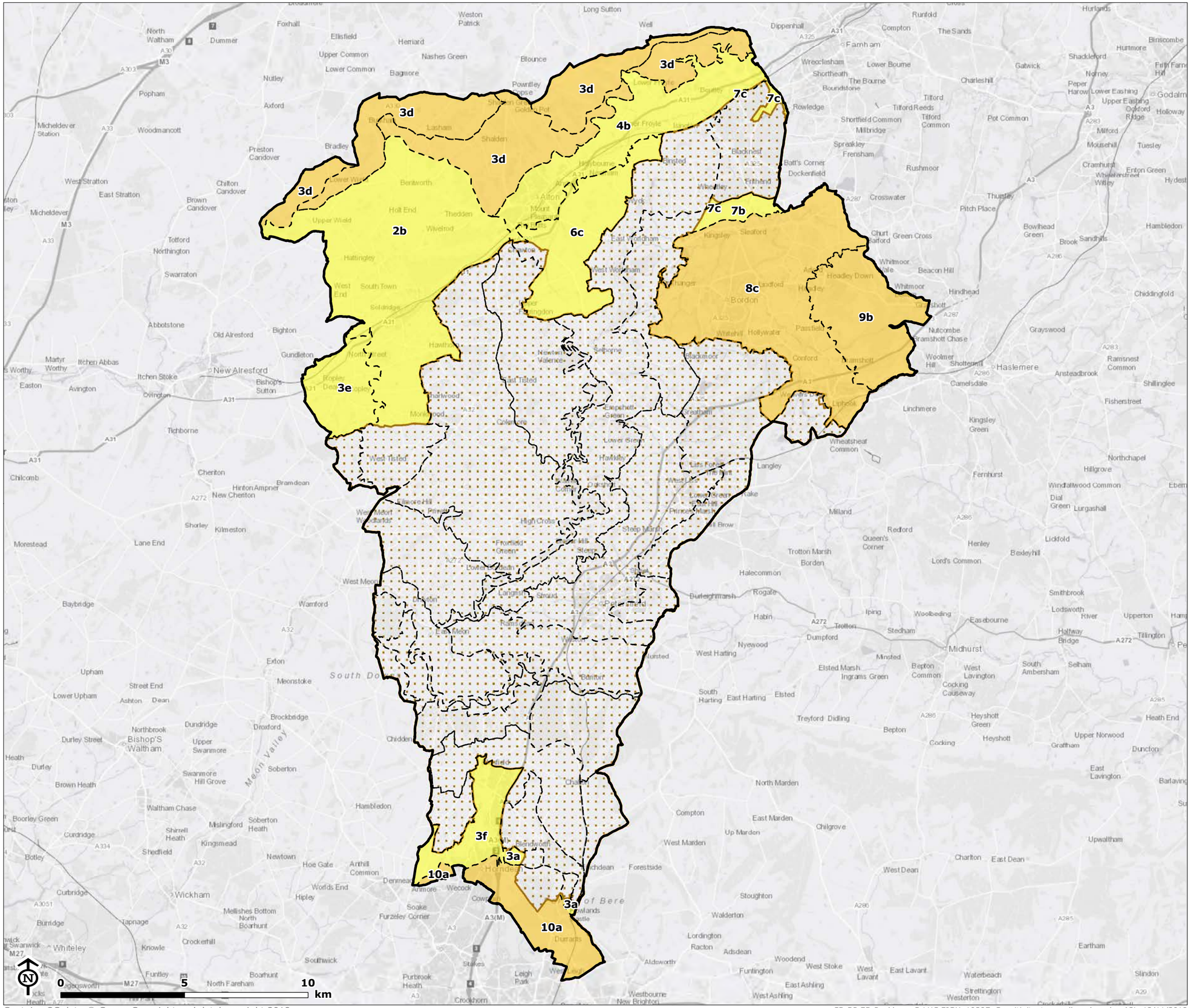
Map Scale @A3: 1:150,000

LUC RICARDO East Hampshire District Council

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_very_large_scale_wind_A3L 04/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.6: Sensitivity to small scale solar development



East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

- 2b: Four Marks
- 3a: Clanfield
- 3d: Lasham
- 3e: Ropley
- 3f: Horndean - Clanfield Edge
- 4b: Northern Wey Valley
- 6c: Worldham
- 7b: Kingsley / Blackmoor
- 7c: Alice Holt
- 8c: Whitehill to Liphook
- 9b: Ludshott and Bramshott Commons
- 10a: Havant Thicket and Southleigh Forest

Sensitivity level

- L-M
- M

Map Scale @A3: 1:150,000

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_small_scale_solar_A3L 12/11/2018

Figure 6.7: Sensitivity to medium scale solar development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

2b: Four Marks

3a: Clanfield

3d: Lasham

3e: Ropley

3f: Horndean - Clanfield Edge

4b: Northern Wey Valley

6c: Worldham

7b: Kingsley / Blackmoor

7c: Alice Holt

8c: Whitehill to Liphook

9b: Ludshott and Bramshott Commons

10a: Havant Thicket and Southleigh Forest

Sensitivity level

Moderate

Moderate/High

Map Scale @A3: 1:150,000

LUC RICARDO East Hampshire DISTRICT COUNCIL

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_medium_scale_solar_A3L 04/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.8: Sensitivity to large scale solar development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

2b: Four Marks

3a: Clanfield

3d: Lasham

3e: Ropley

3f: Horndean - Clanfield Edge

4b: Northern Wey Valley

6c: Worldham

7b: Kingsley / Blackmoor

7c: Alice Holt

8c: Whitehill to Liphook

9b: Ludshott and Bramshott Commons

10a: Havant Thicket and Southleigh Forest

Sensitivity

Moderate

Moderate/High

High

Map Scale @A3: 1:150,000

LUC RICARDO East Hampshire District Council

Figure 6.9: Sensitivity to very large scale solar development

East Hampshire District Council boundary

South Downs National Park (not assessed)

Landscape character area

2b: Four Marks

3a: Clanfield

3d: Lasham

3e: Ropley

3f: Horndean - Clanfield Edge

4b: Northern Wey Valley

6c: Worldham

7b: Kingsley / Blackmoor

7c: Alice Holt

8c: Whitehill to Liphook

9b: Ludshott and Bramshott Commons

10a: Havant Thicket and Southleigh Forest

Sensitivity

Moderate/High

High

Map Scale @A3: 1:150,000

LUC RICARDO East Hampshire DISTRICT COUNCIL

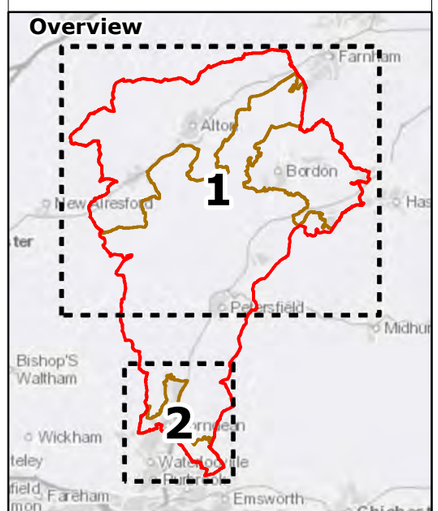
CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_to_very_large_scale_solar_A3L 04/10/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.10: Landscape sensitivity and technical opportunity for small scale wind developments

- East Hampshire District Council boundary
- South Downs national park
- Technical opportunity areas for small scale turbines (<40m tip height)
- Landscape character areas with low/moderate sensitivity
  - 3d: Lasham
  - 4b: Northern Wey Valley
  - 6c: Worldham
- Landscape character areas with moderate sensitivity
  - 2b: Four Marks
  - 3a: Clanfield
  - 3e: Ropley
  - 3f: Horndean - Clanfield Edge
  - 7b: Kingsley / Blackmoor
  - 7c: Alice Holt
  - 8c: Whitehill to Liphook
  - 10a: Havant Thicket and Southleigh Forest

Overview



Map Scale @A3: 1:90,000

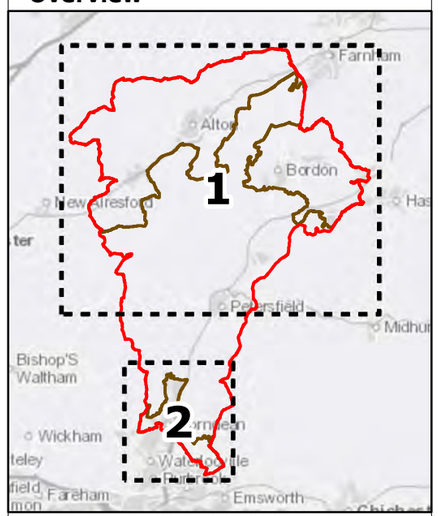
CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_and_opportunity_for_small_scale_wind_A3L 12/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.11: Landscape sensitivity and technical opportunity for medium scale wind developments

- East Hampshire District Council boundary
- South Downs national park
- Technical opportunity areas for medium scale turbines (<40m - 80m tip height)
- Landscape character areas with moderate sensitivity
  - 3d: Lasham
  - 4b: Northern Wey
  - 6c: Worldham

Overview



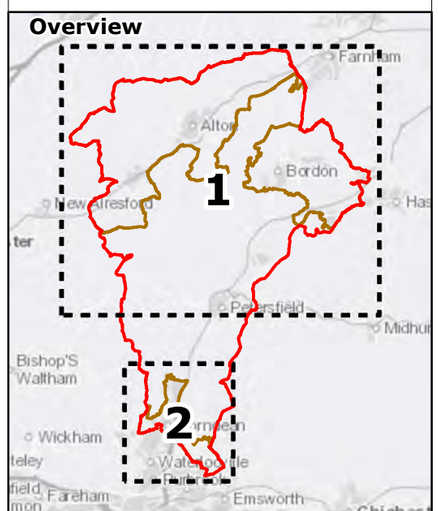
Map Scale @A3: 1:90,000

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_and_opportunity_for_medium_scale_wind_A3L 13/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.12: Landscape sensitivity and technical opportunity for small scale solar developments

- East Hampshire District Council boundary
- South Downs national park
- Opportunity areas for small scale solar developments
- Landscape character areas with low/moderate sensitivity
  - 2b: Four Marks
  - 3a: Clanfield
  - 3e: Ropley
  - 3f: Horndean - Clanfield Edge
  - 4b: Northern Wey Valley
  - 6c: Worldham
  - 7b: Kingsley / Blackmoor
  - 7c: Alice Holt
  - 9b: Ludshott and Bramshott Commons
- Landscape character areas with moderate sensitivity
  - 3d: Lasham
  - 8c: Whitehill to Liphook
  - 10a: Havant Thicket and Southleigh Forest



CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_and_opportunity_for_small_scale_solar_A3L 12/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.13: Landscape sensitivity and technical opportunity for medium scale solar developments

East Hampshire District Council boundary

South Downs national park

Technical opportunity areas for medium scale solar developments

Landscape character areas with moderate sensitivity 2b: Four Marks
3a: Clanfield
3d: Lasham
3e: Ropley
3f: Horndean - Clanfield Edge
4b: Northern Wey Valley
6c: Worldham
7b: Kingsley / Blackmoor 7c: Alice Holt
10a: Havant Thicket and Southleigh Forest

Overview

Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_and_opportunity_for_medium_scale_solar_A3L 12/11/2018

Renewable and Low Carbon Study for the East Hampshire District

Figure 6.14: Landscape sensitivity and technical opportunity for large scale solar developments

- East Hampshire District Council boundary
- South Downs national park
- Technical opportunity areas for large scale solar developments
- Landscape character area with moderate sensitivity
  - 6c: Worldham

Overview

Map Scale @A3: 1:90,000

0 2.5 5 km

CB:BP EB:Packham_B LUC FIGX_10397_Sensitivity_and_opportunity_for_large_scale_solar_A3L 12/11/2018

7. Enhanced Energy Performance Standards

7 Enhanced Energy Performance Standards

Introduction

7.1 This chapter provides a review of the general context, policy framework and standards relevant to the setting of policy relating to energy performance standards in domestic homes and non-domestic buildings within East Hampshire.

7.2 Around 40% of the UK's energy consumption is used to provide heating and hot water in buildings. It accounts for 20% of our greenhouse gas emissions[29]. Planning policy gives local authorities powers to increasing the energy efficiency of our homes and workplaces.

7.3 While building regulations have already improved energy performance, they will need to be tightened further to meet our long-term climate change commitments. Without further enhancing standards, new homes built under the local plan will still need to undergo a deeper, and potentially disruptive, energy efficiency retrofit in future. It is far easier and cheaper to design and build low carbon buildings from the outset.

7.4 East Hampshire's current Local Plan Joint Core Strategy's Policy CP24 Sustainable Construction (adopted 2014) sets a high standard for new developments, with a combination of requirements linked to the Code for Sustainable Homes, the carbon compliance standards proposed by the Zero Carbon Hub with 10% of energy demand met by decentralised and renewable or low carbon energy sources. All properties completed after 2016 are expected to meet Code level 5. Larger multi-residential and non-domestic schemes, with floor area above 500m², have been expected to meet the BREEAM 'Excellent' standard since 2013.

Setting domestic energy performance standards

7.5 Since East Hampshire's current Local Plan was adopted in 2014 the policy context for housing energy standards has changed substantially. The Government was committed to introducing a national zero carbon standard for new homes by 2016 but the Code for Sustainable Homes was withdrawn and the zero-carbon standard was abandoned to reduce construction costs as part of a renewed focus on increasing housing delivery.

7.6 Through a Written Ministerial Statement in March 2015, the Government also sought to limit the ability of local authorities to set energy performance standards higher than the equivalent of Code for Sustainable Homes Level 4 'until commencement of amendments to the Planning and Energy Act 2008'. However, after the General Election in 2015 the amendments were not enacted. These changes led to uncertainty as to what local authorities could do at the local level to encourage enhanced energy and emissions standards in new homes.

7.7 Recent Government clarifications[30] and supportive statements[31],[32] have made it clear that local planning authorities do have the powers to require energy performance standards equivalent to Code Level 4, equivalent to a 19% reduction on the current Part L of Building Regulations 2013. Brighton and Hove City Council and Ipswich District Council have recently adopted this standard which provides a clear precedent for its use.

[29] https://www.theccc.org.uk/wp-content/uploads/2016/10/Next-steps-for-UK-heat-policy-Committee-on-Climate-Change-October-2016.pdf

[30] An exchange in the House of Lords on 6th February 2017 during the passage of the Neighbourhood Planning Bill: Baroness Parminter asked in relation to carbon reductions: "Can the Minister confirm that the Government will not prevent local councils requiring higher building standards? There is some lack of clarity about whether local authorities can carry on insisting in their local plans on higher standards. Will the Government confirm that they will not prevent local authorities including a requirement for higher building standards?"

7.8 The new Revised National Planning Policy Framework was published on 24th July 2018 and reaffirms this position. Paragraph 150 on planning for climate change, states:

> *New development should be planned for in ways that… b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.*

7.9 The Government provides an unambiguous clarification on the ability of local authorities to set energy requirements above Building Regulation in its summary response to the NPPF consultation. The answer to Question 33 states:

> *"the Framework does not prevent local authorities from using their existing powers under the Planning and Energy Act 2008 or other legislation where applicable to set higher ambition. In particular, local authorities are not restricted in their ability to require energy efficiency standards above Building Regulations".*

7.10 Legal interpretation[33,34] also suggests that local authorities may be able to set energy requirements beyond the national technical standards should they wish, with some authorities implementing ambitious zero carbon standards, as with London's emerging new London Plan policy which includes a 35% reduction in emissions over Building Regulations.

Building Regulations Part L 2013

7.11 The current building energy and emissions standards are set out in Part L 2013 and came into force in April 2014. It includes a layered approach to ensuring minimum energy performance is met. It includes:

- Minimum insulation values for the building fabric components and air permeability.
- A fabric energy efficiency standard that sets an overall minimum heating and cooling demand.
- An overall carbon emission standard. The 2013 regulations required a 6% reduction in emissions over the 2010 Building Regulations.

7.12 Developers have considerable flexibility in how they meet the standards. In practice, they might choose to fit triple glazing, install additional insulation, or install on-site low carbon heat and/or power.

Meeting the national technical energy standard

7.13 The national technical energy standard is set at the equivalent of Code for Sustainable Homes Level 4, or a 19% reduction in the overall carbon emission standard over the current Part L of Building Regulations 2013.

7.14 To meet the standard developers still need to meet the Building Regulations minimum insulation values and fabric energy efficiency standard and then decide on the most appropriate approach to meeting the higher overall carbon emissions performance level.

7.15 Evidence to support the technical feasibility and economic viability of the national technical energy standard is provided below and establishes it as a sensible target which can be achieved on a wide range of housing types and development sites without adding substantial development costs.

Lord Beecham replied: "The noble Baroness asked specifically whether local authorities are able to set higher standards than the national ones, and I can confirm that they are able to do just that."

[31] On 21 May 2018 prime minister Theresa May pledged to at least halve the energy use of new buildings by 2030 as part of the clean growth, strategy and industrial strategy: https://utilityweek.co.uk/may-pledges-halve-energy-usage-new-buildings/

[32] The Government's response to the draft revised National Planning Policy Framework consultation, July 2018 states "the Government intends to consult on further improving energy requirements for new homes where the evidence suggests that there are cost effective and affordable opportunities, and it is safe and practical to do so".

[33] TCPA, May 2018, Planning for Climate Change A Guide for Local Authorities

[34] Solar Trade Association, April 2018, Leading Lights How local authorities are making solar and energy storage work today

Technical Feasibility

7.16 New homes have already been built to the national technical standard for energy performance at scale. The UK Green Building Council's research suggests that as of early 2018 there were approximately 107,000 homes in England built to this standard. They can be built using traditional construction methods and materials.

7.17 The national technical standard for energy performance is flexible and there are many options available to developers to meet both energy carbon emission reductions targets. These approaches fall into two main categories:

- Improved fabric energy efficiency standards and installing low carbon generating technologies, usually roof top PV. See '**Good + PV'** in the table below.
- A fabric first approach which meets the standard through improved insulation, air tightness and reducing heat lost through thermal bridges and mechanical ventilation. See '**Advanced'** in the table below.

7.18 **Table 7.1** compares these standards to the Building Regulations 2013 Part L limiting fabric parameters alongside specifications for fabric improvement packages that can be used to meet Code level 4.

Table 7.1: Comparing Building Regulations 2013 Part L limiting fabric parameters and Code 4 fabric improvement packages from DCLG Cost of building to the Code for Sustainable Homes: Updated cost review (2011)

Fabric Specifications	Part L 2013	Good + PV	Advanced
Wall U-value (W/m2K)	0.3	0.18	0.15
Floor U-value (W/m2K)	0.25	0.15	0.1
Roof U-value (W/m2K)	0.2	0.13	0.1
Window U-value (W/m2K)	2.0	1.4	1.1
Door U-value (W/m2K)	2.0	1.4	1.1
Air permeability (m3/m2/hr)	10	3	1
Thermal Bridging (W/m2K)	0.15	0.06	0.04
Mode of ventilation	Natural	Natural	MVHR

7.19 For example, a 3 bed semi-detached house could meet the national technical standard using the 'Good + PV' fabric package with a 1kW PV array or with the 'Advanced' fabric package only. The AimC4[35] project worked with a consortium of house-builders to demonstrate volume production of affordable Code Level 4 built using the fabric first approach. Such precedents give confidence that the standard is technically feasible and is applicable to all housing types and development sites, including dense urban infill to detached off gas grid properties.

[35] https://www.designcouncil.org.uk/sites/default/files/asset/document/DC%20CABE%20HOUSING%20CASE%20STUDY_2_AIMC4_310316%20FINAL.pdf

Economic viability

7.20 Meeting the national technical standard which requires a 19% improvement beyond Part L 2013 requires either enhanced building material specifications and/or low and zero carbon generation, usually PV. These result in an additional development cost which can be considered in viability testing.

7.21 There have been several studies which assess the additional capital costs of meeting the Code for Sustainable Homes levels and these have been reviewed to provide evidence of the estimated costs of meeting the national technical standard.

7.22 The data below is from a Government commissioned report as part of the Housing Standards Review published in 2014. **Table 7.2** presents the extra cost of building homes to the national 'technical energy performance' standard over current Building Regulations Part L 2013. Figures are provided for both technically deliverable approaches and are applicable to a range of development scales.

Table 7.2: The extra cost of building to the national technical energy performance standard over current Building Regulations Part L 2013 (DCLG, Housing Standards Review Cost Impacts 2014)

Approach	1 Bed Flat	2 Bed Flat	2 Bed House	3 Bed House	4 Bed House
Renewables approach (PV)	£125	£500	£469	£625	£938
Fabric first approach	£278	£412	£703	£812	£1,150

7.23 This cost evidence is from a comprehensive study using national construction cost information. It should be noted that anecdotal, but more recent, evidence suggests higher cost estimates with the PV-led approach at £1,500-£2,000 per home and a fabric first approach at £2-3,000 for a mid or end terraced home and up to £5-6,000 for a detached house. Developers may however benefit from higher energy standards, through increased sale value or faster sales due to the attractiveness of lower running costs or energy revenues to the homebuyer.

7.24 The Home Quality Mark (HQM)[36] is a new national standard for new homes which includes indicators related to design, construction quality and running costs. The framework assesses goes beyond energy performance and covers water consumption, internal comfort and health, resilience and safety in addition to the home occupier's experience. It can provide an independent standard to assess the quality of new homes. While the HQM could be used to improve energy performance, it is a new standard and therefore limited evidence is available on costs and efficacy.

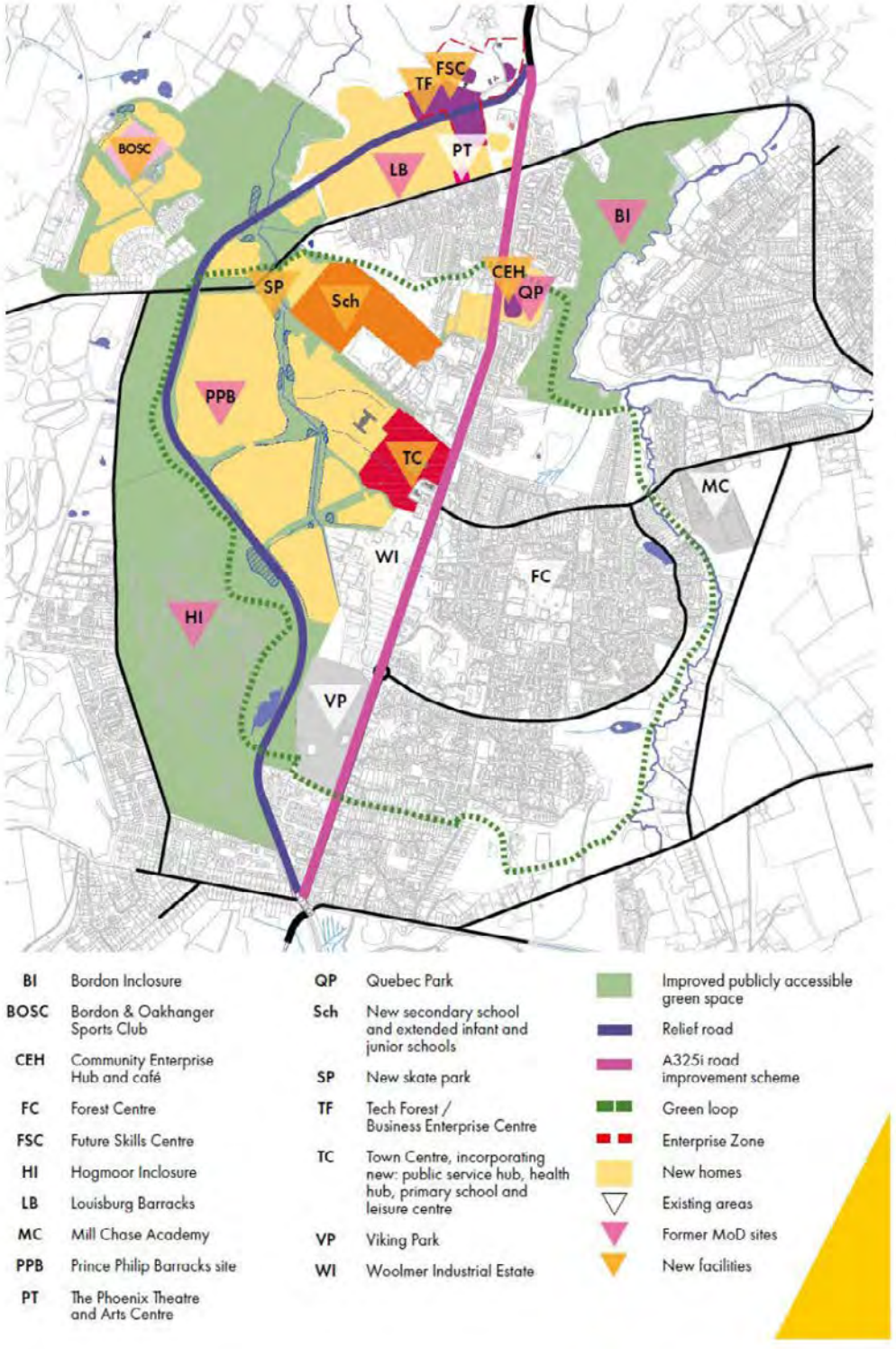
Whitehill and Bordon

7.25 Whitehill and Bordon, located in the northeast of the District, has been selected as one of 10 NHS England Healthy New Town demonstrator sites across the country[37]. The vision for the town is to become a green, healthy and connected town, and it is being constructed on over 100 hectares of ex-MOD land. The regeneration of Whitehill and Bordon is a complex 15-year collaborative and transformational place-making programme, involving a number of partners including East Hampshire District Council, DIO (Defence Infrastructure Organisation), Homes England (HE) and the Local Enterprise Partnerships (Enterprise M3). The development programme includes the provision of a new town centre, 3,350 new homes, 5,500 jobs and nearly 100,000 sqm of new commercial, retail and leisure floor space, as well as the protection and enhancement of around 150 hectares of green space.

7.26 The majority of new homes at Whitehill and Bordon are designed to reduce emissions by 10% (per building) beyond building regulations, with some homes following a fabric first approach and others meeting it through rooftop solar PV.

[36] https://www.homequalitymark.com
[37] whitehillbordon.com

Figure 7.1: Whitehill and Bordon development masterplan[38]



7.27 The 100 homes in the Quebec Park development phase on the site of the old Quebec Barracks has been trialling the Zero Carbon Hub's proposed zero carbon standards that were proposed for the Part L1A 2016 Building Regulations[39]. The standard included strict limits on both fabric energy efficient (FEES) and carbon compliance for different dwelling types as well as allowable solutions payments but is no longer government policy.

[38] whitehillbordon.com
[39] https://www.gov.uk/government/publications/conservation-of-fuel-and-power-approved-document-l

7.28 A green measures strategy for the Prince Philip Park development that includes 2,400 new homes as well as a town centre is a flexible policy that evolves overtime to take advantage of new technology and opportunities. This has included enhanced energy standards, an overheating strategy for town centre as well as green infrastructure, sustainable design and construction. More than £6.5 million has been allocated to green measures.

Setting non-domestic energy performance standards

7.29 Current Building Regulations Part L2A (2013 edition incorporating 2016 amendments) sets out the minimum energy performance standards in new non-domestic buildings (i.e. new buildings other than dwellings). Part L2A includes multiple criteria that ensure minimum energy performance and carbon standards are met:

- Minimum insulation values for the building fabric components and air permeability.
- Solar gains are passively controlled to reduce the demand for cooling and the risk of overheating.
- Measures that enable the building to be operated energy efficiently.
- An overall carbon emission standard. The 2013 regulations required a 9% reduction in emissions over the previous 2010 Building Regulations[40].

7.30 The wider range of non-domestic buildings types, construction methods and uses covered by Part L2A mean that there is greater latitude in how they are met, with no overall fabric energy efficiency standard and flexibility in how the criteria are met. Detailed building energy modelling is undertaken to prove compliance.

Exceeding building regulations

7.31 Local planning authorities are not restricted to a national technical energy performance standard for non-domestic buildings and are free to set standards above building regulations subject to viability.

7.32 BREEAM is a certification scheme which assesses the sustainability performance of non-domestic buildings developed by BRE. Credits are awarded for meeting a range sustainability measures with developers given flexibility to choose how to obtain sufficient credits to be awarded an overall score of Pass, Good, Very good, Excellent or Outstanding. BREEAM includes some minimum standards with mandatory expectations rising with the overall rating. The BREEAM scheme is regularly updated to ensure that it drives further improvements as building standards rise overall. Changes to the current 2018 scheme include more demanding material life cycle assessments, indoor air quality plans and a greater emphasis on addressing the energy performance gap between design and actual performance.

7.33 The BREEAM assessment's primary energy includes a range of energy requirements which reward a reduction in energy use and carbon emissions beyond building regulations with additional credits available for further measures which fall outside of Building Regulations, such as energy monitoring, energy efficient equipment and external lighting for example. There are minimum energy standards linked to the 'Excellent' and 'Outstanding' ratings.

Economic viability

7.34 The Delivering Sustainable Buildings Savings and Payback Report (BRE, 2014) provides the most up-to-date evidence of the additional construction costs of achieving the energy aspects of BREEAM for different types of non-domestic buildings. The evidence is based on cost information collected by Sweett Group from actual building projects chosen as representative examples of new buildings in the UK. This includes an air-conditioned office, a secondary school, and a community healthcare centre. **Table 7.3** below indicates the increase in capital cost relative to BREEAM rating (%) for three case study building types and locations.

[40] National Calculation Methodology Modelling Guide 2013 Edition.

7.35 Several BREEAM credits are directly linked to site conditions such as transport, access to amenities, flood risk and ecological value. A less sustainable site will be restricted in the number of free or low-cost credits they can obtain. So, while construction on an urban brownfield site with good public transport can gain many credits at lower cost, a greenfield site with poor access to amenities and public transport may not be able to achieve BREEAM 'Excellent' for example. The impact of location on the cost of achieving BREEAM ratings is reflected in the Table below.

Table 7.3: Increase in capital cost relative to BREEAM rating (%) for three case study building types and locations (BRE, 2014)

Building type	Location	Pass	Good	Very good	Excellent
Air-conditioned office	Poor	0%	0.15%	0.34%	1.71%
	Typical	0%	0.05%	0.22%	0.96%
	Good	0%	0%	0.13%	0.87%
Secondary school	Poor	0%	0.10%	0.35%	1.68%
	Typical	0%	0.03%	0.28%	1.61%
	Good	0%	0%	0.11%	1.22%
Community healthcare centre	Poor	0%	0.37%	0.96%	5.51%
	Typical	0%	0.20%	0.82%	5.06%
	Good	0%	0%	0.50%	3.24%

7.36 Table 7.3 is based on information collated from outline design specifications, plans and cost data for actual, existing buildings. The 'base case' building was chosen as a representative example of a type commonly built in the UK that complies with the 2010 Building Regulations. Changes to BREEAM since then recognise the regulatory improvements in energy performance with the energy credits available adjustment accordingly[41]. Other studies of the costs of meeting BREEAM criteria under the current 2013 Building Regulations have been undertaken. While they use different assumptions and case studies, the evidence suggests the cost of achieving BREEAM has reduced in recent years[42].

On-site energy technology considerations

7.37 This section provides high-level guidance on the types of on-site energy technologies that could be considered at development scale. **Table 7.4** below summaries the potential advantages and issues associated with each and scores the opportunity in East Hampshire as 'High', 'Medium' or 'Low'.

[41] BRE, 2014, BREEAM UK New Construction 2014 Key updates from 2011.
[42] BRE, 2016, The value of BREEAM A review of latest thinking in the commercial building sector.

Table 7.4: On-site renewable energy and low carbon technology high-level summary

Technology	Scale	Advantages	Considerations	Opportunity
Heat generating				
Solar Thermal	Individual dwellings	Installed on roof and does not require additional land.	Will not meet full hot water demand and other heating technologies will be required.	Medium
Air Source Heat Pump (ASHP)	Individual dwellings	Wall-mounted units are flexible and easy to install.	ASHP works best in properties that are well insulated with good airtightness.	High
Ground Source Heat Pump (GSHP)	Individual dwellings & communal	Ground stays at constant temperature throughout the year.	Land area required is not always available. Poorly designed and operated GSHP can cause ground freeze	Medium
Water Source Heat Pump (WSHP)	Individual dwellings & communal	Water body stays at constant temperature throughout the year.	Sites need to be developed close to large water bodies. EA permits required.	Low
Biomass boiler	Individual dwellings & communal	Can encourage the development of a local and sustainable wood fuel supply.	Requires additional space for boiler, fuel store and deliveries. Air quality concerns.	Medium
Heat and electricity generating				
Gas-fired Combined Heat and Power)	Communal & neighbourhood	District heating network that also produces electricity.	Requires additional space for energy centre. Needs high heat demand density.	Low
Biomass Combined Heat and Power	Communal & neighbourhood	Low carbon district heating network that also produces electricity	Requires additional space for energy centre. Expensive to operate and needs high heat demand density. Air quality concerns.	Low
Electricity generating				
Roof mounted solar PV	Individual dwellings	Installed on roof and does not require additional land. Preferred by developers.	Shading and orientation.	High

Technology	Scale	Advantages	Considerations	Opportunity
Run of river micro hydro	Communal	Ideal community energy asset that takes advantage of local resources.	Limited opportunities in East Hampshire.	Low
Wind turbine	Communal	Appropriately designed and located turbines can meet all of a developments energy needs	Landscape and visual impact and reduced performance when located near to buildings.	Low
Battery storage	Individual dwellings & communal	Increases the proportion of renewable energy generation consumed on the development. Provides grid balancing services.	New technology and regulatory uncertainty.	Medium

7.38 The following additional considerations should be taken into account when identifying the most suitable energy solution:

- Early incorporation – the earlier the technology is considered and incorporated into the design the more scope there is to ensure maximum energy efficiency is achieved.
- Planning and site restrictions – the energy potential for different technologies has been examined in detail within **Chapter 5.** The outputs from this highlight the energy potential within the District and the GIS mapping can be used to identify where technologies are most suited.
- The cost and energy savings of a measure should be assessed - potentially comprising a lifecycle impact assessment, to ensure the measures provide reasonable savings for the cost.

Overheating risk

7.39 Modern highly insulated homes can become excessively warm. Sustained high internal temperatures particularly at night can be uncomfortable and potentially dangerous[43]. Longer and more intense heatwaves as a result of climate change will exacerbate the health risks. The design and construction of new homes must be adapted to take account of overheating now and in the future[44].

7.40 The Building Regulations already recognises overheating risk and requires 'appropriate passive control measures to limit the effect of heat gains on indoor temperature in summer', even where air-conditioning is specified. Compliance is demonstrated using an overheating calculation (SAP Appendix P) that looks at internal temperatures during summer. However, it is a simplified calculation based on today's average summer temperatures, without considering what happens on severe hot days. It does not take into account the complex interactions between the buildings design, environment and how it is used.

[43] CCC, 2017, UK Climate Change Risk Assessment.
[44] NHBC, 2012, Understanding overheating – where to start: An introduction for house builders and designers.

7.41 The SAP overheating calculation is a compliance check and is not intended as a design tool. dynamic thermal simulation modelling is deployed routinely in the design of non-domestic buildings but is currently rarely used for domestic schemes. A range of tools are available[45], including the Chartered Institution of Building Services Engineers Guide A: Environmental Design 2015 provides a good basis for addressing overheating risk.

7.42 Larger residential development sites could be asked to submit an overheating strategy as part of its planning application which demonstrates how overheating risks have been addressed, including the identification of dwelling overheating risk, now and in the future. It should demonstrate how design, orientation and landscape design effectively mitigate overheating risks.

[45] Zero Carbon Hub, 2015, Assessing Overheating: Risk Evidence Review.

8. Review of Planning Policy Approaches

8 Review of Planning Policy Approaches

Introduction

8.1 This section reviews the various planning policy approaches that could be incorporated within the emerging Local Plan in relation to renewable and low carbon energy. This includes a consideration of:

- Enhanced energy standards.
- Separation distances.
- Criteria based policies.
- Areas of suitability for wind.
- Energy opportunity maps.
- Allocation of sites.
- Community renewables.
- Local development orders.

8.2 These are discussed in turn, with a summary provided of the strengths and weaknesses of each policy approach.

Building energy performance standards

8.3 The legislative context for enhanced domestic energy performance standards has recently been clarified and makes it clear that local authorities have the freedom go beyond Building Regulations requirements. East Hampshire District Council should consider using the review of the Local Plan as an opportunity to update Policy CP24 Sustainable Construction.

8.4 The UK Green Building Council (UKGBC)[46] have proposed a local planning policy for domestic energy performance which could be used to adopt the national technical standard for all new homes. It is a carbon emissions-based outcome indicator which provides a clear and unambiguous target while giving developers flexibility in how the standard is met. The wording is consistent with the energy calculations developers already undertake to satisfy Building Regulations.

> *A 19% reduction on the Dwelling Emission Rate (DER) against the Target Emission Rate (TER) based on the 2013 Edition of the 2010 Building Regulations (Part L).*

8.5 The UKGBC also recommend that the policy incorporates the 'fabric first' principal in the energy performance target to effectively prioritises energy efficiency measures before energy supply or renewable energy is considered. Again, the wording is consistent with existing Building Regulations requirements.

> *The energy performance target should be achieved whilst meeting the TER solely from energy efficiency measures as defined within the SAP calculation model.*
>
> *For absolute clarity, the reference to 'solely energy efficiency measures' refers to DER against the TER (i.e. the current requirements of Part L 2013) not to the 19% improvement factor.*

8.6 East Hampshire have greater flexibility in how it sets non-domestic energy performance targets and currently expects BREEAM 'Excellent' to be achieved where feasible and viable. Experience suggests that it is challenging for developers to meet this because of the predominant types of

[46] UK Green Building Council, 2018, Driving sustainability in new homes: a resource for local authorities

development and BREEAMs location-based criteria. It is therefore recommended that BREEAM 'Very Good' is adopted as a technically feasible and financially viable compromise.

8.7 To ensure compliance with the domestic energy performance standards, 'as built' SAP calculations could be secured through a condition post-construction providing evidence that the required standards have been achieved. A BREEAM pre-assessment estimator or design stage assessment should be included with non-domestic planning applications as the BREEAM assessment process needs to be started at the design stage. The BREEAM certificate should be secured post-construction through a planning condition.

8.8 In addition the UKGBC advocates that local authorities should commit to all new homes (and buildings) being net zero carbon emissions by 2030 at the latest.

8.9 The strengths and weaknesses of adopting the proposed energy standards are summarised below.

Strengths:

- Going beyond Building Regulations to meet the proposed energy performance standards can be achieved on a wide range of housing types and development sites without adding substantial development costs.
- The evidence needed to confirm compliance can be prepared by the developers in a consistent easy to measure way.
- New homes have already been built to the national technical standard for energy performance at scale and the standard can be met using traditional construction methods and materials.
- Enhanced building energy performance standards represent the most cost-effective way of meeting climate change commitments.

Weaknesses:

- Developers need to be convinced of the benefits of going beyond the Building Regulation requirements and the potential impacts on viability.
- Enhanced building energy standards still incur additional development costs.
- The Government are planning to update Part L of the Building Regulations and at that point, the ability of local authorities to require developers to go beyond building regulations may be curtailed. It is unclear when Part L will be updated.

Separation distances

8.10 The proximity of large wind turbines to residential properties has become an important consideration in planning decisions for wind energy developments. Several councils in England have sought to impose separation distances between proposed turbines and residential properties. However, developers and climate change groups are concerned that this effectively represents an "anti-wind farm policy" that is not based on evidence.

8.11 It is important to note that there are no minimum separation distances required in English planning law or guidance. The Planning Practice Guidance which accompanies the NPPF [47] clearly states that:

> "*Local planning authorities should not rule out otherwise acceptable renewable energy developments through inflexible rules on buffer zones or separation distances. Other than when dealing with set back distances for safety, distance of itself does not necessarily*

[47] Available at: http://planningguidance.planningportal.gov.uk/blog/guidance/renewable-and-low-carbon-energy/developing-a-strategy-for-renewable-and-low-carbon-energy/

determine whether the impact of a proposal is unacceptable. Distance plays a part, but so does the local context including factors such as topography, the local environment and near-by land uses. This is why it is important to think about in what circumstances proposals are likely to be acceptable and plan on this basis."

8.12 A number of local authorities have however sought to introduce separation distances. For example Wiltshire Council amended its Core Strategy Pre-Submission Document to impose minimum separation distances of 1 kilometre for turbines over 25 metres, 1.5 kilometres for turbines over 50 metres, 2 kilometre for turbines over 100 metres and 3 kilometres for wind turbines over 150 metres high. In that case, the Inspector ruled that it was contrary to the Planning Practice Guidance (PPG) and the policy was removed.

8.13 Allerdale Borough Council has however successfully managed to include a separation distance policy (of 800m between wind turbines and residential properties) within their Local Plan. The policy does however include a caveat that:

"*it is recognised that in some cases due to site-specific factors such as orientation of views, landcover, other buildings and topography it may be appropriate to vary this threshold, where it can be demonstrated through evidence that there is no unacceptable impact on residential amenity".*

8.14 Allerdale Borough Council published its Local Plan prior to the publication of the PPG. However, the Inspectors report, which was published after the publication of the PPG (in July 2014), did not refer to the PPG in consideration of this policy and it is not clear why this was so. It would appear that the Inspector was perhaps not aware of the guidance within the PPG as she states – "*There is nothing in prevailing planning policy, or in up to- date guidance to exclude, as a matter of principle, a minimum separation distance".*

8.15 From discussions with planning officers at Allerdale Borough Council, it is understood that the separation distance policy was included at the request of Members, and that since its adoption the caveat included in the policy has been predominantly used in the determination of applications, rather than adherence to the 800m separation distance.

8.16 Reviews of appeal decisions have also shown that large scale wind turbines have been built with a wide range of separation distances and that they do not show any general rule, but rather judgements have been made according to the specifics of the case and local circumstances. This reflects the fact that the size of the turbines, orientation of views, local topography, buildings and vegetation and trees can all have a significant impact on what may be deemed an acceptable distance between a wind farm development and a residential property/ settlement.

8.17 As outlined in paragraph 2.7.6 of the national policy statement for Renewable Energy Infrastructure (EN-3), the two main issues that determine the acceptable separation distance between residential properties and wind energy developments are visual amenity and noise. Shadow flicker can also potentially determine the minimum acceptable separation distance. Commercial-scale wind turbines are large structures and can have an effect on visual amenity from residential properties. All wind turbines also generate sound during their operation. As such, appropriate distances should be maintained between wind turbines and sensitive receptors to protect residential amenity. The key questions however is whether these safeguards are best achieved through the application of blanket District wide separation distances or through robust criteria based policies and appropriate guidance. The provision of guidance by the Council on how residential amenity and noise issues should be assessed arguably provides a much more robust framework which can be used to assess potential wind farm applications.

8.18 If a separation distance policy is included with the emerging Local Plan, there is a high risk that this will be rejected by the Inspector as it is contrary to the guidance provided in the PPG. Any such potential policy would also need to be accompanied by a caveat recognising that site specific factors also need to be taken into consideration. With the inclusion of such a caveat, as the experience in Allerdale Borough Council has shown, it is doubtful what purpose the policy is serving. Arguably, only by considering the factors affecting residential amenity and noise on a site by site basis can a fair and transparent decision be reached on what is an acceptable distance between a wind farm development and a residential property.

Strengths:

- Puts the onus on the developer to set out why the distance between the wind turbine(s) and residential property is acceptable (if the proposed development is closer than the required distance). However, an Environmental Impact Assessment (EIA) for a wind energy development should already cover these issues.

Weaknesses:

- Contrary to National Planning Policy Guidance.
- Would require the inclusion of caveat to take account of local circumstances which makes the purpose of the policy questionable.
- Aim of policy could be better served through the provision of guidance on how developers should consider residential amenity and noise issues in their planning applications/ EIAs.

Criteria based policies

8.19 The NPPF states that local authorities should design their policies to maximise renewable and low carbon energy development while ensuring that adverse impacts are addressed satisfactorily. No guidance is currently provided within the Adopted Joint Core Strategy on the criteria that will be applied in assessing applications for renewable energy projects within the District and therefore this is a policy approach which should be considered seriously by the Council.

8.20 The PPG provides helpful guidance for local authorities on how to develop robust criteria based policies in relation to renewable and low carbon energy projects. Key points include:

- The criteria should be expressed positively (i.e. that proposals will be accepted where the impact is or can be made acceptable).
- Should consider the criteria in the National Policy Statements (published by the Department of Energy and Climate Change) as these set out the impacts particular technologies can give rise to and how these should be addressed.
- Cumulative impacts require particular attention, especially the increasing impact that wind turbines and large scale solar farms can have on landscape and local amenity as the number of turbines and solar arrays in an area increases.
- Local topography is an important factor in assessing whether wind turbines and large scale solar farms could have a damaging effect on landscape and recognise that the impact can be as great in predominately flat landscapes as in hilly areas.
- Proposals in National Parks and Areas of Outstanding Natural Beauty, and in areas close to them where there could be an adverse impact on the protected area, will need careful consideration.
- Care should be taken to ensure heritage assets are conserved in a manner appropriate to their significance, including the impact of proposals on views important to their setting.
- Protecting local amenity is an important consideration which should be given proper weight in planning decisions.

8.21 Drawing on the guidance outlined in the PPG, after expressing positive support in principle for renewable and low carbon energy development, Local Plans should list the issues that will be taken into account in considering specific applications. This should not be a long negative list of constraints but it should set out the range of safeguards that seek to protect the environment – including landscape and townscape. Other key considerations may include residential amenity, aviation, heritage etc.

8.22 It is important that policy does not preclude the development of specific technologies other than in the most exceptional circumstances and does not purely repeat national policy but is relevant to the process of decision-making at the local level and focuses on locally distinctive criteria related to local assets, characteristics and sensitivities. In the context of East Hampshire this could specifically relate to managing the scale and impact of renewable and low carbon developments within the setting of the South Downs National Park and the Surrey Hills Area of Outstanding Natural Beauty. It may also be appropriate for more detailed issues and guidance to be included in a Supplementary Planning Document (SPD) on renewables.

8.23 The Inspector's report which accompanied the Blackburn with Darwen Borough Council[48] Site Allocations and Development Management Policies Plan (adopted in 2015) noted that in order for the Plan to be found sound, the Borough's criteria-based policies would need to be supported by a Supplementary Planning Document (SPD) which identified suitable areas. It is therefore recommended that any criteria-based policy designed to manage the development of renewable and low carbon technologies should also be supported by guidance on the most suitable locations (see appropriate sections relating to suitable areas, energy opportunities and allocations below), either within the Local Plan or an accompanying SPD.

Strengths:

- Creates greater policy certainty for developers.
- Allows the Council to clearly set out the circumstances in which renewable energy proposals will and will not be permitted.

Weaknesses:

- Maybe perceived to be overly restrictive by certain stakeholders.

Identification of 'suitable areas for wind energy'

8.24 In line with PPG, when considering applications for wind energy development, local planning authorities should (subject to the transitional arrangement) only grant planning permission if the development site is in an area identified as suitable for wind energy development in a Local or Neighbourhood Plan.

8.25 When identifying suitable areas for wind, as outlined in **Chapter 2**, the PPG does not dictate how suitable areas for renewable energy should be identified, but in considering locations, local planning authorities will need to ensure they take into account the requirements of the technology and, critically, the potential impacts on the local environment, including from cumulative impacts and views of affected local communities. It also makes reference to the former Department of Energy and Climate Change's (now part of the Department for Business, Energy and Industrial Strategy) methodology on assessing the capacity for renewable energy development. The guidance notes the value of landscape character assessments in identifying which technologies are appropriate in different locations, including the appropriate scale of development.

8.26 The assessment of technical potential outlined in **Chapter 5** is based on a refinement of the DECC methodology and **Figure 5.11** identifies those areas which are technically viable for wind energy – i.e. they are not constrained by infrastructure, environmental or heritage constraints.

8.27 One of the key factors determining the acceptability or otherwise of wind turbines is their potential impacts on the local landscape – this is due to their height and the movement they introduce into the landscape (i.e. rotating blades). Different landscapes present different opportunities for renewable energy, and landscape sensitivity studies can assist both planners and developers in identifying what scale of development may be appropriate in which areas. This approach is endorsed by the PPG which states that *"landscape character areas could form the*

[48] Blackburn with Darwen Borough Site Allocations and Development Management (2015), Blackburn with Darwen Borough Council

basis for considering which technologies at which scale may be appropriate in different types of location."

8.28 The technical maps provided in **Chapter 5** have therefore been overlaid with the findings of the landscape sensitivity assessment in **Chapter 6** to identify the areas which are most suitable for wind (See **Figures 6.10 and 6.11**). These figures identify the most suitable areas for small and medium scale wind within the Borough in areas of lower landscape sensitivity. No areas were identified for large and very large scale wind with moderate or lower landscape sensitivity.

8.29 It is important to note that if such areas were identified in a Local Plan or Neighbourhood Plan they would be broad designations rather than allocations and would not therefore provide a definitive statement of the suitability of particular location for wind energy. Site specific assessment and design would still be required and all applications would still be assessed on their individual merits. It is also not possible at a strategic level, to take into account cumulative effects. Residential amenity, the setting of heritage assets, telecommunications, ecology and air traffic safety etc., would also need to be carefully considered at a site level.

8.30 All applications would also have to meet second test set out in the PPG i.e. that it can be demonstrated that the planning impacts identified by affected local communities have been fully addressed and therefore the proposal has their backing. It is therefore recommended that such policies are also supported by development management criteria designed to judge individual planning applications against (see section on criteria-based policies above).

8.31 The Council may also want to give consideration to including a policy stating where proposals for wind energy development outside of the identified areas will be considered. For example, where it can be demonstrated that:

- projects are community-led and supported schemes that meet the identified needs of local communities to offset their energy and heat demand; and
- projects are appropriately scaled and sited to meet the demands of local utilities, commercial facilities, agricultural holdings, etc.

8.32 The Redcar and Cleveland Local Plan[49] adopted in May 2018 includes Renewable and Low Carbon Energy Policy SD 6 which identifies areas with potential for wind and solar technologies in the Proposal Map accompanying the Local Plan. These areas were identified by undertaking a technical assessment of wind and solar potential overlaid with the findings of a landscape sensitivity assessment.

Strengths:

- Enables planners to have informed discussions with developers and communities about potential opportunities for wind– i.e. proactive rather than reactive planning
- Meets NPPF, PPG and Ministerial statement that LPAs should consider identifying suitable areas for renewable and low carbon energy sources and supporting infrastructure.
- Can act as a useful tool for neighbourhood planning.

Weaknesses:

- There may be concern that it will lead to multiple wind energy applications within the areas identified as being suitable for wind. However, all applications would still need to be assessed on their own merits, in isolation and in combination with existing developments, and it would not be a replacement for detailed site studies.
- It does not provide a definitive statement on the suitability of a certain location for wind turbine development – each application must be assessed on its own merits. It is not a replacement for detailed site studies.

[49] Redcar and Cleveland Local Plan (May 2018), Redcar and Cleveland Borough Council.

Development of 'Energy Opportunities Map'

8.33 The NPPF and PPG encourage local planning authorities to "*consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure.*" The Council should therefore consider identifying suitable areas for other forms of renewable and low carbon energy sources, and supporting infrastructure, where this would help secure the development of such sources.

8.34 Clearly identifying and mapping an area's renewable and low carbon sources of energy represents a positive and proactive way to spatially plan for renewable and low carbon energy generation. With a spatial map illustrating energy opportunities it is easier for local authorities to work with local communities and developers to identify the areas that would be most appropriate for development in strategic terms, accelerating the planning and development processes and avoiding conflict.

8.35 An energy opportunities map would provide a spatial summary of the key opportunity areas (in terms of their technical potential) for various forms of renewable energy. This can be used to inform development decision and discussions and guide development towards the most suitable areas. As outlined above, if the energy opportunities map is informed by a landscape sensitivity study and the location of graded agricultural land, it could also be used to guide solar developments away from the most sensitive landscapes and best and most vulnerable agricultural land, in line with PPG. **Figures 6.12 – 6.14** set out the results of the technical potential for small, medium and large scale solar PV arrays within areas of moderate or lower landscape sensitivity.

8.36 It would be important, however, that any locational policies are framed such that they do not preclude projects in other (constrained and currently considered suboptimal) areas; for example, if better solar data becomes available or if the factors determining optimal sites for solar PV arrays change.

8.37 With the introduction of neighbourhood planning, the energy opportunities map could also provide a useful tool for communities and other stakeholders to identify the key opportunities for renewables within their area. It is important to note however that it is not possible to identify locations for all types of renewable energy, as many technologies such as building integrated solar, heat pumps, farm-scale AD, and small-scale biomass can be located in nearly all areas.

8.38 As outlined above, the Redcar and Cleveland Local Plan[50] adopted in May 2018 includes Renewable and Low Carbon Energy Policy SD 6 which identifies areas with potential for wind and solar technologies in the Proposal Map accompanying the Local Plan.

Strengths:

- Enables planners to have informed discussions with developers and communities about potential opportunities for renewable and low carbon energy technologies – i.e. proactive rather than reactive planning
- Meets NPPF, PPG and Ministerial statement that LPAs should consider identifying suitable areas for renewable and low carbon energy sources and supporting infrastructure.
- Can act as a useful tool for neighbourhood planning.

Weaknesses:

- Not possible to identify locations for all types of renewable energy technologies.
- It does not provide a definitive statement on the suitability of a certain location for a particular development – each application must be assessed on its own merits. It is not a replacement for detailed site studies.
- May identify potential areas for renewable energy development which are unpopular.

[50] Redcar and Cleveland Local Plan (May 2018), Redcar and Cleveland Borough Council.

Allocating sites for standalone renewable and low carbon energy schemes

8.39 The local plan could allocate sites specifically for standalone renewable developments. This could provide more strategic direction to the siting of renewables for developers, investors, the local authority, statutory stakeholders and communities. It may be possible to allocate sites which have the greatest potential for sustainable energy and carbon reduction or sites that could potentially be developed for other purposes (e.g. resulting in the sterilisation of potential sites).

8.40 If sites exist that have potential for standalone renewable or low carbon energy use but are constrained in a way that would make them less attractive to commercial developers, then allocating the site is a way of promoting that site for renewable/low carbon development to a wider audience such as land owners or co-operatives. Alternatively or in addition, the Council could undertake a 'call for sites' exercise for renewable and low carbon development and consider the merits of promoted sites in isolation or in combination with other planned types of development. It should however be noted that such call for sites exercises tend to generate a relatively poor level response.

8.41 Again, it would be important that site allocations only highlight appropriate schemes/areas; site developers and communities would still be required to undertake detailed site-based assessment work to support individual development planning applications and if required Environmental Impact Assessments. Furthermore, site allocations are framed such that they do not preclude projects in other locations.

Strengths:

- Provide strategic direction to the siting of renewables.
- Ensure sites with the greatest potential are identified.
- May promote sites to a wider audience such as co-operatives.

Weaknesses:

- Resource intensive to gather necessary evidence to justify allocation.
- Would be desirable to secure agreement of landowner which may be resource intensive.
- May identify potential sites for renewable energy development which are unpopular.

Encouraging community renewables

8.42 The NPPF states that local authorities should support community-led initiatives for renewable and low carbon energy, including developments being taken forward through neighbourhood planning. Community-led renewable energy projects are increasingly being seen as an attractive option for local communities wishing to contribute to local/national climate change targets and as a way to generate local revenue to directly benefit the community. Driven by the launch of the Feed-in Tariff in 2010 and other Government initiatives, a large number of community renewable energy projects have been delivered, including a broad technologies, such as wind, solar PV, biomass heating and hydro schemes. Despite Government support, the Feed-in Tariff has been considerably cut and the Government is in the process of considering its long term future.

8.43 Community groups can face considerable challenges in the pre-planning stage and there are a number of opportunities for local authorities to provide advice and guidance throughout this stage, including the provision of early advice on planning requirements and lending support to consultation activities within the community. Engaging communities for the earliest stages of plan-making to provide clear information on local issues and the decision making process.

8.44 The Redcar and Cleveland Local Plan[51] outlines support for community based renewable energy schemes which can help to deliver cheap energy sources to local communities through a local supply network. The Local Plan also supported the potential for waste heat from industrial processes being used to heat homes, businesses and community services.

8.45 The Council's emerging Local Plan could broaden its support for community renewable schemes by stating that the Council would actively support community renewable energy schemes which are led by or meet the needs of local communities. Such developments would normally be conceived by and/or promoted within the community within which the renewable development will be undertaken, delivering economic, social and/or environmental benefits to the community. Neighbourhood plans provide a particular opportunity to define detailed local site allocation policies for renewable and low carbon technologies.

Strengths:

- Provides support to local communities to develop renewables and low carbon energy.
- Generates local revenue to directly benefit the local community.
- Can secure a broad base of local support for renewable energy schemes.

Weaknesses:

- Care may need to be taken not to prescribe the process of community ownership (i.e. shared ownership etc.) as some would argue it is not the role of the planning system to do this.

Preparation of Local Development Orders (LDO)

8.46 LDOs[52] can be made by local planning authorities and give a grant of planning permission to specific types of development within a defined area. They streamline the planning process by removing the need for developers to make a planning application to a local planning authority, and create certainty and save time and money for those involved in the planning process.

8.47 LDOs are very flexible tools, and can be either permanent or time limited, depending on their aim and local circumstances. For example, an LDO may be time limited so that it can be revised and updated in the future. Another key point is that LDOs can be revoked and modified by a local planning authority at any time; however, modifications may require re-consultation.

8.48 It is important to bear in mind that LDOs only grant planning permission, and do not remove the need to comply with other relevant legislation and regulations. Similarly, conditions can be imposed in a LDO, which may be similar to conditions imposed on a normal grant of planning permission. However, a local planning authority should try to avoid imposing excessive numbers of conditions on LDOs, as their purpose is to simplify and speed up local planning.

8.49 There are also restrictions on the use of LDOs, for example, an LDO cannot grant planning permission for development which is likely to have a significant effect on a European Site.

8.50 Some renewable energy developments already fall within Permitted Development Rights (PDR). Part 14 of the Town and Country Planning General Permitted Development Order (2015)[53] sets out the permitted development rights for a range of small scale renewable and low carbon development technologies, including:

[51] Redcar and Cleveland Local Plan (May 2018), Redcar and Cleveland Borough Council.

[52] Planning practice guidance on LDOs can be found at Paragraph 076 – 085 at: http://planningguidance.planningportal.gov.uk/blog/guidance/when-is-permission-required/what-types-of-area-wide-local-planning-permission-are-there/

[53] The detailed conditions within which the permitted development rights relating to renewable and low carbon technologies apply can be found at: https://www.planningportal.co.uk/info/200187/your_responsibilities/37/planning_permission/2

- Solar photovoltaic and solar thermal equipment on dwellings, on buildings within the curtilage of dwellings, on non-domestic premises and stand-alone within the curtilage of non-domestic premises.
- Ground, air and water source heat pump equipment on dwellings or on buildings within the curtilage of dwellings or non-domestic premises.
- Biomass heating systems and combined heat and power and their flues on dwellings or non-domestic premises.
- Wind turbine equipment on dwellings on buildings within the curtilage of dwellings, or stand-alone turbines within the curtilage of dwellings.

8.51 However it may be possible for example for an LDO to be created allowing the installation, alteration or replacement of small scale renewable energy systems on any industrial, warehouse, business and commercial buildings within a defined area.

8.52 Swindon Borough Council has adopted several LDOs which relate to renewable and low carbon technologies[54], including Swindon Low Carbon LDO1 which relates to Boroughwide non-domestic air source heat pumps and district heating installations and several separate LDOs which prescribe appropriate sites for solar arrays and solar farms within the Borough.

Strengths:

- LDOs can streamline and simplify the planning process for specific development types and locations.
- They can create certainty and save time and money for all those involved in the planning process.
- They can be flexible tools and can be revised and updated as circumstances and policy change.

Weaknesses:

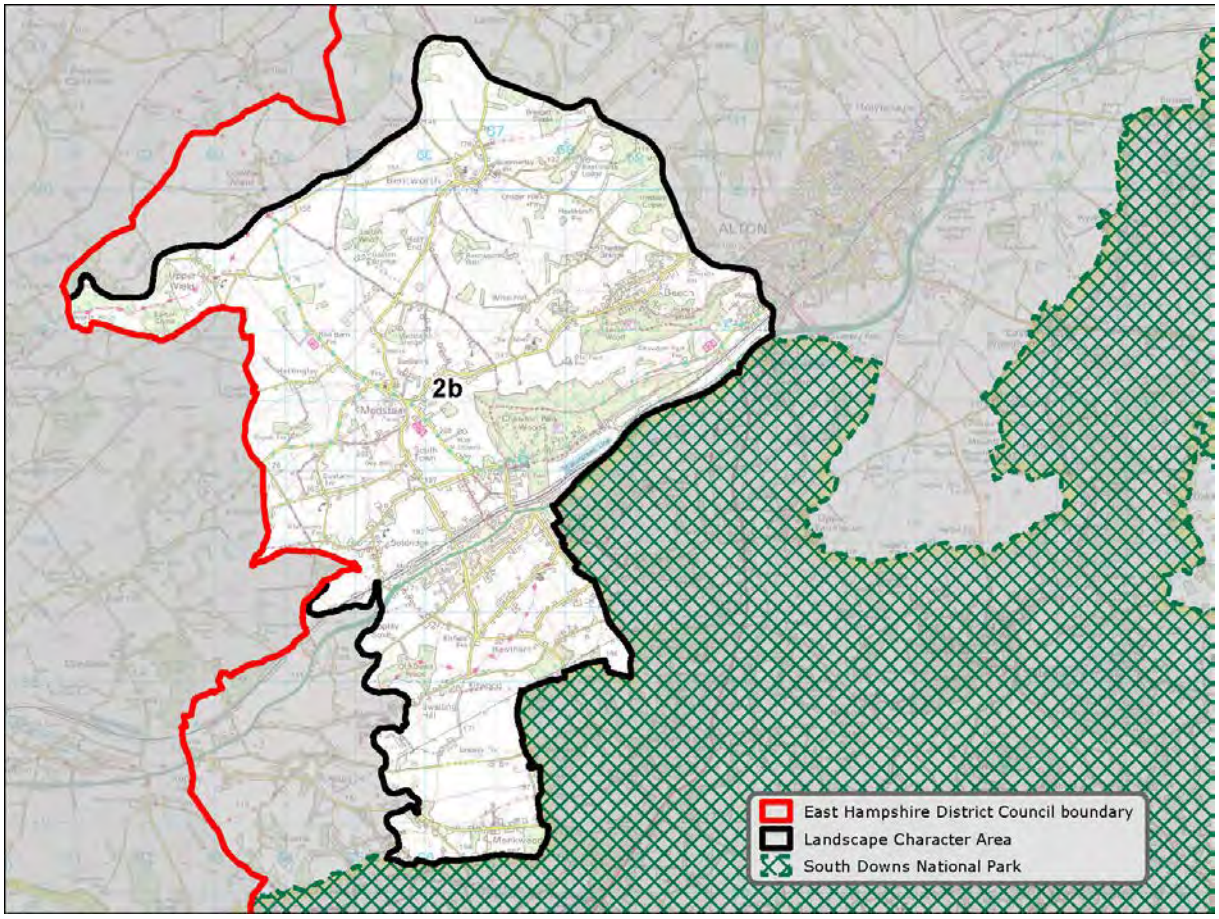
- As technologies change, LDOs may need to be revised and updated to reflect any key changes.
- There may not be enough demand for an LDO to warrant its creation.
- An EIA may need to be undertaken by the Local Authority.

[54] Further details of Swindon Borough Council's LDOs can be found at: https://www.swindon.gov.uk/info/20113/local_plan_and_planning_policy/648/local_development_orders/2

Appendix 1

Landscape Sensitivity Assessment for Wind and Solar

Landscape Character Area 2b: Four Marks Clay Plateau



Representative photographs

Location and summary of overall character

Please note, part of the land within this Landscape Character Area is within the South Downs National Park. This assessment only considers the land outside of the South Downs National Park boundary.

A large, elevated plateau landscape which primarily comprises mixed farmland, with some extensive woodland areas. Some areas are extensively settled, although a strong rural character is evident throughout the landscape. From higher ground, there are expansive views to the South Downs National Park and the adjacent downland to the north.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• A medium-scale, elevated undulating plateau landscape. • Steep slopes occur in the north east of the area where the landscape transitions to the adjacent downlands. • The scale of the landscape varies depending on the landform and land cover. The central parts of the landscape are smaller scale than the broad, elevated parts of the character area.
Land cover pattern and presence of human scale features	• Land use is primarily pasture with some arable field and horse paddocks. • The field pattern is varied; on lower lying areas around the settlements, fields tend to be small and regular in shape. On higher ground, larger arable fields are more frequent. • Settlement is frequent throughout the character area, including the linear village of Four Marks. • Frequent woods and trees, including Bushy Leaze Wood and Chawton Park Wood. Tree cover creates a secluded and enclosed landscape, contrasting with the openness of the larger arable fields.
Tracks / transport pattern	• The area is cut by the A31 and is also accessed by a good network of rural roads which cross the area. • A well connected rights of way network, including parts of the historic route of the Pilgrim's Way.
Skylines / intervisibility	• Skylines are mostly undeveloped and are often marked by woodland. • The plateau is elevated, with skylines visually prominent above adjacent character areas. • Pylons and overhead lines cross the landscape south of Kitwood. • There are high levels of intervisibility with the South Downs National Park (which forms the south-eastern boundary of the character area).
Perceptual qualities including sense of openness/enclosure	• Despite the density of settlement around the A31 at Four Marks this is a peaceful and, in places, a tranquil and rural landscape. • In the more wooded areas, there is a sense of seclusion and enclosure. In places with larger-scale fields, there is a sense of openness and expansiveness.
Historic Landscape Character	• The landscape forms part of the setting to several Conservation Areas, including Bentworth and Upper Wield. • Occasional tumuli and earthworks are located on higher ground. • Medieval fields are located in the north and south of the character area, with more modern parliamentary field origins in the central area. • Some areas of historic parkland, including Bentworth, Medstead and Thedden. • The Watercress Line heritage railway runs parallel to the A31.
Scenic and special qualities	• Away from the A31 main road and its associated modern development, scenic qualities of the landscape include the quiet lanes and rural character, the seclusion and enclosure created by woodland and hedgerows and contrasting open, elevated areas.

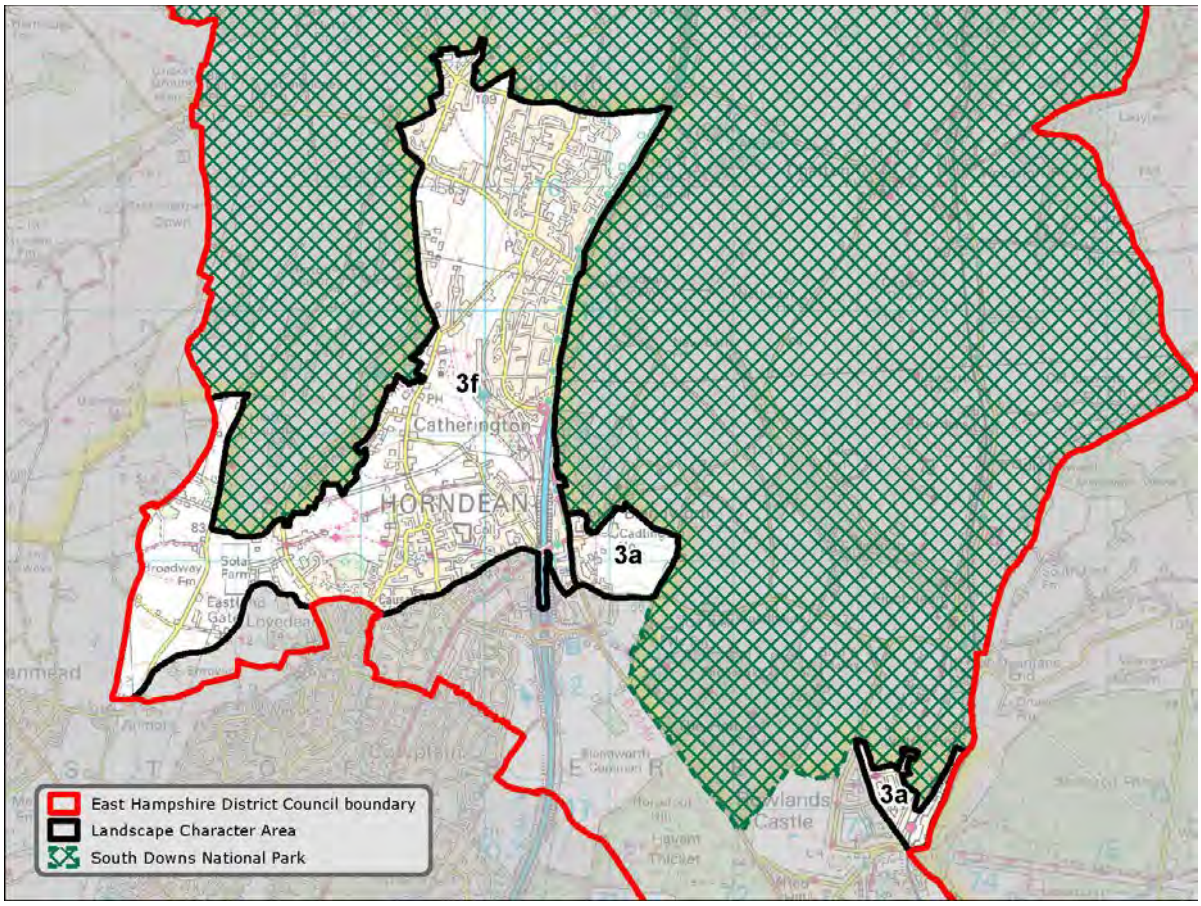
Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)			**M**		
Medium-scale wind turbines (40-80 metres)				**M-H**	
Large-scale wind turbines (80-120 metres)					**H**
Very large wind turbines (120-160 metres)					**H**
Small solar PV installation (<5 hectares)		**L-M**			
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity
Areas which are immediately adjacent to and intervisible with the South Downs National Park will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment. The larger-scale, more expansive areas generally have reduced levels of sensitivity to small-scale wind turbines. Steeply sloping areas (e.g. to the west of Medstead and south east of Bentworth) are highly sensitive to all scales of solar PV development considered as part of this landscape sensitivity assessment.

Landscape Character Area 3a & 3f: Clanfield Downland Mosaic/Horndean-Clanfield Edge



Representative photographs

Location and summary of overall character

Please note that part of character area 3A: Clanfield is within the South Downs National Park. This assessment considers the land outside of the South Downs National Park.

These Landscape Character Areas are located in the south the district and are densely settled, containing large parts of Clanfield and Horndean. The A3 is a major route which runs along the edge of the character area. Overhead electricity infrastructure is prominent in several locations. Away from the urban development, fields are primarily used for horse paddocks although some areas of arable cultivation remain.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Located on the lowest elevations of the south facing chalk dipslope. A gently sloping landform with some undulations in the chalk created by dry valleys. • The varied landform means that the scale of the landscape is not uniform cross the area, although tends to be small-medium in scale.
Land cover pattern and scale and presence of human scale features	• Extensive area of medieval assarted fields west of Horndean typified by small-medium irregular enclosures, with a smaller area of recent enclosures to the north. • Some fields in arable cultivation remain around the built edge of Horndean and Clanfield. Much of the land is now used as paddocks for horse/pony grazing, particularly the smaller fields in the southern part of the area. • Relatively little woodland, but that which remains (e.g. Yoells Copse) is an important local feature. • Settlement has developed in a linear form along the A3 linking Horndean and Clanfield. These settlements have subsequently expanded to form larger blocks of built development.
Tracks / transport pattern	• The A3 effectively severs the area from the downs to the east. Smaller rural roads link development. There are a number of ancient lanes through the area such as Coldhill, Ham, Crouch and Tagdell Lanes.
Skylines / intervisibility	• Electricity pylons cut across the landscape north of Horndean and are a highly visible and prominent feature. • Woodland on higher ground also marks skylines, particularly where they are viewed from the settlement edge. • From higher ground, there is intervisibility with the high ground of the South Downs National Park to the north east. • Views are typically to blocks of residential development superimposed on the chalk landform. There are also long views south from elevated vantage points.
Perceptual qualities including sense of enclosure/openness	• The frequent development and major roads crossing through the area create the perception of an urbanised landscape, although there are pockets of tranquillity on the fringes of the landscape which are more rural in character. • Sense of enclosure and openness is variable throughout the landscape depending on landform and tree cover. The areas immediately adjacent to the settlement edge tend to be more open due as there are less trees present.
Historic Landscape Character	• The landscape is dominated by modern development, although there are remaining historic features scattered throughout the character area, including occasional historic farms. • Remnant medieval enclosures also contribute to historic landscape character.
Scenic and special qualities	• Remaining areas of woodland including Yoells Copse area contribute to the scenic character of the landscape. High levels of tranquillity can be experienced in localised parts of the character area, which is identified as an important special quality. • The dominating urban development limits and can detract from the special qualities of the landscape.

Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

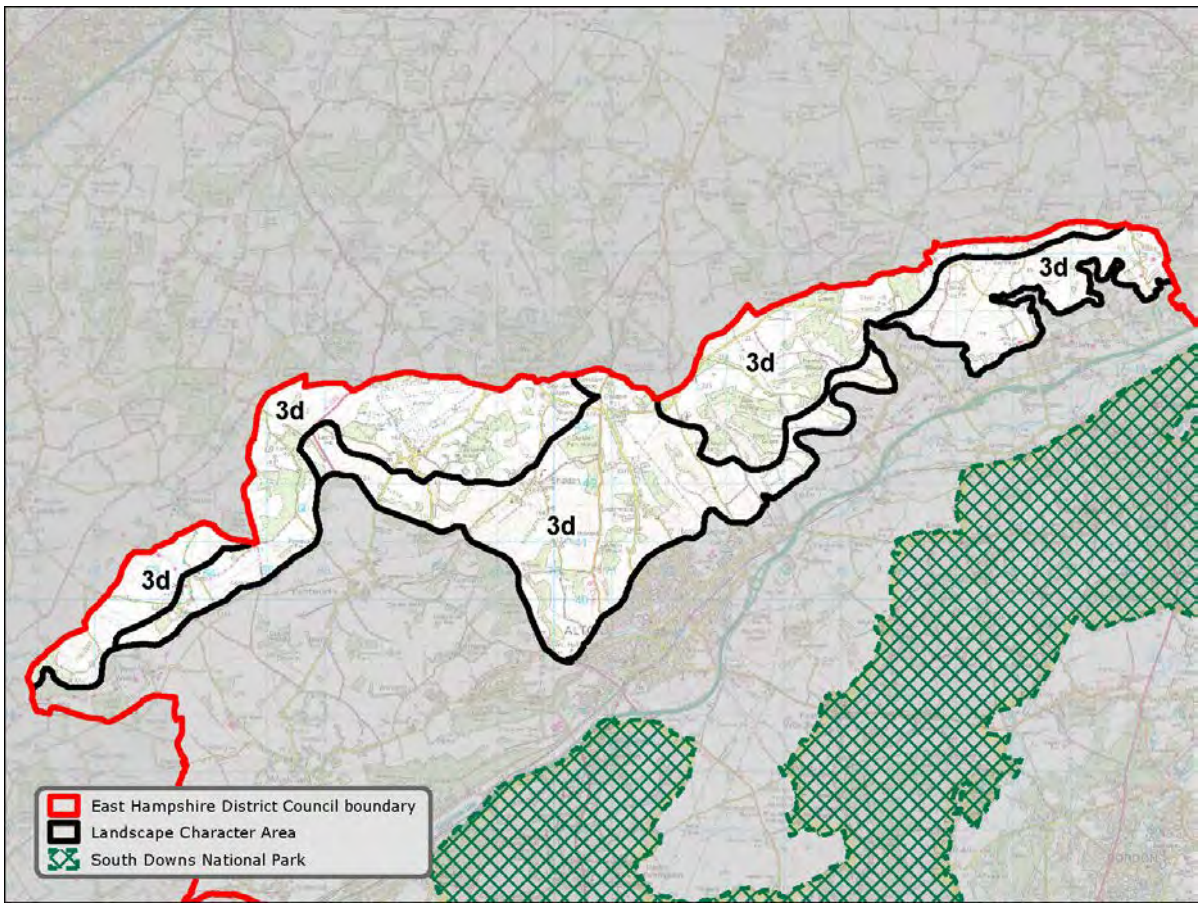
Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)			**M**		
Medium-scale wind turbines (40 – 80 metres)				**M-H**	
Large-scale wind turbines (80 – 120 metres)				**M-H**	
Very large wind turbines (120 – 160 metres)					**H**
Small solar PV installation (<5 hectares)		**L-M**			
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity

Areas which are immediately adjacent to and intervisible with the South Downs National Park will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment.

Steeply sloping areas will have higher levels of sensitivity to all scales of solar PV development considered as part of the landscape sensitivity assessment.

Landscape Character Area 3d: Lasham



Representative photographs

Location and summary of overall character

This Landscape Character Area is located across the northern edge of the district.

The Lasham Downland is an expansive character area, with a broad rolling landform incised by dry valleys which add complexity to the landscape. Land cover is primarily a mixture of farmland and woodlands. A strongly rural area, with settlement generally limited to isolated farms and houses. Due to the elevated character of the landscape, there are expansive views which include the South Downs National Park to the south.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Large-scale rolling landform characteristic of chalk, incised by linear dry valleys and forming strong bluffs above, and a dramatic contrast with, the Wey valley.
Land cover pattern and presence of human scale features	• A mosaic of arable fields interlocked with woodland to create a unified landscape of both openness and enclosure. • Ancient woodland corresponds to areas of clay capping (Lasham Wood) and steeper slopes (Row Wood). • Sparsely settled, with occasional small villages and isolated farmsteads.
Tracks / transport pattern	• The A339 crosses through the western part of the landscape. • The rest of the landscape is serves by a dense network of narrow rural lanes, track and footpaths.
Skylines / intervisibility	• Church spires are key landmarks. Transmitters and telecommunication masts are more recent additions and are often prominent in long views. Masts on Lasham Airfield. • Long views are across open fields to a wooded or open skyline, with some important views across the Wey valley. In more enclosed areas views are short and contained by woodland. • Pylons and overhead lines form skyline features to the north of Bentley. • From higher ground, there is intervisibility with the high ground of the South Downs National Park to the south.
Perceptual qualities	• Generally this is a rural and peaceful landscape, with traditional villages and limited modern influences. • A sense of openness and expansiveness on high ground, with long views across the Wey Valley to the south. • Woodland cover can create a sense of enclosure in places, including along many of the narrow rural roads.
Historic Landscape Character	• Several post 1810 parkland are recorded on the Hampshire Register at Burkham Park, Shalden Park Farm, Lasham Hill Farm, and Shalden Manor representing large landed estates. • The landscape provides a setting to several Conservation Areas including Lower Wield, Lasham and Shalden. • Earthworks are occasional features on higher ground in the character area, including the Scheduled Monument at Penley.
Scenic and special qualities	• The undeveloped, open hills are visually prominent and contribute to the scenic qualities of the area, providing a backdrop to adjacent landscapes. • Special qualities of the landscape include its strong rural character, dense areas of woodland and the narrow rural lanes.

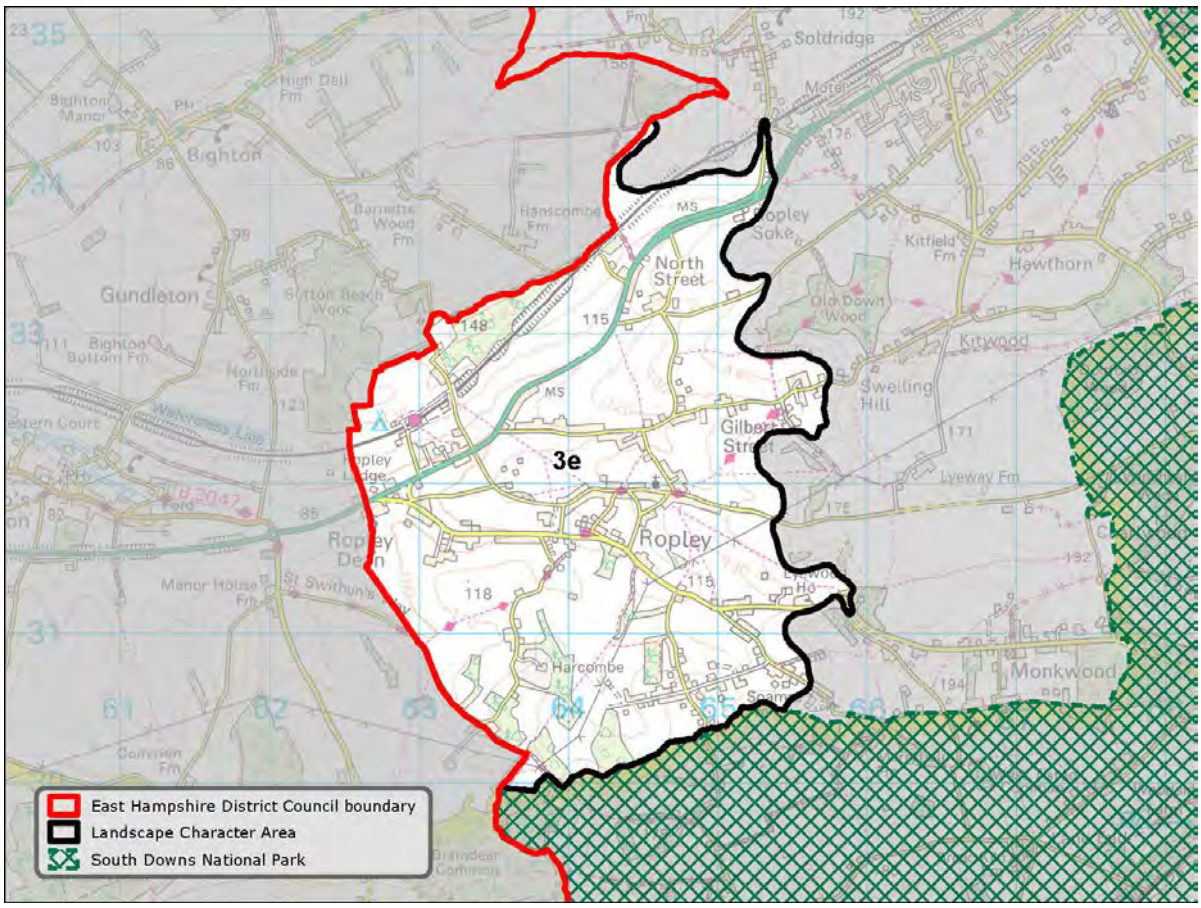
Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)		**L-M**			
Medium-scale wind turbines (40-80 metres)			**M**		
Large-scale wind turbines (80-120 metres)				**M-H**	
Very large wind turbines (120-160 metres)					**H**
Small solar PV installation (<5 hectares)			**M**		
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity
More open, large scale parts of the landscape (e.g. Lasham Airfield) will have reduced sensitivity to small and medium scale wind turbines. Areas with steep landforms (e.g. Brockham Hill) will have higher levels of sensitivity to solar energy development. Conversely, areas which are visually screened by the landform or woodland cover will have reduced sensitivity to solar energy development.

Landscape Character Area 3e: Ropley Downland Mosaic



Representative photographs

Location and summary of overall character

This character area is located on the western edge of East Hampshire.

The Ropley Downland Mosaic comprises undulating mixed farmland surrounding the settlements of Ropley and Ropley Dean. Occasional blocks of woodland intersperse the farmland. The character area is relatively densely settled with a good network of rural roads providing access. As a low lying landscape, it is overlooked from the adjacent high ground to the east and south.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Undulating, low lying landscape which slopes gently to the west. • In the north of the area, there are some pronounced slopes, particularly north of the A31. • Some areas have a larger scale (e.g. east of Ropley) where fields have been enlarged via boundary removal.
Land cover pattern and presence of human scale features	• Small to medium sized fields of early enclosure are bound by hedgerows. There are areas of large more open fields, particularly to the north and east of Ropley. • Mainly arable cropping mixed with some areas of pasture and horse paddocks. • Relatively densely settled with frequent houses and farms throughout the character area. Linear dispersed pattern of settlement along the rural lanes. • The frequent tree and woodland cover (including copses and boundary trees) conveys a human scale to the landscape.
Tracks / transport pattern	• The A31 crosses east-west through the landscape and is the only major route. The rest of the character area is served by an extensive network of narrow rural lanes. • Numerous public rights of way provide access, including parts of St Swithun's Way.
Skylines / intervisibility	• Skylines are usually marked by the frequent trees and woodland within the landscape. • Pylons and overhead lines cross the southern part of the character area and form prominent skyline features. • From the south of the area and where woodland allows, there is intervisibility with the higher ground of the South Downs National Park which lies adjacent to the south.
Perceptual qualities including sense of openness/enclosure	• A strong sense of enclosure is experienced along the rural lanes due the woodland and hedgerows. • Larger-scale fields to the north and east of Ropley tend to be enclosed by low hedgerows and have a sense of openness which contrasts with the sense of enclosure experienced elsewhere in the character area. • A traditional rural landscape, with few modern influences.
Historic Landscape Character	• The landscape provides a setting to Ropley Conservation Area and the numerous listed buildings that it contains. • There are three post-1810 parks listed on the Hampshire Register at Ropley House, Ropley Grove and Ropley Manor. • The Watercress Line heritage railway crosses the north of the character area.
Scenic and special qualities	• The Landscape Character Area profile notes the area's strong rural characteristics and enclosed, secluded and small-scale character as being key special qualities.

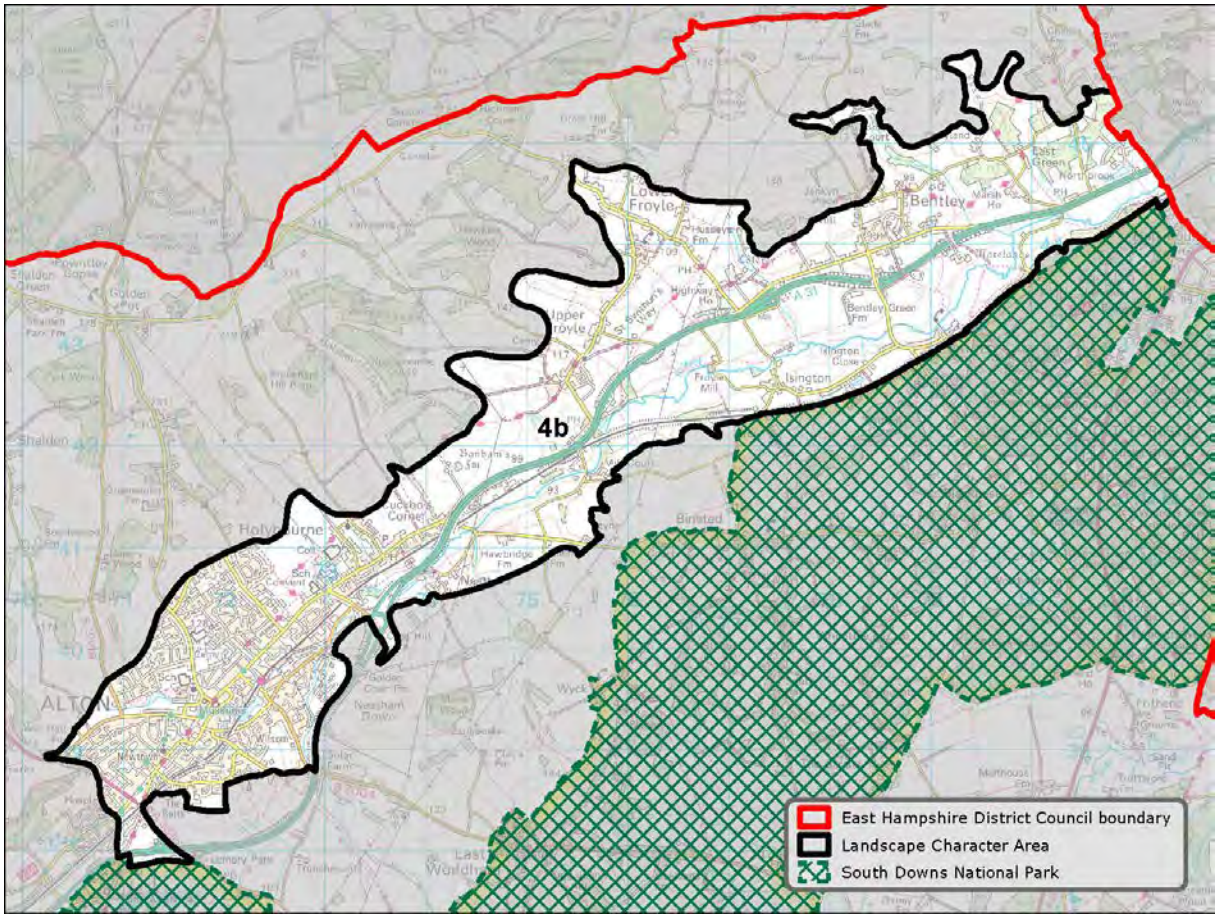
Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)			**M**		
Medium-scale wind turbines (40-80 metres)				**M-H**	
Large-scale wind turbines (80-120 metres)					**H**
Very large wind turbines (120-160 metres)					**H**
Small solar PV installation (<5 hectares)		**L-M**			
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)					**H**
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity
Areas which are strongly overlooked from the adjacent South Downs National Park have higher levels of sensitivity to all the renewable energy development scenarios considered as part of the landscape sensitivity assessment. Steep slopes, including those in the north and east of the landscape character area, have higher levels of sensitivity to solar PV installations, which would be more visually prominent in these locations.

Landscape Character Area 4b: Northern Wey Valley



Representative photographs

Location and summary of overall character

This Landscape Character Area is located in the north east of East Hampshire district

This character comprises the broad valley of the River Wey, from its source at Alton to the edge of the district west of Farnham. Road and rail corridors follow the course of the river. A chain of settlements of various sizes are also located along the valley. The landscape character area abuts the South Downs National Park to the south.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Broad valley landform of the River Wey, with some steep combe valleys along the edges, particularly along the northern edge. • The broad nature of the valley creates a medium-scale landform, although the combe valleys have a smaller-scale.
Land cover pattern and presence of human scale features	• Well-wooded landscape, with areas of woodland and frequent roadside and field boundary trees. • Hedgerows divide fields, while linear shelterbelts are often located along tracks. Trees also occur along the river corridor. • The valley floodplain is predominantly pastoral with arable cultivation on the valley sides.
Tracks / transport pattern	• The A31 dual carriageway is a major route which runs along the length of the valley. Roads are otherwise minor, comprising narrow rural lanes and tracks. • The landscape also contains a dense network of public rights of way, including St Swithun's Way.
Skylines / intervisibility	• Skylines are generally undeveloped and open, with boundary trees forming occasional features. Skylines become more frequently wooded in the east of the character area. • Pylons and associated overhead lines cross the valley north-south between Upper Froyle and Bentley, forming prominent skyline features. • There is intervisibility with the higher ground of the South Downs National Park to the south. It is also overlooked from higher ground to the north.
Perceptual qualities	• The south western end of the character area comprises the settlement of Alton and is primarily urban. • Away from the settlements and roads, the landscape is strongly rural with a variety of semi-natural habitats which contribute to the natural character of the landscape. • Noise and movement from traffic on the A31 can have a negative impact on tranquillity.
Historic Landscape Character	• The landscape provides a setting to Conservation Areas including Isington, Bentley, Upper Froyle and Lower Froyle. • Cuckoo's Corner Roman Site is a Scheduled Monument located adjacent to Holybourne. • The Watercress Line steam railway crosses through the valley. • Historic features associated with the river are apparent today. Remnant features relating to water management and agricultural/industrial use of the river, include weirs, mills, millponds, watercress beds. • Predominantly a landscape of recent planned enclosure of 18th-19th century date, particularly on the northern and higher slopes of the valley. • There are a number of historic farmsteads scattered throughout.
Scenic and special qualities	• The frequent semi-natural habitats along the river corridor, including floodplain grassland and woodland, contribute to the scenic character of the landscape. • Modern intrusions including pylons and the A31 can detract from the scenic qualities of the landscape. • There are views across the valley from the higher slopes. The valley is overlooked from the adjacent downland to the north.

Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)		**L-M**			
Medium-scale wind turbines (40-80 metres)			**M**		
Large-scale wind turbines (80-120 metres)					**H**
Very large wind turbines (120-160 metres)					**H**
Small solar PV installation (<5 hectares)		**L-M**			
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)				**M-H**	

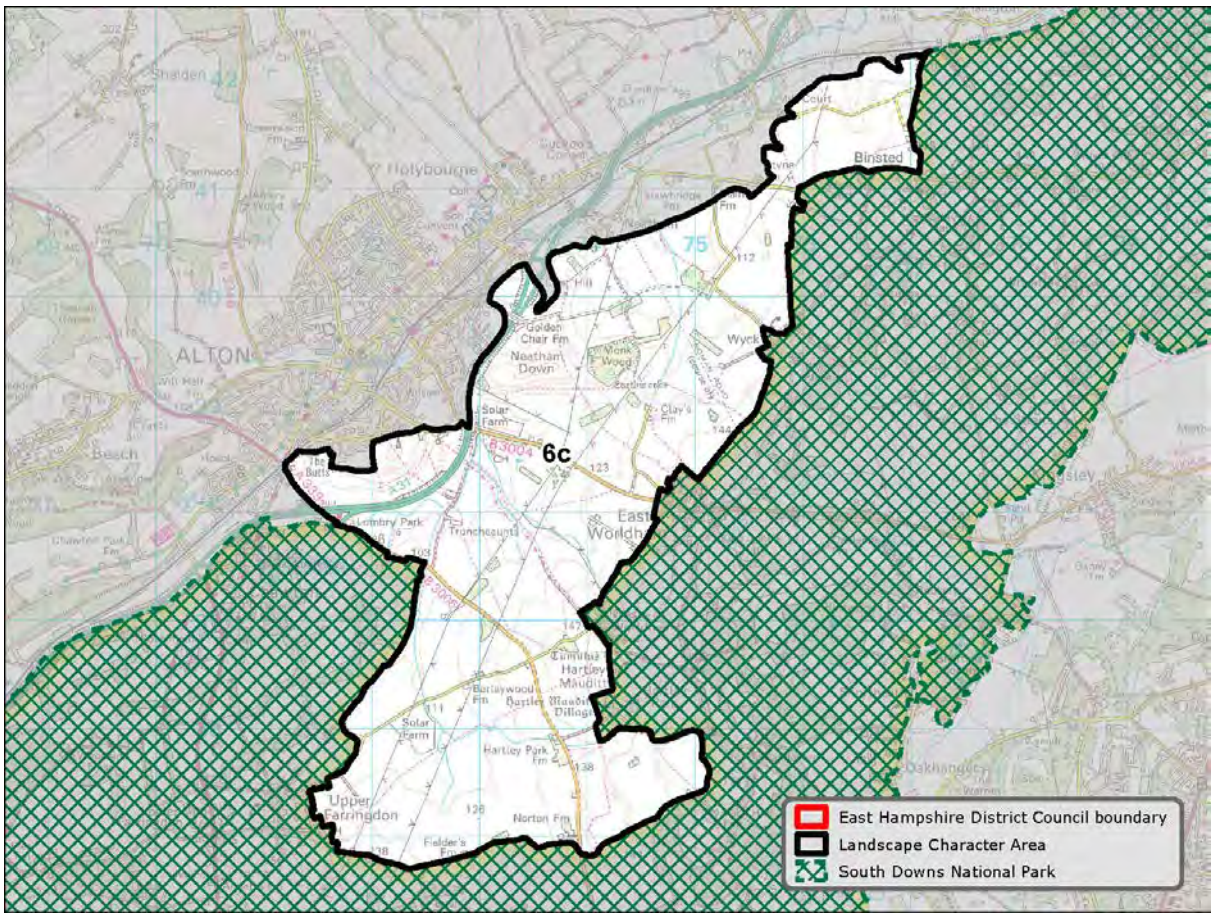
Notes on any variations in landscape sensitivity

Steep, more complex landforms (e.g. those associated with the combe valleys along the northern edge) will have higher levels of sensitivity to all categories of renewable energy development considered as part of this landscape sensitivity assessment.

The woodland in the east of the character area could perform a screening function for appropriately sized and designed solar PV installations.

Areas which are immediately adjacent to and intervisible with the South Downs National Park will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment.

Landscape Character Area 6c: Worldham



Representative photographs

Location and summary of overall character

This Landscape Character Area is located to the south and east of Alton. Part of this character area is contained within the South Downs National Park. This assessment only considers land outside of the National Park.

This landscape character area comprises a transitional area between the South Downs National Park and the River Wey. An open landscape, characterised by mixed farmland within medium-large scale fields, with limited woodland cover. Settlement is limited to scattered farms and the landscape is strongly rural. From elevated vantage points, long views across the district are possible.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• A flat to gently sloping landform of Upper Greensand contained to the west by chalk hills. • An open landscape dominated by medium to large fields of pasture and arable agriculture.
Land cover pattern and presence of human scale features	• Oak hedgerow trees are distinctive landscape features, plus willow pollards alongside the stream and ditches. • Generally an absence of woodland with a single block of ancient woodland occurring at Monk Wood. • Poplar shelter belts indicate where hops were formerly grown. Old hop kilns have frequently been converted to residential use. • Settlement is limited to scattered farmsteads. The villages of East and West Worldham are located on the boundary of the character area on the edge of the Rother Valley. • Ditches and hedgerows divide the fields. Some of the hedgerows are low cut
Tracks / transport pattern	• The area is crossed by a number of footpaths including the Hangers Way. • Crossed by a number of rural lanes some of which are sunken.
Skylines / intervisibility	• Skylines are marked by the frequent plantation woodland which occur throughout the character area. • The wooded escarpment at Selborne is a prominent backdrop feature to the south. • Two parallel pylon lines run the length of the character and are visually prominent skyline features. • There are high levels of intervisibility with the South Downs National Park which is adjacent to the east, south and west of the landscape character area.
Perceptual qualities	• A peaceful landscape with no major roads and very limited settlement. The sense of tranquillity is reduced by the pylons which are visually prominent in the open landscape and by the presence of prominent farm buildings. • The B roads - Selborne Road and Caker's Lane are a source of noise and movement within the landscape.
Historic Landscape Character	• A landscape of early enclosure with a small block of recent planned enclosure of 18th-19th century date between East Worldham and Alton (now partly occupied by Worldham Golf Course). • Earthwork enclosures (not designated) are located in Monk Wood. • The landscape provides part of the wider setting to archaeological features outside of the character area, including the Medieval settlement at Hartley Mauditt Scheduled Monument.
Scenic and special qualities	• From the chalk hills to the north, at Neatham there are views across the Wey Valley. Otherwise there are open views across arable farmland. • This is a smooth, simple and open landscape allowing long views across arable fields to adjacent low lying landscapes. • The strong rural qualities of the landscape and sparely settled character are notable qualities of the character area.

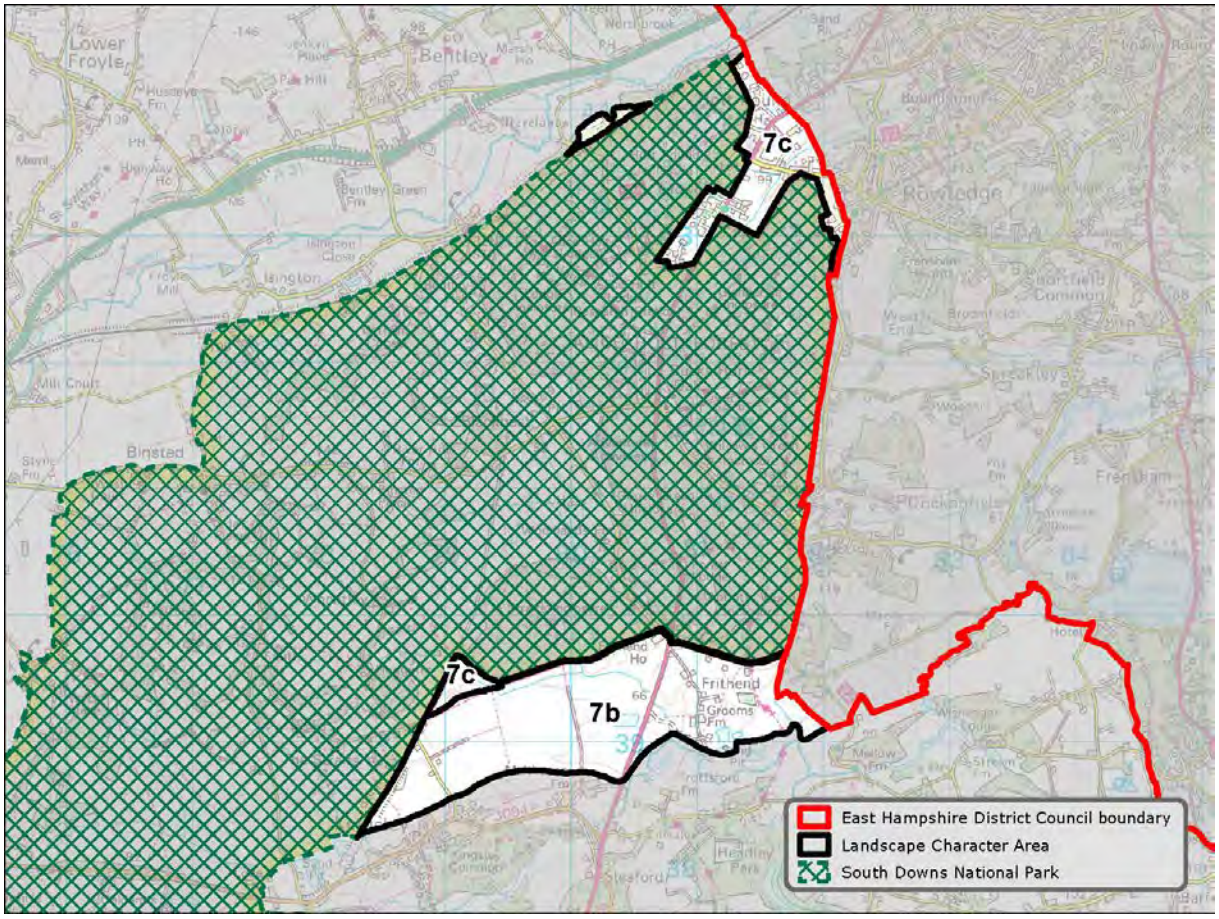
Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)		**L-M**			
Medium-scale wind turbines (40-80 metres)			**M**		
Large-scale wind turbines (80-120 metres)				**M-H**	
Very large wind turbines (120-160 metres)					**H**
Small solar PV installation (<5 hectares)		**L-M**			
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)			**M**		
Very large solar PV installation (20-30 hectares)				**M-H**	

Notes on any variations in landscape sensitivity
Visually prominent, steeply sloping areas will have higher levels of sensitivity to all scales of solar PV development. These include Neatham Down, Golden Chain Hill and Lynch Hill. Areas which are immediately adjacent to and intervisible with the South Downs National Park will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment.

Landscape Character Area 7b/7c: Kingsley / Blackmoor and Alice Holt



Representative photographs

Location and summary of overall character

Please note the majority of these character areas form part of the South Downs National Park. This assessment considers the land outside of the South Downs National Park.

This is a small area of mixed farmland to the south of Alice Holt woods. Medium-scale fields are enclosed by thick hedgerows with frequent mature broadleaved trees. The area is very sparsely settled with few roads and a dense network of footpaths and trackways. The Alice Holt Woods (within the South Downs National Park) are prominent in views to the north.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Very gently undulating medium-scale landform, with a small rounded hill (Kites Hill) located in the east of the area.
Land cover pattern and presence of human scale features	• Settlement is limited to several farms. • Land cover primarily comprises medium-scale arable fields. There are also areas of pasture and horse paddocks. • Fields are contained by thick hedgerows with frequent mature trees, which convey a human scale to the landscape.
Tracks / transport pattern	• The A325 crosses north-south through the area. Elsewhere roads are limited are minor rural lanes and tracks, including parts of the Shipwrights Way.
Skylines / intervisibility	• Skylines are undeveloped and marked by the occasional trees. • The dense woodland within the South Downs National Park to the north creates wooded skylines. • There is intervisibility with higher ground within the adjacent South Downs National Park.
Perceptual qualities	• Strong rural qualities, with limited modern influences. • Noise and movement emanating from traffic on the A325 detracts from tranquillity and the rural qualities of the landscape. • There is sense of expansiveness and openness within some of the larger fields.
Historic Landscape Character	• Some of the sites identified as part of the Alice Holt Forest, Romano-British kiln sites Scheduled Monument are located in the north of this area. • Several of the farm houses are Grade II listed buildings.
Scenic and special qualities	• Woodlands, thick hedgerows and spreading hedgerow oaks which create a lush, wooded character and sense of enclosure contribute to the scenic character of the landscape. • High levels of tranquillity which are experienced away from the A325 are a key special quality.

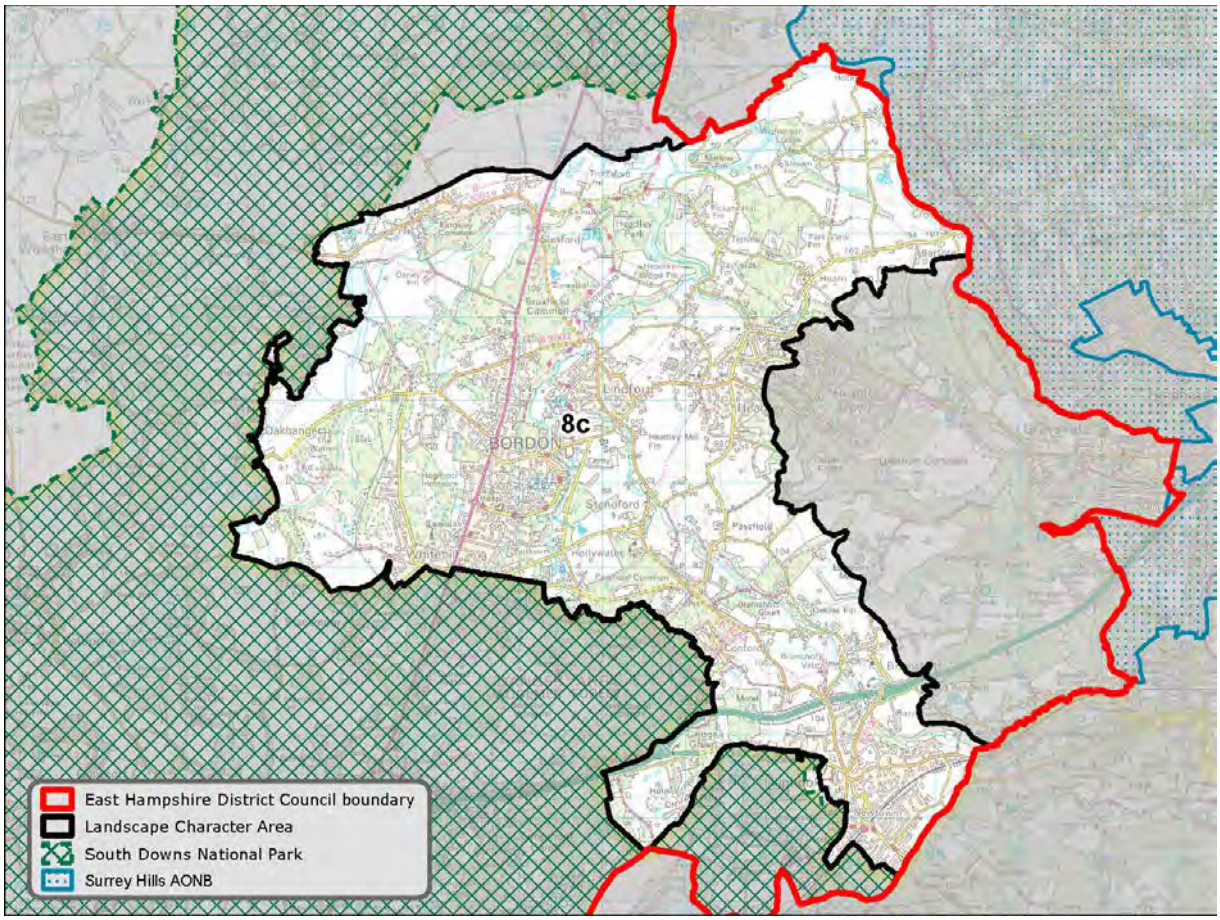
Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)			**M**		
Medium-scale wind turbines (40-80 metres)				**M-H**	
Large-scale wind turbines (80-120 metres)					**H**
Very large wind turbines (120-160 metres)					**H**
Small solar PV installation (<5 hectares)		**L-M**			
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity
Areas which are immediately adjacent to and intervisible with the South Downs National Park will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment. Elevated and more visible slopes such as those associated with Kites Hill have higher levels of sensitivity to all scales of solar PV development.

Landscape Character Area 8c: Whitehill to Liphook Farmland and Heath Mosaic



Representative photographs

Location and summary of overall character

This Landscape Character Area is located in the eastern part of the district, adjacent to the South Downs National Park boundary.

A varied landscape, with a mixture of farmland, woodlands, commons and settlement. The larger settlements of Bordon, Liphook, Headley and Lindford are located in the character area. Away from the larger settlements, the landscape has strong rural qualities. Visual and perceptual character varies depending on landcover and the presence of woodland.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Gently undulating landform, with incised valleys cut by a number of watercourses (River Slea, Southern River Wey and Deadwater). • To the west of Bordon, the landform is flat. • A series of small hills are located in the north of the character area.
Land cover pattern and scale and presence of human scale features	• Small to medium fields of pasture, paddock and rough grazing, with a framework of ancient woodlands and wood pasture. • Areas of settlement (Whitehill, Bordon, Lindford, Liphook and Headley) contained by woodland with smaller villages and farms found in the sheltered valleys. Frequent human scale features. • Other land uses include golf courses, MOD land at Bordon. • Several areas of common land, including areas of internationally important heathland.
Tracks / transport pattern	• Dissected by the A325 and A3, otherwise winding rural lanes and deep sunken lanes provide access. • There is a well-developed footpath network particularly in the north of the area along Oxney Stream and Oakhanger Stream with access to Kingsley and Broxhead Commons.
Skylines / intervisibility	• Skylines within the character are typically undeveloped and wooded, although overhead lines feature in some localised views. • There are also views to elevated wooded skylines in adjacent landscapes, including Alice Holt forest. • There is intervisibility with the South Downs National Park and Surrey Hills AONB, which are both adjacent to the character area.
Perceptual qualities including sense of enclosure/openness	• A tranquil, natural character is retained away from built up areas and busy roads. • The busy A325 and A31 roads create local noise and visual intrusion and areas of MOD land around Bordon (Prince Philip Barracks) erode the rural character. However, the heathland/woodland mosaic provides a high level of rural naturalness and a strong sense of tranquillity is retained along the small river and stream corridors, particularly where they are wooded, with deep sunken lanes being a distinctive feature of these areas.
Historic Landscape Character	• The landscape provides part of the wider setting to several Conservation Areas, including Headley, Arford and the River Wey. • Remnant features relating to water management and agricultural/industrial use of the river, including mills and aqueducts (including the Scheduled Monuments at Headley Wood Farm and Bramshott Court), the latter probably associated with medieval watermeadows. • Variety of archaeological monuments – Bronze Age barrow cemeteries; Civil War fortifications at Walldown, Bordon, forming part of Royalist defence line opposing Parliamentary garrison at Farnham. • Military occupation at Bordon – established as a training ground in the 1860s, with barracks built c.1900 to accommodate troops returning from the Boer War.
Scenic and special qualities	• The commons and frequent woodland represent a continuation of character from the adjacent nationally protected landscapes. • Away from the developed areas of the landscape, this area has a rural character with a strong sense of time-depth and many naturalistic features which form special qualities of the landscape.

Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

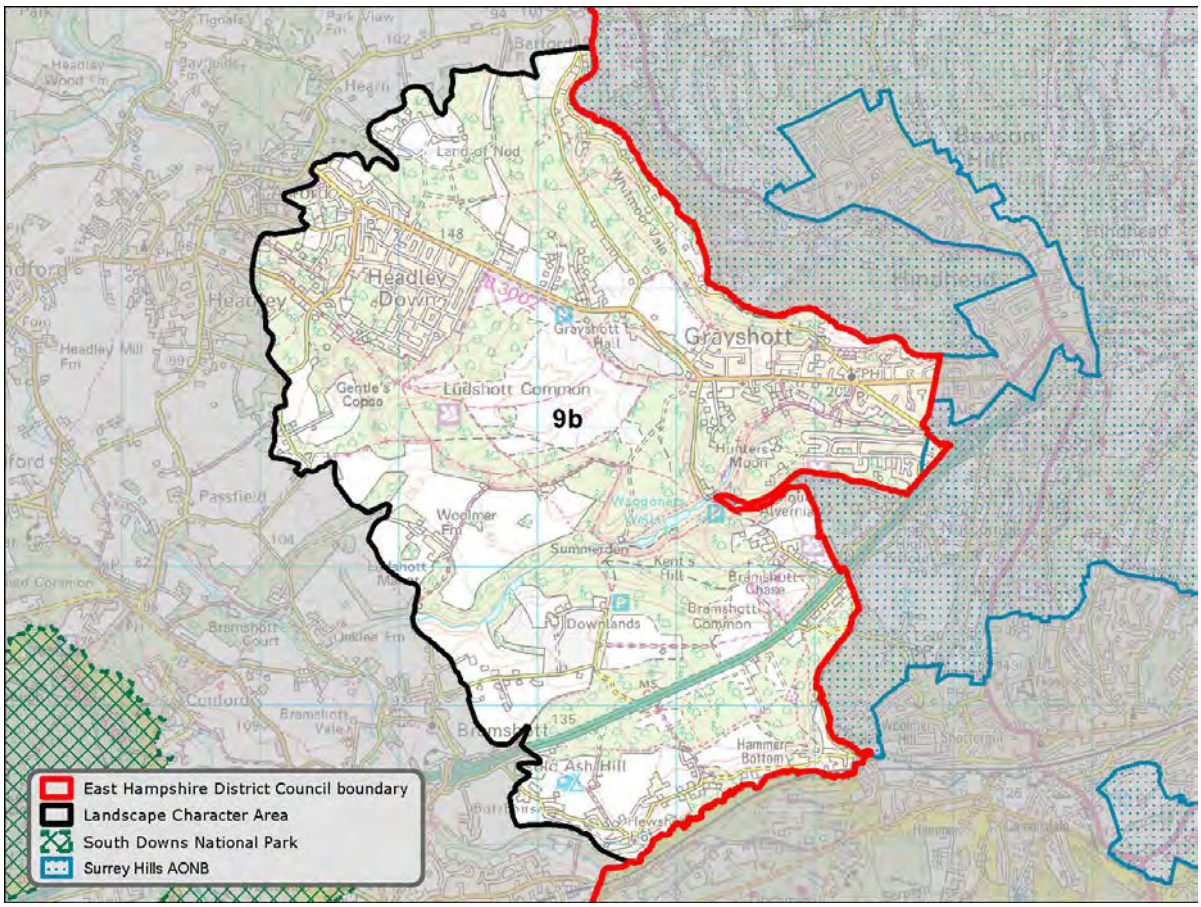
Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)			**M**		
Medium-scale wind turbines (40 – 80 metres)				**M-H**	
Large-scale wind turbines (80 – 120 metres)					**H**
Very large wind turbines (120 – 160 metres)					**H**
Small solar PV installation (<5 hectares)			**M**		
Medium solar PV installation (5-10 hectares)				**M-H**	
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity

The flat land associated with the airstrip in the north east of the character area may have reduced sensitivity to small and medium-scale wind energy development, although the close proximity of this area to the South Downs National Park and the Surrey Hills AONB may counteract this.

Areas which are immediately adjacent to and intervisible with the South Downs National Park and the Surrey Hills AONB will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment.

Landscape Character Area 9b: Ludshott and Bramshott Commons



Representative photographs

Location and summary of overall character

This character area is located on the eastern edge of the district.

This character area mainly comprises common land interspersed with woodland and plantation forestry. The commons are associated with expanses of open heathland and acid/neutral grassland, including areas which are internationally designated. The settlements of Headley Down and Greyshott are located in the character, along the B3002 which bisects the area. The character area is adjacent to the Surrey Hills AONB which lies to the east.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Elevated and undulating landform, with some steep slopes (e.g. to the north east of Headley Down adjacent to the Surrey Hills AONB). • Coopers Stream has created a steeply incised, small-scale valley in the southern part of the character area.
Land cover pattern and scale and presence of human scale features	• Land cover comprises a mosaic of different land uses/types, including common land, woodland and historic parkland. • Well-wooded landscape, including large areas of coniferous plantation and ancient woodland (often on valley sides). • Small-scale regular pastoral fields occur in woodland clearings sometimes containing paddocks. • Internationally important areas of unenclosed healthland common (Bramshott and Ludshott Commons SSSI) form part of the Wealden Heaths SPA. • Frequent human scale features are associated with the settlements of Grayshott and Headley Down.
Tracks / transport pattern	• The majority of access route comprise sunken rural lanes/informal tracks. The character area also contains the larger routes of the A3 trunk road and the B3002. • Ludshott Common, Hunters Moon, Bramshott Chase and Waggoners' or Wakeners' Wells are National Trust land, with a comprehensive footpath network and access facilities.
Skylines / intervisibility	• Skylines are marked by the frequent plantation woodland which occur throughout the character area. • There are wide, open vistas across the open commons, characterised by unmarked, expansive skylines. • There are high levels of intervisibility with the dramatic wooded hills of the Surrey Hills AONB which is adjacent to the east.
Perceptual qualities including sense of enclosure/openness	• Varied perceptual qualities as a result of the diverse land cover. There is a strong sense of enclosure created by the woodland throughout much of the character area, which contrasts with a strong sense of openness experienced on the heathland commons. • A rural and tranquil landscape with a sense of intimacy and secrecy. The corridor of the A3(T) in the southern part of the area is a local source of noise and disruption.
Historic Landscape Character	• Historic parkland with pre-1800 park at Downlands House, post-1800 parkland at Ludshott Manor and Grayshott Hall. • The landscape provides a setting to Conservation Areas including Grayshott and the River Wey Conservation Area. • A former military camp is located on Bramshott Common.
Scenic and special qualities	• There is a continuation of character from the nationally protected landscape of Surrey Hills AONB into the character area. • The Landscape Character Area profile notes the tranquil qualities of the area as a key sensitivity.

Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Renewable energy typology	Sensitivity				
Small-scale wind turbines (<40 metres)				M-H	
Medium-scale wind turbines (40 – 80 metres)					H
Large-scale wind turbines (80 – 120 metres)					H
Very large wind turbines (120 – 160 metres)					H
Small solar PV installation (<5 hectares)			M		
Medium solar PV installation (5-10 hectares)				M-H	
Large solar PV installation (10-20 hectares)					H
Very large solar PV installation (20-30 hectares)					H

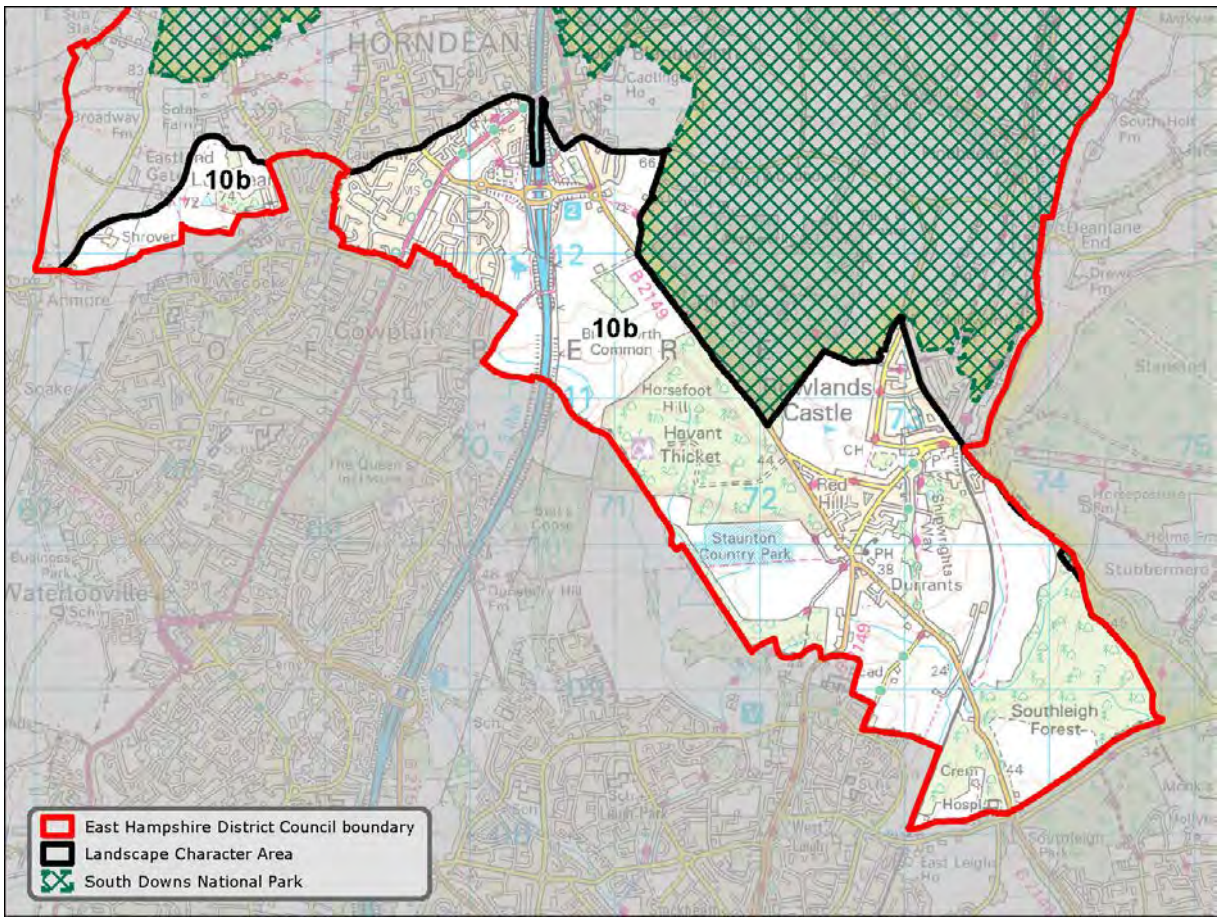
Notes on any variations in landscape sensitivity

The steeper slopes to the north east of Headley Down and along the north-eastern edge of the character area are visually prominent and would have higher levels of sensitivity to both wind and energy development.

The internationally designated open heathland commons are highly sensitive to any scale of solar and/or wind energy development.

Areas which are immediately adjacent to and intervisible with the Surrey Hills Area of Outstanding Natural Beauty will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment.

Landscape Character Area 10a: Havant Thicket and Southleigh Forest



Representative photographs

Location and summary of overall character

Please note, part of the land within this Landscape Character Area is within the South Downs National Park. This assessment only considers the land outside of the South Downs National Park boundary.

This Landscape Character Area comprises gently undulating land which is dominated by large areas of woodland, including Havant Thicket, The Holt and Southleigh Forest. Areas of pasture, paddocks and common land intersperse the woodland. It is also a settled landscape, containing parts of Rowlands Castle and Horndean. The A3(M) is a major road which crosses through the landscape.

Landscape sensitivity assessment

Criteria	Description
Landform and scale	• Transitional area incorporating the low lying, clay vale and the edge of the chalk downland dipslope. • Generally a medium scale landscape, although more expansive, flat areas occur within the parklands.
Land cover pattern and scale and presence of human scale features	• Small geometric fields predominantly of recent enclosure with pasture, some managed as horse paddocks. • Varied landcover dominated by woodland and including pasture, paddocks and commonland. • The Southleigh landfill site is prominent on the southern edge of the area.
Tracks / transport pattern	• Sheepwash Road is an ancient route through the area providing access form the lowlands up onto the downs. • The A3(M) is a major route crossing through the western part of the area.
Skylines / intervisibility	• Skylines are mostly undeveloped, with the thick woodland creating wooded skylines. Pylon lines adjacent to the A3 are occasionally glimpsed above the trees. • There is intervisibility with the South Downs National Park to the north.
Perceptual qualities including sense of enclosure/openness	• The dense woodland and frequent semi-natural habitats create a rural landscape, with high levels of tranquillity. • The close proximity of the urban edges of Havant and Horndean and the A3(M) motorway can detract from the rural and tranquil qualities of the landscape.
Historic Landscape Character	• Remains of a motte and bailey are located to the south of Rowlands Castle are designated as a Scheduled Monument. • The character area contributes to the setting of Conservation Areas at Rowland's Castle and Staunton Country Park (also a Grade II* Registered Park and Garden. • The remnant woodland and common land represent fragments of the once extensive Forest of Bere - a medieval royal hunting preserve.
Scenic and special qualities	• The frequent historic parklands add to the scenic qualities of the landscape, although the major roads, pylons and urban development can be detract from the scenic qualities of the landscape.

Overall assessment of landscape sensitivity to development scenarios

Please note: Landscape sensitivity often varies within an LCA, with areas exhibiting higher and lower sensitivity. It is therefore very important to take note of the explanatory text supporting the assessments in each Landscape Character Area profile, particularly the box entitled 'Notes on any variations in landscape sensitivity'. Whilst the Landscape Sensitivity Assessment results provide an initial indication of landscape sensitivity, they should not be interpreted as definitive statements on the suitability of individual sites for a particular development. All proposals will need to be assessed on their own merits through the planning process, including – where required – through proposal-specific Landscape and Visual Impact Assessments (LVIAs).

Development scenario	Sensitivity				
Small-scale wind turbines (<40 metres)			**M**		
Medium-scale wind turbines (40 – 80 metres)				**M-H**	
Large-scale wind turbines (80 – 120 metres)					**H**
Very large wind turbines (120 – 160 metres)					**H**
Small solar PV installation (<5 hectares)			**M**		
Medium solar PV installation (5-10 hectares)			**M**		
Large solar PV installation (10-20 hectares)				**M-H**	
Very large solar PV installation (20-30 hectares)					**H**

Notes on any variations in landscape sensitivity
Areas which are immediately adjacent to and intervisible with the South Downs National Park will have higher levels of sensitivity to all renewable energy development scenarios considered as part of the landscape sensitivity assessment. Areas which are visually enclosed by the presence of dense woodland are likely to have lower levels of sensitivity to small and medium scale solar PV development.