

ENVIRONMENTAL SENSITIVITY CONSOLIDATION October 2009

Commissioned by North Northamptonshire Joint Planning Unit





North Northamptonshire Joint Core Strategy Review

Consolidation of Environmental Sensitivity Testing

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Executive Summary

The River Nene Regional Park CIC (RNRP), formerly part of NCC's Built and Natural Environment service, have over the a period of five years developed and produced three environmental sensitivity studies to different standards and criteria. The first was developed in 2005 to provide an objective evidence base to assist the Joint Planning Unit in the directions of growth for the proposed Sustainable Urban Extensions. This study used baseline information from the emerging Environmental Character Assessment and Green Infrastructure suite, which was subsequently adopted, and set a benchmark in sensitivity analysis.

In 2008, North Northamptonshire Joint Planning Unit commissioned RNRP to undertake an environmental sensitivity analysis on sites that had been put forward as part of the Strategic Housing Land Availability Assessment (SHLAA), to identify suitably sustainable sites for development between 2021 and 2031. The environmental sensitivity study was part of a wider study undertaken by Roger Tym and Partners. Following on from the 2008 study, RNRP was commissioned by East Northamptonshire Council to undertake a supplementary study in support of the Rural North, Oundle and Thrapston Plan (RNOTP).

Although the criteria for each of these studies was different, and the latter being largely rapid desk based studies supplemented by limited ground-truthing, all identified sites of high, medium or low sensitivity of three landscape elements, visual landscape, biodiversity and cultural heritage, in relation to their potential to accept mixed use development. Whilst all three studies were presented in map form, with the relative sensitivities shown in red, orange or yellow, representing high, medium and low sensitivity to mixed use development for each landscape element, only the 2005 study included a composite map representing the combined or aggregated sensitivities.

This study provides a comparison of the three methodologies and the criteria used and critically examines each against their potential to inform the decision making process for future growth. This critique concludes that, whilst there are differences between the studies, in the relationship of the sites and the numerical values used in the scoring of their relative sensitivity, there is a consistency in their approach that allows them to be consolidated into a single study represented by elemental maps and a map of the composite sensitivity of the sites included in the three individual studies.

Recommendations for future testing are made for two possible levels of study. The first provides a basic desk top assessment at the same level of detail as the consolidated version of the three previous studies, with the option to include provision for Green Infrastructure. However, the second level would provide a more detailed assessment of not only the suitability of individual sites, but of the whole of the area around potential growth settlements. These would indicate the comparative sensitivity of all sites, thereby strengthening the rationale for selection, and incorporate a strategic framework for Green Infrastructure, as carried out for settlements in West Northamptonshire.

1. Introduction

In 2005, as part of the research and development of the North Northamptonshire Core Spatial Strategy, a sensitivity study was undertaken to establish the relative sensitivity of areas around the major growth towns in North Northamptonshire, Corby, Kettering and Wellingborough, and the optimal directions for growth of the Sustainable Urban Extensions for those towns.

In 2008, as part of a wider review by Roger Tym & Partners (RTP), the River Nene Regional Park CIC (RNRP) was commissioned by NN JPU to undertake a rapid sensitivity analysis of a number of sites put forward for consideration as part of the SHLAA to address housing needs in North Northamptonshire to 2021. This supplementary assessment was used in conjunction with the original 2005 study information to provide an environmental data set to complete the SHLAA study being undertaken by RTP in 2008.

A further study was commissioned by East Northamptonshire Council to undertake a sensitivity study of sites put forward for consideration as part of the Rural North, Oundle and Thrapston Plan (RNOTP). This was site rather than area based and was focussed on sites in and around Oundle and Thrapston.

Following the Examination in Public of the North Northamptonshire Core Spatial Strategy, where the decision making process and objectivity of the document was placed under scrutiny, it was recognised that objective studies are an essential form of base line data and that, presented in map form, can provide a simple means of conveying complex information.

It was therefore considered that the evidence base for the Core Strategy Review should be consolidated to present the 2005 sensitivity analysis, the subsequent assessment data for SHLAA in 2008 and the study for East Northamptonshire together, and to provide a single composite map and data base to assist in the strategic planning of a sustainable North Northamptonshire. It was also considered that measures should be taken to meet the future needs of the NN JPU for the commissioning and presentation of environmental assessments as an integral part of plan making.

These requirements have subsequently been formalised, as set out in the commission; the desired outputs of which are shown below.

The Commission to review the previous studies and establish a common baseline

NN JPU has commissioned RNRP to prepare a report that will deliver the following outputs:

- (i) Provision of a combined data base and mapping of (a) the 2005 sensitivity study for Corby, Kettering and Wellingborough, (b) the work undertaken for the 2008 SHLAA study and (c) the work undertaken for the 2009 assessment of sites in Oundle and Thrapston;
- (ii) Preparation of a combined sensitivity map to allow all data sets to be presented together, using the same criteria;
- (iii) Preparation of a full report setting out the details of the commissions, the methodologies and criteria for each study, and the methodology by which they would be combined;
- (iv) A critique of the consolidated work to establish whether any improvements could be made for future sensitivity testing;

(v) Recommendations for the approach to be taken to testing of growth options across North Northamptonshire for the period 2021 – 2031.

The River Nene Regional Park

The River Nene Regional Park CIC (RNRP) originated from a specialist team that was drawn from Northamptonshire County Council's Built and Natural Environment service. This was in response to the Sustainable Communities Plan 2003, which proposed the construction of 100,000 new homes in Northamptonshire by 2021, with RNRP being formed to ensure that the environment was taken into consideration as an integral part of growth.

Since its inception in 2004, RNRP has undertaken a comprehensive and objective landscape character assessment and developed the concept of a strategic Green Infrastructure network (both of which have been formally adopted by North Northamptonshire and other partners throughout Northamptonshire) and made this freely available as an interactive web based facility. This can be searched on a topic-by-topic basis or be map driven, using its Ordnance Survey base, for detailed information on sites across the county. The Environmental Character Assessment and Green Infrastructure suite (ECA&GI) is available at www.rnrp.org.

The countywide environmental base line data has been further developed to assist in the strategic planning and development of Northamptonshire, particularly through the use of sensitivity studies and, more recently, to include provision for strategic networks of Green Infrastructure as an integral part of a single study of potential growth settlements. This provides planners and developers a common framework, which gives greater certainty as to what is required both at individual site, and at a wider level, to increase connectivity and support the established local and strategic GI corridors.

The Consolidation of Environmental Sensitivity Testing for NN JPU

This section begins to address the five specific elements of the brief, commencing with item iii) as an introduction to the production of the combined data base and mapping that is required and the combined sensitivity map, which will present all the data sets together using the same criteria

I. The commissions, methodologies and criteria for each of the studies, namely the NNJPU Environmental Sensitivity Assessment 2005, The 2008 SHLAA study for NN JPU and the Rural North, Oundle and Thrapston study undertaken for ENC in 2008, and the methodology by which they will be combined

Whilst the full studies are referenced, this section sets out the details of the commissions, their methodologies and the criteria for each of the studies.

2. The Commission of the Environmental Sensitivity Assessment - 2005

In 2005, NCC provided support to the North Northamptonshire Joint Planning Unit (NNJPU), as a member of the partnership between CBC, BCW, ENC, KBC and NCC. The study was undertaken by Northamptonshire County Council's Built and Natural Environment service (B&NE) and was developed to establish the relative sensitivity of areas around the major growth towns in North Northamptonshire; namely Corby, Kettering and Wellingborough, to identify optimal directions for growth for the proposed Sustainable Urban Extensions to those towns. This was undertaken as part of the development of North Northamptonshire's Core Spatial Strategy and, in particular, the identification of sustainable options for optimal directions for growth of the settlements to meet the planned increase in numbers of dwellings proposed for the area.

The study was used in parallel with other studies as part of a wider Sustainability Appraisal to identify optimal directions for growth for each of the three major growth settlements. These were included in the document "Preferred Options for North Northamptonshire: Towards a Joint Core Spatial Strategy", which was subject to peer review and public consultation, and included in the Submission of the Core Strategy to Government, prior to the independent public examination in Autumn 2007 and adoption in Spring 2008.

Methodology of the Environmental Sensitivity Assessment – 2005

The Milton Keynes South Midlands sub-regional strategy, (MKSM SRS) provides the context for new growth in the form of sustainable urban extensions across the sub region. In Northamptonshire two plan delivery areas around existing settlement have been identified to facilitate this growth, one in the west, (West Northamptonshire Delivery Area) and the other in the north of the county, (North Northamptonshire Delivery Area). The separate planning authorities in the north joined together to form a Joint Planning Unit, (JPU) and a Local Delivery Vehicle called North Northamptonshire Together, (NNT). This has subsequently become the North Northamptonshire Development Company (NNDC).

As part of Northamptonshire County Council's (NCC) participation in support of the Joint Planning Unit, the Built and Natural Environment service undertook an environmental sensitivity assessment of defined land areas around the existing settlements of Corby, Kettering and Wellingborough. In this context, sensitivity refers to the degree to which a particular area is able to accommodate change without significant effects on its character.¹

To provide an objective framework to support the assessment, extensive use was made of the 'MapInfo' Geographical Information System, (GIS), and the two major studies commissioned by NCC, namely the Environmental Character Assessment, (ECA) and Green Infrastructure, (GI) study which is now a requirement as part of the Sustainable Communities Plan.

<u>Technical overview and processes</u>

The following section draws heavily on the "Technical Overview and process" section contained within the 2005 Report as Appendix 6. This has been updated to reflect the fact that the study was carried out over four years ago, and to provide a basis for comparison with the subsequent studies undertaken by RNRP in 2008 for NN JPU and ENC.

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¹ Adapted from Countryside Agency Topic Paper 6; Landscape Character Assessment – Techniques for Judging Capacity and Sensitivity.

Technical overview

Sensitivity assessment is within the family of assessment techniques that includes issues of environmental capacity, and is an important tool of Strategic Environmental Assessment. The development of Geographical Information Systems, (GIS) has enabled assessment techniques to be applied and presented in map form using layers of information representing potential receptors, allowing a 'landscape scale' context to be considered.

The North Northamptonshire study began by drawing a nominal 2 km radius around the settlements of Corby, Kettering and Wellingborough and subsequently dividing this area utilising natural features, roads or other logical boundaries, into study segments. Once defined these areas were subject to a phased sensitivity analysis, using an assessment framework, across a range of receptors, grouped under the headings of biodiversity, landscape and cultural heritage-throughout the assessment process extensive use was made of the 'MapInfo' geographical information system.

The following are the technical descriptive notes of the sensitivity assessment for each receptor. The phases were indicated to allow cross referencing to the general methodology in the main document.

Landscape Sensitivity Assessment

Landscape sensitivity can be interpreted as the ability of a landscape to accommodate change. The definition of this is taken from Landscape Strategy for Truro, Falmouth and Penrhyn, (Landscape Design Associates, with Carrick District Council, 2000 ²:

The ability of a landscape to accommodate change is a complex issue, and will be a function of the type of development proposed and its potential effects upon the intrinsic character and quality of the receiving landscape, the setting and character of the town, and views and visual amenity.

There are four strands to this definition of landscape sensitivity:

- Type of development proposed;
- Intrinsic character and quality of the receiving landscape;
- Setting and character of the town;
- · Views and visual amenity.

In the 2005 study, the assessment being made was of the sensitivity of the landscape to proposed urban extensions. Thus the type of development is assumed to be consistent across the area. The landscape sensitivity is assessed on the basis of objective data sources from which a professional judgement was made.

The three strands relating to landscape can be broken down further to:

- 1) Intrinsic character and quality of the receiving landscape:
 - i) Scenic quality;
 - ii) Sense of place;
 - iii) Unspoilt character;
 - iv) Condition and intactness;
 - v) Rarity of landscape type.
- 2) Impact on the setting and character of the settlement and whether the landscape is:
 - i) Critical;
 - ii) Supportive;
 - iii) Connective:
 - iv) Beyond the setting of the town.
- 3) Assessment of views and visual amenity:
 - i) Visual prominence;
 - ii) Intervisibility.

These strands were taken into account in the overall assessment of the three major components of the landscape as an integral part of the environmental sensitivity. The methodology for the Phase 1 assessment was similar for all three of the studies with the main differences being in the supporting data sets used.

² This study is cited as best practice by the Institute of Environmental Management and Assessment and the Landscape Institute, (2002)

Landscape Sensitivity - Phase I

The above issues were assessed as follows:

Intrinsic Character and Quality			
Scenic Quality	Special Landscape Areas and Current		
	Landscape Character Assessment		
Sense of Place	Current Landscape Character Assessment		
Unspoilt Character	Aerial Photographs / Constraints mapping /		
	Current Landscape Character Assessment		
Condition and Intactness	Aerial Photographs / Constraints mapping /		
	Current Landscape Character Assessment		
Rarity of landscape type	Current Landscape Character Assessment		
Assessment of the impact on the setting and character of the town			
Critical	Base mapping ³		
Supportive	Base mapping		
Connective	Base mapping		
Beyond setting	Base mapping		
Assessment of the impact on views and visual amenity			
Visual prominence	Interpretation of base mapping		
Inter-visibility	Interpretation of base mapping		

Data sources included in the constraints map are:

- Country Parks;
- Quarried Land;
- Special Landscape Areas (SLAs);
- Floodplain / watercourses;
- Conservation Areas:
- Parklands;
- Ridge and Furrow;
- Woodlands;
- Rights of Way;

An assessment of landscape sensitivity was carried out for each study segment, supported by a textual description of the area, including the intrinsic character and scenic quality of the area, the importance of the area in the character and setting, and a description of potential impacts on views and visual amenity. In addition, possible mitigation measures that would minimise the adverse effect of development are suggested. These were also informed by the

reference to the Current Landscape Character Areas, which were part of the emerging countywide Environmental Character Assessment and Green Infrastructure strategy. The results of these areas were cross checked against the other settlements and study segments to ensure consistency across the study area.

o ensure consistency across the study area.

³ Base mapping sources include OS Base maps and additionally constraints mapping and aerial photography.

Biodiversity Sensitivity Assessment – Phase 1

For the purposes of this assessment, biodiversity was considered at a landscape scale; i.e. a streamside habitat, a block of woodland etc. Biodiversity sensitivity is the sensitivity of these landscape scale areas to change. Thus the sensitivity will be a function of:

- The value of the biodiversity resource that could be lost or damaged by the change (assets).
- The impact of the change on preventing future habitat recreation or enhancement opportunities (opportunities).

This approach was based on the consideration of the biodiversity resource as a combination of assets and opportunities, an approach taken in previous studies looking at biodiversity and development pressures. ⁴

Biodiversity assets; the current resource is defined by the extent of known sites of nature conservation value. ⁵

Biodiversity opportunities; Using existing areas of environmental value as a starting point, these are areas for environmental enhancement through habitat creation or restoration.⁶

The Biodiversity Phase 1 assessment looked solely at biodiversity assets within the segments assigned for assessment. The following assets were considered:

- Potential Special Protection Areas (pSPA);
- Sites of Special Scientific Interest (SSSIs);
- County Wildlife Sites;
- Ancient Woodland:
- Flood Zones and Rivers.
- UK BAP Priority habitats / Habitat types defined by the CROW Act, (2000) as of principal importance England, including:
- Eutrophic standing waters, Aquifer fed naturally fluctuating water bodies;
- Reed beds, floodplain grazing marsh, Lowland meadows & Wet woodland;
- Ancient and/or species-rich hedgerows, Lowland wood-pasture and parkland, Lowland mixed deciduous woodland;
- Lowland calcareous grassland Lowland dry acid grassland & Cereal field margins.

Priority habitats were informed by, and drawn in part from, the following data sets:

- Aerial images;
- Woodland;
- Wildlife Corridors (e.g. Ancient Hedgerows);
- Quarried Land:
- Registered Parks;

⁴ Environmental assets and opportunities in Northamptonshire, English Nature, 2003;

Good practice study – opportunity maps for landscape scale conservation of biodiversity – English Nature, (in progress);

Green Infrastructure Strategic Framework Study Phase 1, Northamptonshire County Council, (in progress).

Biodiversity Character Assessment, NCC, (in progress) and habitat types of principal Importance in England (Section 74 CROW Act 2000).

⁶ Opportunity Maps for Landscape Scale Conservation of Biodiversity, English Nature, (in progress); Environmental Assets and Opportunities in Northamptonshire, English Nature, (2003), and NWT, (2005) NNT County Wildlife Site Review Preliminary Report.

- Ridge and Furrow survival;
- Landscape Classification Types:
- **Biodiversity Character Assessment:**

The Phase 1 assessment was carried out using the same assessment criteria as for landscape sensitivity, in respect of High, Medium and Low sensitivity. As before, no areas were identified where development would be regarded as positive.

Cultural Heritage Sensitivity Assessment – Phase 1

In order to assess the impact of strategic development on the historic environment of the potential growth segments, a rounded assessment model was developed which utilised Historic Landscape Characterisation data, Sites and Monuments (SMR) data, and heritage/environmental designation data. The assessment model developed was based on the methods utilised by English Heritage, Bedfordshire County Council, Buckinghamshire County Council & Milton Keynes Council in preparation of a Historic Environment Assessment of the potential Milton Keynes Urban Expansion in 2003.

An initial data collation exercise provided a working summary of recorded cultural heritage assets and features within the North Northamptonshire Growth Options areas defined by the JPU, based on national designations, information held in the Northamptonshire SMR and data from Historic Landscape Character Assessment. Sources of data used to identify Cultural Heritage assets and constraints were:

- Registered Parks & Gardens
- Historic Parks recorded in Northamptonshire SMR
- **Ancient Woodland**
- Surviving Ridge & Furrow
- Historic Fieldscapes (defined as fieldscapes of C19 or earlier origins, which substantially retain their historic pattern, identified from HLC)
- Historic Landscape Character (from Historic Landscape Character Assessment)
- **Scheduled Monuments**
- Archaeological earthwork sites (recorded in Northamptonshire SMR)
- Buried archaeological sites (those recorded as cropmark complexes on SMR)
- **Conservation Areas**
- Historic settlement core (recorded from C19 or earlier maps)
- **Listed Buildings**

- Historic Buildings (recorded from C19 maps correlated against modern land use⁷)
- Important Geological sites (Geological SSSIs, RIGGs, GCR sites)

The components of the historic environment were grouped into three categories: Historic Landscape, Historic Buildings, and Archaeological Sites; the visual setting of the three was also examined as a fourth category. In order to assess the 'baseline' sensitivity of the segment before any mitigation measures were taken into account, it was assumed for the purposes of the assessment that development would be uniform across the segment.

⁷ Assessment of historic building survival: mapping of built structures from early OS maps (1810 2" surveyors drawings and 1880s 1st edition 1:10560) against modern OS Mastermap to identify buildings with pre-C20 origins. It is accepted that this method is not foolproof. It assumes that where buildings are shown in the same location on the modern & historic maps that this is the same structure rather than a modern replacement for a demolished earlier building. It also takes no account of the degree of conversion, alteration, or extension that buildings may have seen and the extent to which historic fabric survives. Nevertheless, as a rapid quantification method for the purposes of the

The number and quality of these components in each potential growth area segment was assessed for each of these four categories and given a rating relating to the likely impact of growth on the historic environment & cultural heritage of the segment.

The severity of impact is a product of the scale of impact with the importance of the asset (receptor) affected:

Scale of Impact				
Importance of Asset		Major	Moderate	Minor
	National	Major	Moderate	Minor
	County/Regional	Moderate	Moderate	Minor
	Local	Minor	Minor	Minor

^{&#}x27;Major' impact was defined as physical destruction or extensive harm leading to significant loss of historic value.

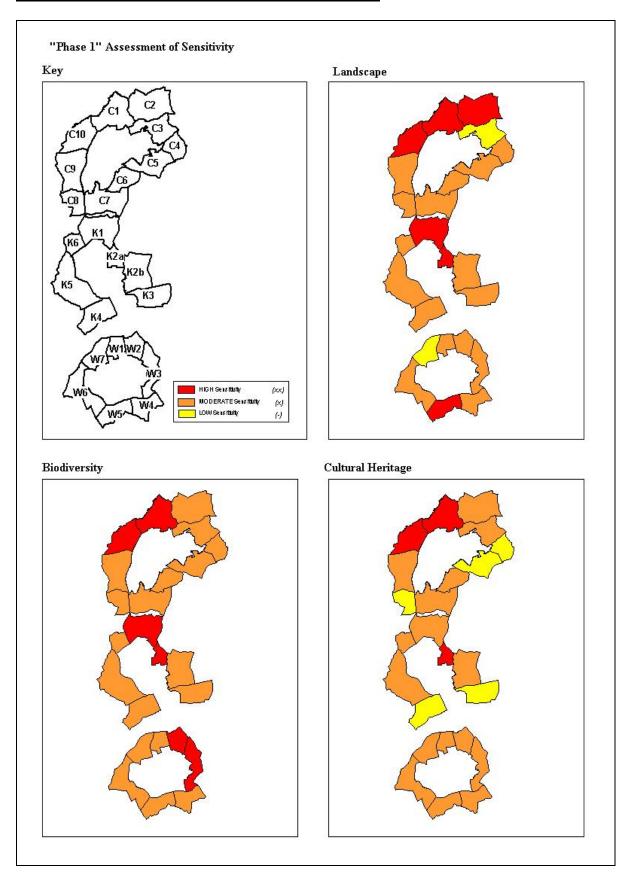
These Impact Assessment results were reviewed to inform assignment of an initial overall 'Cultural Heritage sensitivity' grading to each potential growth segment, using the same assessment criteria and approach as the landscape and biodiversity studies.

The results of this desk based assessment were entered into a table, following an initial assessment as to whether the segments were of high, medium or low sensitivity, scored accordingly and presented in map form, as shown overleaf.

^{&#}x27;Moderate' Impact was defined as significant damage or harm leading to noticeable loss of historic value.

^{&#}x27;Minor' Impact: slight damage or harm likely to be ameliorated by mitigation measures.

"Phase 1" mapping of environmental sensitivity



Landscape, Biodiversity and Cultural Heritage - Phase 2

Using the information from the three Phase 1 studies, the initial findings were supplemented by ground truthing i.e. visiting sites around the three growth settlements to check and refine the desk based assessment.

Landscape - Phase 2

This stage of the methodology involved further iteration using data sources from ground truthing, with landscape issues being assessed as follows:

Intrinsic Character and Quality			
Scenic Quality	Special Landscape Areas, Field study		
	and Current Landscape Character		
	Assessment		
Sense of Place	Field study and Current Landscape		
	Character Assessment		
Unspoilt Character	Field study and Current Landscape		
·	Character Assessment		
Condition and Intactness	Field study and Current Landscape		
	Character Assessment		
Rarity of landscape type	Current Landscape Character		
	Assessment		
Assessment of the impact on the setting and character of the town			
Critical	Field study		
Supportive	Field study		
Connective	Field study		
Beyond setting	Field study		
Assessment of the impact on views and visual amenity			
Visual prominence	Field study		
Intervisibility	Field study		

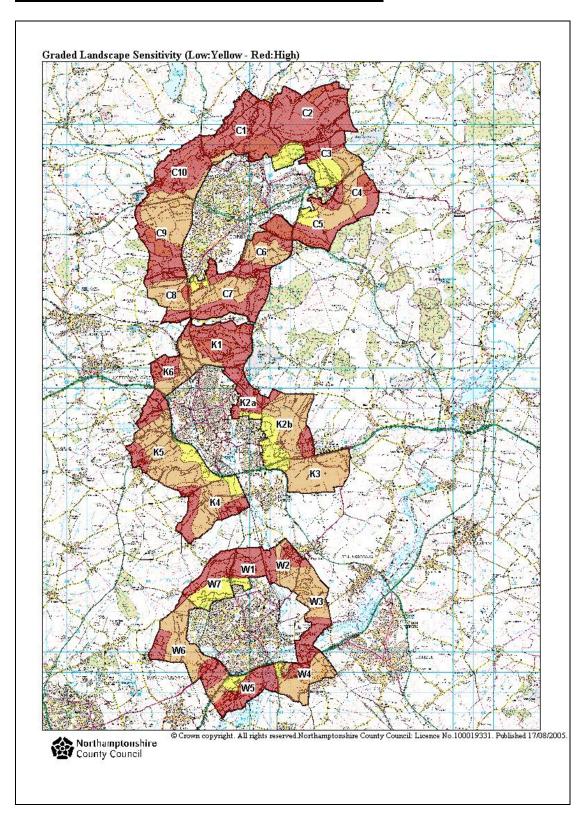
The ground truthing methodology was developed in line with current best practice guidance from the Institute of Environmental Management and Assessment and the Landscape Institute (2002).

Using these data sources, landscape sensitivity is mapped according to the assessment criteria established with the JPU, and in line with best practice guidance on a 'beyond segment' basis. The delineations between different areas of sensitivity are defined by landscape features, which might be ridgelines, woodlands, or roads, where these form appropriate landscape boundaries. However, some areas were less clearly defined and the boundaries were more transitional. Other landscape features included significant areas of parkland, heritage or cultural assets with associated landscape features or river valleys. These results were cross checked against previous assessments and against the other settlements to ensure consistency across the results.

The result of this phase of the survey is the following map, with landscape sensitivity assessed according to the above criteria, and a linked brief description of each landscape area. Where mitigation against adverse landscape impact was necessary, measures were suggested in accordance with the Current Landscape Character Assessment and the Green Infrastructure report.

Thus the study was informed and draws on both published and emerging practice and policy in order to describe sensitivity and suggest appropriate mitigation.

Landscape sensitivity map for the three districts



Landscape sensitivity

The map above shows the result of the landscape sensitivity assessment for the three districts of Corby, Kettering and Wellingborough. The following text box is a descriptive narrative of the map highlighting the main findings.

Corby. Analysis of the landscape around Corby shows that, overall, there is a high degree of sensitivity. The area of highest sensitivity covers much of the north-west, north and northeast of Corby where the landscape is highly distinctive but largely beyond the setting of Corby itself. These areas have strong historical associations, particularly the largely unspoilt Welland Valley which includes Rockingham Castle and the setting of Kirby Hall and forms a northern boundary to the wider landscape of the Rockingham Forest. Large areas of woodland also exist mainly along ridges to the east. These create important and visually distinctive elements within the forest landscape particularly as the landform falls to the south separating the southern aspect of Corby from its rural setting.

The remaining areas of Corby vary in terms of their visual prominence but are largely more visually connected to the town where views look inwards towards Corby. Although more prominent, their intrinsic characters tend to be less distinctive, less settled and therefore less sensitive to change. Such areas include: land south of Cottingham, south-west and east of Corby.

Kettering. The detailed landscape mapping shows that landscape sensitivity is generally high to the north and north-east of the town, with patches of high sensitivity scattered within other areas. The rural setting of distinct villages such as Geddington, Weekley and Warkton form an important element within the wider landscape. Woodland cover, the parkland around Boughton House and the Ise valley landscape are also important elements which add to the intrinsic character of this area.

A large proportion of Kettering is of moderate sensitivity; the landscape is less distinctive and intrinsic character is more locally focussed with natural features such as streams, ridgelines and valleys exist to the west, south-west and east. These are locally important intrinsic features of the landscape reinforcing a local distinctiveness.

Areas of low sensitivity exist where the visual impact of development would be limited; these have less distinctive landscape features though a higher degree of visual connectivity to Kettering, to the east of Barton Seagrave and areas adjacent to the A14.

Wellingborough. The detailed landscape sensitivity mapping of Wellingborough shows varied patches of sensitivity across the area, the most sensitive being to the north, south and south-east of the town. To the north, the landscape affords both inward and outward views encompassing important elements such as Great Harrowden parkland, the settlement of Finedon, Finedon Callybanks and the Ise Valley. To the south and south-east, the landscape is dominated by views of Wellingborough and the Nene Valley.

A 'quiet' plateau landscape exists to the west, to the east and south sits a broad valley landscape though both landscapes loose visual connectivity to the town due to landform' and features such as woodland. Areas of low sensitivity exist where the intrinsic quality is unsettled, views outwards are limited and connectivity to the town is clearly evident.

Biodiversity - Phase 2

This phase assessed sensitivity on the basis of both biodiversity assets and biodiversity opportunities. Biodiversity opportunities were identified on the basis of previous studies, (English Nature 2003) and in line with the methodology from previous studies and good practice. ⁸

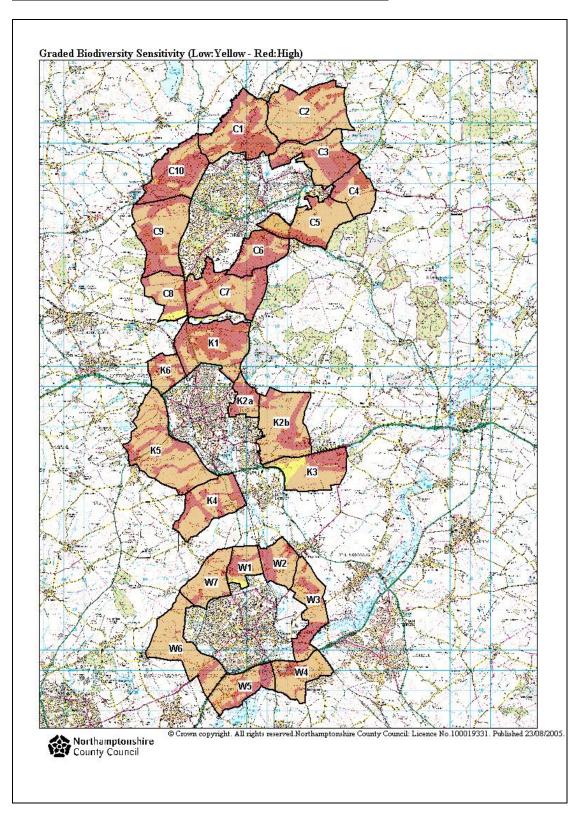
Identifying biodiversity opportunities involved the identification of clusters of significant areas of semi-natural habitat, which would form the focus for habitat creation or restoration. Clusters defined were then compared against geological data to identify suitable enhancement areas. This resulted in an assessment of where environmental enhancement could be delivered, using existing areas of environmental value as a starting point.

The same data sets and assessment criteria as Phase I were used, but the approach was more detailed to produce results that were at an intra-segment scale. The boundaries of biodiversity sensitivity zones were defined by the edges of landscape scale biodiversity areas, such as a woodland edge or the end of the streamside habitat associated with watercourses, though these boundaries are, to some degree, transitional. The assessment of map-based assets and identified opportunities was carried out in tandem in order to assess the sensitivity to development. The result of this phase of the survey was a map with biodiversity sensitivity assessed as above. The results of this phase were cross checked across and between the settlements, to ensure consistency.

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⁸ Good practice studies, opportunities for landscape scale conservation of biodiversity, English Nature, (in progress).

Biodiversity sensitivity map for the three districts



Biodiversity sensitivity

The above map shows the result of the biodiversity sensitivity assessment for the three districts of Corby, Kettering and Wellingborough. The following text box is a descriptive narrative of the map highlighting the main findings.

Corby. The detailed biodiversity sensitivity mapping of land around Corby has identified a large number of areas of high biodiversity sensitivity. Overall the area falls within the RSS8, (Regional Spatial Strategy) Biodiversity Conservation Area of Rockingham Forest. A high proportion of statutory and non-statutory sites of conservation value in Corby are associated both with quarried and brownfield sites, woodland (including ancient woodland), and forest and parkland landscapes. The small proportion of land of lowest sensitivity can be seen in areas of landfill or intensive farming.

Kettering. Highest areas of sensitivity are principally associated with rivers and streams, as Habitats of Principal Importance⁹, in addition to a range of sites of conservation value. Sensitive habitats occur in both Liassic and Limestone Slopes around Kettering. To the east is the Alledge Brook and to the west tributaries of the Ise river. The small proportion of land of lowest sensitivity occur on the Cropped Clayland areas around Kettering are generally arable and relatively of a lower conservation value.

Wellingborough. The detailed biodiversity sensitivity mapping around Wellingborough identified the largest areas land of high sensitivity as associated with the Rivers Nene (an East Midlands Strategic River Corridor) and Ise. Habitats of Principal Importance contributing to the sensitivity of the area include species rich hedgerow and woodlands. To the south east is the potential Special Protection Area, (pSPA) of the Upper Nene Valley Gravel Pits. In addition locally notable habitats on the Liassic Slopes of semi-improved grassland and arable margins are considered as sensitive. Small areas under intensive arable production show a lower biodiversity sensitivity or greater potential for habitat regeneration.

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⁹ Habitats of Principle Importance under Section 74(2) CRoW Act, (2000)

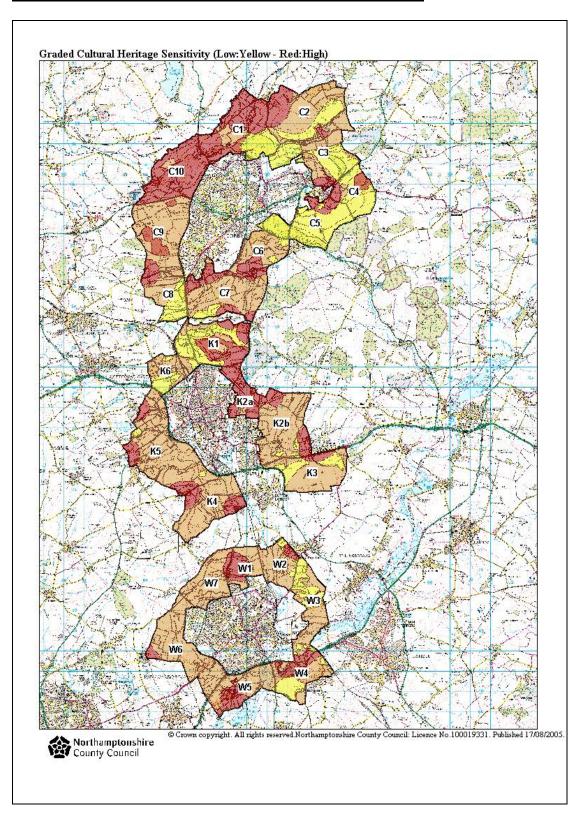
Cultural Heritage - Phase 2

The 'whole-segment' grading for the Cultural Heritage was refined through a process of 'ground-truthing' involving selective checking of conditions and asset survival, supported by "remote validation" using aerial photography produced in 2000. No new survey work was undertaken as part of the study. This refining process was intended to provide a finer grained assessment, identifying the sensitivity of different areas within each segment and enabling inter-segment constraints and issues to be recognised.

The location and geographical extent of assets and features identified in the Phase 1 study were mapped. Where appropriate, a 'buffer zone' was mapped to address the issue of impact on the setting of a visible monument or asset; this was provided by a simple buffering of the mapped asset, without the use of detailed view-shed modelling. Mapping areas of former mineral extraction, which can be considered to have low or no remaining historic environment potential, provided additional information on the sensitivity of areas. Areas where no specific cultural heritage assets were mapped were assigned the general whole-segment sensitivity grading to provide comprehensive coverage. The sensitivity grading allocated to each area with the potential growth area segments was checked between areas to ensure a consistency of approach and application.

The results of this mapping and the source/justification for the grading allocated were summarised in assessment matrix (Appendix 2, 3, 4 & Appendix 9). This was supported by a brief summary of the nature of the historic environment and the sensitivity of different areas within each segment. Where the impact of development on cultural heritage issues could be mitigated, suggested themes and measures were identified.

<u>Cultural heritage sensitivity map for the three districts</u>



The map in above shows the results of the cultural heritage sensitivity assessment for the three districts of Corby, Kettering and Wellingborough. The following text box is a descriptive narrative of the map highlighting the main findings.

Corby. The detailed Cultural Heritage sensitivity mapping of land around Corby shows greater variability than around the other two towns. Overall there is a broad gradient with sensitivity falling from west to east across the potential urban expansion areas. The zone north-west of the existing urban area is considered to be very sensitive to development impact, with a combination of important built environment assets in the historic settlement cores of Rockingham, Middleton & Cottingham combining with historic parkland of Rockingham Park and important archaeological remains to present a significant constraint on potential development in this area. This zone of high sensitivity continues to the northeast into the surroundings of Gretton, but the adjacent land closer to the north side Corby is not considered to have the same high sensitivity.

The areas north-east & east of Corby and Weldon are generally considered to have a low sensitivity to development impact, although Kirby Hall and its setting provide an area of greater sensitivity north-east of Weldon and the areas immediately surrounding Weldon itself are of high sensitivity because of the Conservation Area designation of Weldon and the important archaeological site of Little Weldon Roman villa. Urban expansion potential eastwards is terminated in the highly sensitive landscape of the historic woodland and former deer park of Weldon Park.

The zone bounding the southern part of Corby, roughly from Stanion south & west past Newton & Rushton to East Carlton, is mapped as being generally of 'moderate' sensitivity, although a linear band of highly sensitive land surrounding Little & Great Oakley presents a greater constraint to southwards expansion of Corby, and may make southwards growth difficult.

Kettering. The detailed Cultural Heritage sensitivity mapping of the land surrounding Kettering identifies the area north-east of Kettering as the most sensitive area. In this area the combination of well-preserved built historic environment assets in the villages of Weekley & Warkton, and important historic landscapes in the surrounding areas present major constraints to potential growth.

The potential urban expansion areas east & west of Kettering are generally characterised as being of 'moderate' Cultural Heritage sensitivity, with some potential for development providing that appropriate mitigation measures are included; more sensitive landscapes and areas are generally found at the outer edges of the defined expansion areas, typically relating to the setting of historic villages such as Cranford St Andrew, Isham, Pytchley, Gt Cransley, and Thorpe Malsor on the expansion area boundaries or historic fieldscapes and features associated with these villages.

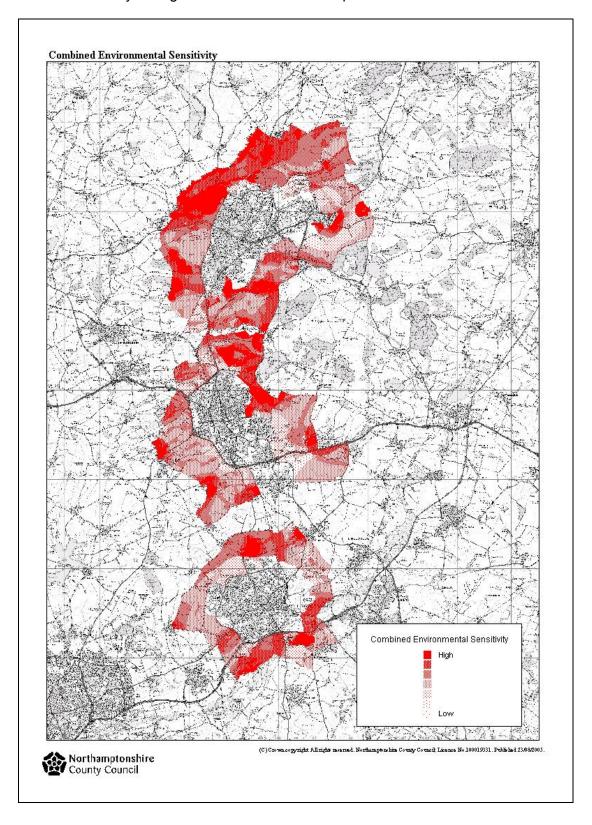
Areas of former mineral extraction have been identified north and north-west of Kettering, and to the south-east of the town in a band south & west of the Cranfords. These activities have reduced the Cultural Heritage sensitivity of these areas.

Wellingborough. The detailed Cultural Heritage sensitivity mapping of the potential urban expansion areas around Wellingborough has identified large areas of moderate sensitivity, with relatively localised areas of high sensitivity scattered around the periphery of the potential expansion areas. To the north of Wellingborough, the formal parkland around Gt Harrowden Hall represents a local landscape of high Cultural Heritage sensitivity, similarly the setting of historic settlement cores of Finedon and Mears Ashby, and the historic settlement of Gt Doddington provide further localised areas of high sensitivity north-east, west, and south of Wellingborough respectively. The important archaeological remains and historic buildings & landscape around Chester Farm provide a further area of high sensitivity centred on the A45 south-east of Wellingborough.

Areas of reinstated former mineral extraction sites to the east and south-east of Wellingborough (south of Finedon and between Irchester & Wellingborough) provide areas of typically low Cultural Heritage sensitivity, although the un-reinstated quarry remains and exposed former quarry face within Irchester Country Park are identified as highly important and sensitive in terms of their industrial archaeological and geological remains.

Composite sensitivity map for the three districts

With the refined assessment of the landscape components completed, it was recognised that a map drawing these detailed studies together would be helpful, as this would indicate the areas around the three settlements that broadly had the least and the highest levels of relative sensitivity to large scale mixed use development.



The above map was created by representing the levels of sensitivity for each receptor, visual landscape, biodiversity and cultural heritage, assigning a value of 3 for a receptor rating of high sensitivity, 2 for medium sensitivity and 1 for low sensitivity. These values were then aggregated for each sector and settlement, and represented graphically by adding to the depth of shading for each additional level of sensitivity. This was not intended to suggest that the levels of sensitivity for landscape, biodiversity and cultural heritage were equally weighted, or could be directly compared, but to provide a simple means of indicating the relative, cumulative sensitivity.

As part of the peer review process, emerging results of the sensitivity analysis were presented to the Joint Planning Unit on 11/5/2005 and 4/8/2005, and to a stakeholder workshop held on 17/06/05. On each occasion discussions were centred on the methodology and initial results, challenging and testing the process and results for robustness.

A "Sustainability Appraisal of the Preferred Options", dated November 2005, was subsequently undertaken by Baker Associates, who concluded that the methodology, which was used to select the preferred directions of growth for the Sustainable Urban extensions of Corby, Kettering and Wellingborough, was appropriate.

Environmental Sensitivity Study 2005 - Criteria

Whilst the section on methodology, above, includes the criteria used in the assessment, the following are the principal criteria used in the study and provide a benchmark against which the two later studies were carried out

Significant constraints such that it is not considered appropriate for development to take place	High sensitivity
Significant constraints identified although it may be possible for some development with appropriate mitigation	Medium sensitivity
- Whilst there may be constraints, it should be possible to mitigate as part of development proposals	Low sensitivity
✓ Development would be positive	Positive

For this study, no numerical values were initially assigned to the Phase I or II mapping as there were no areas that were considered to warrant the use of the Positive value. However, the relationship between the three levels of sensitivity was subsequently taken to be 1 for Low, 2 for Medium and 3 for High sensitivity. These values were used in the development and presentation of the composite sensitivity map, as described below.

The Composite Sensitivity map brings together the three sensitivity assessment maps of landscape, biodiversity and cultural heritage in a composite form to create a combined environmental sensitivity map.

The map was created by representing degrees of sensitivity for each receptor by assigning a value of 3 for a receptor rating of high sensitivity, 2 for medium sensitivity and 1 for low sensitivity. The combined environmental sensitivity map adds these ratings and represents the combined sensitivity rating using a graded intensity of colour (Table 1). Thus areas which have been identified as having a high sensitivity in each of the three assessment headings (a maximum combined 'score' of 3+3+3) have been given a deep red colour. Correspondingly where an area which was considered to have a low sensitivity in each of the headings (a combined score of 1+1+1), a light red shade has been used.

Representation of composite map shading

Sensitivity	Landscape	Biodiversity	Cultural Heritage	Total	Colour
High	3	3	3	9	Dark Red
	2	2	2	6	
Low	1	1	1	3	Light Red

3. The Commission of work to support the SHLAA - 2008

Roger Tym and Partners were commissioned by NN JPU to undertake a Strategic Housing Land Availability Assessment for NNJPU. The SHLAA was the first such document produced for North Northamptonshire, which includes the local authority areas of Corby, East Northamptonshire, Kettering and Wellingborough. It was developed to consider the potential supply of housing from a range of settlements and planned Sustainable Urban Extensions (SUEs) across North Northamptonshire, over a 20 year period from a base date of April 2008. It was a technical study (supported by site visits) of housing land potential, which was produced on the best available information at that point in time.

In 2008, as part of the wider review by Roger Tym and Partners, RNRP, which comprises key members of NCC's B&NE service, was commissioned by the NN JPU to undertake a rapid analysis of the environmental sensitivity of a number of sites put forward for consideration for SHLAA to address housing needs in North Northamptonshire to 2021. This assessment, which is included as Appendix 2, followed a similar methodology to the Environmental Sensitivity Assessment 2005, albeit in a different context and with a different scoring system, and was used to supplement that study for the purpose of assessing potential sites for their suitability to appropriately accommodate mixed use development.

The initial proposal by Roger Tym and Partners, dated June 2008, set out the study in three sections of Criteria; Suitability, Availability and Achievability. However, the proposals for the Suitability Criteria were not taken forward in the original form proposed for the following reasons:

- 1a) Policy Restrictions. The proposed criterion focused solely on Areas of Outstanding Natural Beauty (AONB) and designated Green Belt, of which Northamptonshire has neither. This category was omitted from the study
- 1b) Impact on Protected Landscapes. This sought to score on the basis of whether the site was within a Landscape Character Area (LCA) or not. Since all the sites would be in a LCA, and this does not equate to inherent value or sensitivity, the category would have been meaningless and was therefore also omitted from the study.
- 1c) Potential Impacts on Nature Conservation. This sought to relate potential development sites to "Nature Conservation Areas", which did not adequately address the range of issues affecting biodiversity and ecology. This was also omitted from the study.

To ensure that environmental considerations were fully taken into account in the suitability criteria, and to build on the evidence base provided by the 2005 environmental sensitivity study, NNJPU commissioned RNRP to undertake a rapid assessment of the relative sensitivity of the three landscape elements; visual landscape, biodiversity and cultural heritage. The study was presented in both map and chart form, which included supporting notes about the individual land parcels.

Methodology of the work in support of North Northamptonshire SHLAA 2008

Whereas the previous study had involved a systematic survey of sectors defined within a radius of 2km around the three major growth settlements of Corby, Kettering and Wellingborough, the areas of search for the SHLAA were much broader and included areas around smaller settlements, as well as others which coincided with, or were adjacent to the boundaries of the previous study undertaken in 2005. However, as comprehensive environmental character information was not available for all sites within the built up areas, these were only assessed on a piecemeal basis.

NNJPU's initial 'long' list contained well over 1,000 sites, which was filtered to remove duplicates, sites below the minimum size threshold of 0.25 hectares, and sites not in accordance with the adopted CSS. This resulted in 626 sites being finally considered, of which 273 were in urban areas. Consequently, RNRP was commissioned to review 58 sites, which had been assessed in the previous survey, and to assess 298 new sites.

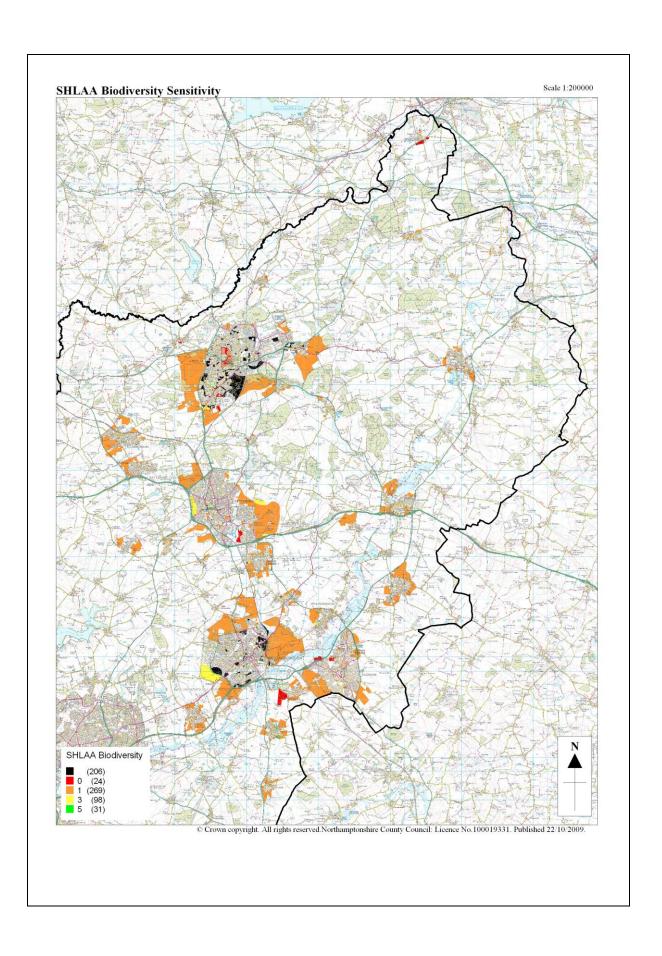
The study was carried out to a similar methodology in that each site, which was given a unique identifier reference, was considered in respect of the relative sensitivity of the three landscape components, visual landscape, biodiversity and cultural heritage, to large scale mixed use development, and an assessment made as to whether it was of high, medium or low sensitivity. A further category was available for sites where such development would be considered positive, or the impact was considered to be neutral.

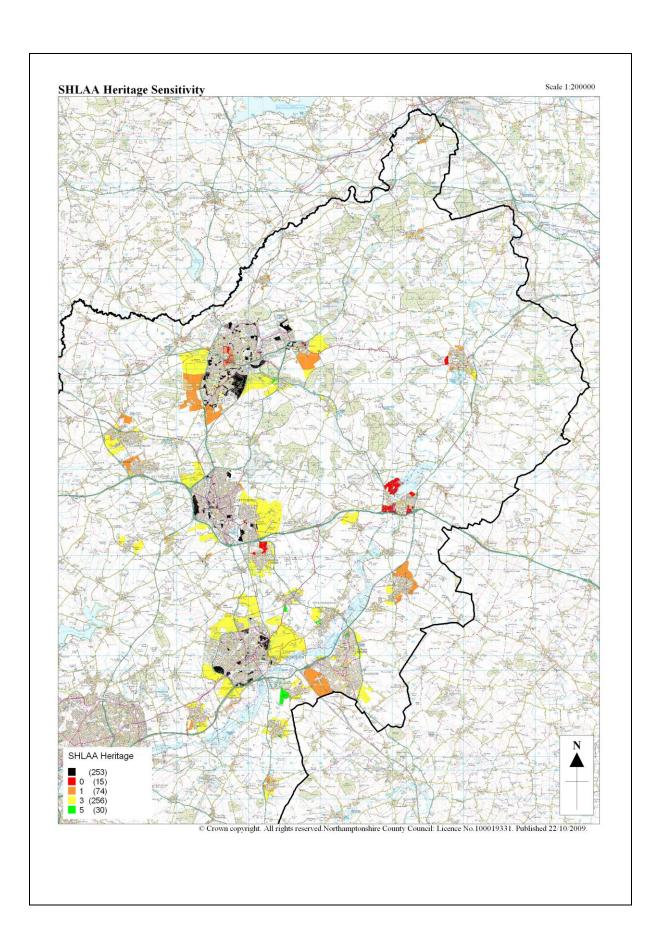
For those sites that were assessed as part of the 2005 study, the sites were re-assessed and the results compared to the original ratings, which were confirmed in most cases. The only variations occurred where the new sites formed only part of those used in the previous study, that is they were either smaller than the original land parcels, or they crossed more than one previous study boundary. Where such a variance was identified, a note was added to highlight the reasons. In addition, each site rating was supported by a brief note.

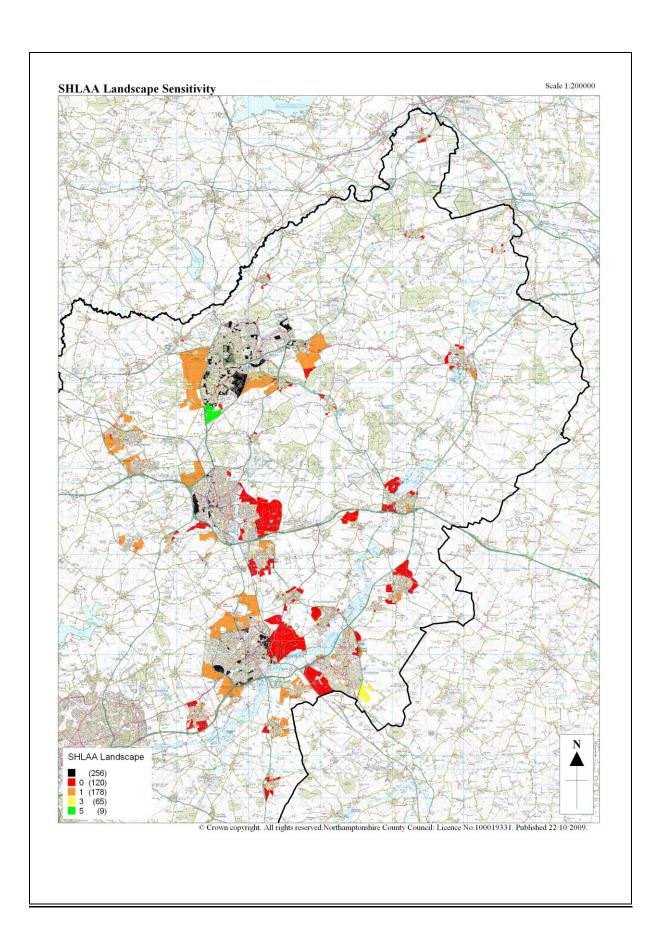
The study was drawn together with a table of the high, medium and low ratings for each of the study sites, along with the notes or comments about the site. This table was also produced in map form visually indicating the relative sensitivities of the sites surveyed. These were shown in the same colours as for the previous 2005 study, red indicating the highest level of sensitivity, orange for the medium sensitivity and yellow for the lowest.

It should be noted that the environmental sensitivity studies formed only part of the overall SHLAA, and the values using the inverted scale were assimilated by Roger Tym and Partners into their own table, which was entirely of positive scores. The results of the SHLAA were subsequently published in February 2009.

Maps of the SHLAA study and the Site Category Ratings are shown overleaf. (Note that the sites shown in black could not be fully assessed due to only partial data being available)







Study Criteria for the SHLAA study - 2008

Unlike the previous study of 2005, where the scoring system followed what was essentially a three level scale, although a fourth "positive" level had been available, but not used, this study was undertaken as part of a wider assessment that used a series of scales that ran from 0 to 5 in increments of one, a two point scale of 0 and 5, a three point scale of 0, 3 and 5, and a four point scale of 0, 2, 3, 4 and 5. In each case, the higher the score, the more suitable the site was considered as part of the overall assessment, which was based on an aggregate score.

This was in direct contrast to the previous three point scale from 1 to 3 where the higher the score, the greater the sensitivity, and therefore, the less desirable it would be for the site to be proposed for development. Although it was proposed that negative scores be used, to offset the natural bias that positive numbers would give to sensitive sites, this was rejected by Roger Tym and Partners, due to the SHLAA scoring methodology already having been previously agreed.

Consequently, an inverted scale was used whereby sites where development was considered to be positive, or neutral, would be given a score of 5, the least sensitive sites were given a score of 3, sites of medium sensitivity were given a score of 1, and sites of high sensitivity a score of 0. The full SHLAA methodology can be found in the published Final Report and Appendices (February 2009).

4. The Commission of work to support the Rural North, Oundle and Thrapston Plan (RNOTP) 2009

East Northamptonshire Council submitted the Rural North, Oundle and Thrapston Plan (RNOTP) DPD to the Secretary of State on 11 January 2008. An Examination in Public was held in 2008 to consider the draft RNOTP. However, in a letter to ENC, the Examination Inspector expressed concern that, in his opinion, some of the policies in the draft RNOTP were not supported by an 'adequately robust and credible evidence base'.

Accordingly, the Inspector decided to keep the Examination open until 'further evidence gathering' in respect of the supply of housing land had been undertaken. Noting that the draft RNOTP did not make specific allocations for Oundle for years 6-10 of the plan period, the Inspector concluded that: 'The approach taken in paragraph 8.11 of the DPD, which identified possible sites but did not give a preference or make any allocations, was unsound'.

In order to provide the evidence to enable a further allocation for Oundle to be identified, the Inspector required the development of the high-level sustainability work, which Roger Tym & Partners (RTP) undertook for the District Council in 2007, with more emphasis on locally based, site-specific assessments.

In December 2008, the District Council appointed RTP to undertake the evaluation of possible alternative sites in and adjacent to Oundle and Thrapston. RNRP was also commissioned by East Northamptonshire Council at that time to undertake an assessment of the suitability of these sites to appropriately accommodate mixed use development. This work was used as part of the RTP report to provide an 'adequately robust and credible evidence base'.

Study Methodology for the RNOTP 2009

The land parcels, which had been drawn together by ENC and given unique identifier references, were assessed for their sensitivity to a change to mixed use development, taking each of the three landscape components; visual landscape, biodiversity and cultural heritage, in turn. The study was carried out in isolation to the remainder of the assessment, which was undertaken by Roger Tym and Partners.

The overall study, including the three environmental analyses, had a total of 22 assessment measures. The sites included in the study were given unique identifier references and were located around Oundle and Thrapston.

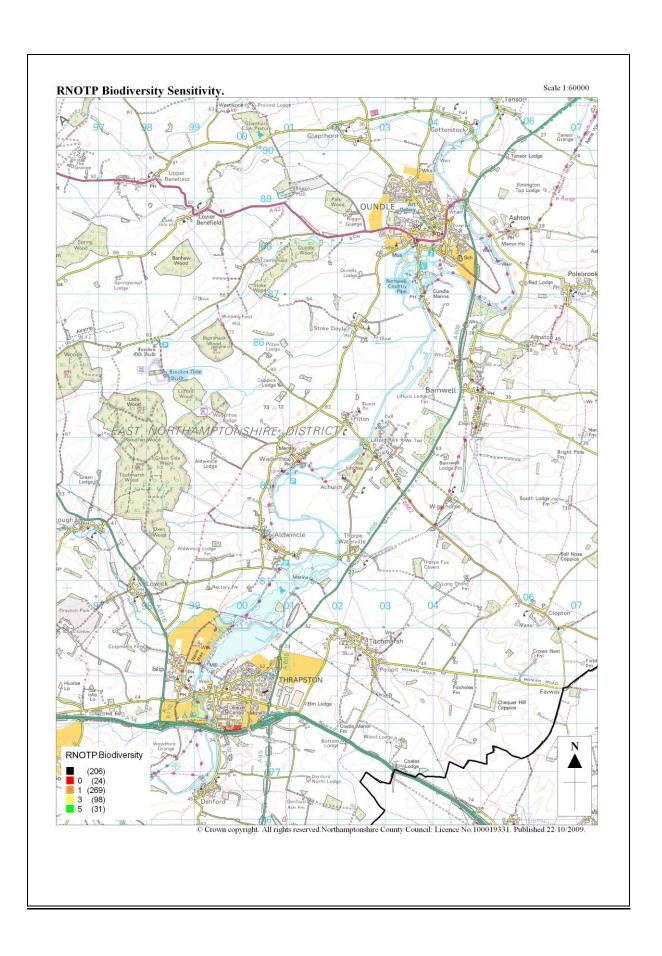
Each land parcel was then considered in relation to the three environmental components and an assessment was made as to whether they were of high, medium or low sensitivity. A further category was available for sites where development would be considered positive but, as before, no such locations were identified.

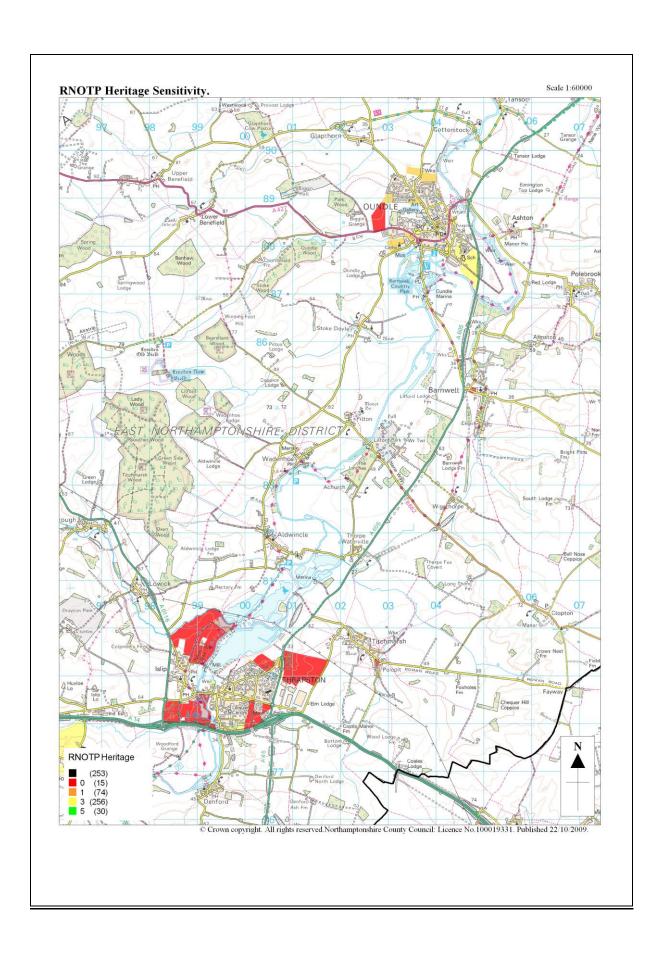
The results of the analysis were entered into a MapInfo table for each site, along with brief notes about the site. The results were submitted digitally to Roger Tym and Partners for assimilation into the remainder of the results, which were finally produced in tabular form. However, the results were also capable of being shown in map form with the usual colour code of red for highly sensitive sites, orange for sites of medium sensitivity and yellow for those of low sensitivity. No sites were identified as being neutral, which would have been shown in green.

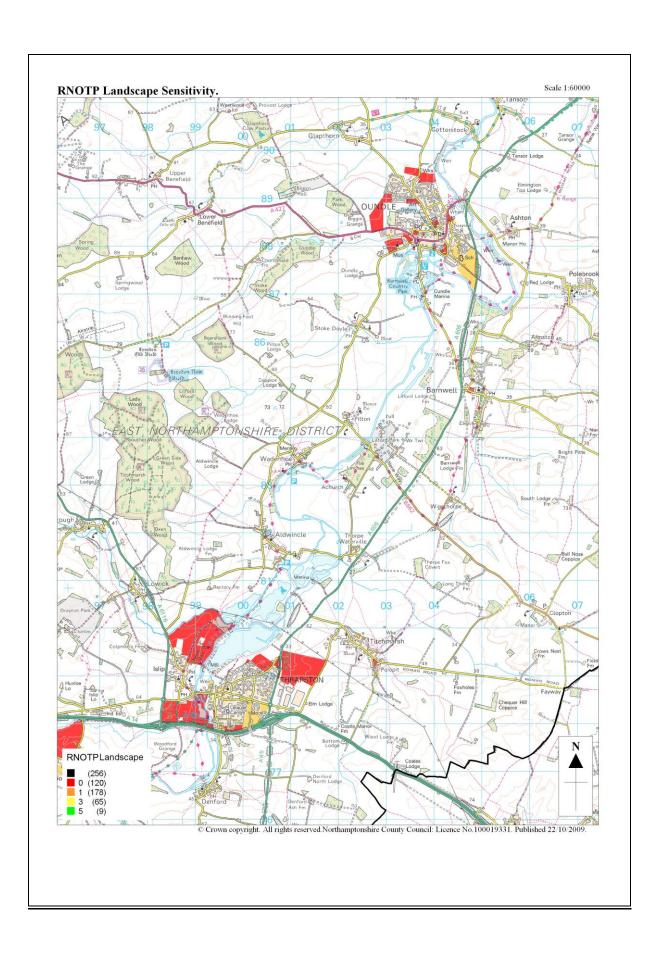
Study Criteria for the RNOTP 2009

The scoring system made provision for the use of negative values, important as when used for land availability studies, it is the highest scoring sites that are regarded as the most suitable for development. Consequently, where environmental sensitivity or the likelihood of flood risk is concerned, positive values, even on an inverted scale, would simply increase the aggregate score for a given site and bring it closer to the threshold for suitability.

With this study, the overall matrix was calibrated so that all positive impacts were given positive scores and similarly, negative impacts were given negative scores. In the case of visual landscape, biodiversity and cultural heritage, the scoring system was 0 for sites of neutral impact, -1 for sites of low sensitivity, -2 for sites of medium sensitivity and -3 for sites of high sensitivity. Setting these scores in context, the minimum attainable score was -67 and the maximum possible score is +52, whereas the highest aggregated score for environmental sensitivity was only -9.







5. Methodology for combining the three studies

Required output iii) is to set out a methodology to combine the three studies and deliver:

- i. Provision of a combined data base and mapping of (a) the 2005 sensitivity study for Corby, Kettering and Wellingborough, (b) the work undertaken for the 2008 SHLAA study and (c) the work undertaken for the 2009 assessment of sites in Oundle and Thrapston;
- ii. Preparation of a combined sensitivity map to allow all data sets to be presented together, using the same criteria;

Maps have been produced that draw together the sites of high, medium and low sensitivity for each of the three landscape elements; visual landscape, biodiversity and cultural heritage. These are shown regardless of the original and varying approaches to scoring, and have been combined on a single map to show a composite sensitivity map.

The following table shows how the respective values have been unified:

Level of sensitivity	2005 study scoring	2008 study scoring	2009 study scoring	Consolidated study rating
High	3	0	-3	3
Medium	2	1	-2	2
Low	1	3	-1	1
Positive	0	5	0	0

The consolidated study ratings have numerical values in the final tabular data due to a technical issue with shading polygons by a value in a range of values – the scores must be represented numerically for ranges to work correctly in MapInfo. The consolidated study ratings may also be translated to meaningful alphabetical character values depending on the context in which they are to be used.

However, as these studies are likely to be used in conjunction with other positive values, negative values such as those used in the 2009 study would appear to be the most appropriate to reflect the value of the environment as a finite resource. Consideration should also be given to whether these values are sufficiently high to provide a realistic balance to positive drivers such as availability and achievability values, and the ratio between the highest positive scores and the highest negative scores.

This above chart provides a relatively simple process where land parcels are independent of each other. However, with the comparatively large scale of the sectors used in the 2005 study, and the overlaying of sites from the SHLAA study in 2008, provision has also been made to refine the mapping and grading of such sites. This allows the highest sensitivity value of sites to be shown where two levels of grading apply to a single area and a composite sensitivity map to be produced of the three study areas for each landscape component or element. The method for achieving this will be referred to in the Mapping Methodology section.

Also, by overlaying the maps of each of the three landscape elements, effectively aggregating the sensitivity ratings, a composite map of the whole of the three study areas has been produced.

6. GIS Mapping Methodology.

<u>Aims</u>

Following the preparation of the body of the main report, attention then turned to the regrading and combination of the 3 studies component GIS map data using MapInfo.

The aim of the integration exercise was:-

- to grade all polygons from all studies equally using the same revised scale, while respecting their original grade of sensitivity from their study of origin
- to permanently shade the re-graded polygons clearly, in order that they could be used by non-specialists in future planning decisions
- to provide a series of MapInfo data layers which allowed users to appraise the various subject related databases clearly and to cross reference the original RNRP team responses in the relevant original study (B&NE 2005, SHLAA or RNOTP)

Method

The three separate final project datasets were extracted from RNRP's digital data archive, examined and compared in the light of the revised scoring system proposed in this report.

Each data set had additional data columns added, where necessary, and the scores were transposed through a series of query / update processes on sub-sets of each database defined by the old score (e.g. select all 2008 Heritage grade 1 scores, update this subset's new score column with a 3).

Updated scoring was inserted in the accompanying New Score field for each type of sensitivity (Biodiversity, Heritage and Landscape sensitivities) which were then combined into one large output data table representing only the reworked scoring to avoid confusion.

Technical Issues

As each of the three studies generated GIS data with different database structures to one another, initial consideration was given to combining every field into one master layer.

This would, however, have resulted in a high degree of redundant fields within the combined database, as only records from the B&NE 2005 study would populate the first set of fields in the database structure, leaving the rest of the fields blank. The SHLAA study sites would then have blank columns for every field in the B&NE 2005 study, but would have their relevant columns from the SHLAA filled in. The RNOTP data would have added even more blank fields to the end of the table.

This approach was considered to be too confusing and inefficient for end users. Therefore an alternative scheme was devised where the only information copied with the polygon and its various sensitivity scores and comments were the primary references from the relevant study and original data set.

This allows users to cross reference to any of the three study reports or cross reference with the relevant digital data sets from the original studies to access the detailed level of information relevant for that record. In addition it helped to reduce the number of fields in the output dataset which would remain permanently blank and, therefore, redundant.

Once all scores were updated the 3 data sets were combined into a master table and a new column added for the combined sensitivities. This was updated by a simple sum function where the Biodiversity Grade, Heritage Grade and Landscape Grade were summed and the result inserted into the Combined Sensitivity column.

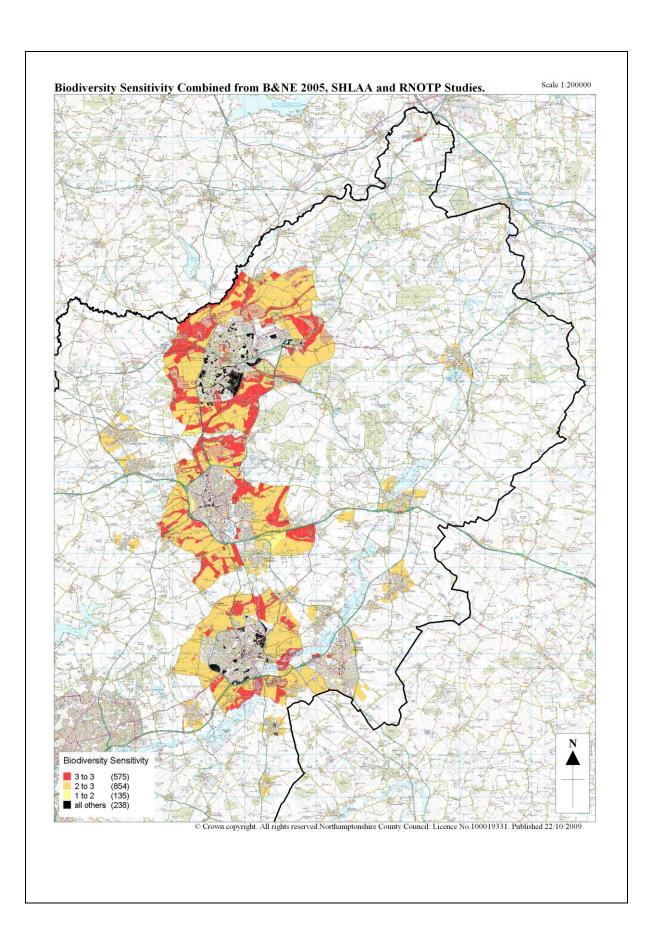
The polygons in the master layer were then shaded by value, and each temporarily shaded map was permanently fixed for each polygon using a MapBasic utility. The shaded output layer for Biodiversity, Heritage, Landscape and Combined Environmental Sensitivity was saved as a separate dataset for further editing.

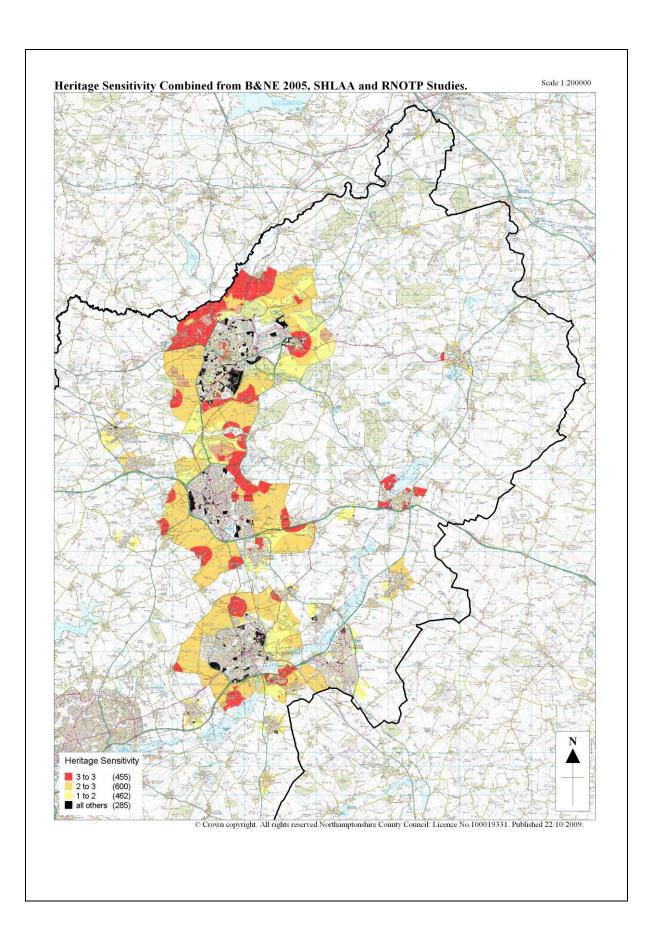
Due to a technical issue with MapInfo's spatial indexing of polygons it is not possible to force the program to sort polygons by their value or shading, and have them reliably drawn in a specified order. This means that if a user was looking at the shaded combined sensitivity map as a single MapInfo dataset, some polygons from the SHLAA study overlay earlier polygons from the 2005 study. If the 2005 polygon has a high value it may therefore be masked by a lower grade polygon from the later SHLAA study.

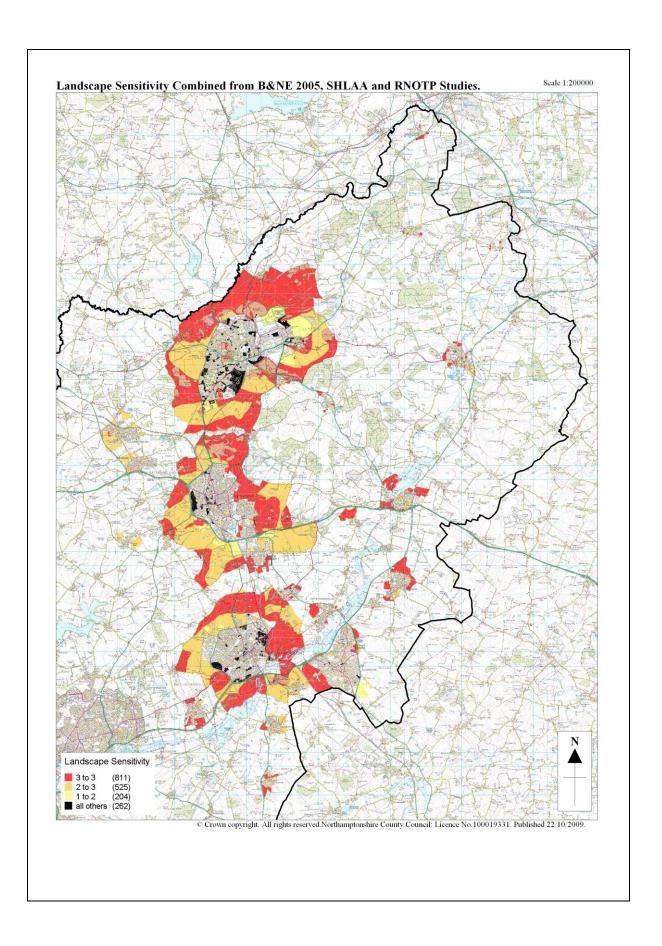
Several attempts were made to work around or fix this issue without success, as it is a long standing issue with MapInfo's own core spatial indexing mechanic. However a successful work-around was eventually achieved and is detailed in Appendix 1.

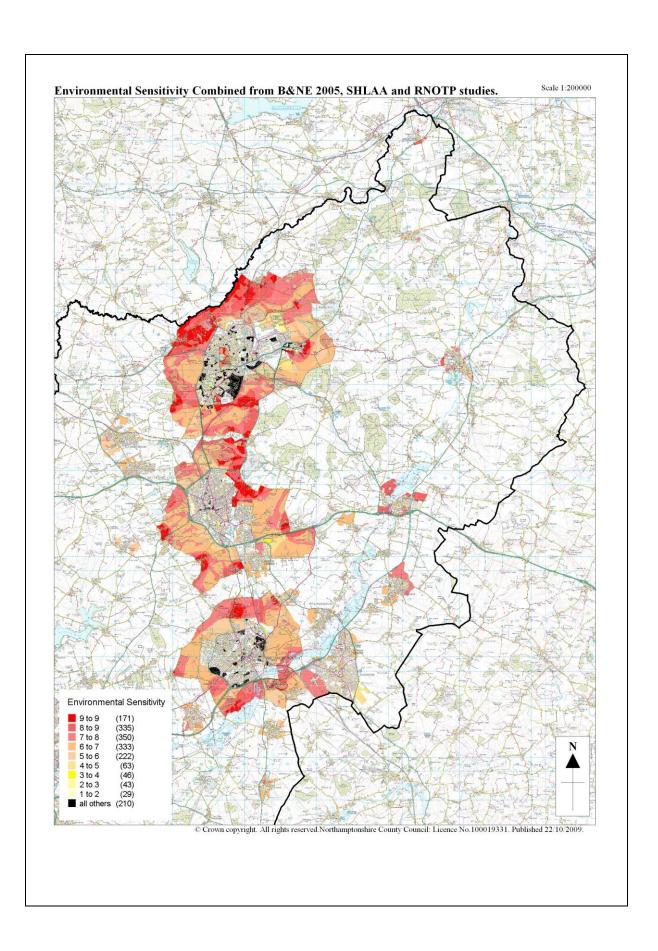
Each subject area was then examined in turn (Biodiversity, Heritage, Landscape and Combined Environmental scores) and the following operations carried out on them:-

- For each subject area each grade was queried and the permanently shaded polygons were extracted into a standalone MapInfo table (e.g. one table each for Biodiversity Grade 0, 1, 2 and 3)
- These tables were arranged lowest to highest in the MapInfo Layer Control dialogue, ensuring the draw order is forced and preserves visually the highest value grades.
- Separate data sets were constructed for each subject area, resulting in 4 graded layers per subject area and 10 layers to reflect the distribution of grades for the combined sensitivity.









7. Critique of the consolidated work to establish whether any improvements could be made for future sensitivity testing

The three studies carried out to date all have common factors, particularly in respect of the presentation of the levels of sensitivity to mixed use development, and to the analysis of the three key elements of the environment; visual landscape, biodiversity and cultural heritage. However, as the table above shows, there are also many differences in the approach to scoring the relative sensitivities of the sites and to the methodologies and the contexts in which the studies were undertaken as well as their underlying datasets.

Environmental Sensitivity study 2005

The 2005 study, which was undertaken by the Built and Natural Environment service of NCC, was the most extensive in that the process was rigorous, academically sound and well documented. This landscape scale study was undertaken to inform decisions about the directions for growth with Sustainable Urban Extensions (SUEs) and focussed on a series of segments, which were common to a number of other parallel assessments, radiating around each of the three major growth settlements of Corby, Kettering and Wellingborough.

The desk top study element was supported by a high degree of ground-truthing, which allowed the assessment to be refined to a much finer level. Although the segments were quite large, the subsequent ground truthing allowed them to be broken down to indicate specific landscape features or areas, whether of visual, ecological or cultural significance, and was supported by both notes against each segment for each of the three landscape elements, including the potential for mitigation. It also included a summary of the landscape features and issues to support each of the three maps for the major growth settlements.

The assessments for each of the segments, which was broken down into the assessments of the three elements of the landscape, were presented in tabular form as part of the NNJPU Sustainability Appraisal of a range of other strategic considerations, such as proximity to services, schools and transport. Using a traffic light system, already reflected in the representation for mapping, the study supported the strategic decision making process for establishing the most appropriate directions for growth and the SUEs.

The study also included a composite map that aggregated the relative sensitivities of the individual sectors and sub-areas, and represented these in increasing levels of colour shading, in red. This gave an easy to understand overview of the areas that were generally the most sensitive to mixed use development in relation to others where the sensitivity was assessed as being of medium of low sensitivity.

The study therefore provides a benchmark against which other approaches may be considered, although other factors such as time and cost should be taken into account.

Subsequent SHLAA 2008 and RNOTP 2009 studies

Although commissioned by separate bodies and using different scoring systems, the two studies above have much in common. Both were part of rapid and largely desk-based assessments that were commissioned as part of wider studies to identify potential future development sites, to accommodate further growth to 2026.

Whilst many of the sites included in the 2008 study were adjacent to or part of the 2005 study, for the most part the sites did not sit within the wider landscape context that was also being assessed. Consequently, the assessments were being undertaken more in isolation than as part of a whole. Whilst this should not affect the scoring of the individual sites, they lack the context and continuity of the wider area based study.

The reasons for this relate to the process for bringing sites forward for consideration, possibly based on land ownership, and to the need to ensure that potential development sites have a spatial relationship to the existing "growth" settlement core, which should ensure that potential sites meet the criteria for sustainable development.

The focus of the studies is on a desk top assessment with selective ground-truthing and verification of digital data. Selected site visits were made to check the currency of aerial photos and professional judgement was used to assist the assessments of visual landscape, biodiversity and cultural heritage features.

The consolidated work, which is presented in map and tabular form, and has a composite map of the relative sensitivities using the original overlaying of individual element sensitivities does not provide the same degree of descriptive dialogue, or indeed analysis; though it has provided a clear visual and numerical means of identifying the most suitable and sustainable potential development sites for the future. As a means of screening out the less suitable sites, the resultant consolidation appears to be an appropriate approach.

However, the process itself is limited in that individual sites are brought forward, either by the planning body or the land owners themselves, and may be driven as much by the hope value of a change of use to development, as to strategy. It is also limited in that a wider range of development scenarios may need to be considered, such as the growth of small towns and service centres as opposed to a policy of dispersal of growth throughout the whole of North Northamptonshire.

This weakness is less about the methodology of the assessment but more about the strategy for identifying appropriate long-term development options. This is discussed further in the following section and the final section on recommendations for testing growth options across North Northamptonshire for the period 2021 - 2031. However, a further weakness of the methodology is that, not only does it not provide a contextual sensitivity analysis, but it does not make positive provision for relating sites to the strategic Green Infrastructure network defined by RNRP and adopted as an integral part of the Core Spatial Strategy.

Potential for improvements to future sensitivity testing

As identified above, the rapid desk-based assessments have their limitations in that they are not necessarily part of a systematic landscape scale appraisal, which places the sites in a clearer context, nor have the same resources been available to invest in the later studies. However, they do have the benefit of being developed from the 2005 study, and use the same overall format, basic methodology and levels of sensitivity. In this respect, whilst the time spent on survey work and the context of the studies has subsequently been reduced, the core content of the site assessments themselves remains broadly compatible and provides a clear and objective evidence base.

Areas for improvement include the process of the selection of sites, which may be determined by the process for identifying Housing Land Allocation, as well as the adoption of a standardised approach to the scoring of the individual sites for their relative sensitivity. As indicated above, it is recommended that negative scores are assigned, increasing in quantity in relation to the increasing levels of sensitivity assessed.

Further improvements to the value of the studies could be achieved through the weighting of these scores in relation to the positive scores given to drivers that would contribute to sustainable development. This would reduce the potential for sensitive sites being scored highly overall, due to the larger number of positive drivers that are included in the wider studies. Also, as suggested above, the opportunity should be taken to consider how potential sites should contribute to a strategic GI network.

8. Recommendations for the approach to be taken to testing of growth options across North Northamptonshire for the period 2021 – 2031

There are two broad levels of study that could be delivered to meet the requirements for testing growth options. The first is to make basic provision for the testing of sites put forward through the core strategy review process, although this may result in an ad hoc approach to landscape survey unless the study areas are wider and therefore, more strategic. The methodology in either case would be as described above using a negative scoring system, weighted appropriately to counter the tendency of bias as a result of the greater number of availability and achievability criteria.

A refinement of this process would be to provide an indication of how the sites related to the established Green Infrastructure network of strategic and local GI corridors, either by simply overlaying the corridors on the map, or by highlighting features or areas of importance that would contribute to the network.

The second, and preferred approach, would be to undertake a systematic review of potential growth settlements and to carry out a combined landscape sensitivity analysis and Green Infrastructure study, adopting the methodology used in West Northamptonshire derived from the Daventry Infrastructure Study and already undertaken for Northampton, Towcester and Brackley. These are primarily environmental assessments and take into account a wide range of objective data fields such as landform, hydrology, floodplain and nature conservation, as well as the key Sustainable Movement, Biodiversity and Green Infrastructure networks. These are supported by analyses of sensitivity and lead to composite landscape sensitivity and green infrastructure maps that can be used to inform the decision making process at a strategic and local level.

These would provide an enduring robust and objective evidence base and provide a meaningful context within which potential development sites, including Sustainable Urban Extensions (SUEs), could be identified. In the case of Corby, Kettering and Wellingborough, the existing 2005 studies could be upgraded, and potentially extended to include the core urban areas where data is available, and complete landscape sensitivity studies carried out for potential growth settlements in smaller towns (this includes Burton Latimer,Rothwell, Desborough, Rushden, Higham Ferrers, Irthlingborough, Raunds, Thrapston and Oundle) and larger villages such as Kings Cliffe.

Where areas of low landscape sensitivity were identified, these would provide the most logical areas for further investigation for potential sites.

References

The Northampton Landscape Assessment and Green Infrastructure study is available at: http://www.westnorthamptonshirejpu.org/Documents/EvidenceBase/NorthamptonLandscape SensitivityandGIStudy/tabid/104/Default.aspx

The RNOTP and SHLAA document suites are available at: http://www.east-northamptonshire.gov.uk/pp/silver/viewsilver.asp?id=2647

Appendix 1 – GIS Guide for Users

Each themed group of layers has a MapInfo TAB file created for that group and named "Ordered<Subject><Grade>".TAB, which if opened into an active Map window in MapInfo will open all the relevant graded layers for that subject area, and add them into the current active map window in the correct order.

This automates the process, making it simpler for end users, and forces the draw order of the polygons of each grade ensuring that the highest graded polygons always appear on top, whatever the subject area being examined.

This is an effective work around for a non-trivial issue with the commercial GIS package; however it does come with its own small caveats.

- 1. The "Ordered<Subject><Grade>" file used to differentiate the subject must be used at all times to ensure users get the right data, and that it is correctly displayed.
- 2. Users are warned that this file will cause an error message in MapInfo, and no application or window will open if it is opened before a map window is active.
- 3. It will also likewise not open the MapInfo application by double clicking from a Directory in Windows.

Once these issues are acknowledged and the reasons for them understood the system works well, and should lead to users making consistent planning based decisions from the same data every time.

For clarity users with MapInfo 10 or above may get better results by making the vector polygon layers transparent to some value as this allows the map base to be viewed through the solid shading. Alternatively in earlier versions of MapInfo, 1:10000 or 1:50000 mapping can be made transparent and placed at the top of Layer Control.



RIVER NENE REGIONAL PARK COMMUNITY INTEREST COMPANY

c/o Northamptonshire County Council

PO Box 221, First Floor . John Dryden House . 8-10 The Lakes . Northampton . NN4 7DE

T: 01604 237648 F: 01604 236696 W: WWW.RIVERNENEREGIONALPARK.ORG

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