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Guidance on assessing the sensitivity of the landscape of the East of England

Prepared for Landscape East by Land Use Consultants

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CONTENTS

APPENDICES

Acknowledgements

This study was steered by a Client Commissioning Group comprising of Rachel Penny (Natural England), Simon Odell (Hertfordshire County Council), Peter Holborn (Suffolk County Council), Peter Herring (English Heritage), Judith Cantell (Norfolk County Council), Jonathan Dix (Natural England) and Alan Wheeler (Landscape East). The emerging work was presented at a Landscape East Regional Conference in October 2009. Land Use Consultants team comprised of Kate Ahern, Andrew Tempany, Jeremy Owen, Sally Parker, Graham Savage, Tom Ginnett and Alison King, with input from Lyndis Cole and Rebecca Knight, and additional contributions from Professor Carys Swanwick (University of Sheffield) and Steven Warnock (Living Landscapes).

1 Introduction

1.1 Land Use Consultants was commissioned in September 2009 by Landscape East and Natural England to develop guidance on producing and recommending a methodology for landscape sensitivity assessment using the regional landscape typology prepared by Landscape East. The method addresses landscape only. In order to consider wider environmental sensitivity, it will need to be set alongside other judgements in relation to, for example biodiversity and historic character.

1.2 The aim was to:

- develop a methodology for assessing the sensitivity of different regional landscape character types in the East of England to different change scenarios;
- recommend how the typology and methodology should be "positioned" to ensure application.

1.3 The key objective is for the method to have useful application, at the regional scale, in seeking to manage and focus the significant levels of change anticipated. It should help ensure that change is delivered in ways that respond to and enhance the distinctive character and sense of place of the East of England.

1.4 It is recognised that all landscapes change. Change is not necessarily negative and a methodology must seek to understand change in context and manage accordingly, recognising opportunities to create new character, rather than preserving the status quo or restoring previous landscape character. Landscape change can encompass a myriad of scenarios and factors. In the course of this work, the emphasis was on types of change which have specific resonance for the East of England. These include:

- Growth: the emerging work then being undertaken in the context of the Growth Areas and Growth Points/New Growth Points agenda in relation to housing scenarios for the East of England Plan Review and Integrated Sustainability Appraisal/related work such as the Regional Scale Settlement Study;
- Infrastructure associated with growth, such as transport corridors and highway schemes;
- Climate change predictions;
- Renewable energy proposals;
- Other forms of change associated with land management e.g. agricultural change.

1.5 The details of the method and pilot studies presented in this report are directed at change associated with growth in the context of housing, however the principles are such that it can be applied to consideration of all types of change at the regional scale in the East of England.

1.6 The development of the method draws on current good practice in understanding landscape sensitivity and aligns with Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity. The approach described in this report explores sensitivity to a given type of change, and places emphasis on sensitivity, rather than capacity, as a basis to positively focus future landscape change. This guidance also draws on professional expertise involving a roundtable meeting of stakeholders from Landscape East and Land Use Consultants (chaired by Prof. Carys Swanwick) and was tested at a Landscape East regional conference (Oct 2009).

1.7 The report is set out in the following sections:

- A proposed method - assessing landscape sensitivity at the regional scale with guidance on how it could be applied – **section 2**;
- Piloting the method – showing how the method has been applied to landscape types within the East of England (EoE) Landscape Framework – **section 3**.

1.8 **Appendix 1** sets out a review of recent relevant landscape sensitivity studies. **Appendix 2** shows several case study applications of the sensitivity method presented in this report.

2 A proposed method

2.1 This section sets out a method for assessing landscape sensitivity which can be applied at the regional scale. The method is specific and detailed enough to have meaningful application, and sufficiently generic to enable it to be used in consideration of a wide variety of different change scenarios likely to affect landscape types within the East of England.

High Level Design Principles

2.2 The following high level principles have been defined to focus method development. They draw on findings from the review of recent studies, and consultation:

The method should be:

- Fit for purpose – applying at the regional scale but with principles relevant to other scales of application (e.g. county and local level decision making);
- Simple, understandable, especially by non landscape professionals;
- Streamlined - non data hungry, working with available information as part of the EoE Landscape Framework;
- Flexible, capable of being added to as new data emerges;
- Targeted at specific types of change rather than dealing with inherent sensitivity;
- Positive and forward looking, to have useful application in managing change;
- Contain sensitivity judgements (3 point scale) but ensure that these are linked to GUIDANCE.

2.3 Key steps in the method are described in this section, with guidance on how the method could be applied, with reference to theoretical examples where appropriate, set out in boxes alongside the relevant stages. At the end of this section are some observations concerning potential use of the method.

2.4 Key steps in the method are

Step 1: Define type and nature of landscape change

Step 2: Identify landscape attributes - what is important and why

Step 3: Assess effects of change (assigning landscape sensitivity)

Step 4: Develop appropriate landscape guidance

Step 1: Define type and nature of change

2.5 Identification of the specific type and nature of change is important as it will influence which landscape attributes are sensitive. Consideration needs to be given here to the potential impacts of the proposed change and the aspects of the change in question. Potential aspects of change to consider include:

- Scale, proportion and size - Height/massing;
- Ancillary structures;
- Lighting;
- Reflectivity;
- Colour/texture/finish;
- Permanence/reversibility.

Landscape attributes are likely to be sensitive in different ways or have different sensitivities to specific forms of change. For example, some areas of low lying topography may have a comparatively low sensitivity to residential development but may be vulnerable and therefore highly sensitive to flooding and fluctuating water levels, as a result of climate change.

Step 2: Identify landscape character - what is important and why

2.6 Landscape characteristics and a sound understanding of landscape and place should be the basis for judgements on sensitivity and supporting landscape guidance. This is noted in the Guidance on Landscape Character Assessment (Topic Paper 6):

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'.

Topic Paper 6, para 4.2

2.7 Identification of landscape attributes at the **regional** level should be undertaken with reference to the key landscape characteristics for the relevant landscape type within the **EoE Landscape Framework**. The ideal scenario would be to use these to identify key positive or valued landscape character attributes with input from relevant stakeholders, although it is recognised that this may not always be possible.

2.8 **Box 1** identifies some common landscape attributes by which key landscape characteristics may be grouped, as a basis for assessing sensitivity to a given type of change. It should be noted that these may be vary according to the specific type of change being assessed, and that different attributes will be sensitive in different ways to specific types of change. For example the presence of human scale built interventions or settlement features in a landscape may indicate a lower sensitivity to comparable residential proposals, but a higher sensitivity to large scale infrastructure projects.

Box 1: Example landscape attributes

Scale – whether or not the landscape include human scale elements, presence or absence of enclosing features
Topography/Landform – Whether undulating, rolling or flat. Level of landform variation, gradient
Landscape pattern and complexity – Presence or absence of cultural pattern, time depth (presence of features from different historical periods, in the landscape), landscape structure/fabric, enclosure patterns, interplay of colour and texture
Settlement and human influences – time depth, age, nature, form and level of settlement
Skylines - Whether open or framed, settled etc, role in relation to surrounding areas
Perceptual aspects such as sense of remoteness, tranquillity
Aesthetic attributes such as texture, pattern, colour, movement, light, reflection; and consideration of visual issues e.g. relationship to landform and vegetation
Consideration should also be given to the sensitivity of specific elements – hydrology, biodiversity, archaeology etc

2.9 The most important step in the process involves reviewing the landscape evidence base (at the regional scale this is the EoE Landscape Framework) and using judgement to identify the relevant characteristics. Key landscape characteristics can be grouped under the headline attributes. The EoE Landscape Framework provides a good level of detail that can be mined to pull out relevant information under such headings. The EoE Landscape Framework also has the advantage of having considerable stakeholder input and validation in its preparation. It provides a consistent landscape evidence base across the region. It is also recognised that it may be appropriate for those considering change scenarios to drill down to finer level of detail and information than in the EoE Landscape Framework (even if considering matters of a regional scale) and to use this information as well as the EoE Landscape Framework.

2.10 An example of grouping of landscape characteristics (and settlement characteristics) under a number of the headline attributes is provided in **table 2.1**. This is based on information contained in the *Wooded Plateau Farmlands* landscape character type within the regional framework. The landscape attributes of this landscape type, as listed in **table 2.1**, have been applied to a specific change scenario in piloting the sensitivity method, at the end of **section 3** of this report.

Table 2.1: Example Landscape attributes and component characteristics

Landscape attribute:
Scale
Medium to large sized fields
Topography/landform
Gently undulating landscape often associated with broad plateau, or narrow ridges
Landscape pattern and complexity
Arable land use within a more irregular pattern of medium to large sized fields
Settlement and human influences
Settled character comprising scattered farmsteads, hamlets (often linear) and historic villages
Fairly high intensity of traditional settlement
Present settlement pattern includes nucleations of different sizes (though with relatively few towns)
Dispersed settlement - small isolated farms – form a significant component of the settlement pattern
Limited expansion of urban areas into this landscape character type (LCT)
Skylines
No information in LCT description (may need to be defined locally)
Perceptual aspects such as sense of remoteness, tranquillity
Wooded landscape –with copses of ancient woodland and smaller plantations

Step 3: Assess effects of change (assigning landscape sensitivity)

2.11 A three point sensitivity scale has been defined, which we recommend for application at the regional scale, and this is set out in **table 2.2** below. It should be noted that this will not necessarily be appropriate for 'finer scale' sensitivity analysis ('site specific' situations), when more detailed sensitivity scales and matrices may be required.

Table 2.2: Regional scale landscape character sensitivity – potential definitions

Sensitivity level	Definition
High	Key characteristics of the landscape are highly vulnerable to the type of change being assessed, with such change likely to result in a significant change in valued character.
Moderate	Some of the key characteristics of the landscape may be vulnerable to the type of change being assessed. Although the landscape may have some ability to absorb change, some alteration in character may result. Considerable care may be needed in locating and designing change within the landscape.
Low[1]	Key characteristics of the landscape are less likely to be adversely affected by change. Change can potentially be more easily accommodated without significantly altering character and there may be opportunities to positively create new character. Sensitive design is still needed to accommodate change.

2.12 **Table 2.3** below shows how landscape sensitivity can be related to the attributes described in **Box 1**. In this case the type of change considered is residential development. It should be noted that landscape sensitivity will be to an extent relative to the scale and form of the change being proposed. Different scale scenarios in relation to residential development are explained in the examples in the following chapter.

Table 2.3: Examples of attributes and relative sensitivities

Landscape Sensitivity Assessment Criteria			
Characteristic/ attribute	**Aspects which may indicate lower sensitivity to residential /mixed use development**		**Aspects which may indicate higher sensitivity to residential/mixed use development**
Residential			
Scale	Presence of human scale	↔	Absence of human scale
Topography/landform	Absence of strong	↔	Presence of strong

[1] It should be noted that a landscape of 'low sensitivity' to a given change still require careful consideration of siting and location of change in that landscape, particularly given the emphasis on all landscapes being of value, as set out in the European Landscape Convention.

Landscape Sensitivity Assessment Criteria			
Characteristic/ attribute	**Aspects which may indicate lower sensitivity to residential /mixed use development**		**Aspects which may indicate higher sensitivity to residential/mixed use development**
Residential			
	topographical variety Featureless, convex or flat		topographical variety or distinctive landform features
Landscape pattern and complexity	Simple Regular or uniform Large scale, or eroded landscape pattern	↔	Complex/mosaic Rugged and irregular Intact or small scale landscape pattern and structure
Settlement	Concentrated settlement pattern Presence of contemporary structures e.g. utility, infrastructure or industrial elements Hard or eroded settlement edge	↔	Dispersed settlement pattern Absence of modern development, presence of small scale, historic or vernacular settlement Porous/soft landscape edge, with settlement well integrated with the landscape
Skylines	Non-prominent /screened skylines Developed/built or cluttered skyline character	↔	Distinctive, undeveloped skylines Skylines with important historic landmarks
Perceptual aspects (sense of remoteness, tranquillity)	Close to visible signs of human activity and development Simple aesthetic character	↔	Physically or perceptually remote, peaceful or tranquil Complex, varied mosaic aesthetic character

2.13 When sensitivities have been assigned to the individual landscape attributes, these can then be used to build up a profile of landscape sensitivity for the landscape character type (see pilot examples in **section 3**). In assigning a sensitivity judgement it is important to note why a particular judgement has been made, as well as to consider how all the attributes work together to create landscape character.

2.14 In essence, what is required here is to make a considered professional judgement on what is important and why, in terms of contribution to character (significance), and how this would be affected by the proposed change.

Step 4: Develop appropriate landscape guidance

2.15 It is not the purpose of sensitivity judgements to say that development or change should be rejected on account of a sensitivity rating. Such decisions will depend on a wide range of different factors, such as biodiversity, hydrology and historic environment, as well as policy. Indeed it must be recognised that our landscape is dynamic and ever evolving, and that change is as much a characteristic of the landscape as a source of impact upon it.

2.16 Therefore at the regional level sensitivity judgements should be linked to guidance in respect of siting, design and management, to ensure that change is focussed in the most positive way. Guidance should clearly and concisely link back to understanding of landscape character (key characteristics and landscape attributes). Guidance should be targeted as specifically as possible to the type and scale of landscape change in question. It may also be helpful to relate the guidance to broad commentary on cumulative change issues. An example of landscape guidance in relation to positively reflecting landscape character, and which would be appropriate at the regional scale, in relation to change, is set out below.

Theoretical guidance example

For new settlement in relation to the *Wooded Plateau Farmland* landscape type:

Use landform variation in relation to development to 'absorb' development and rooflines as far as possible within the landscape. Conserve landscape features such as ancient woodland and field boundaries as integral parts of the green infrastructure network. Seek to 'break' development with green space swathes incorporating sensitive landscape features such as ancient woodland, common land and mature landscape structure. Such landscape structure would be especially important to conserve in relation to cumulative development issues.

Observations on the method and its application

- The method was designed for use at the regional scale and with the landscape typology defined for the East of England Landscape Framework. However, the principles are equally relevant to more local or 'detailed' proposals, and in relation to local authority and local scale decision making, although clearly at this scale they would need to work with an appropriate evidence base. Some hypothetical and real examples of the application of the method to the scale of decision making for which the method was designed, are presented in the illustrated case studies at **Appendix 2**. Key points for application of the method are set out below, and this is further discussed in the companion paper 'Applying the Guidance to Other Issues':

- Landscape attributes will have different sensitivities to different types of change, and not all landscape attributes will necessarily be sensitive;

- The intention of the method is not to suggest that sensitivities of individual attributes cancel each other out. It is a question of professional judgement in weighing up which of the landscape attributes are most important to character and which would be most affected by the change being assessed. For example in the Planned Peat Fen landscape type, the relative lack of topographic variety would be less sensitive to residential development, whilst the sense of remoteness and the large landscape scale and open character would be considerably more sensitive, and as

such the landscape type would be highly sensitive to residential development in overall terms;

- At the regional scale the preference should be for a relatively 'limited' or simple range of landscape evidence, namely the information held as part of the EoE Landscape Framework (which can of course be added to);
- Those seeking to evaluate landscape sensitivity in relation to change at a more local scale (e.g. Local Authorities), should refer to the relevant local level landscape character assessments (e.g. sensitivity analysis in relation to Local Development Framework site allocations should refer to a District level Landscape Character Assessment, with appropriate sub division of component landscape character areas, informed by professional judgement). Sensitivity analysis in relation to very large scale proposals should make reference to relevant National Character Areas as well as the EoE Landscape Framework, given the likely scale and range of landscape effects);
- The three point sensitivity scale is appropriate for the regional scale. More local sensitivity analysis may require consideration of different sensitivity 'thresholds' or a sensitivity scale with a greater number of thresholds (such as a 5 point sensitivity scale), reflecting the scale of the landscape/site at which the work is undertaken and the scale of change being assessed);
- In applying the method, care should also be taken to consider inter relationships within the wider landscape, for example how a change in one landscape type could have an effect on adjacent landscape types;
- This proposed method does not consider landscape capacity. The idea of defining capacity as some kind of threshold can be misleading. There also seems a risk that capacity suggests scope to accommodate change without landscape implications, whereas the term sensitivity reflects the fact that some degree of consequence will almost always result. It must also be considered that landscape is just one piece of evidence that needs to be considered along with other sensitivities in determining environmental capacity, e.g. that capacity needs to be informed by wider understanding of a range of factors;
- Stakeholder consultation on identifying landscape values is particularly relevant at the local level;
- In addition, it may be helpful for local level and site specific studies (e.g. where the spatial form and location of change/proposals are largely known) to also consider visual sensitivity, that is, visibility and the potential scope to mitigate the visual effects of any change that might take place.

Designated landscape interests

2.17 The East of England contains important designated landscapes, The Broads and 4 AONBs – The Chilterns (part), Dedham Vale, Suffolk Coast and Heaths

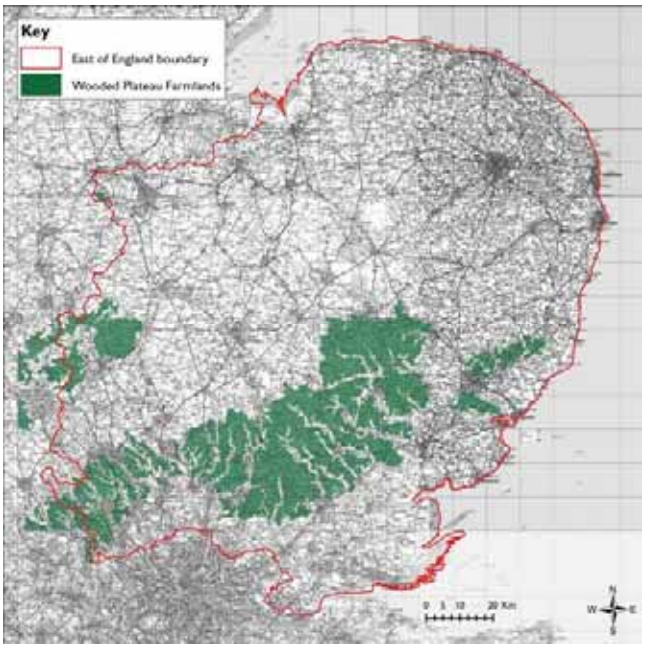
and Norfolk Coast. When the sensitivity method is applied, the effects of change may also need to be considered separately on the character, special qualities and integrity of any relevant designated landscape interest; this may include consideration of setting. It is recommended that when working at the regional level the consistent baseline of the EoE Landscape Framework is applied in the first instance and that effect on designated landscape interests is undertaken as a second stage, where required, providing a finer grain of analysis. In such cases the effect of change will need to be evaluated against the identified qualities and character of the designated landscape as usually set out in the relevant Management Plan or Landscape Character Assessment for that protected landscape.

2.18 Analysis of the relevant landscape attributes in relation to landscape types or character areas should pick up or reference as appropriate other non landscape designations but which relate to understanding or expression of place and character (e.g. nature conservation designations such as Sites of Special Scientific Interest and ancient woodland, heritage designations such as registered parks and gardens).

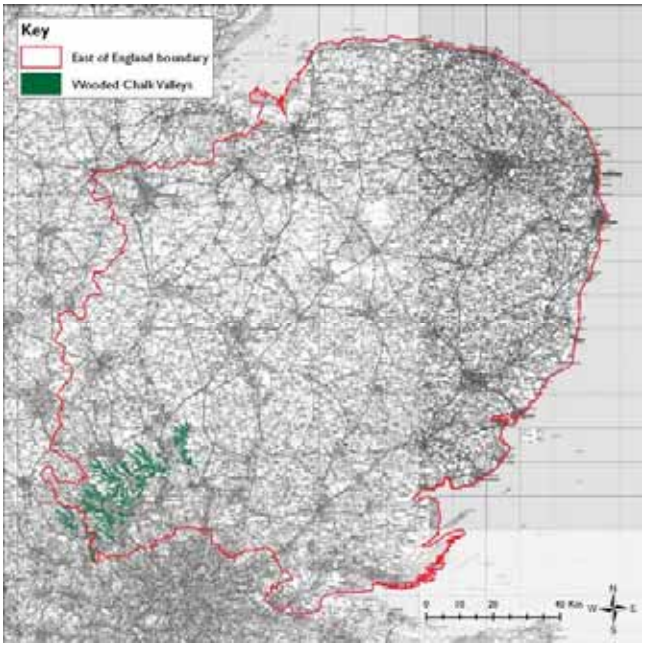
3 Piloting the method

3.1 The method introduced at **section 2** has been piloted in different landscape character types within the EoE Landscape Framework. These are:

- *Wooded Plateau Farmlands*;
- *Wooded Chalk Valleys*.



Location of Wooded Plateau Farmlands Landscape Type

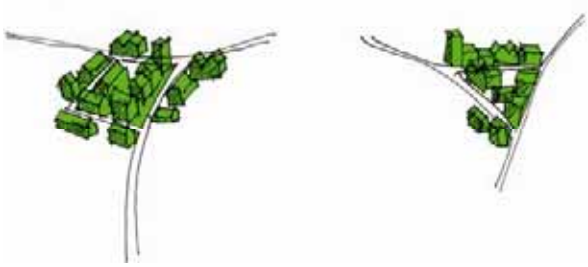


Location of Wooded Chalk Valleys Landscape Type

3.2 Sensitivity has been considered in relation to several different **residential development scenarios**, which could all form components of larger/regional scale settlement proposals/Eco Town scale settlement**.** The form and layout of such proposals could include several/multiple clusters of smaller settlements, which is why a range of settlement scales have been considered in the models for the analysis. The residential development scenarios which have been considered as part of this exercise are set out below:

	**Medium to large scale development** – a development footprint of 1000-3000 houses, either as infill, or more probably settlement expansion/'bolt on'.
	**Large scale development** – a development footprint in excess of 3000 houses and up to 10,000 houses, as settlement expansion/new settlement, or as settlement aggregation.
	**Very large scale settlements** – Development in excess of 10,000 houses, either as standalone settlements or significant scale settlement extensions/urban extensions, or settlement aggregation.

3.3 In addition to development footprint, a range of other variables were considered, as set out below. Note that these considerations of density and development form are provided as theoretical examples only. They are not intended to suggest that nucleated development is either typical or characteristic in the East of England.

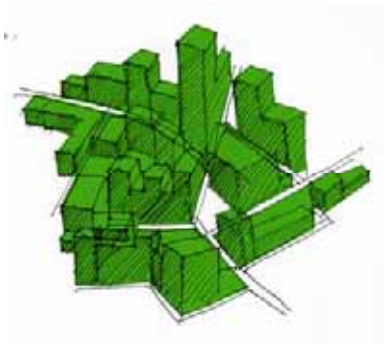


Small concentrations of nucleated development

30-50 dwellings per hectare (dph), with separate small groupings of nucleated settlement. 2 storey development commonplace.

Typical medium-high density – nucleated

30-50 dph, a level associated with Planning Policy Statement 3 (PPS3), in relation to recent approaches to 'sustainable development'. Such density would normally inevitably require a more 'nucleated' form. 2 storey with some 2.5/3 storey 'landmark' buildings.



Very high density – inner core/urban

Reflecting historic inner city/town development. Densification of settlement and associated tight urban grain, with density in the order of 50-80 dph. Predominantly taller buildings – 3 and 4 storey.

Assumptions

Storey heights (based on typical development models) are 3 metres, with 2 storey dwellings being 9m to ridge height, 3 storey 12m to ridge height and so on. In relation to commercial development, based on comparable existing late 20th Century employment development, the assumption is that 2 commercial storeys = 9m height, 3 commercial storeys = 12 m height.

3.4 The pilot sensitivity analysis for the two landscape character types is presented overleaf.

SENSITIVITY ANALYSIS – WOODED PLATEAU FARMLANDS (LUC)

Variable 1: Settlement typology

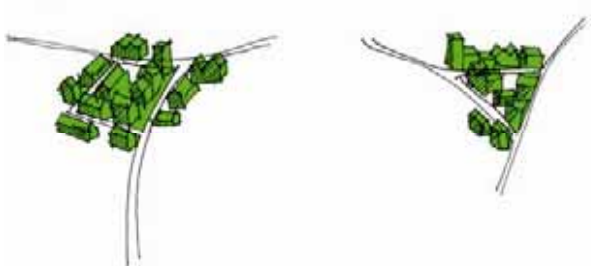
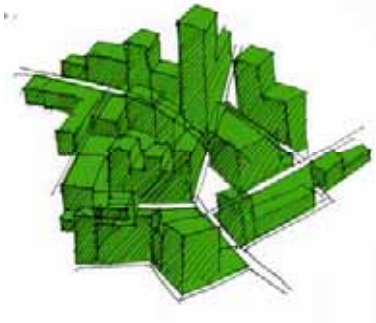
Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlement (10,000 houses plus)** 
Scale			
Medium to large sized fields	It is likely this landscape pattern could be accommodated within such a development scale, with careful design – **low** sensitivity.	Care needed in relation to layout design to respect this landscape pattern and the perception of it – **moderate** sensitivity.	Would be likely to significant alter character in relation to landscape scale, particularly if substantially over 10,000 houses – considerable care needed in relation to layout design/development disposition – **moderate to high** sensitivity.
Topography/landform			
Gently undulating landscape often associated with broad plateau, or narrow ridges	With careful design in relation to building heights/disposition and rooflines, this could be accommodated and could still make reference to visual relationships – **low** sensitivity.	Great care needed in relation to development siting, and to conserve visual relationships with more elevated areas within the type – **moderate** sensitivity.	Would need considerable care in terms of development siting in relation to landform and more elevated areas to avoid changing character, as well as to conserve landform features – **moderate to high** sensitivity.
Landscape pattern and complexity			
Arable land use within a more irregular pattern of medium to large sized	Land use would naturally have a **high** sensitivity to this type of change, although irregular	Land use would naturally have a **high** sensitivity to this type of change, although irregular field	Land use would naturally have a **high** sensitivity to this type of change. Irregular field pattern is likely to be

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlement (10,000 houses plus)** 
fields	field pattern could be retained within this scale of development, with careful design – **low** sensitivity.	pattern could be retained within this scale of development, however there would be a need for careful design in relation to this – **low** sensitivity to the smaller end of the development scale, but likely to be of **moderate** sensitivity to the upper end.	sensitive to development of this scale and considerable care would be needed in relation to development layout and siting to avoid changing character – **moderate to high** sensitivity.
Settlement and human influences			
Settled character comprising scattered farmsteads, hamlets (often linear) and historic villages	Careful design would be needed in relation to development of this scale (density/footprint/dispersal etc) to avoid altering character – **moderate** sensitivity.	Such a scale of development would be likely to introduce notable change to character, unless very careful development layout design – **moderate to high** sensitivity.	Such scale of development would be likely to introduce significant change to character – **high** sensitivity.
Fairly high intensity of traditional settlement	Subject to development form and layout this could be	Subject to development form and layout this could be	Such a scale of development is increasingly likely to be 'at odds' with

Landscape attributes and associated key landscape and settlement characteristics	Sensitivity to:		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlement (10,000 houses plus)** 
	accommodated without changing character – **low** sensitivity.	accommodated without changing character – **low** sensitivity. Sensitivity is likely to be **moderate** towards the top end of the development threshold.	established settlement character, outside of the larger towns and would necessitate careful design to avoid altering character – **moderate to high** sensitivity.
Present settlement pattern includes nucleations of different sizes (though with relatively few towns)	Potentially in keeping with this pattern (and in relation to the few larger towns within the type), subject to form – **low** sensitivity.	Potentially in keeping with this pattern (and in relation to the few larger towns within the type), subject to form – **low** sensitivity. Sensitivity is likely to be **moderate** towards the higher end of the development size threshold.	Such a scale of development is likely to be significantly different to established settlement character, especially if development is substantially in excess of 10,000 houses – **moderate to high** sensitivity.
Dispersed settlement - small isolated farms form a significant component of the settlement pattern	Careful design required, in relation to development layout – **moderate** sensitivity, although sensitivity may be greater in a cumulative scenario.	Large scale development would be likely to significantly change this character – **high** sensitivity.	Development of this scale would be likely to significantly change this character – **high** sensitivity.
Limited expansion of urban areas into this LCT	Careful design required, in relation to development layout – **moderate to high** sensitivity. Sensitivity may be greater in a cumulative	Large scale development would be likely to significantly change this character – **high** sensitivity.	Development of this scale would be likely to significantly change this character – **high** sensitivity.

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlement (10,000 houses plus)** 
	scenario.		
Skylines			
No information in LCT description	-	-	-
Perceptual aspects			
Wooded landscape with copses of ancient woodland and smaller plantations	With careful design, this character could be retained – **low** sensitivity, although sensitivity may be **moderate** towards the larger end of the development scale (e.g. vulnerability of such landscape features to development footprints and utilities etc).	Need for careful development design in relation to these landscape features – **moderate** sensitivity.	Need for very careful development design in relation to these landscape features – **moderate to high** sensitivity.
Overall sensitivity	**Low to moderate** This is due to landscape scale, landform and the relative intensity of existing settlement of comparable scale.	**Moderate** Careful consideration would be needed in relation to landscape scale and topography and due to scale difference with established settlements, although this model may potentially be comparable to existing settlement form.	**Moderate to high** This is due to the difference of this model to landscape scale and the potential impact of the development footprint on topography. The model also has a significant scale difference to the established settlement pattern.

Variable 2: Development form, density and massing

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Small concentrations of nucleated development (clusters of 30-50dph, 2 storey) 	**Medium to high density – nucleated (30-50 dph, 2-2.5/3 storey)** 	**Very high density – urban (50-80 dph, 3-4 storey)** 
Scale			
Medium to large sized fields	This landscape scale would be unlikely to be changed by this development model – **low** sensitivity.	This landscape scale would be unlikely to be changed by this development model – **low** sensitivity, although there would be a need for careful design, and sensitivity may be greater in a cumulative scenario.	This landscape scale would be unlikely to be changed by this development model – **low** sensitivity, as likely to have a relatively smaller footprint.

Topography/landform			
Gently undulating landscape often associated with broad plateau, or narrow ridges	Small scale concentrations of development would be unlikely to affect this and could potentially maintain visual relationships in relation to landform – **low** sensitivity.	Potentially greater development footprint would necessitate careful design in relation to landform – **moderate** sensitivity.	Massing and building heights would be likely to be greater on the high density model. Therefore need for careful design in relation to visual relationships between landform features, and in relation to prominence of taller buildings on elevated areas - **moderate to high** sensitivity.

Landscape pattern and complexity			
Arable land use within a more irregular pattern of medium to large sized fields	Land use has a **high** sensitivity although the irregular landscape pattern could potentially accommodate such a settlement model - **low** sensitivity.	Land use has a **high** sensitivity although the irregular landscape pattern could potentially accommodate a compact, nucleated development model, with careful design – **moderate** sensitivity.	Land use has a **high** sensitivity although the irregular landscape pattern could potentially accommodate a compact, nucleated development model, with careful design – **moderate** sensitivity.

Settlement and human influences			
Settled character comprising scattered farmsteads, hamlets (often linear) and historic villages	Such a development pattern could fit with established settlement character – **low** sensitivity.	Such a development pattern could fit with established settlement character – **low** sensitivity, although sensitivity may be higher (**moderate**) toward the upper end of the density threshold, and sensitivity may be greater in a cumulative scenario.	High density and potential associated massing may be out of place in relation to established settlement character – **high** sensitivity.
Fairly high intensity of traditional settlement	Such a development pattern could fit with established settlement character and reflect historic settlement pattern – **low** sensitivity.	Such a development pattern could fit with established settlement character and reflect historic settlement pattern – **low** sensitivity.	High density urban model does not generally fit with this characteristic outside of the few towns within the type – **high** sensitivity.
Present settlement pattern includes nucleations of different sizes (though with relatively few towns)	Such a development pattern could fit with established settlement pattern, subject to scale – **low** sensitivity, although sensitivity may be greater in a cumulative scenario.	This would be consistent with established settlement pattern – **low** sensitivity, although sensitivity may be greater in a cumulative scenario.	High density urban model does not generally fit with this characteristic outside of the few towns within the type – **high** sensitivity.

Dispersed settlement - small isolated farms form a significant component of the settlement pattern	Subject to size of nucleations, such a development pattern could potentially fit with established settlement pattern, subject to scale – **low** sensitivity, although sensitivity may be greater in a cumulative scenario.	Introduces a different character to this aspect of settlement pattern. **Moderate** sensitivity, particularly towards the higher end of the density threshold, although sensitivity may be greater in a cumulative scenario.	High density urban model does not generally fit with this characteristic outside of the few towns within the type – **high** sensitivity.
Limited expansion of urban areas into this LCT	Small scale development of this kind would be more likely to be consistent with this characteristic – **low** sensitivity, although sensitivity may be greater in a cumulative scenario.	Careful design needed in relation to accommodating such development - **moderate** sensitivity, although sensitivity may be greater in a cumulative scenario.	High density urban model would not fit well with this - **high** sensitivity.
Skylines			
No information in LCT description	-	-	-
Perceptual aspects			
Wooded landscape with copses of ancient woodland and smaller plantations	Small scale concentrations of development could be more readily designed around these features, with less impact on them – **low to moderate** sensitivity.	Need for careful design in relation to such features, which could be more vulnerable to higher density models – **moderate to high** sensitivity.	Need for careful design in relation to such features, which could be more vulnerable to higher density models – **moderate to high** sensitivity.

Overall sensitivity	**Low** This model would fit with landscape scale, topographic character and established settlement character/typologies.	**Low to moderate** Issues and sensitivities are similar to the 'small nucleations' model, although sensitivity would be greater when considered cumulatively. The model may also introduce a character different to the established settlement pattern.	**High** This is due to the potential need for careful consideration of visual relationships with topography and potential fundamental difference to established settlement typologies within the landscape type.

Sensitivity judgements

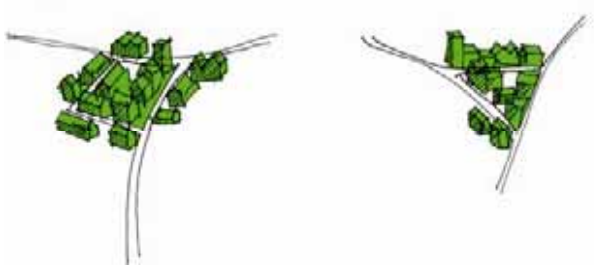
The landscape of the *Wooded Plateau Farmlands* has a **low to moderate** overall sensitivity to medium to large scale development of 1000-3000 houses (of the type which often characterises these plateau landscapes) and a **moderate** overall sensitivity to large scale residential development (3000-10,000 houses), subject to careful siting in relation to characteristic elements of landscape structure, pattern, scale and visual relationships, and a **moderate to high sensitivity** in relation to very large scale settlement (in excess of 10,000 houses), as landscape character and landscape: settlement relationship would be fundamentally altered by such proposals. The landscape type has a **low** overall sensitivity to small areas of nucleated settlement, with a **low to moderate** sensitivity to medium density, nucleated settlement. Sensitivity to high density development is **high** overall.

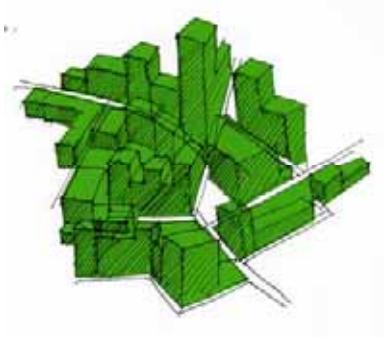
Guidance

Any residential development should aim to conserve features such as ancient woodland and aspects of the historic landscape (opportunities for green infrastructure). Existing landscape character and the sensitivity analysis exercise suggest that the landscape would be most able to accommodate smaller scale 'clusters' of development, which do not detract from the landscape pattern, topography and skylines, sense of scale or open aspect. Some larger scale development could be accommodated, provided it was sensitive in relation to landscape structure and the resulting landscape pattern and scale, with areas of smaller or nucleated as opposed to high density development configurations likely to be more consistent with established settlement pattern (outside of the few large towns) and landscape character.

Summary guidance in relation to the individual scenarios is presented in the table overleaf.

Scenario	Guidance
 **Medium – large scale development (1000-3000 houses)**	**Low to moderate sensitivity** Maintain the large landscape scale and open character, through disposition and dispersal of development, although compact and nucleated settlement forms can also be appropriate where this reflects established settlement character. Seek to reflect established settlement character/footprints and reflect other larger scale visual 'breaks' within the landscape, such as woodland blocks. Use landform variation in relation to development to 'absorb' development and rooflines as far as possible within the landscape. Conserve landscape features such as ancient woodland, common land and field boundaries as integral parts of the green infrastructure network. Such landscape structure would be especially important to conserve in relation to cumulative development issues.
 **Large scale development (3000-10,000 houses)**	**Moderate sensitivity** Use landform variation in relation to development to 'absorb' development and rooflines as far as possible within the landscape. Conserve landscape features such as ancient woodland and field boundaries as integral parts of the green infrastructure network. Seek to 'break' development with green space swathes incorporating sensitive landscape features such as ancient woodland, common land and mature landscape structure. Such landscape structure would be especially important to conserve in relation to cumulative development issues.
 **Very large scale settlement (10,000**	**Moderate to high sensitivity** Such large scale development is not recommended in more elevated plateau landscapes. In limited areas of the wooded plateau there may be some ability to

Scenario	Guidance
houses plus)	accommodate development and here the following guidance applies: Use landform variation in relation to development to 'absorb' development and rooflines as far as possible within the landscape. Conserve landscape features such as ancient woodland and field boundaries as integral parts of the green infrastructure network. Aim to 'break' development by green space swathes incorporating sensitive landscape features such as ancient woodland, common land and mature landscape structure.
 **Small concentrations of nucleated development (clusters of 30-50 dph, 2 storey)**	**Low sensitivity** Use this model to conserve and respond to the existing small scale settlement character. Conserve and respect established landscape structure and patterns such as the network of sinuous rural roads, commons and greens. Conserve and respect existing visual relationships in relation to landform features. Enhanced consideration of the above would be necessary in relation to cumulative development.

Scenario	Guidance
 **Medium to high density – nucleated (30-50 dph, 2-2.5/3 storey)**	**Low to moderate sensitivity** Conserve the large landscape scale and predominantly open character. Where using variation in storey heights e.g. 2, 3, 4 storey, seek to use these in a way which responds to and respects landform character and existing visual relationships. Consider varying (reducing) density to settlement edges, especially in relation to large scale development, to create a 'porous' edge which relates positively to the wider landscape. Conserve and respect established landscape structure and patterns such as the network of sinuous rural roads, commons and greens, giving enhanced consideration to these in relation to cumulative development.
 **Very high density – urban (50-80 dph, 3-4 storey)**	**High sensitivity** Unless seeking to site very large scale settlement proposals, in which case this model could be used as part of a new settlement core, this model is best avoided in this settled rural landscape type. If planning such a density in relation to settlement cores, existing landscape structure, pattern and visual relationships should be respected and used to guide the form of development layouts.

SENSITIVITY ANALYSIS – WOODED CHALK VALLEYS (LUC)

Variable 1: Settlement typology

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlements (10,000 houses plus)** 
Scale			
No information in LCT description	-	-	-
Topography/landform			
Comprises steep sided sometimes narrow valleys that extend into surrounding plateau areas	Need for careful design of development layout and infrastructure in relation to topographic features, and to ensure that these, and associated visual relationships, are conserved – **moderate to high** sensitivity, particularly towards the upper end of the development threshold.	Landform features would be likely to be vulnerable to development of this scale – **high** sensitivity.	Landform features would be likely to be vulnerable to development of this scale – **high** sensitivity.
Valleys sides may undulate - the tributaries often forming shallow gentle combes with	Downland landscape character would have a **high** sensitivity to development of any scale.	Downland landscape character would have a **high** sensitivity to development of any scale.	Downland landscape character would have a **high** sensitivity to development of any scale.

Landscape attributes and associated key landscape and settlement characteristics	Sensitivity to:		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlements (10,000 houses plus)** 
distinctive 'downland' character			
Landscape pattern and complexity			
Mixed land use comprising arable (often on upper slopes) and pasture on steeper slopes and on the valley floor	This land use would be inherently sensitive to change – **high** sensitivity.	This land use would be inherently sensitive to change – **high** sensitivity.	This land use would be inherently sensitive to change – **high** sensitivity.
Fragmented pattern of ancient woods scattered throughout area particularly on steepest slopes	Ancient woodland would have a **high** sensitivity to development of any scale.	Ancient woodland would have a **high** sensitivity to development of any scale.	Ancient woodland would have a **high** sensitivity to development of any scale.
Varied enclosure pattern defined by mature hedgerows which are often species rich	With careful and considered design, such landscape pattern and structure could be retained within development – **moderate** sensitivity, although sensitivity may be greater if considering cumulative development scenarios.	Need for great care in design and placement, although with this, such landscape pattern and structure could be retained within development – **moderate to high** sensitivity.	Need for great care in design and placement, to avoid altering character. Some aspects of the landscape pattern may, by virtue of development layouts, be vulnerable to development of this scale – **high** sensitivity.

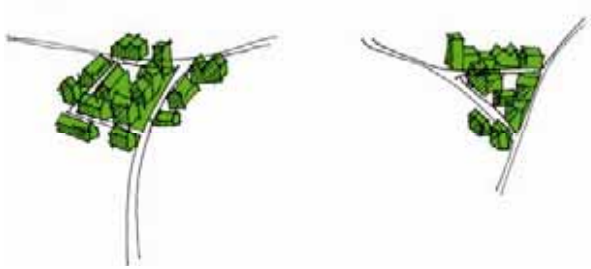
Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlements (10,000 houses plus)** 
Settlement and human influences			
Occasional parkland landscapes	These landscape features would have a **high** sensitivity to development of any scale.	These landscape features would have a **high** sensitivity to development of any scale.	These landscape features would have a **high** sensitivity to development of any scale.
Settled character with dispersed pattern of villages/hamlets and larger settlements	Subject to careful consideration of layout and siting, this scale of development could be accommodated - **moderate** sensitivity, although sensitivity may be greater in a cumulative scenario.	Subject to careful consideration of layout and siting, this scale of development could potentially be accommodated - **moderate** sensitivity, although sensitivity would be **moderate to high** towards the upper end of the development threshold.	Very large scale settlement would potentially introduce an element different to established settlement character – **moderate to high** sensitivity, although sensitivity may be **high** if development was substantially in excess of 10,000 houses.
Valleys often form transport corridors (road and rail) and **sunken lanes** are a feature	Sunken lanes would have a **high** sensitivity to development of any scale.	Sunken lanes would have a **high** sensitivity to development of any scale.	Sunken lanes would have a **high** sensitivity to development of any scale.
High density of traditional settlement	With careful consideration of layout and configuration, this model could fit with this character – **low** sensitivity,	Given the scale of this model, careful design would be needed to respond to this established settlement character –	Careful design would be needed in relation to established settlement character, as very large scale settlement may introduce

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlements (10,000 houses plus)** 
	although sensitivity may be greater in a cumulative scenario.	**moderate** sensitivity.	development patterns out of keeping with this character – **moderate to high** sensitivity.
Nucleations tend to be larger - including 'towns'	This would fit with the established settlement pattern – **low** sensitivity.	This would fit with the established settlement pattern – **low** sensitivity, although sensitivity may be higher (moderate) towards the upper end of the development threshold.	Given the scale of this development model, would be likely to introduce a character different to that other than in the largest 'towns' – **moderate to high** sensitivity.
Urban development impinges substantially on this LCT	The LCT may have a **high** sensitivity to the introduction of further urban elements which could impinge on character.	The LCT may have a **high** sensitivity to the introduction of further urban elements which could impinge on character.	The LCT may have a **high** sensitivity to the introduction of further urban elements which could impinge on character.
Intensity of development is low relative to the settlement footprint (probably due to planning controls in the Hertfordshire Green Belt)	Smaller scale development models would potentially not depart from this character – **low** sensitivity, although sensitivity may be greater in a cumulative scenario.	This development model would be likely to introduce a change of character – **high** sensitivity.	This development model would be likely to introduce a change of character – **high** sensitivity.

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlements (10,000 houses plus)** 
Skylines			
No information in LCT description	-	-	-
Perceptual aspects			
Many of the valleys are winterbournes while as others are associated with a permanent water channel	These features would be inherently sensitive to change – **high** sensitivity.	These features would be inherently sensitive to change – **high** sensitivity.	These features would be inherently sensitive to change – **high** sensitivity.
Some woods are linear in form but make a significant visual contribution giving rise to a well wooded, intimate character	The intimate, wooded character could potentially accommodate smaller scale development, with careful development design – **moderate** sensitivity.	The scale of this development model would be likely to conflict with the intimate landscape scale – **high** sensitivity.	The scale of this development model would be likely to conflict with the intimate landscape scale – **high** sensitivity.
Overall sensitivity	**Moderate to high** Topography and downland/valley landscape	**High** Topography and downland/valley landscape	**High** Topography and downland/valley landscape character are all sensitive,

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Medium - large scale dev (1000-3000 houses) 	**Large scale development (3000-10,000 houses)** 	**Very large scale settlements (10,000 houses plus)** 
	character are all sensitive, as are historic elements such as ancient woodland. This model could, however, respond to established settlement pattern.	character are all sensitive, as are historic elements such as ancient woodland. The scale of the landscape and the settlement morphology would also be sensitive to this scale of development.	as are historic elements such as ancient woodland. The scale of the landscape and the settlement morphology would also be sensitive to this scale of development.

Variable 2: Development form, density and massing

Landscape attributes and associated key landscape and settlement characteristics	**Sensitivity to:**		
	Small concentrations of nucleated development (clusters of 30-50 dph, 2 storey) 	**Medium to high density – nucleated (30-50 dph, 2-2.5/3 storey)** 	**Very high density – urban (50-80 dph, 3-4 storey)** 
Scale			
No information in LCT description	-	-	-
Topography/landform			
Comprises steep sided sometimes narrow valleys that extend into surrounding plateau areas	This model could, with careful design, respond to this landform and associated visual relationships - **low** sensitivity.	Careful consideration would be needed in relation of development to landform and associated intervisibility with plateau areas – **moderate** sensitivity.	Would be likely to ignore landform/visual relationships – **high** sensitivity

Valleys sides may undulate - the tributaries often forming shallow gentle combes with distinctive 'downland' character	This model could, with careful design, respond to this landform and to maintain downland character - **low** sensitivity.	These landform subtleties would have a **moderate to high** sensitivity to such change.	These landform subtleties would be inherently sensitive to high density development models - a **high** sensitivity to such change.
Landscape pattern and complexity			
Mixed land use comprising arable (often on upper slopes) and pasture on steeper slopes and on the valley floor	Small scale concentrations of development could potentially accommodate these land uses with appropriate design – **moderate** sensitivity, although sensitivity may be greater in a cumulative scenario.	These land uses would have a **high** sensitivity to higher density development models	These land uses would have a **high** sensitivity to higher density development models
Fragmented pattern of ancient woods scattered throughout area particularly on steepest slopes	These features would be inherently sensitive to any type of development – **high** sensitivity.	These features would be inherently sensitive to any type of development – **high** sensitivity.	These features would be inherently sensitive to any type of development – **high** sensitivity.

Varied enclosure pattern defined by **mature hedgerows** which are often **species rich**	These features could be accommodated within this type of settlement model, with careful design – **moderate** sensitivity, although sensitivity may be greater in a cumulative scenario.	These elements would have a **high** sensitivity to higher density settlement models, as they may be vulnerable to such change, depending on development layout.	These elements would have a **high** sensitivity to higher density settlement models, as they may be vulnerable to such change, depending on development layout.
Settlement and human influences			
Occasional parkland landscapes	These landscape elements would have a **high** sensitivity to change of any scale.	These landscape elements would have a **high** sensitivity to change of any scale.	These landscape elements would have a **high** sensitivity to change of any scale.
Settled character with dispersed pattern of villages/hamlets and larger settlements	This would potentially be consistent with this established pattern – **low** sensitivity.	Nucleated model could fit with larger settlements, with careful design – **moderate** sensitivity.	This would depart from established character – **high** sensitivity.
Valleys often form transport corridors (road and rail) and sunken lanes are a feature	Features such as sunken lanes would have a **high** sensitivity to development of any form.	Features such as sunken lanes would have a **high** sensitivity to development of any form.	Features such as sunken lanes would have a **high** sensitivity to development of any form.
High density of traditional settlement	This would be consistent with this established pattern – **low** sensitivity.	This would be consistent with this established pattern – **low** sensitivity.	This would depart from established character – **high** sensitivity.

Nucleations tend to be larger-including 'towns'	This would fit within the established pattern – **low** sensitivity.	This would fit within the established pattern – **low** sensitivity.	This would depart from established character – **high** sensitivity.
Urban development impinges substantially on this LCT	With careful design this may not be exacerbated by this type of development, although cumulative issues would still potentially need to be considered - **moderate** sensitivity.	This may impinge further on wider character within the LCT – **high** sensitivity.	This may impinge further on wider character within the LCT – **high** sensitivity.
Intensity of development is low relative to the settlement footprint (probably due to planning controls in the Hertfordshire Green Belt)	This would fit within the established pattern – **low** sensitivity.	To the lower end of the density threshold, this would fit with established pattern, although sensitivity would be higher towards the upper end of the density threshold – **low to moderate** sensitivity.	This would be likely to introduce a change in character in this respect – **high** sensitivity.
Skylines			
No information in LCT description	-	-	-
Perceptual aspects			
Many of the valleys are winterbournes while others are associated with a	These would be inherently sensitive to any form of development - **high** sensitivity.	These would be inherently sensitive to any form of development - **high** sensitivity.	These would be inherently sensitive to any form of development - **high** sensitivity.

permanent water channel			
Perceptual aspects			
Some woods are linear in form but make a significant visual contribution giving rise to a well wooded, intimate character	This type of development could maintain this character, with careful design - **low to moderate** sensitivity.	These features would be likely to be vulnerable to this development model – **high** sensitivity.	These features would be likely to be vulnerable to this development model – **high** sensitivity.
Overall sensitivity	**Moderate** The distribution of sensitive features such as ancient woodlands and parklands are offset by the settled character, of a form comparable to this model.	**Moderate to high** This is in view of landform character and sensitive features such as parkland landscapes, although, with appropriate design, this nucleated model could also fit with existing settlement character.	**High** This is due to the fact that this settlement model is fundamentally different to the existing in terms of settlement form and density. The model would also be significantly out of place with landscape scale.

Sensitivity judgements

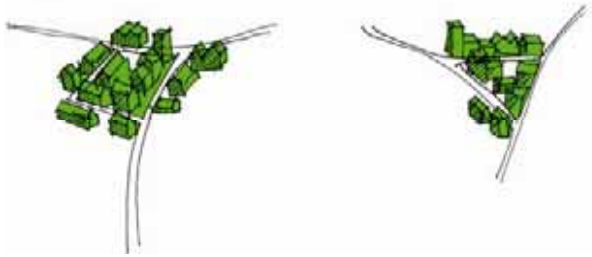
The landscape of the *Wooded Chalk Valleys* has a **moderate to high** overall sensitivity to medium to large scale development (1000 to 3000 houses) with a **moderate** overall sensitivity to small clusters of nucleated settlement. Sensitivity to larger scale nucleated or higher density development is **high** in overall terms, within this landscape type.

Guidance

Understanding of landscape characteristics and use of the sensitivity analysis suggests that this landscape type has a limited ability to accommodate medium to larger scale and higher density development models (e.g. > 1000 houses). However, small scale settlement could be accommodated in terms of existing settlement character, provided it respected the landscape character and landscape structure framework (and with appropriate consideration given to cumulative development). Development should conserve sensitive elements which are intrinsic to landscape character, such as ancient woodlands, downland and combes, and winterbournes/minor watercourses. Such features should be conserved as integral parts of the green infrastructure network in relation to potential growth. Another general guiding principal should be to conserve visual relationships in terms of topographic variation and with adjacent plateau landscapes.

Summary guidance in relation to the individual scenarios is presented in the table overleaf.

Scenario	Guidance
 **Medium – large scale development (1000-3000 houses)**	**Moderate to high sensitivity** Seek to conserve visual relationships in relation to landform and visual relationships with adjacent plateau landscapes through sensitive roofline design and disposition of development in relation to slopes. Conserve wooded belts, ancient woodland fragments, parklands and winterbourne watercourses as integral parts of the green infrastructure network in relation to development, and to create positive landscape and townscape relationships (porous development). Consideration should be given to cumulative landscape issues in relation to 'clusters' of development, which may have a greater impact on landscape character.
 **Large scale development (3000 – 10,000 houses)**	**High sensitivity** Given the limited ability of this landscape type to accommodate larger scale development, these valley landscapes and their component landscape features would be best conserved as an integral part of the green infrastructure network in relation to future growth.
 **Very large scale settlement (10,000 houses plus)**	**High sensitivity** Given the limited ability of this landscape type to accommodate larger scale development, these valley landscapes and their component landscape features would be best conserved as an integral part of the green infrastructure network in relation to future growth.

Scenario	Guidance
 **Small concentrations of nucleated development (clusters of 30-50 dph, 2 storey)**	**Moderate sensitivity** Seek to conserve landform and visual relationships, and sensitive features such as parkland, ancient woodland and areas of grassland of 'downland' character. This development model would provide the opportunity for greenspace setting in relation to such landscape elements, although consideration should be given to cumulative issues in relation to potential settlement 'clusters'.
 **Medium to high density – nucleated (30-50 dph, 2-2.5/3 storey)**	**Moderate to high sensitivity** Ensure that development conserves and is respectful of existing aspects of landscape character, conserving features such as ancient woodland, wooded belts and winterbournes, as well as areas of parkland landscape, as integral parts of the green infrastructure network in relation to new development. Compact areas of lower valley nucleated settlement may be able to be accommodated and this would also help conserve landscape and visual relationships in terms of topography and adjacent landscape types, although consideration should be given to cumulative issues in relation to potential settlement 'clusters'.

Scenario	Guidance
 **Very high density – urban (50-80 dph, 3-4 storey)**	**High sensitivity** This development type would be unlikely to fit with established settlement character and the essentially rural quality of the landscape, and would be difficult to accommodate in terms of topographic and visual relationships (in view of development densification and storey heights). Seek to conserve instead the valleys and component landscape features as integral parts of the green infrastructure network in relation to future growth.

Appendix 1: Review of recent studies

1 Review of recent studies

1.1 This sets outs a summary of recent landscape sensitivity studies which were reviewed as part of the scoping for the guidance report. Studies were evaluated under the following headings, where information was available:

- Summary (scope of the work)
- Purpose
- Methodology
- Stakeholder involvement (if appropriate)
- Clarity of the document
- Application of the tool

1.2 A selection of studies was reviewed under these headings, with main findings set out below.

Cornwall Landscape Sensitivity Study (LUC, 2010)

Summary

1.3 A study examining the sensitivity of the landscape of Cornwall to various types of renewable energy developments, including turbines and solar array schemes.

Purpose

1.4 The study was commissioned as part of the evidence base for the Cornwall Local Development Framework, to enable the council to make robust and well informed decisions in relation to applications for renewable energy schemes, as they come forward, and to ensure that such schemes have a good 'landscape fit'.

Methodology

1.5 The study defined criteria to assess the sensitivity of specific attributes interpreted from the LCA descriptions (e.g. landform and scale, landcover pattern, tracks/transport pattern, skylines, perceptual and scenic qualities, and distinctive landscape features). Consideration was given to how these attributes were sensitive to differing forms of renewable energy development. For each type of development a 5 point sensitivity scale was also defined, with scales and criteria applied to the respective landscape character areas. Sensitivity judgements for the character areas and the respective types of renewable energy developments were linked to a landscape strategy for consideration of these types of development.

1.6 Extracts from the criteria and scales are shown overleaf.

Table 4.3: Criteria for Assessing Landscape Sensitivity to Wind Energy Development

Landform and scale				
A smooth, convex or flat landform is likely to be less sensitive to wind energy development than a landscape with a dramatic rugged landform, distinct landform features (including prominent headlands and cliffs, and the outer facing tips and landforms associated with the China Clay industries) or pronounced undulations and larger scale landforms are likely to be less sensitive than smaller scale landforms - because turbines may appear out of scale, detract from visually important landforms or appear confusing (due to turbines being at varying heights) in the latter type of landscapes. Information sources: Key landscape characteristics, 'Description' and 'Topography' sections of the Cornwall LCA; Ordnance Survey basemaps; Topography data (Ordnance Survey Panorama).				
Examples of sensitivity ratings				
Lower sensitivity	← →			**Higher sensitivity**
e.g. an extensive lowland flat landscape or elevated plateau, often a larger scale landform	e.g. a simple gently rolling landscape, likely to be a medium-large scale landform	e.g. a landscape with distinct convex hills, perhaps also incised by valleys, likely to be a medium scale landform.	e.g. a landscape with distinct landform features, and/or irregular in topographic appearance (which may be large in scale), or a smaller scale landform.	e.g. a landscape with a rugged landform or dramatic landform features (which may be large in scale), or a small scale landform.
Land cover pattern and presence of human scale features				
Simple, regular landscapes with extensive areas of consistent ground cover are likely to be less sensitive to wind energy development than landscapes with more complex or irregular land cover patterns, smaller field sizes and landscapes with frequent human scale features[17]. This is because smaller scale and / or complex landscapes with a variety of land cover patterns may be more difficult to incorporate wind turbines into without significant effects on landscape character, than larger scale landscape patterns and simple landscapes. Information sources: 'Key Landscape Characteristics', 'Land Cover', 'Land Use' and 'Field and Woodland Pattern' sections of the Cornwall LCA; Google Earth (aerial photography).				
Examples of sensitivity ratings				
Lower sensitivity	← →			**Higher sensitivity**
e.g. an unenclosed landscape of uniform groundcover lacking in human scale features	e.g. a landscape with large scale fields, little variety in land cover and occasional human scale features such	e.g. a landscape with medium sized fields, some variations in land cover and presence of human scale features such	e.g. a landscape with irregular small-scale fields, variety in land cover and presence of human scale features such as	e.g. a landscape with a strong variety in landcover and small-scale / irregular in appearance

[17] Human scale features are aspects of land cover such as stone walls, hedges, buildings which give a 'human scale' to the landscape

Example of landscape sensitivity criteria and scales used in the Cornwall Study

Stakeholder involvement

1.7 This was undertaken with the steering group and a range of stakeholders.

Clarity of the document

1.8 The study sets out a clearly presented set of criteria and sensitivity scales in relation to different renewable energy development typologies. These are then applied to the Cornwall landscape character areas to arrive at overall sensitivity judgements and to develop an appropriate landscape strategy. As such the presentation of information is clear, transparent and well linked.

Application of the tool

1.9 The study forms part of the LDF evidence base and to inform Development Management decisions.

Bath and North East Somerset Landscape Sensitivity Study (LUC, 2010)

Summary

1.10 This study identified the sensitivity of the landscape character areas of Bath and North East Somerset District to Wind Turbine development, and developed landscape guidance and recommendations as part of a district wide strategy for consideration of deployment of wind energy. The study also considered aspects of cultural heritage as they relate to the landscape e.g. views from the Bath World Heritage Site and of registered landscapes/designated historic landscape interests such as Registered Parks and Gardens and Conservation Areas. The method developed in the study was also applied and developed at a more local level, to inform consideration of individual technical sites being considered for wind energy development.

Purpose

1.11 The study was developed to inform the district's strategy for deployment of wind energy across the district to respond appropriately to landscape character. The intention was also for it to be used to inform development management decisions with regard to wind turbine schemes as they come forward.

Methodology

1.12 The study defined criteria to examine sensitivity of specific landscape elements to wind turbine development (landscape scale, landform, pattern and complexity, settlement and man made influences, skylines, intervisibility with adjacent landscapes including Bath World Heritage Site and perceptual aspects), as well as defining a five point scale to evaluate landscape sensitivity. Criteria and scales were then applied to the relevant character areas to determine overall landscape sensitivity to three different turbine scale typologies, and to develop guidance and recommendations in relation to siting.

Stakeholder involvement

1.13 None, although consultation was undertaken with the client steering group throughout.

Clarity of the document

1.14 Information is clearly presented with a concise explanation of the methodology used and, clear and simple mapping assigning sensitivity to the three different turbine typologies' to the landscape character areas and a clearly presented summary of each character area, identifying what is sensitive and why. In all cases judgements and landscape guidance are clearly linked back to understanding of the landscape baseline.

Application of the tool

1.15 The tool is being used to inform Bath and North East Somerset District's strategy with regard to deployment of wind energy. It will also be used to inform development management decisions as planning applications for wind turbine schemes come forward within the district.

Harlow Strategic Sensitivity Analysis (CBA, 2005)

Summary

1.16 Chris Blandford Associates (CBA) was commissioned in 2004 to undertake a strategic scale sensitivity analysis of the landscape and environment of the area around Harlow, in light of its Growth Point status and anticipated future change. The study led onto a more detailed analysis of the urban fringe of Harlow, setting the framework for sustainable future landscapes in the study area.

Purpose

1.17 Harlow was identified as a priority area of growth within the London – Stanstead-Peterborough Growth Area. The study forms part of the holistic, green infrastructure based consideration of Harlow's future growth, to help define an appropriate future growth framework. In addition to providing a strategic level understanding of variations in landscape character and inherent sensitivities, specific objectives identified by the study include:

- Identification and assessment of Gibberd's approach to the landscape in his original masterplan for Harlow, and to determine whether appropriate for Harlow's future growth;
- Preparation of a landscape framework to inform potential future growth to Harlow's urban fringe.

Methodology

1.18 The CBA study applied landscape characterisation (as defined in the 2002 Guidance[1]) and analysis of other, designated environmental assets to evaluate the sensitivity of the landscape. It used and adapted the suggested criteria defined in Countryside Agency Topic Paper 6[2] to make judgements on sensitivity at a strategic level, undertaking a sensitivity analysis of landscape character areas and specific attributes within the areas.

1.19 Criteria used in the study were:

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[1] Countryside Agency, 2002 **Landscape Character Assessment: Guidance for England and Scotland**, CAX 84/F

[2] Countryside Agency **Topic Paper 6: Techniques and Criteria for Judging Sensitivity and Capacity**

- Landform;
- Landscape pattern;
- Character of skyline;
- Inter visibility;
- Rare landscape features (such as historic parks and gardens, and habitats);
- Settlement pattern and communication routes;
- Sense of enclosure;
- Sense of tranquillity/remoteness;
- Historic landscape time-depth and stability.

1.20 The study then built up an overall sensitivity profile for character areas and component elements (based on a three point sensitivity scale), using the landscape and visual variables set out in Topic Paper 6, and consideration of tranquillity. A variety of different development scenarios were also considered as part of this exercise. The sensitivity analysis was used to inform identification of opportunities for, and constraints to, growth.

Stakeholder involvement

1.21 There is no evidence of whether this was undertaken for this study.

Clarity of the document

1.22 The study provides a clear, succinct application of techniques considered in Topic Paper 6, tailored to the local context. Also use of landscape characterisation and evaluation as part of an output focussed process (although the study needs to be read in context, with the more 'detailed' tiers, to understand this fully), with the output in the later, more detailed work by CBA being a strategic Vision for Harlow, based on an understanding of landscape qualities. Judgments are clearly linked back to baseline characteristics and to definitions of sensitivity set out in the methodology.

Application of the tool

1.23 The study notes that its main use is as '*a broad-based strategic input to evaluation of the major constraints and opportunities for development as a guide to the overall direction of growth*'. The more detailed settlement fringe analysis within Volume 2 is intended to guide more specifically the shape and form of development to the edge of Harlow.

Breckland District Settlement Fringe Landscape Assessment (LUC, 2007)

Summary

1.24 LUC was commissioned in 2006 to undertake a strategic scale Landscape Character Assessment of Breckland District, building on the earlier landscape typology derived by LUC as part of the Wind Turbine Sensitivity Study for Breckland and King's Lynn/West Norfolk. The LCA informed a second tier of work – a local landscape character assessment and sensitivity analysis of the principal market towns and candidate local service centre villages within Breckland District.

Purpose

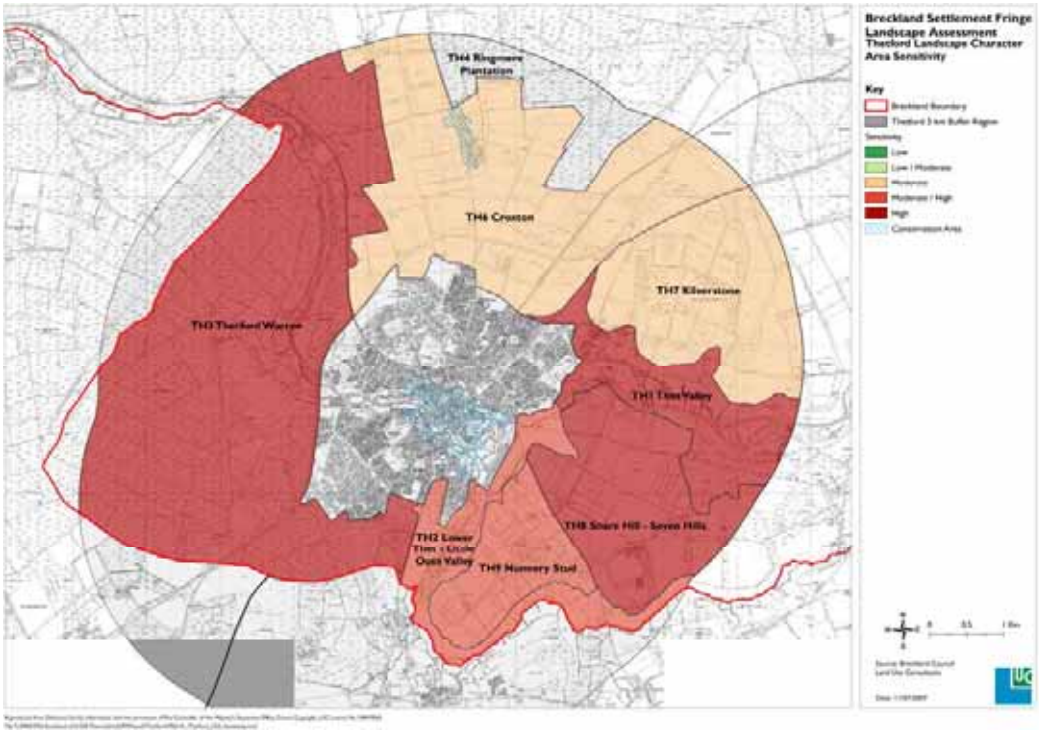
1.25 The Settlement Fringe Landscape Assessment forms part of the evidence base for the Breckland District Local Development Framework (LDF), informing future options for growth. The study also considered one of the Government Growth Points (Thetford) and has also informed the Green Infrastructure Study undertaken for this by LUC.

Methodology

1.26 Sensitivity was judged in terms of a number of criteria under landscape and visual sensitivities, using a tailored version of the criteria set out in Topic Paper 6, with sensitivities defined on a three point scale, in order to build up a profile to arrive at an overall sensitivity judgment. The following criteria were considered for each settlement:

- Landscape quality and condition (for the character areas as a whole);
- Individual landscape elements – natural, cultural and aesthetic/perceptual;
- Character of the settlement edge, considering:
    - Development types;
    - Accessibility/permeability and integration;
    - Gateways;
    - Nodes
- Visual sensitivities, considering:
    - General views (landform and enclosure);
    - Intervisibility – nature of views to and from the settlement edge;
    - Mitigation potential.

1.27 This was undertaken for each local character area (with consideration of individual landscape elements) to the fringes of each of the identified settlements. Whilst sensitivities to specific types of development were not identified, residential development was the primary type of development in mind in undertaking the sensitivity analysis.



Sensitivity ratings for component local character areas – example from the Breckland Settlement Fringe Landscape Assessment

1.28 The sensitivity analysis was used to develop summary landscape management and design guidance, as well as high level principles in relation to development for each settlement.

Stakeholder involvement

1.29 Stakeholder consultation was undertaken as part of the strategic scale, district wide LCA, to validate the characterisation, which formed the framework for the local level settlement fringe study.

Clarity of the document

1.30 Succinct application of current characterisation and sensitivity analysis techniques, with concise, focussed method, which translates clearly into characterisation and sensitivity analysis of the individual settlements. Sensitivity judgments and design guidance are linked back to characterisation.

Application of the tool

1.31 The study forms part of the evidence base for the LDF. It enables flexibility in determining an overall sensitivity judgment, based on building up a profile. It is suitable for relatively small scale work, but separate studies would be needed in relation to assessing individual sites and applications.

Great Yarmouth Borough and Waveney District Landscape Character Assessment (LUC, 2008)

Summary

1.32 An integrated LCA across the two authorities, and taking account of inherent sensitivities as part of the evaluation stage. This was a single phase (District scale) study, although LUC also used the strategic LCAs to inform more detailed objective landscape and visual sensitivity analysis of sites which formed the focus for wind turbine planning applications, on behalf of the two councils.

Purpose

1.33 The studies formed part of the evidence base for the Core Strategies for the two authorities, informing emerging landscape planning policy and development management decisions.

Methodology

1.34 A landscape evaluation was undertaken for each of the character areas identified and described for the study, identifying inherent (strategic scale) sensitivities to change. This identified and developed judgments where appropriate on the following:

- Positive landscape features of significance and inherent landscape sensitivities;
- Inherent visual sensitivity;
- The current state of the landscape in terms of condition and quality;
- Landscape change (including past and potential future change);
- Strategic objectives or 'pointers' for the landscape – a guiding landscape strategy and principles to help achieve that strategy, based on the points above.

Stakeholder involvement

1.35 Stakeholder consultation was undertaken to validate the draft characterisation, and to focus the evaluation development. One workshop was undertaken with key stakeholders, in each authority area.

Clarity of the document

1.36 The study is strategic in nature and focuses only on inherent sensitivity, rather than identifying sensitivities to specific types of development/change scenarios. As such, no scale has been applied to determine level of sensitivity.

Application of the tool

1.37 The studies form part of the evidence base for the respective LDFs and are also being used to inform development management decisions. The LCA reports identify the limitations of the study in the context of sensitivity analysis, as a '*rural LCA, which does not consider settlement fringes. Detailed landscape and visual sensitivity and capacity analysis in relation to any specific*

development should build upon this (LCA) assessment of inherent sensitivity, but will require a separate, detailed study', e.g. that detailed decisions should consider specific local circumstances.

Central Bedfordshire and Bedford Borough LCAs (LUC, 2007)

Summary

1.38 A strategic scale suite of district and borough wide Landscape Character Assessments, commissioned from LUC, and fitting within the overarching county wide LCA. The studies considered sensitivities at a strategic scale, although these were broken down into landscape and visual sensitivities, with an overall sensitivity judgement reached for each category.

Purpose

1.39 The primary objectives were to inform landscape planning policy and related development management decisions and guidance in relation to landscape management, as well as to inform decisions in relation to growth.

Methodology

1.40 The studies applied the methodology developed in the 2002 LCA Guidance, developing a draft landscape typology of landscape types and component landscape character areas, which was confirmed and refined through field survey. The landscape character areas formed the basis of a landscape evaluation, focussing on forces for change and key sensitivities of each landscape character area, in landscape and visual terms. Taking into account key positive landscape and visual attributes, an overall sensitivity level (based on a three point scale) was defined for the individual character areas.

Stakeholder involvement

1.41 The characterisation which formed the basis for the evaluation was validated through stakeholder consultation. In each case a workshop was held with professional stakeholders and community representatives/local residents and local amenity groups. In addition, electronic/web consultation was undertaken on the full draft landscape character assessments.

Clarity of the document

1.42 Although sensitivities have been identified at a strategic scale, local detail (specific sites and features) are identified and these are clearly linked back to material in the description for each character area. Sensitivity has been defined using a simple three point scale.

Application of the tool

1.43 The study is used by Development Management officers to inform planning decisions and has also assisted in framing landscape policy.

Breckland, King's Lynn and West Norfolk – Landscape sensitivity to wind turbines (LUC, 2002)

Summary

1.44 Development of a landscape typology and supporting landscape and visual sensitivity analysis in relation to wind turbine development scenarios (joint study for two local planning authorities – Breckland District and Kings Lynn and West Norfolk Borough).

Purpose

1.45 The need for the study arose through the East of England's Regional Targets for Renewable Energy (2001, Energy for Sustainable Development) and in light of the fact that the study area possesses many of the geographic and physical attributes to contribute significantly towards achieving such targets. In view of the significant number of planning applications received in relation to wind energy developments, the two authorities needed an informed position to comment on planning applications in sensitivity terms. As such the study informs planning and development control decisions, in terms of providing strategic guidance as to landscape capacity to accommodate wind turbine developments. Through informing choices as to potential locations of wind turbine developments, the study also has application in informing local renewable energy policies.

Methodology

1.46 Working within the National Character Areas, a landscape typology was defined for the study area, with the special and sensitive characteristics and qualities of the individual landscape types identified.

1.47 Four different generic wind turbine typologies were defined in order to understand the effects of different sizes, groupings and types of wind turbine development within the landscape. The four 'models' developed were considered to be those most likely to come forward as planning applications within the study area.

1.48 The generic typologies were identified prior to field survey to allow visualisation of the effect of different scales of development on the landscape. The evaluation of sensitivity considered each of the four typologies in turn.

1.49 Through consultation with the steering group, characteristics of the landscape likely to be sensitive to wind turbine development were identified, to be used in a matrix (as set out below), to assess the sensitivity of the landscape types to the four development scenarios:

Key Characteristics of the landscape	**Single Turbine**	**Small Scale Group**	**Medium Scale Group**	**Large Scale Group**
Scale and Enclosure				
Landform and Topography				
Land Cover Pattern				
Settlement				
Visible Built Structures				

Key Characteristics of the landscape	Single Turbine	Small Scale Group	Medium Scale Group	Large Scale Group
and Landmarks				
Views and Connections with Adjacent Landscapes				
Vistas and Landmarks				
Remoteness and Tranquillity				

1.50 The sensitivity assessment was based on a simple three-point scale, given the strategic nature of the assessment, with definitions as below.

Low sensitivity – key characteristics of the landscape are robust and would not be adversely affected by turbine development. The landscape would be able to accommodate development without a significant change in character.

Moderate sensitivity – key characteristics of the landscape are vulnerable and may be adversely affected by turbine development. The landscape may have some ability to absorb types of wind energy development without a significant change in character. Particular attention to siting and design will be required.

High sensitivity – key characteristics of the landscape would be adversely affected by turbine development. Such development would result in a significant change in character.

1.51 The study also identified capacities for the different development scenarios in relation to individual landscape type (three point scale), with illustrated guidance on siting for those landscape types with a higher capacity for wind turbine development.

Stakeholder involvement

1.52 None undertaken for this study.

Clarity of the document

1.53 The matrix approach provides transparency, as does the definition of criteria for the respective levels of sensitivity. Judgments and their justification are clearly linked to these criteria and to the identified baseline landscape characteristics.

Application of the tool

1.54 Given the strategic nature of the study, parameters have been set for its application, with more detailed studies likely to be required in relation to specific sites. The study has subsequently been used to inform planning policy and to advise on planning applications.

Huntingdonshire – Landscape sensitivity to wind turbines (LUC, 2004)

Summary

1.55 LUC was commissioned by Huntingdonshire District, to undertake a study of the sensitivity of the landscape to wind turbines of a variety of typologies. As part of the study, a strategic landscape typology (landscape types only) was used (based on that in the LCA), to form the baseline against which to evaluate sensitivity to different wind turbine development scenarios.

Purpose

1.56 The primary purposes of the study were to inform proposals for wind turbine development across the district, and to aid policy formulation, as well as to provide objective baseline information to allow developers to consider effects on the landscape in identifying locations for wind energy developments.

Methodology

1.57 As this was a study assessing sensitivity to a specific type of development/infrastructure proposal, a range of generic wind turbine typologies and scenarios was derived for assessment.

1.58 Landscape attributes likely to be sensitive to wind turbine development were identified, including aspects of landscape character and visual sensitivity (as set out in Topic Paper 6), shown in the table below:

Landscape Character	***Visual***
• Scale and Enclosure	• Views to Landmarks and Visible Built Structures
• Landform and Topography	• Skyline
• Land Cover	• Visual Connections with Adjacent Landscapes
• Settlement Density and Pattern	

Landscape and visual sensitivity criteria derived for the Huntingdonshire study

1.59 Sensitivity thresholds were defined using a three point scale, with evidence and information gathered through field survey fed into a matrix to determine the sensitivity of the landscape types to four different wind turbine development scenarios.

1.60 In line with guidance in Topic Paper 6, landscape values were considered, in this case under four headings (landscape character and condition, human response/perceptions, remoteness and tranquillity and other values, such as historic/natural/cultural). The results of the assessment of landscape values and of the sensitivity analysis were used to inform an overall capacity judgment for each landscape type. For locations deemed to have a

moderate/high capacity to wind turbine development, illustrated guidance was provided in relation to siting and form of development.

Stakeholder involvement

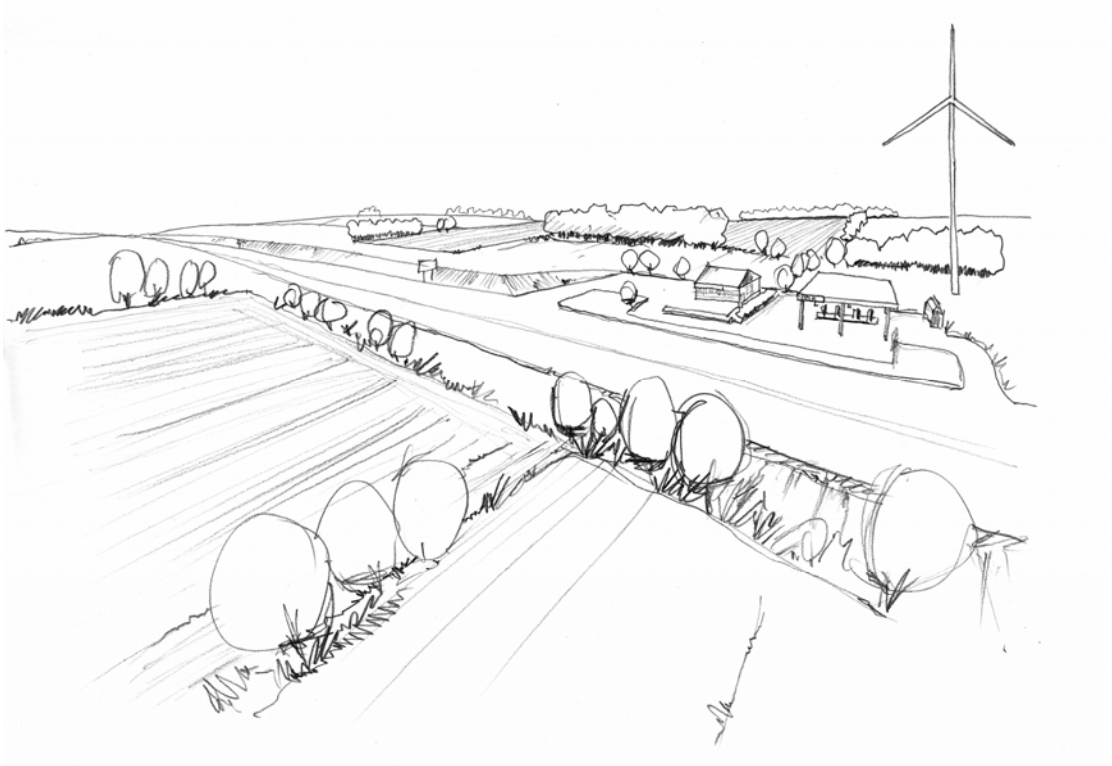
1.61 None undertaken for this study.

Clarity of the document

1.62 The document uses a simple matrix approach (example illustrated below), setting out a transparent, easily followed process for determining landscape sensitivity, value and capacity to specific development scenarios. As such judgments are also clearly linked back to the baseline information.

Key Characteristics of the landscape	**Single Turbine**	**Small Scale Group**	**Medium Scale Group**
Scale and Enclosure			
Landform and Topography			
Land Cover Pattern			
Settlement Pattern and Density			
Landmarks and Visible Built Structures and Landmarks			
Skyline			
Views and Connections with Adjacent Landscapes			

Example of sensitivity matrix used in Huntingdonshire Study



Huntingdonshire: Illustrated guidance in relation to development siting within the landscape

Application of the tool

1.63 The study provides strategic guidance on the landscape factors influencing the location of wind turbines within Huntingdonshire District, setting out a positive approach to guide development rather than absolute thresholds. The results are intended to help guide the right type of development to the right location to ensure that the key characteristics and values of the landscape are not adversely affected. It is not intended to 'stereotype' any landscape type as suitable for a particular type of development. Nor does it suggest that simply by virtue of having guidance that some landscapes are more suitable for such development. The study states that any decision on an application for wind turbines should not be considered in isolation, and should be the subject of a site-specific investigation, drawing on the information in the guidance derived, with consideration given to a range of other factors including biodiversity value, historic environment and other planning and economic issues.

Placing Renewables in the East of England (EERA/Arup/White Consultants/University of Northumbria, 2008)

Summary

1.64 A regional scale, strategic study commissioned by the East of England Regional Assembly (EERA) and undertaken by Arup, White Consultants and the University of Northumbria.

Purpose

1.65 Key objectives of the study were to define the resource potential of the region for electricity generation from renewable energy technologies, as well as to '*test, revise if appropriate and give spatial expression to the current Plan's 2020 targets*'.

Methodology

1.66 Upon identification of draft scenarios for different types and combinations of renewable energy development, landscape and visual and cumulative impacts were considered. Landscape sensitivity was considered in the context of a regional landscape sensitivity dataset in relation to wind turbine developments, and mapping of 'strategic scale constraints'. Sensitivity was defined on a 5 point scale, and applied to the relevant National Character Areas.

1.67 The following (physical and perceptual) criteria were used to evaluate sensitivity in relation to wind farm development:

- Landform and shape;
- Landscape scale and openness;
- Settlement/built enclosure;
- Landscape pattern and foci;
- Visual composition;
- How the landscape is experienced;
- Context;
- Remoteness/modification/naturalness.

1.68 These were supported by identification of a series of physical and perceptual landscape characteristics potentially more able to accommodate wind turbine development.

1.69 The report identified broad areas (at the National Character Area scale) where wind turbine development could potentially be accommodated, and areas of higher sensitivity.

1.70 Based on mapping of strategic level constraints to wind turbine development, three windfarm scenarios were tested in unconstrained and variably constrained landscapes within the region. The following aspects were examined:

- The relationships between the assessed landscape sensitivity of different character areas and maximum wind farm size; and
- Different separation distances between windfarms.

Stakeholder involvement

1.71 Consultation was undertaken with a range of key stakeholders at four half day seminars in different locations across the region, in September 2007. The proposed approach set out in the study was also presented to members of the Regional Landscape Forum, and their feedback used to refine the scenarios, in order to identify broad locations appropriate for different renewable energy technologies.

Clarity of the document

1.72 The study follows a recognisable method based on identification of landscape characteristics and sensitivities and assigning sensitivity on a 5 point scale, making use of a matrix to judge sensitivity in relation to National Character Areas and to calibrate potential visual impact of development scenarios in relation to these sensitivities.

Application of the tool

1.73 The document was intended to inform criteria based policies at the regional level, in relation to renewable energy targets. Landscape sensitivity and impact forms a key part of the evidence base in relation to this. The strategic nature of the analysis (and associated limitations as to more detailed application) is noted within the study, e.g. that it was carried out at a regional scale, using the National Character Areas as the baseline.

Thurrock Landscape Capacity Study (CBA, 2005)

Summary

1.74 CBA was commissioned by Thurrock Council to undertake a landscape sensitivity and capacity study of the borough, in light of its status as a key regeneration area within the Thames Gateway, itself identified as a key growth area within the Sustainable Communities Plan.

Purpose

1.75 The primary purpose of the study was to form part of the evidence base for the emerging development plan for the borough, and to assess the ability of the landscape to accommodate potential future development scenarios. It therefore also formed part of the evidence base for the implementation plans prepared by the Thurrock Urban Development Corporation, in addition to informing local input to the Regional Spatial Strategy and spatial options development within the Local Development Documents.

Methodology

1.76 The study applied landscape characterisation techniques developed in the 2002 Guidance to create a baseline of landscape types and component local landscape character areas, set within the higher level landscape typology established at national level, and based on an understanding of physical and cultural landscape characteristics (including forces for change which helped shape the development of the landscape evaluation). A three point sensitivity scale was developed, as were a range of indicative development scenarios (based on the type of residential and mixed use development anticipated). Sensitivity of each character area was considered in relation to the respective development scenarios, with a judgment reached for each scenario, considering the following factors:

- Effects of development on physical landscape components;
- Effects of development on landscape experience;
- Visual effects of development; and
- Mitigation potential.

Stakeholder involvement

1.77 The level of stakeholder involvement and input is unclear.

Clarity of the document

1.78 There is a clear link between characterisation (baseline information and description) and the identification of sensitivities in the evaluation stage. For each character area landscape qualities and characteristics desirable to safeguard (and opportunities for green infrastructure), are identified, to inform future guidance and decisions in relation to development proposals, with supporting mapping of landscape/environmental constraints in relation to urban fringe locations, before arriving at a summary of landscape capacity (broad commentary only).

Application of the tool

1.79 The tool is being applied by officers in developing the LDF proposals for the borough. It is also intended for use in Development Management decisions.

Appendix 2: Case study applications

CASE STUDY APPLICATIONS: HOW MIGHT THE EOE LANDSCAPE FRAMEWORK AND THE SENSITIVITY METHOD HELP?

This appendix illustrates some case study applications of the EoE Landscape Sensitivity Method, to demonstrate how it could be applied 'on the ground' by decision makers, in relation to different scenarios. The case studies show hypothetical applications of the method to 'real' landscape planning, management and siting/design issues in relation to proposals (case studies 1 and 2). Case study 3 also shows how the EoE Landscape Framework and the sensitivity method can be used to influence spatial planning (case study 3).

The case studies are:

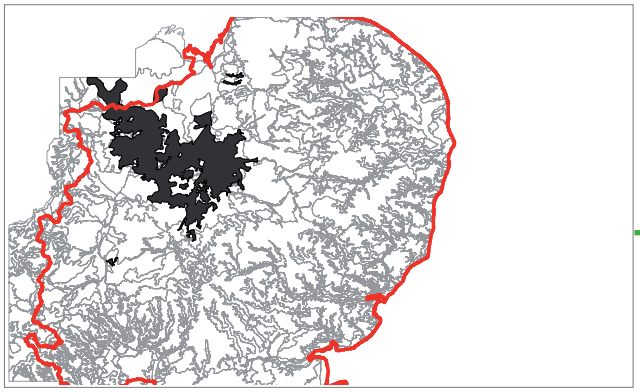
- 1. A windfarm site in the *Planned Peat Fen* landscape type, and immediately adjacent to the *Wooded Peat Fen* landscape type
- 2. A demonstration of how the method can be applied to renewable energy developments such as solar array schemes
- 3. Use of the method to inform consideration of landscape and landscape sensitivity within spatial planning (part of Landscape East's response to consultation on the former Regional Spatial Strategy for the East of England, 2009)

For case studies 1 and 2, the process is the same: Identify landscape attributes likely to be affected by the proposal, and likely landscape issues arising, and then use these to frame advice in relation to landscape issues, as well as design guidance to focus change positively. The case studies are shown in the following pages.

Professional judgement has had to be used to interpret the high level information in the LCT description, in terms of ascribing sensitivities and justifications. It is recommended that a landscape specialist would do this in a real life scenario.

Additional confirmation has also been provided by use of readily available internet based resources (to which decision makers could reasonably be expected to have recourse) such as aerial photograph imagery.

Case Study Illustration 1
Windfarm site in the Planned Peat Fen:



Scheme description and location

The proposal is for three wind turbines of 125m height to tip, plus supporting access/service tracks, substation and associated infrastructure.

The site location straddles two regional landscape types – the Planned Peat Fen and the Wooded Peat Fen. Key positive/sensitive attributes are identified below.

Sensitive landscape attributes which may be affected by the proposal

Planned Peat Fen

- An expansive, low-lying, distinctively flat landscape: A landscape with little topographic variation would be less sensitive to wind turbine development, in landscape terms.
- Planned geometric landscape and occasional linear shelterbelts: An ordered geometric and linear landscape pattern would be able to respond to/create a framework for wind turbine development.
- Historic landscape relating to drainage of the area in the 18th and 19th centuries - water management (drainage) remains fundamental to the appearance and maintenance of the landscape: These features provide a sense of time depth and historic 'setting'. They would be sensitive to wind turbine development.
- Settlement limited to isolated brick built farmsteads: The traditional settlement pattern would be sensitive to turbine proposals.
- Roads are often located on dykes above the arable fen fields and occasional pump houses are a feature.

Wooded Peat Fen

- Low-lying valley landscapes, or areas surrounded by broad and open fen: Topographic variation would be sensitive to turbine development. Areas of broad, open landscape less so.
- Mixed pattern of traditional riparian meadows, reed and sedge beds, and carr (alder/willow) woodland: This varied and 'complex' landscape mosaic would be sensitive to wind turbine development.
- Pastoral meadows along valley floors: The relatively 'intimate' scale of this landscape would be sensitive to wind turbine development.
- Generally unsettled due to flooding, although occasional mill buildings often form local features: The sparsely settled character would reduce sensitivity to wind turbine development, although areas of traditional settlement are sensitive.
- Wild, overgrown and often inaccessible areas with limited outward views: Visual containment would reduce sensitivity to turbine development. The

landscapeast

- The sky plays a dominant role in creating mood and interest

- Flat horizontal nature of the landscape can give vertical features (e.g. church towers/wind farms) unusual prominence: Vertical skyline elements are already a characteristic of the landscape and would potentially reduce sensitivity to turbine development (with appropriate design in relation to such features and skyline characteristics)

description 'wild, overgrown and often inaccessible' indicates a degree of remoteness, which would be sensitive to turbine proposals.

- Deeply tranquil as a result of inward-looking wooded character and limited access: This would be sensitive to turbine development.

Likely landscape issues, landscape advice and potential guidance

Landscape issues likely to result from the proposals are set out below, as is potential advice on landscape issues/how the landscape attributes can be used to inform positive guidance for the proposal.

Likely landscape issues

The introduction of a wind turbine development of the scale identified above should consider the following:

- Impact on sparsely settled and exposed character

- The remote and generally large scale landscape, whose qualities are the legacy of 18th and 19th century land drainage. Also the relationship to more 'intimate' Wooded Peat Fen landscapes;

- Response to the geometric landscape structure

- Response to existing vertical landmark features such as church towers which form focal points on skylines – seek to complement/use such features as a template, whilst seeking to conserve expansive skyline character;

- Impact on areas of more intimate and smaller scale landscape associated with Wooded Peat Fen landscape type, and associated tranquillity.

Evaluation of landscape sensitivity. Recommendations and potential guidance in relation to landscape attributes.

Planned Peat Fen

Overall landscape sensitivity of the Planned Peat Fen to large scale wind turbine development is moderate. This is in view of the large landscape scale, lightly settled quality, planned geometric character and the presence of existing vertical elements which punctuate the skyline.

Wooded Peat Fen

Overall landscape sensitivity of the Wooded Peat Fen landscape type to large scale turbine development is moderate to high, in view of the more intimate character created by the more varied topography and interplay of different wetland and riparian vegetation elements such as wet woodland and carr woodland.

Sensitivity of this landscape type is reduced overall by the sense of visual containment and by areas of larger scale fenland landscape within the type.

Summary guidance

Guidance may include consideration of

- The existing planned, historic, geometric landscape and linear shelter belts – this linearity could form a good template for turbine siting (well sited avenues of turbine development, which reflect the landscape pattern)
- Large scale landscape and pattern – has greater potential to accommodate large elements such as turbines. Seek to locate as far as possible from 'human scale' elements, e.g. areas of settlement, intimate wooded landscapes within the Wooden Fen landscape type. This would also assist in maintaining the sense of tranquillity in adjacent areas of Wooded Peat Fen
- Expansive and open skylines and 'big skies' – use clustered rather than dispersed groups of turbines, to help maintain the sense of landscape scale
- Existing vertical elements to skylines such as church towers – well sited turbines can respond to such elements

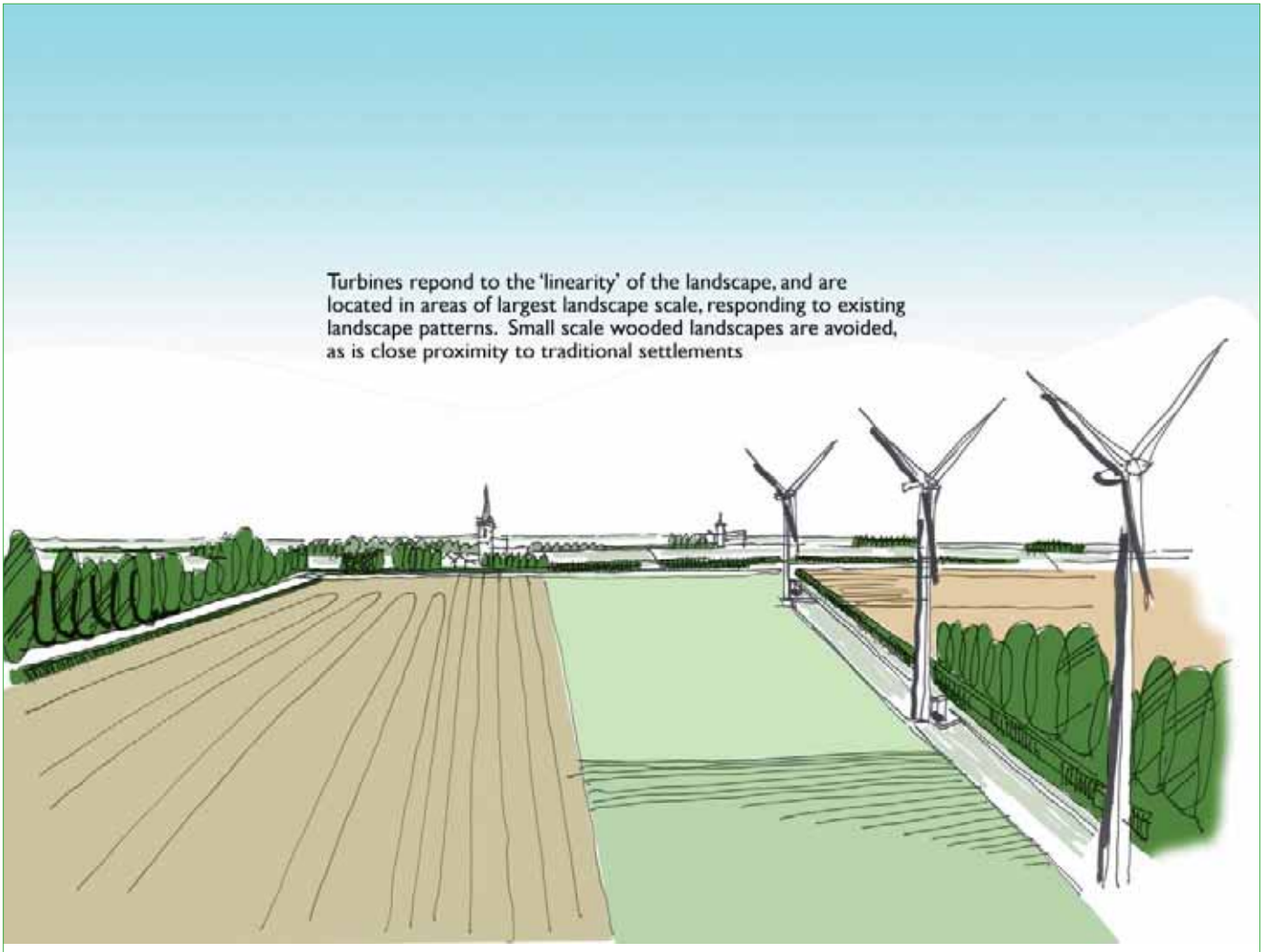
Other potential advice on landscape matters

Sensitive landscape attributes identified above can feed into/ inform EIA scoping of landscape issues in connection with the scheme, e.g. that Landscape and Visual Impact Assessment (LVIA) will be a requirement.

The East of England Landscape Sensitivity Method can feed into the LVIA (sensitivity and impact assessment) and the guidance can inform landscape and visual mitigation, e.g. identify what is important and why it is sensitive to the change proposed, develop positive guidance to focus the change.

Other work which may be needed as part of the process:

- Potential for use of information within local/district level landscape character assessments, and within National Character Areas
- Zone of Theoretical Visibility (ZTV) analysis, to establish the landscape character types likely to be affected perceptually
- Use of fieldwork to confirm sensitivity judgements



Planned Peat Fen – wind turbine proposals: Indicative guidance principles

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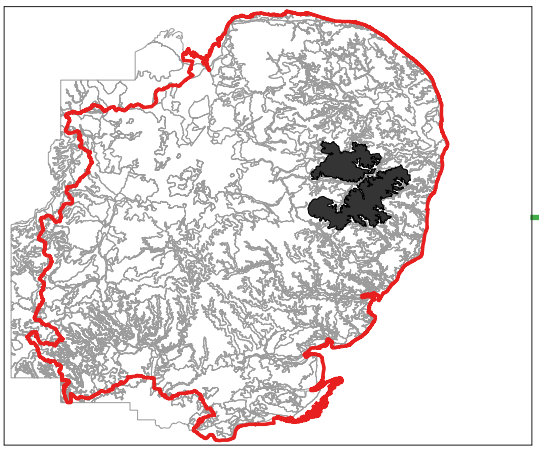
Case Study Illustration 2
Solar array in the Settled Plateau Claylands



Scheme description and location

A 5mw Solar park development in the Settled Plateau Claylands overlooking the River Blyth in Suffolk, with massed banks of solar panels at 3m height, covering a 12 hectare area.

The scheme layout encompasses low level, south facing solar energy panels laid out in rows approximately 8 metres apart, with a maximum height of 3 metres. The panels are to be mounted on open frames, enabling topography and surface field vegetation to be retained. Supporting infrastructure includes cabling and an access track/single track vehicular access route to service and maintain the scheme.

Sensitive landscape attributes
which may be affected by the proposal

- Gently undulating plateau dissected by small streams: Topographic subtleties and localised landform distinction would be sensitive to solar park development and may exacerbate effects in terms of multi directional reflectivity and solar glare. Small streams which dissect the landscape imply a landscape of relatively intact, intimate scale at points, which would be sensitive to development with a large footprint, such as a solar park.
- Ancient organic pattern of fields, some co-axial: Intact and small scale early enclosure field patterns are in themselves important and sensitive. They would also be vulnerable to the type of development proposed (subject to layout/design), although such field systems would also provide a degree of visual containment in relation to solar park development.
- Substantial thorn and elm hedges with oak and ash as predominant hedgerow trees: Hedgerows form a distinctive element of the landscape, providing scale and definition. They would be vulnerable to large scale development footprints/operational requirements of a solar park (note this would depend on scheme design and layout). As above, however, hedgerows can also provide visual containment in relation to structures within a solar park development.
- Open arable landscape with occasional small copses around farmsteads: Large scale, simple landscape would be relatively able to accommodate elements such as a solar park in landscape terms (but visual issues should be noted), although areas of smaller scale landscape associated with traditional settlement such as farmsteads would be more sensitive to this type of change.
- Large and small greens associated with villages: This implies a traditional, historic settlement pattern which would be sensitive to solar park development.
- Redundant WWII airfields: This implies larger scale, more open areas of landscape with relatively little topographic variation, which would have a lower landscape sensitivity to solar park development, although openness would be sensitive.
- Clustered settlement, comprising villages, hamlets and scattered farmsteads: Traditional, small scale, historic settlement would be sensitive to large scale solar park development.
- Rich stock of medieval and later vernacular buildings: Same as for above bullet point. Traditional vernacular settlement would be sensitive to development of this kind.

Likely landscape issues, landscape advice and potential guidance

Landscape issues likely to result from the proposals are set out in the table below, as is potential advice on landscape issues/how the landscape attributes can be used to inform positive guidance for the proposal.

Likely landscape issues

The introduction of a solar array of the scale identified above should consider the following

- Reflectivity, glare and associated perceived source of movement in the landscape (potential effects on tranquillity)
- Loss of openness due to development footprint
- Potential, albeit reversible/temporary, loss of vegetation due to scheme layout and footprint
- Potential change to perceptual landscape characteristics in general terms e.g. loss of ability to 'read' the subtleties of the landscape in terms of topography/relief and scale

Evaluation of landscape sensitivity. Recommendations and potential guidance in relation to landscape attributes.

This landscape type has a moderate overall sensitivity to large scale solar park development. Features such as small scale, traditional, clustered settlement and the ancient enclosure pattern would be sensitive to solar park development.

However other elements such as the large scale landscape character and presence of airfields reduce sensitivity, in landscape terms, to moderate overall. Summary guidance in relation to siting of solar parks is set out below.

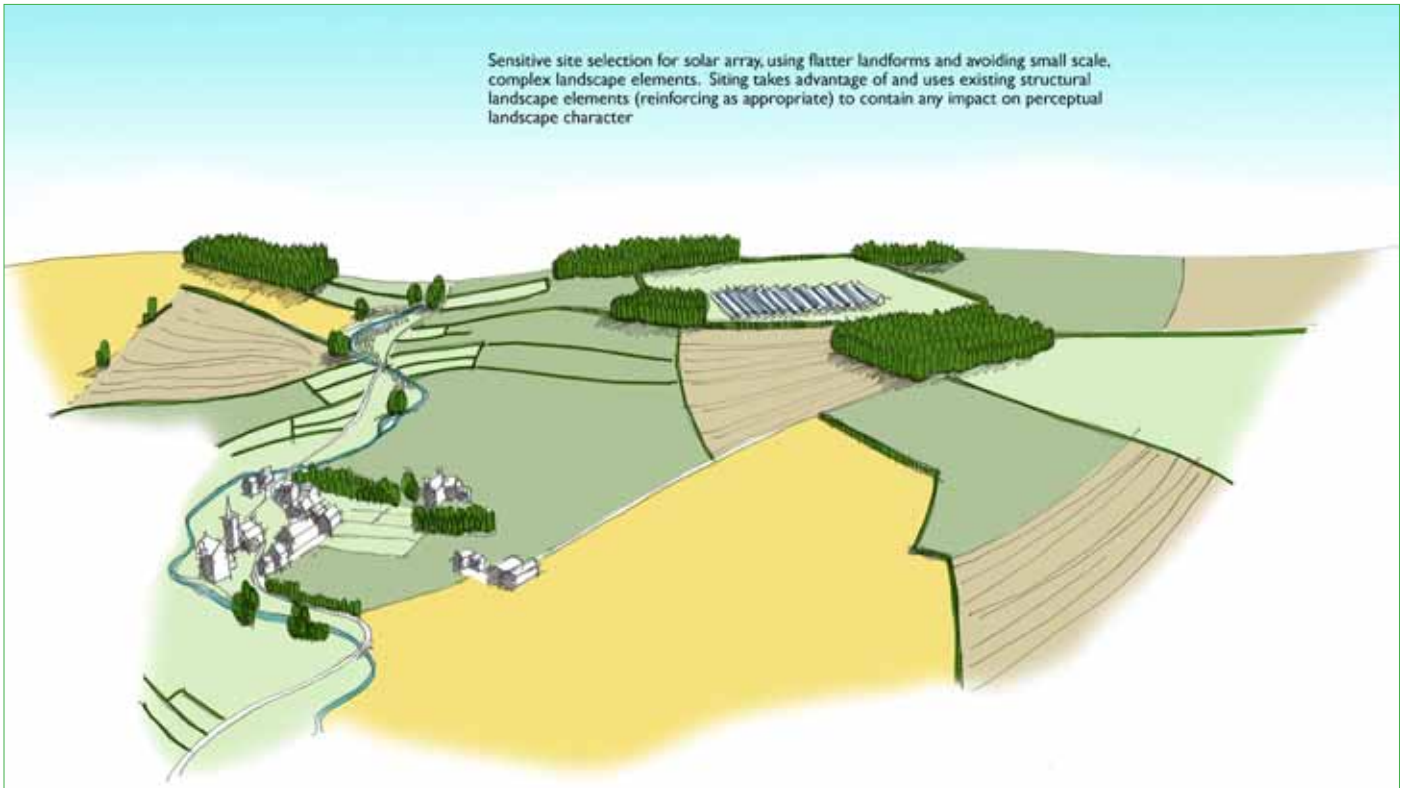
Summary guidance

- Areas of 'stronger' topographic variation should be avoided in relation to siting, to minimise the possibility of adverse change to the perceptual landscape (glint/ reflectivity/glare/visual prominence in relation to landscape features
- Seek to site solar array developments on flatter land, enhancing the surrounding landscape structure to help conserve perceptual landscape character
- Ensure that landscape features such as field boundary hedgerows which provide containment and landscape definition, are retained and reinforced
- Avoid siting schemes in areas of smaller scale landscape patterns such as co axial enclosures which would be vulnerable to such development
- Maintain an appropriate stand off from structural landscape features to the edges of solar array developments, which would also help retain the perception of openness in relation to landscape character, as identified in the description for this regional landscape type

The main points of the guidance are summarised in the illustration below:

Other potential advice on landscape matters

- Sensitive landscape attributes identified above can feed into/inform EIA scoping of landscape issues in connection with the scheme, e.g. to help determine whether landscape and visual impact assessment (LVIA) will be required
- The Landscape Sensitivity Method can feed into a site specific landscape appraisal or LVIA (sensitivity and impact assessment) and the guidance can inform the landscape strategy for the proposals, or landscape and visual mitigation in an LVIA, e.g. identify what is important and why it is sensitive to the change proposed, develop positive guidance to focus the change
- Other work which may be needed as part of the process: Potential for use of information within local/district level landscape character assessments; Zone of Theoretical Visibility (ZTV) analysis, depending on the visual characteristics and complexity of the location



Settled Plateau Claylands – Solar array: Indicative guidance principles

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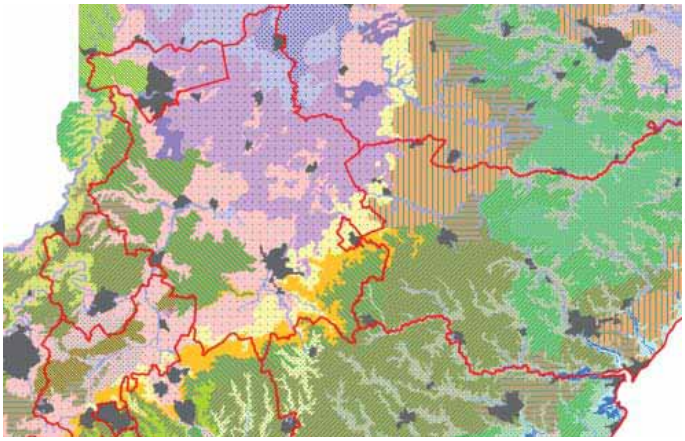
Case Study Illustration 3

Using the method to influence spatial planning

(Landscape East's responses to the East of England Regional Spatial Strategy consultation, November 2009)



Existing situation: Issues

The consultation on the Integrated Sustainability Appraisal (ISA) of the East of England Regional Spatial Strategy (RSS) in the autumn of 2009 revealed that there was variable treatment of landscape character and sensitivity within the RSS. Key issues noted were as follows:

- Encouraging references had been made to valued landscapes and sensitivity of the landscapes of the region, although these were not defined or quantified.
- Whilst the distinctiveness of local landscapes was recognised, consideration of landscape appeared to be restricted to protected landscapes and settlement settings of the key cities and towns.
- Use had not been made of other information to give a picture of the 'whole' landscape (such as the EoE Landscape Framework), whether in general terms or in relation to the sub areas and the four high level growth scenarios identified in the RSS and ISA Report.

Potential solutions

How the method could inform consideration of landscape in strategic spatial planning

Landscape East prepared a response as part of the consultation process on the ISA Report, identifying ways in which the EoE Landscape Framework and the landscape sensitivity method could be used to positively influence spatial planning at the regional level. Key recommendations provided to the consultants undertaking the RSS/ISA exercise were as follows:

- Recognise that landscape is everywhere and that 'all landscapes matter' (as per the European Landscape Convention) and that all change scenarios will have impacts on landscapes which are valued or important at some level, and to certain groups of people.
- Give consideration to all the landscapes of the region with reference to the EoE Landscape Framework and landscape character types relevant to the scenario(s) being considered – a 'whole landscape' approach, rather than just focusing on protected landscapes or landscapes which are important to settlement settings.
- Identify protected landscapes and make reference to their special qualities.
- Identify the type of change likely to affect protected landscapes and relevant landscape types within the scenario, and identify spatial locations for change. Relate these locations to the corresponding landscape type.
- Within the relevant landscape types, draw out key landscape characteristics which are likely to be sensitive to the change in question (recognise that different characteristics are likely to be sensitive in different ways to different change scenarios or combinations of these).

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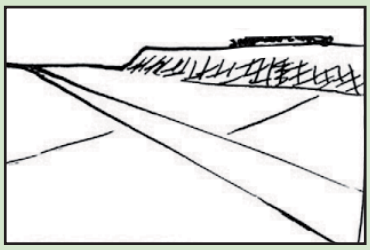
In the response by Landscape East, guidance was also provided on assigning potential sensitivity to the landscape attributes identified in a landscape type description and noting which characteristics are likely to be important in considering landscape change. That is, landscape characteristics concerned with the outward expression of the physical characteristics of the landscape, such as landform or vegetation, resulting from geology, cultural pattern and perceptual aspects, rather than underlying physical/geological factors, or locational characteristics. For example, in relation to the Wooded Sandstone Hills landscape type, the following characteristics were identified as important/likely to be sensitive:

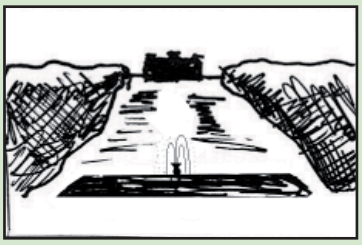


Prominent, often narrow elevated ridges, some with relatively steep sides

Occasional patches of heathland

Heavily wooded landscape with large blocks of ancient woodland

Wooded horizons and strong sense of enclosure



Historic houses and associated parkland

The response noted that, by assigning landscape sensitivity to the important landscape attributes and building up a potential sensitivity profile (using sensitivity definitions presented in the Analysis and Recommendations/Guidance Report), it would be possible to build up a picture of the most sensitive landscape character types affected by the respective growth scenarios then being considered by the RSS.

Similar principles to those outlined above were also recommended in relation to considering landscape character and sensitivity more fully within the sub area profiles identified in the RSS. Key principles (which were supported by a worked example which discussed sensitive landscape attributes of a landscape type forming part of a sub area), were identified as follows:

- Identify the type of change likely to affect the landscape of the sub area.
- Within the sub area, identify protected landscapes and special qualities.
- Identify the landscape types within the relevant sub area profiles and refer to the key landscape characteristics described for this type within the EoE Landscape Framework. Although for completeness general reference should be made to all the landscape types within the sub area, it would be helpful to focus in more detail upon landscape types where change is expected to be located (in terms of spatial locations identified in the sub area profiles).
- Identify the important landscape characteristics of the landscape types likely to be affected.

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