



West Lothian
Council



Scottish Natural Heritage
Dualchas Nàdair na h-Alba

All of nature for all of Scotland
Nàdar air fad airson Alba air fad

West Lothian Council and Scottish Natural Heritage

**LANDSCAPE CAPACITY STUDY
FOR
WIND ENERGY DEVELOPMENT
IN
WEST LoTHIAN**

TECHNICAL REPORT

David Tyldesley and Associates
Hudson House
8 Albany Street
Edinburgh
EH1 3QB

0115 9680092
dta@dt-a.co.uk

DTA Ref. 1797: Consultative Draft, Final December 2011



DAVID TYLDESLEY AND ASSOCIATES
PLANNING, LANDSCAPE AND ENVIRONMENTAL CONSULTANTS

[Page left blank]

CONTENTS

Page

	NON-TECHNICAL EXECUTIVE SUMMARY [including flow diagram of the process followed].....	i
1	INTRODUCTION	1
	The Purpose of and Background to the Study	1
	Key Stages	2
	The Study Area.....	4
	Format of the Report	5
2	METHODOLOGY	7
	Assessment of Landscape Sensitivity.....	9
	Assessment of Visual Sensitivity	11
3	WIND ENERGY TYPOLOGIES	15
	<u>STAGE 1: REVIEW OF THE LOTHIAN LANDSCAPE CHARACTER ASSESSMENT, 1998</u>	
4	DEFINING THE LANDSCAPE UNITS	17
	Review of The Lothians Landscape Character Assessment, 1998	17
	Principles for Defining Landscape Units	17
	Identification of Landscape Character Types and Landscape Units	18
	<u>STAGE 2: LANDSCAPE CAPACITY STUDY FOR WIND ENERGY DEVELOPMENT IN WEST LOTHIAN</u>	
5	LANDSCAPE SENSITIVITY ASSESSMENT	21
	Landscape Character.....	21
	Landmark Landscape Features	24
6	VISUAL SENSITIVITY ASSESSMENT	27
	Principal Tourist and Amenity Routes.....	27
	Important Viewpoints.....	28
7	LANDSCAPE CAPACITY FOR WIND ENERGY DEVELOPMENT IN WEST LOTHIAN	31
	Introduction	31
	Key Landscape Characteristics	32
	The Scale of Wind Energy Development that may be Accommodated.....	33
	The ‘Baseline’ Landscape including Existing Wind Energy Developments	34
	Cumulative Effects	35
	Landscape Objectives with Reference to Key Thresholds for Landscape Protection, Accommodation or Change	36
	Effects on Sense of Distance and Skylining.....	37
	Effects on Other Landscape / Townscape Interests	37
	Locations with Potential for Wind Energy Development in West Lothian	38
8	GUIDANCE FOR DEVELOPMENT MANAGEMENT OF WIND ENERGY PROPOSALS	41

	Page
GLOSSARY & ACRONYMS used in the Study	51
 APPENDICES	 55
Appendix 1: Landscape Character Classification Descriptions.....	55
Appendix 2: Wind Energy Developments In and Adjacent to West Lothian	85
Appendix 3: Bibliography	87
 FIGURES	 89
Figure 1: Landscape Character Types	91
Figure 2: Landscape Sensitivity to Wind Energy Development	93
Figure 3: Sensitivity of Landmark Landscape Features and Important Viewpoints	95
Figure 4: Principal Routes	97
Figure 5: Locations with Potential for Wind Energy Development in West Lothian	99
Figure 6: Existing Wind Farms and Potential Areas for Wind Energy Development	101
 LIST OF TABLES	
Table A: Step 1 – Identifying Landscape Units of the Highest Sensitivity	10
Table B: Step 2 - Assessing Sensitivity of all other Landscape Units	10
Table C: West Lothian Landscape Classification	18
Table D: Landscape Character Sensitivity to Wind Energy Development in West Lothian	21
Table E: Key Landscape Characteristics and their General Influence on Wind Energy Capacity.....	32
Table F: Locations with Potential for Wind Energy Development in West Lothian	39

NON-TECHNICAL EXECUTIVE SUMMARY

Introduction

This study is a regional-scale, broad strategic study to assist West Lothian Council in the preparation of policy guidance on how to accommodate future wind energy developments, in accordance with *Scottish Planning Policy (SPP)*, 2010. This requires the council to set out in the development plan a policy and map for onshore wind farms of over 20 megawatts (MW) generating capacity, and wind energy developments of less than 20MW if considered appropriate.

In accordance with SPP, and more recent Scottish Government advice on renewable energy published in 2011, this study uses the landscape character approach as a basis for enabling appropriate wind energy development whilst maintaining and enhancing West Lothian's local landscape character (landscape character refers to the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, that is, what makes one area 'different' or 'distinct' from another) and visual amenity (the views that people enjoy). In so doing the study assists the council in considering the location of turbines to ensure that landscape and visual amenity (the views that people enjoy) is minimised. Thus the study will provide only one 'layer' of information, as part of the council's strategic planning framework, and the report should *not* be used in isolation *nor* to 'test' proposed wind farm developments. It does not take into account landscape designations such as AGLV (Areas of Great Landscape Value) – these and other local and national concerns are considered by the council in other parts of the work that will build up the whole policy.

Methodology

A flow diagram is provided at the end of this non-technical summary to illustrate the process followed. It has been undertaken in two separate but interdependent stages: **Stage 1**, which commenced in January 2011, is the review of The Lothians Landscape Character Assessment, 1998. The findings of Stage 1 are presented at Appendix 1 in this report, the landscape character classification descriptions, and in Figure 1 which shows the new landscape character types (referring to landscapes which possess broadly similar combinations of characteristics).

Stage 2 is the landscape capacity study for wind energy development in West Lothian, which commenced in April 2011. This stage follows 6 steps to assess the sensitivity of the landscape (that is the extent to which each character area defined in Stage 1 is vulnerable to change from a range of different wind energy types as described below), visual sensitivity (that is the extent to which views from important viewpoints and routes are vulnerable to changes in the appearance of the landscape) and the capacity of each area (that is the degree to which new wind development could occur in an area without significantly affecting its character). The capacity study includes the assessment of cumulative landscape and visual effects, which consider the combined effects that may occur as a result of more than one development, giving rise to changes in the character and the appearance of an area.

A steering group comprising members of West Lothian Council and officers from Scottish Natural Heritage met with the consultants on a regular basis throughout each stage of the study.

Wind energy types

An important part of the study was to establish the types of wind energy developments in excess of 20MW and below 20MW output which are likely to be proposed in West Lothian, to enable the provision of meaningful guidance. The study considers a range of possibilities as follows:

<u>Turbine Groups</u>		<u>Turbine Heights</u>
Single Turbine:	1 turbine	51-80m approximately
Small Wind Farm:	2-7 turbines	81-100m approximately
Medium Wind Farm:	8-20 turbines	101-130m+ approximately
Large Wind Farm:	21+ turbines	
Extensions to existing wind farms		

This enables the study to consider a range of different scales of wind energy, from a single turbine to a small wind farm of 2-7 turbines between 51-80m high, or a small wind farm of 2-7 larger turbines between 101-130m or more in height. The study also takes into account existing wind developments within and adjacent to West Lothian at August 2011, which are shown in a table at Appendix 2.

Guidance on siting and design aspects of proposals for smaller wind turbines less than 50m high is provided by Scottish Natural Heritage and is not considered in this report.

The study area

The study area includes the whole of the West Lothian Council area. It addresses wind energy issues beyond the main settlement boundaries as shown in the Local Plan, with smaller settlements included where they exhibit a stronger countryside character, rather than urban character. Account is also taken of relevant issues within neighbouring council areas, in particular landscape character assessments and capacity studies for wind development, where they have been carried out.

Understanding the terms used in the study

A glossary of key terms used in the context of this study, and acronyms used in the report, follows Section 8 at the end of the main report and before the appendices.

The Outcome of Stage 1 of the Study

Table C and Figure 1 show the revised West Lothian landscape classification. 9 Landscape Character Types (LCT) have been identified (there are 6 LCTs in the current LLCA) and 23 smaller landscape units (there are 7 landscape units). It is important to note that the boundaries of landscape types and units shown in Figure 1 are not precisely drawn. Landscape character rarely changes abruptly, and detailed assessment will be required in order to define precise boundaries.

The Findings of Stage 2 of the Study

Six steps were followed in sequence in Stage 2. **Step 1** defines any landscape units, or parts of them, which are 'Areas of the Highest Sensitivity' (AHS), where wind energy development, and indeed any other large scale, uncharacteristic form of built development, would be inappropriate and therefore require significant protection.

Step 2 was the application of another four criteria to the rest of the West Lothian area to enable the definition of areas of higher, medium and lower sensitivity to all wind energy development. 5 landscape units are assessed as being of High sensitivity and are colour coded pink in Figure 2. All of the remaining 14 landscape units are assessed as being of Medium sensitivity, colour coded orange in Figure 2, where there is the potential to accommodate wind energy development in terms of landscape character.

In order to assess the overall capacity of these areas they are subject to further landscape character assessment of impact on landmark landscape features in **Step 3** (2 have been identified, Linlithgow Loch, Royal Palace and Peel (its park) and St. Michael's Church, including Airngath Hill considered

important to the setting, and The Pentland Hill uplands and an area at the foot of the hills considered to be important to their setting).

Step 4 of the methodology is the identification and mapping of principal sensitive routes. The steering group identified 14 routes from where there are attractive views in and around West Lothian, particularly towards the Pentland Hills, the Bathgate Hills and across the Firth of Forth, which should generally be protected from the cumulative effects of wind development without imposing unreasonable constraints. In this step consideration was also given to the core path network in West Lothian being prepared by the council, including long distance footpath and cycle routes, national cycle routes, bridleways, rail paths, and river and canal towpaths. All these roads and other routes are shown in Figure 4. Views from them are included in the consideration of cumulative effects which is discussed in Section 7 of this report.

Step 5 involved the identification of 9 viewpoints considered to be important as either a major destinations or as being representative of the best distinctive scenery in West Lothian. Figure 3 shows the nine viewpoints and their visual cones / compartments used in this study, representing the important setting of the viewpoint where wind energy development would be inappropriate.

Broad Zones with Potential for Wind Energy Development in West Lothian

Table F in this report summarises the findings of **Step 6**, showing the capacity assessment of those parts of the landscape units which lie within strategic zones potentially suitable for wind energy development, following the broad sequential assessment of landscape and visual sensitivity. These strategic zones are shown in Figure 5. **It is important to recognise that the capacity assessment refers only to parts of the landscape units and not to the entire unit.**

As a result of the step-by-step capacity assessment summarised here, 12 landscape units (or rather **parts of 12 landscape units**) lie within strategic, broad zones with the potential capacity to accommodate wind energy development. Further assessment of landscape sensitivity, cumulative effects and views from principal sensitive routes shows that there is no capacity within two of these, namely landscape unit 3(i) *Bathgate Hills*, an Area of High Sensitivity where the objective should be landscape protection; and landscape unit 7(ii) *Almond Valley*, an area of High sensitivity with landscape constraints requiring protection. One area is assessed as having low capacity to accommodate wind energy, namely landscape unit 2(iii) *Harburn / Hartwood Fringe*, an area of High sensitivity overall where in general landscape characteristics should be protected.

Parts of the remaining 9 landscape units are all assessed as Medium sensitivity where some wind energy development could be acceptable. Landscape accommodation is considered the most appropriate objective (rather than landscape protection or landscape change) since there may be some important landscape-related constraints in terms of the siting and scale of wind energy development, but suitably designed wind energy developments which generally fit within the landscape could potentially be accommodated even though they may have an impact on the landscape locally. These 9 areas with potential for wind energy development are shown in Figure 6 together with the location of existing installed or approved wind farms in and adjacent to West Lothian.

Broad zones with the potential capacity to accommodate wind energy development are:

- The modern technological, well designed character of some of West Lothian's business parks and campuses could make them suitable locations for the siting of wind turbines. Potential locations might be within the Houstoun Industrial Estate northeast of Livingston, Starlaw Business Park and Deans Industrial Estate west of Livingston, The Pyramids Business Park to

the east of Bathgate, Junction 4 on the M8 close to the Whitehill Industrial Estate, and within the East Mains Industrial Estate to the east of Broxburn.

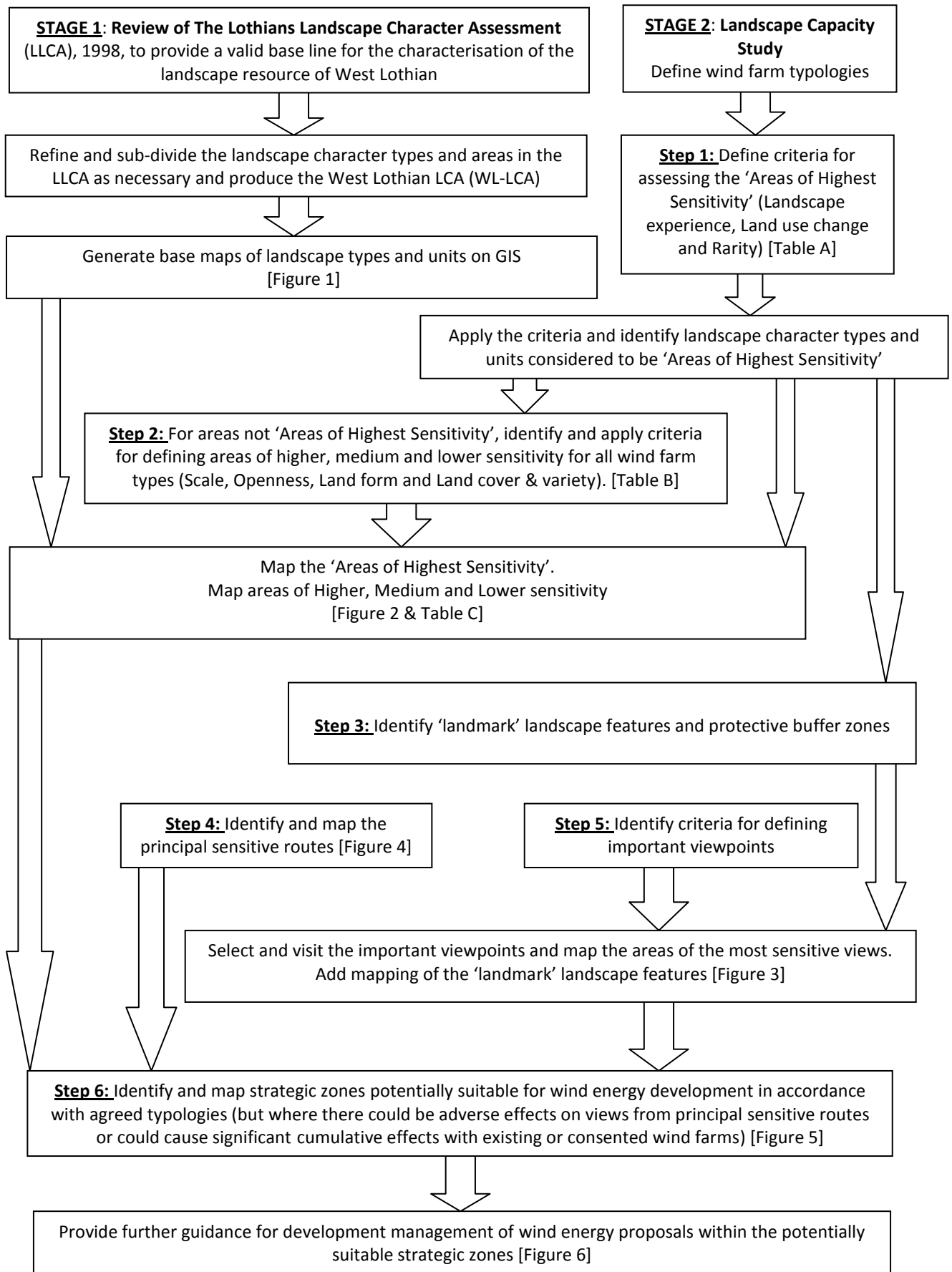
- If the approved development at Tormywheel did not become operational there would be more capacity for a medium wind farm of possibly 8-12 turbines @101-125m approximately, possibly located somewhere within the Woodmuir Plantation subject to other environmental and non-environmental considerations. There could also be capacity for a small extension of the Pates Hill wind farm with turbines 107m tall to match existing. This would provide three clusters of wind farms within established forestry, i.e. Blacklaw in the Gladsmuir Hills, a new wind farm within Woodmuir Plantation, and Pates Hill wind farm within forestry at Pates Hill, with more appropriate spacing between them. The spaces between the clusters could be identified as an essential element of the Council's spatial framework, requiring significant protection from wind energy development. At Leven Seat this could be a further catalyst for restoration and environmental enhancement once existing quarrying and tipping has ceased.
- There may be the capacity for some small scale wind energy development in the *Almond Valley* landscape unit 4(i). Development should be restricted to single or small numbers of turbines and a height at the lower end of the 51-80m typology or more likely below 50m tall.
- It may be possible to locate a small wind farm with turbines approximately 100m tall within the Fauldhouse Hills area of landscape unit 5(i) *Polkemmet Moor* within the Lowland Plateaux LCT, subject to detailed assessment of all material considerations (for example issues of noise and shadow flicker on nearby sensitive receptors, in particular dwellings in Fauldhouse).
- Small turbines below 50m in height may be acceptable if carefully located close to agricultural or other buildings of similar scale in a very small part of landscape unit 6(i) *Kirknewton Plain*, in 2 areas of landscape unit 6(ii) *East Calder / Livingston / Broxburn Plain*, and within the northern half of landscape unit 6(iii) *Winchburgh / Niddry Plain*.

The potential areas of search for wind turbine locations summarised above have been identified following a broad assessment of landscape and visual sensitivity and capacity only. Further, more detailed technical assessment of each wind energy proposal within these areas will be required to enable consideration of all likely landscape and visual effects. Localised constraints including non-landscape and visual issues, such as noise and shadow flicker, are likely to significantly limit areas suitable for wind energy development in West Lothian.

All proposals should comply with the principles set out in SNH guidance and all should be subject to detailed landscape and visual impact assessment including cumulative impacts.

All proposals should provide detailed analysis to demonstrate to the Council's satisfaction that there would not be significant adverse cumulative impacts on any of the principal sensitive routes.

Flow Diagram of the Process Followed in the Landscape Capacity Study for Wind Turbines



[Page left blank]

1 INTRODUCTION

The Purpose of and Background to the Study

1-1 The purpose of the study is to advise West Lothian Council (WLC) on the best strategic approach for accommodating future wind energy developments within the context of West Lothian's landscape and settlement pattern. Key requirements of the study are transparency, clarity and relative simplicity.

1-2 The West Lothian Local Plan (WLLP, adopted January 2009) sets the pattern of development for the area to 2015 and beyond. The WLLP includes sections and policies on landscape and renewable energy. Adopted Local Plan policy NWR 20 states the current position on renewables: *"the council supports the development of renewable energy schemes provided that the schemes are environmentally acceptable and the criteria set out in this Local Plan can be met."* This landscape capacity study for wind energy development will underpin the council's interim planning guidance, and subsequent policy inclusion in the emerging Local Development Plan, which will guide wind energy development to appropriate locations and protect natural and built assets.

1-3 This study responds to Scottish Government policy on renewable energy set out in Scottish Planning Policy¹ (SPP) paras 182 – 186 which includes support for the development of a diverse range of renewable energy technologies, including spatial guidance for wind farms. SPP (para 189) requires planning authorities to set out in the development plan a spatial framework for onshore wind farms of over 20 megawatts (MW) generating capacity. Authorities may incorporate wind farms of less than 20MW in their spatial framework if considered appropriate. All proposals are required to be assessed against comprehensive criteria-based policies to provide clarity on the issues that must be addressed to enable development to take place.

1-4 Planning Advice Note (PAN) 45 *Renewable Energy Technologies*² and Annex 2 *Spatial Frameworks and Supplementary Planning Guidance for Wind Farms*³ were replaced in February 2011 with web-based renewable advice on 'Onshore wind turbines'⁴ and 'Process for preparing spatial frameworks for wind farms'.⁵ This latest advice recognises that since PAN 45 was published in 2002, the number of onshore wind farms and the scale of individual onshore wind turbines has grown substantially. The latest trends indicate that feed-in-tariffs are driving applications for groups of wind turbines and single wind turbines below 5MW. Planning authorities are also more frequently having to consider turbines within lower-lying more populated areas, where design elements and cumulative impacts need to be managed.

1-5 There is an increasing level of interest in West Lothian from developers of projects under 20MW – in particular small and medium scale of projects. Applications for single turbines in the 70-80m height range are becoming more common.

¹ The Scottish Government (February 2010); *Scottish Planning Policy*; <http://www.scotland.gov.uk/Publications/2010/02/03132605/0>

² The Scottish Executive Development Department (Revised 2002); *Planning Advice Note 45 Renewable Energy Technologies*; <http://openscotland.net/Publications/2002/02/pan45/pan-45>

³ The Scottish Government (November 2008); *Planning Advice Note 45. Annex 2: Spatial Frameworks and Supplementary Guidance for Wind Farms*; <http://openscotland.net/Publications/2008/11/12125039/0>

⁴ The Scottish Government (February 2011); *Onshore wind turbines*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore>

⁵ The Scottish Government (February 2011); *Process for preparing spatial frameworks for wind farms*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/spatialframework>

1-6 Scottish Planning Policy ¹ justifies using the landscape character approach as a basis for facilitating positive change whilst maintaining and enhancing distinctive character: “Different landscapes will have a different capacity to accommodate new development, and the siting and design of development should be informed by local landscape character.” (para 127). The Renewable Energy subject policy in SPP justifies using the landscape character approach as a basis for this work: “*The design and location of any wind farm development should reflect the scale and character of the landscape. The location of turbines should be considered carefully to ensure that the landscape and visual impact is minimised.*” (para. 187)

Key Stages

1-7 In order to meet the requirements of Scottish Planning Policy on renewable energy, this landscape capacity study for wind energy development has been undertaken in two separate but interdependent stages:

Stage 1: Review of The Lothians Landscape Character Assessment, 1998⁶

1-8 The Lothians Landscape Character Assessment (LLCA), 1998, is a general, broad assessment carried out at 1:50,000 scale, nearly fifteen years ago. Whilst remaining a valid baseline resource, a more up-to-date and fit-for-purpose West Lothian Landscape Character Assessment (WL-LCA) is required. Thus a detailed and descriptive exercise was undertaken at 1:25,000 scale to record consistently all the landscape characteristics that may influence the capacity of any landscape character type within West Lothian to accommodate wind energy developments, of various types. This stage of the study is described in more detail in Section 4.

1-9 As well as providing the primary baseline for the landscape capacity study for wind energy development, it is envisaged that the WL-LCA will be used by WLC for other future landscape-related decisions including but not restricted to:

- Assessment of planning applications and development management decisions
- Landscape planning policies and guidance
- Development plan decision making processes including the future West Lothian - Local Development Plan
- Local Landscape Designations review.

Stage 2: Landscape Capacity Study for Wind Energy Development in West Lothian

1-10 The WL-LCA is used as the basis for defining the sensitivity of landscape units within West Lothian to potential changes brought about by a range of large, medium and smaller wind energy proposals. The study assesses the capacity for wind energy developments both greater than 20MW output and below 20MW, within the West Lothian landscape, using a landscape character approach. The range of typologies appropriate to the West Lothian area was agreed with the Steering Group. Section 3 describes the wind farm typologies adopted for this study.

1-11 The landscape capacity study for wind energy development is limited to landscape character and visual amenity issues only. In this way it provides only one ‘layer’ of information to inform the council’s spatial planning framework. No account is taken of landscape ‘evaluation’ which is a different process to that of assessing the sensitivity of landscape character. The study does not take account of nationally or locally designated landscapes, in accordance with published guidance from

⁶ Ash Consulting Group, (1998); *The Lothians Landscape Character Assessment*, Scottish Natural Heritage Review No. 91; <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=322>

SNH following a review of capacity studies⁷ and the study brief. Nor does the study take account of other natural and built heritage considerations, except in so far as they influence landscape character and visual amenity and it does not take account of technical factors such as wind speed, grid capacity or aviation constraints.

1-12 The capacity study is a regional-scale, strategic study which identifies potential areas of search for wind turbine locations following a broad assessment of landscape and visual sensitivity and capacity only. Further, more detailed technical assessment of each wind energy proposal within these areas will be required to enable consideration of all likely landscape and visual effects. Localised constraints including non-landscape and visual issues, such as noise and shadow flicker, are likely to significantly limit areas suitable for wind energy development in West Lothian.

1-13 Section 2 describes the methodology used in the study following discussions with the Steering Group. This involved a step-wise application of criteria adopted for assessing landscape sensitivity of different landscape character types to accommodate the different wind energy typologies. Step 1 defines any landscape character units, or parts of them, which are 'Areas of the Highest Sensitivity' (AHS), where wind energy development, and indeed any other large scale, uncharacteristic form of built development, would be inappropriate and therefore require significant protection. Step 2 uses different landscape criteria to indicate those areas, other than those areas defined in step 1 as AHS, which if exhibiting all or the majority of the criteria specified could feed into the selection of the broad areas of search, where proposals are likely to be supported, subject to satisfactorily addressing all other material technical considerations. These are defined as areas of either Lower, Medium or Higher sensitivity.

1-14 A selection of landmark landscape features were identified in step 3, which were considered to be of more than local importance in West Lothian, and which ought not to be affected by the construction of wind farms (or indeed any other large scale form of built development) in ways that would alter their landmark qualities. These were discussed with the Steering Group and a final list of two were agreed together with an appropriate 'envelope' defining the area considered important to the setting of the feature and thus requiring significant protection from wind energy development (or any other large scale, uncharacteristic form of built development). This is discussed in more detail in Section 5.

1-15 For the assessment of effects of wind energy developments on visual amenity, which is the enjoyment of views by people, a variety of different methods have been tried by consultants in the past which have their own strengths and weaknesses. There is no recognised single appropriate method, and some of the methods adopted elsewhere would be beyond the resources of the council, especially bearing in mind the diversity of the area to be covered. Consequently, following agreement with the Steering Group, we adopted a tried and tested visual assessment methodology used recently to inform planning for wind energy in Perth & Kinross⁸, with some significant adaptations to make the study appropriate to West Lothian. This involved as Step 4 the identification of principal sensitive routes and strategic, visually important corridors, and in Step 5 the definition of visual compartments related to important views / viewpoints which were agreed with the Steering Group following initial identification and refining by testing in the field.

1-16 Step 6 brings the previous steps together to identify and map broad strategic zones with the potential capacity for wind energy development in accordance with the agreed typologies. A

⁷ Grant, A. in association with Clark, P. and Lynch, S. (2010); *Landscape capacity studies in Scotland – a review and guide to good practice*; Scottish Natural Heritage Commissioned Report No. 385; http://www.snh.org.uk/pdfs/publications/commissioned_reports/385.pdf

⁸ David Tyldesley and Associates (Nov. 2010); *Landscape Study to Inform Planning for Wind Energy*, Final Report; unpublished report to Perth & Kinross Council

combination of desk study and field validation was used in Stage 2 in assessing landscape and visual sensitivity and capacity for wind energy development. This stage of the study is described in more detail in Sections 5 and 6.

The Study Area

1-17 This West Lothian landscape capacity study for wind energy development covers the entire West Lothian area. Account is also taken of relevant issues within neighbouring council areas, in particular landscape character assessments and capacity studies for wind development, where they have been carried out (see Section 2). A full list of the documents which have informed this study is given in Appendix 3.

1-18 Whilst taking broad settlement issues into account, in particular pattern and setting, the study addresses renewable energy issues outwith the main settlement boundaries as shown in the Local Plan. Smaller settlements are 'washed over' and included within the assessment of landscape character types where they exhibit a stronger countryside rather than urban character. The Council envisages that liaison and networking with neighbouring authorities will continue to address limits and thresholds for wind turbines within settlement envelopes, and in due course other renewable energy mechanisms and issues.

1-19 Whilst the study takes account of coastal and seascape issues in so far as they are relevant to the assessment of landscape character and sensitivity of the short coastal section of West Lothian along the Firth of Forth, between Blackness and west of Queensferry, offshore wind energy developments are outwith the remit of the capacity study.

1-20 The brief for the capacity study included the need to consider existing and proposed wind energy projects beyond the West Lothian council boundary, focusing on those projects which are likely to be most relevant to the study. There is now a wealth of policy and guidance on the assessment of cumulative effects of wind farm development. PAN 45 (revised 2002)² advised that the cumulative impact of a number of neighbouring developments may be a relevant consideration in assessing the impact of wind energy development. Figure 7 within para 78 of PAN 45 (revised 2002)² gave a general guide to the effect which distance has on the perception of a wind farm in an open landscape, referring to a distance of up to 30km where a wind farm would be seen in very clear visibility as a minor element in the landscape. SNH guidance in 2005⁹ advises that within a cumulative landscape and visual impact assessment, the zone of visual influence (ZVI) analysis is normally undertaken out to 30km from a wind farm (para 43).

1-21 The February 2011 web-based renewable advice on 'Onshore wind turbines'⁴, replacing PAN 45 and Annex 2³, dispenses with guidance on the effect which distance has on the perception of a wind farm by simply stating that *"In considering wind farm visibility it should be noted that in some locations and clear weather, turbines may be visible over long distances, though this will depend on elevation, the angle of the sun and other factors."*

1-22 In accordance with the brief and current guidance, we have taken into account relevant existing and proposed wind energy projects to define a study area up to a distance of 10km beyond the West Lothian council boundary. The basis for this extended study area beyond West Lothian is defined as the distance where it is considered there is the potential for significant visual impact of wind turbines up to approximately 130m high to blade tip, whether located within West Lothian or the adjacent authorities of Falkirk, North Lanarkshire, South Lanarkshire, Scottish Borders, Midlothian or the City of Edinburgh. It is noted that the study area within the recent Landscape

⁹ Scottish Natural Heritage (2005); *Cumulative Effect of Windfarms*; <http://www.snh.gov.uk/docs/A305440.pdf>

Capacity Study for Wind Turbine Development in East Lothian¹⁰ similarly extends 10km beyond the East Lothian council area on the same basis.

1-23 The table in Appendix 2 includes examples of wind energy developments (including turbines installed, approved, applications under consideration or where there are known pre-application scoping / screening considerations) extending 10km into neighbouring districts, as at August 2011. Figure 6 shows the location of existing and approved wind farms within the study area.

Format of the Report

1-24 After this introductory section, Section 2 describes the detailed methodology, which follows a staged approach as described above. Section 3 explains the wind energy typologies considered in this strategic study. Stage 1 of the methodology, the review of The Lothians Landscape Character Assessment, 1998, and classification and description of revised landscape units, is described in Section 4. Sections 5, 6 and 7 in the report comprise Stage 2 of the method, describing the landscape sensitivity assessment (Section 5), visual sensitivity assessment (Section 6) and conclusions on the capacity for wind energy development in West Lothian (Section 7). In Section 8 we provide guidance at the strategic level on the overall suitability, scale, location and design of the four turbine groupings and the three turbine heights considered in the study (as defined in Section 3).

1-25 A glossary of key terms used in the context of this study, and acronyms used in the report follows Section 8.

1-26 Appendices follow the glossary. Descriptions of the revised landscape character units following the review of The Lothians Landscape Character Assessment, 1998, can be found in Appendix 1.

1-27 A table of the details of wind energy developments in and adjacent to West Lothian which have been taken into account in this study, showing the number of turbines, height of turbine to blade tip, and the Megawatt output of each wind farm, is given in Appendix 2.

1-28 A bibliography of all the reports and studies considered during the preparation of this report is given in Appendix 3.

1-29 Figures (drawings) to illustrate the findings of the study are provided towards the back of the report, after the Appendices. All figures have been prepared using Geographic Information System (GIS) computer mapping in MapInfo Professional (Version 10) format.

¹⁰ Carol Anderson & Alison Grant (May 2005); *Landscape Capacity Study for Wind Turbine Development in East Lothian*, Final Report; http://www.eastlothian.gov.uk/downloads/Final_Report_May_05.pdf

[Page left blank]

2 METHODOLOGY

2-1 The method is consistent with the approach suggested in MacRoberts LLP and Enviros Consulting Ltd. (2008 – 2009)¹¹. It has been developed following discussions with the project Steering Group, a detailed analysis of previous landscape studies (see Appendix 3: Bibliography), and a careful examination of the SNH review of landscape capacity studies in Scotland and guide to good practice, 2010⁷.

2-2 It follows similar methodology used in a recently completed landscape study to inform planning for wind energy in Perth & Kinross¹², adapted for use in West Lothian. Prior to its use within that study, extensive consultation was undertaken in July 2010 with key stakeholders including landscape consultancies with a known interest in wind energy proposals in Scotland; the Landscape Institute; the National Parks; adjacent local authorities; and the John Muir Trust. Constructive responses to this consultation influenced the final adopted methodology, although this further evolved as a result of testing in the field. In particular, the criteria for identifying landscape units of the highest sensitivity (see Step 1 and Table A below) was developed following consultation on the draft methodology proposed in the Perth & Kinross wind energy study.

2-3 As described in paragraph 1-7, this study has been undertaken in two separate but interdependent stages; Stage 1 review of The Lothians Landscape Character Assessment, 1998; and Stage 2 the landscape capacity study for wind energy development in West Lothian. A flow diagram in the non-technical executive summary towards the front of the report illustrates the process followed.

Stage 1: Review of The Lothians Landscape Character Assessment, 1998¹³

2-4 The Lothians Landscape Character Assessment (LLCA), 1998, is one of the more general LCAs completed as part of Scotland's national programme of landscape character assessment. It was undertaken at a broad 1:50,000 scale covering the whole of the East Lothian, Midlothian, Edinburgh (excluding the City of Edinburgh urban area) and West Lothian areas. It records only six landscape character types (LCT) within West Lothian, and only one of these is sub-divided into a smaller landscape character area. It is evident from the LLCA that there is no distinction drawn between different parts of landscape character areas in the same landscape character type, despite their large geographic extent.

2-5 Whilst remaining a valid baseline resource, a more detailed and descriptive exercise was considered necessary to record consistently all the landscape characteristics that may influence the capacity of any landscape character type within West Lothian to accommodate wind energy developments, of various types (as discussed in the following paragraph). Furthermore, guidance on managing landscape change by wind energy development in the LLCA is very general and dated, referring to outdated Scottish Government guidance. The review of the LLCA follows recognised

¹¹ MacRoberts LLP and Enviros Consulting Ltd. (2008 – 2009); *SPP6 Supplementary Planning Guidance for Wind Farms*; www.spgadvice.co.uk; including *Landscape and Visual Good Practice Guidance*; http://www.spgadvice.co.uk/docs/Landscape%20and%20Visual_Good%20Practice%20Guidance_141008.pdf

¹² David Tyldesley and Associates (Nov. 2010); *Landscape Study to Inform Planning for Wind Energy*, Final Report; unpublished report to Perth & Kinross Council

¹³ Ash Consulting Group, 1998; *The Lothians Landscape Character Assessment*; Scottish Natural Heritage Review No. 91; <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=322>

methodology in landscape character assessment¹⁴ to provide an up-to-date and fit-for-purpose West Lothian Landscape Character Assessment (WL-LCA) which respects the broad landscape character types within the LLCA but reclassifies the West Lothian landscape into more and smaller landscape character units at a 1:25,000 scale. Background information in the LLCA on the evolution of the West Lothian landscape, including the physical forces and processes which have shaped it through time, especially geological, topographical, hydrological, soils and land cover information, together with cultural influences and perceptions, were fed into the revised WL-LCA.

2-6 The key landscape characteristics recorded which are considered influential to the capacity of each LCT and unit to accommodate wind energy development, as agreed with the Steering Group, are landform (topography, shape and complexity), land use (including land use change, historical continuity), land cover (pattern and variety including settlement, infrastructure and other development), rarity (rare or unusual landscapes with a distinctive 'sense of place') and non-physical characteristics such as scale and openness (enclosure), together with characteristics of people's experience of the landscape such as wildness, solitude, tranquillity and sense of movement.

2-7 A combination of desk study and field validation was used in Stage 1. The desk study involved the generation of initial generic landscape character types following a review the LLCA and the following landscape character assessments covering areas adjacent to West Lothian:

- *The Borders landscape assessment, 1998*
- *Central Region landscape character assessment, 1999*
- *Glasgow and the Clyde Valley landscape assessment, 1999*
- *Stirling to Grangemouth landscape character assessment, 1999*
- *Edinburgh Landscape Character Assessment, 2010*
- *South Lanarkshire Landscape Character Assessment, 2010*

2-8 The Ordnance Survey (OS) 1:50,000 Landranger Series map, Sheet 65 Falkirk and West Lothian, was used to draft the boundaries of the initial landscape character types (LCTs), taking the LCTs in the existing LLCA as the starting point. The LCT boundaries were then considered in more detail using satellite imagery (Google Earth including Street View), the 1:25,000 scale OS Explorer maps (Sheets 343, 344 and 350) on to which the initial landscape units were drawn. The initial LCTs and units were then tested in the field, fine-tuned and agreed with the Steering Group. Existing wind turbine developments within the study area were taken into account as part of the baseline landscape during the landscape characterisation stage.

2-9 The current landscape classification within the LLCA 'washes over' all urban areas within West Lothian by including them within the classification and landscape character descriptions. Thus there is currently no distinction between the characteristics of settlements and areas beyond settlement boundaries. In accordance with the brief, the study assesses the capacity of the West Lothian landscape outwith the main settlement boundaries identified on the West Lothian Local Plan. We have 'washed over' the smaller settlements where we feel there is a stronger countryside character rather than a predominantly urban character as in the larger settlements.

2-10 Figure 1 shows the distribution of landscape character types (LCT) within the revised West Lothian landscape classification. Descriptions of the characteristics of the revised landscape character types and landscape units, illustrated by photographs, are given in Appendix 1. It is

¹⁴ The Countryside Agency and Scottish Natural Heritage (2002); *Landscape Character Assessment: Guidance for England and Scotland* by University of Sheffield and Land Use Consultants; <http://www.landscapecharacter.org.uk/lca/guidance>

important to note that at the strategic scale of the study, the boundaries of LCTs and landscape units are not precisely drawn. Landscape character rarely changes abruptly, and detailed assessment will be required in order to define precise boundaries. This stage of the study is described in more detail in Section 4.

Stage 2: Landscape Capacity Study for Wind Energy Development in West Lothian

2-11 As described in Section 1, Stage 2 of the landscape capacity study included separate assessments of the landscape and visual sensitivity of the West Lothian landscape (within Sections 5 and 6 respectively), to arrive at the potential landscape capacity for wind energy development in West Lothian (Section 7).

Assessment of Landscape Sensitivity

2-12 With regard to the assessment of landscape sensitivity, useful overviews of wind farm characteristics and typical effects of wind turbines on the landscape are found in various guidance documents. The documents reviewed for this study are included in Appendix 3. We have also considered in detail many environmental statements submitted in connection with wind farm proposals, and a number of capacity studies elsewhere in Scotland, in particular the following landscape capacity studies for wind energy development in adjacent authority areas:

- *Landscape Capacity Study for Wind Turbine Development in East Lothian*, Final Report, 2005
- *Landscape Capacity Study for Wind Turbine Development in Midlothian*, Final Report, 2007
- *South Lanarkshire Spatial Framework and Landscape Capacity for Windfarms*, 2010

2-13 We also considered the published guidance from SNH following a review of capacity studies¹⁵ and the decision letters of Reporters and the Scottish Ministers in relation to many wind energy proposals in Scotland (in particular the Inquiry Reporters decision letter of 2007 to PM Renewables Ltd. following the appeal into refusal of planning permission by WLC for 15 wind turbines, internal access roads and ancillary infrastructure at Tormywheel, Leven Seat, Fauldhouse¹⁶). There is now a wide consensus as to the ways in which wind turbines affect the landscape, which were used to inform the definition of landscape sensitivity criteria for use in this study.

2-14 To establish the sensitivity of the West Lothian landscape to wind energy development, we adopted a step-wise application of the criteria, as set out below. The criteria are drawn from the review of the LLCA in Stage 1 and based on the recent capacity study that David Tyldesley and Associates undertook in Perth & Kinross¹¹, adapted for West Lothian.

2-15 Wind energy typologies appropriate to the West Lothian landscape context were discussed and agreed with the Steering Group. The agreed typologies have been arrived at by combining turbine heights and groupings of different numbers of turbines as described in Section 3. These typologies are used in the sensitivity assessment and are the subject of Sections 7 and 8 in which conclusions are made on the capacity for wind energy development in West Lothian, and guidance given at the strategic level on the overall suitability, scale, location and design of the five turbine groupings and the three turbine heights considered in the study, respectively.

¹⁵ Grant, A. in association with Clark, P. and Lynch, S. (2010); *Landscape capacity studies in Scotland – a review and guide to good practice*; Scottish Natural Heritage Commissioned Report No. 385; http://www.snh.org.uk/pdfs/publications/commissioned_reports/385.pdf

¹⁶ Scottish Government, Directorate for Planning and Environmental Appeals, Inquiry Reporters Unit (7th June 2007); ref PPA/400/220; <http://www.dpea.scotland.gov.uk/casesearch.aspx?T=1>

2-16 Step 1 was to define any landscape character types, or parts of them, which are of the highest sensitivity, where wind energy development (or any other large scale, uncharacteristic form of built development) would be inappropriate and therefore require significant protection. Criteria L1 to L3 in Table A below were used to identify any such areas:

Table A: Step 1 – Identifying Landscape Units of the Highest Sensitivity	
Landscape Criterion	Areas of Highest Sensitivity
L1 Landscape experience:	Landscapes where people are likely to feel a particularly strong sense of solitude, remoteness and / or peacefulness / tranquility, emptiness, naturalness or wildness and, apart from natural movements, such as wind and clouds, have little or no movement, and exhibit particularly strong sense of stillness or calmness
L2 Land use and change:	Landscapes with no obvious or extremely limited evidence of modern settlement, buildings, infrastructure or main roads, no or only very localised forestry plantations or intensive agriculture, obviously unspoilt, historic landscapes and inventory Designed Landscapes, landscapes with regionally or nationally important cultural heritage associations
L3 Rarity (unusual / distinctive):	Landscapes with rare or unusual characteristics which retain their distinctiveness and merit protection in the interests of sustaining good representative examples of each landscape unit in West Lothian

2-17 Any areas defined in Table A have been identified and mapped as “Areas of Highest Sensitivity”. **Step 2** is the application of the four criteria L4 to L7 set out in Table B below to the rest of the West Lothian area. This has enabled the definition of areas of higher, medium and lower sensitivity to all wind energy development typologies as defined in Section 3.

2-18 Table B therefore shows the criteria which indicate those areas, other than those requiring significant protection as defined in Table A, which if exhibiting all or the majority of the criteria specified, could feed into the selection of the broad areas of search, where proposals are likely to be supported, subject to satisfactorily addressing all other material considerations:

Table B: Step 2 - Assessing Sensitivity of all other Landscape Units			
Landscape Criterion	Areas of lower sensitivity	Areas of medium sensitivity	Areas of higher sensitivity
L4 Scale Landscapes that are:	Very large scale or large scale	Medium scale	Intimate and small scale
L5 Openness (enclosure) Landscapes that are:	Extensively open or generally open	Semi-open	Enclosed or confined
L6 Landform Landscapes with:	Flat, or smooth, regular, rolling or undulating, or flowing landform, plateau	Landform that does not readily fit into either the lower or higher sensitivity descriptions	Dramatic, or mountainous, or rugged, or steep, or complex landform, including deep or steep sided valleys

Table B: Step 2 - Assessing Sensitivity of all other Landscape Units			
Landscape Criterion	Areas of lower sensitivity	Areas of medium sensitivity	Areas of higher sensitivity
L7 Land cover and variety (complexity): Landscapes with:	Extensive areas of homogenous character and similar ground cover such as heather or grass moorland, or extensive forestry, or areas with extensive settlement, infrastructure, or other development	Areas with a limited variety of land cover types, for example moorland with forestry, or areas with some settlement, infrastructure, or other development	A variety of land cover types in smaller units or patchworks, or small fields or crofts, complex or diverse landscapes, or with only occasional or sporadic settlement, infrastructure, or other development

2-19 The findings of Steps 1 and 2 are shown in a table (Table D in Section 5) which indicates the application of the criteria L1 to L7 for each landscape unit. The sensitivity assessment “Areas of Highest Sensitivity” (i.e. application of criteria L1 – L3) and High, Medium or Low Sensitivity (i.e. application of criteria L4 – L7) is illustrated in Figure 2 (see map section at end of report) which reproduces the colour coding used in the table.

2-20 It is recognised that whether or not a wind farm is perceived as a positive or negative contribution to landscape character, there are some ‘landmark’ landscape features which ought not to be affected by the construction of wind farms, or indeed any other large scale form of built development, in ways that would alter their landmark qualities. Consequently, in **Step 3** we identified an initial list of landmark landscape features considered important within the West Lothian context, and an area representing the key setting of each feature which should be protected to ensure it is not adversely affected by wind energy developments (see Section 5, paragraphs 5-9 to 5-12). The areas were initially defined on the basis of desk study following a review of various documents such as the West Lothian Local Plan 2009 and various maps including the OS 1:25,000 scale Explorer maps and the OS 1: 250,000 Road Map 3 (Southern Scotland & Northumberland). They were drawn on to draft base maps which were then discussed with the Steering Group and refined and finalised by field survey. The findings of a joint workshop between West Lothian planning staff and SNH on the 27th January 2011, to consider landscape and visual sensitivities of the West Lothian landscape, were also used to help define the initial list of landmark landscape features.

2-21 Careful consideration has been given to the appropriateness of defining landscape features as ‘landmark’ features, and if appropriate the essential area needed to protect the integrity and / or context of the landmark, without imposing unreasonable constraints on wind energy developments that may be proposed. Consequently, following discussion with the Steering Group and detailed field survey some features initially considered were not progressed as landmark landscape features and only the two features described in Section 5 were considered to be of significant quality and sensitivity to development to justify protection.

Assessment of Visual Sensitivity

2-22 The basis of the methodology for assessing visual sensitivity to wind energy development is that there are some important viewpoints which ought not to be affected, or further affected, by the construction of wind farms in ways that would detract from the ‘unspoilt’ nature of these views. Such important views could be enjoyed by local residents and by visitors from principal tourist and amenity routes, in and through West Lothian. The importance of the ways in which the area is perceived by both locals and travellers is recognised.

2-23 In conjunction with the Steering Group, an initial list of principal tourist and amenity routes was defined in **Step 4** based on local knowledge, including the findings of the joint workshop

between West Lothian planning staff and SNH held on the 27th January 2011, as mentioned above. The intention was to define relatively narrow visual corridors along key 'gateway' or tourist routes of high amenity value which should be protected to ensure they are not adversely affected by wind energy developments. Corridor widths should be limited to principal views experienced by travellers, in order to avoid imposing unreasonable constraints on wind energy developments. The visual corridors so defined would be assigned the highest visual sensitivity, indicating that wind energy developments would be inappropriate.

2-24 The definition of 'principal tourist and amenity routes' proved difficult within the West Lothian context, as discussed further in Section 6. It was decided not to include the principal sensitive tourist and amenity routes within the assessment of visual sensitivity at this stage, but to include them in the consideration of cumulative effects which is discussed in Section 7.

2-25 Step 5 involved the identification of criteria for defining important 'iconic' viewpoints. The methodology involved the initial identification of viewpoints marked on OS maps (in particular the 1:50,000 scale Landranger series, the 1:25,000 Explorer series, the Michelin map of Scotland No. 501 and OS 1:250,000 Road Map 3 Southern Scotland & Northumberland). These were discussed with the Steering Group and a list of candidate viewpoints drawn up. Three criteria were initially applied to assist in the selection of those viewpoints considered to be so significant that they should be protected without imposing unreasonable constraints on wind energy developments:

- (i) the viewpoint should be considered to be of 'national' status, a viewpoint recognised nationally, or at least well beyond West Lothian;
- (ii) the viewpoint should be a major 'destination' in its own right, not merely a viewpoint where passers-by may stop to enjoy a view;
- (iii) the viewpoint should be representative of the West Lothian or Lothian landscape, a 'post-card' type view (even if no post-card was available) which might be used by a visitor wanting to clearly portray to someone who did not know the area, the best scenery in the area and how distinctive it is.

2-26 In accordance with the initial methodology, to be selected as 'iconic' the viewpoint had to meet all three criteria. Field survey revealed that it was unlikely that any viewpoint in West Lothian would meet criteria (i) in that arguably none could be considered as being of national status. However, there are a number of viewpoints that meet criterion (ii) and (iii) and which could be considered important within the West Lothian context. Final viewpoints were identified by further desk study, including a search of the Historic Scotland web site and local promotional material (for example on the Pentlands Hills Regional Park and The River Avon Heritage Trail) and field validation.

2-27 Field validation included identification of visual cones or compartments associated with each viewpoint, defined to represent the principal cone, circle or span of the views from the viewpoints to the point where the view is terminated or enclosed, or out to a distance of 5-10km considered to be appropriate in the context of the view and without imposing unreasonable constraints on wind energy developments that may be proposed. A maximum distance of 10km is considered appropriate (this is partly because the Reporter at the Tormywheel Public Inquiry considered that the landscape and visual impacts of that scheme would be readily apparent within a radius of up to 10km and that Cairnpapple Hill and Knock Hill at about 12km were sufficiently far from the site not to be significantly affected).

2-28 Nine important viewpoints were finally agreed with the Steering Group, as discussed in Section 6. The visual compartments so defined around each viewpoint are assigned the highest visual sensitivity, indicating that wind energy developments would not be appropriate in the views.

Assessment of Potential Capacity for Wind Energy Development in West Lothian

2-29 Finally **Step 6** brings together all previous steps to identify areas potentially suitable in landscape and visual terms for wind energy development, in accordance with the agreed typologies. GIS mapping of previous steps provides layers of information to enable the identification of broad strategic zones outwith the areas of highest sensitivity where there may be the capacity to accommodate a specified number and grouping of wind turbines.

2-30 Cumulative effects on landscape character and visual amenity are recognised as important considerations in Scottish Planning Policy¹⁷. Existing and consented wind farms are taken into account in the capacity study since, self evidently, a wind farm or combinations of wind farms are likely to dramatically change the landscape character of the area on which they are built and their immediate surroundings. A single turbine can appear as a single feature which may not affect the landscape character of the wider landscape unit. However, a single turbine out of scale with the landscape could change its character.

2-31 Cumulative effects on visual amenity are usually expressed as ‘in combination’ (two or more seen by the observer from the same viewpoint at the same time); or successive (two or more seen by the same observer from the same viewpoint but only by turning to look in a different direction); and sequential (two or more seen by an observer whilst travelling along a route, when no more than one may usually be seen at the same time). Repeated views of wind farms can give travellers along a route the impression that they are travelling through a ‘wind farm landscape’.

2-32 The assessment of cumulative effects is discussed in Section 7. Consideration is given to thresholds of capacity by mapping existing and consented wind farms to identify any areas approaching their carrying capacity or, in other places, where thresholds of cumulative impact are likely to be lower. There is likely to be a number of localised constraints and other material planning issues to take into consideration, however.

2-33 The study identifies where there would be a presumption in favour of appropriate wind energy development, subject to assessment of cumulative effects and other non-landscape considerations, together with detailed landscape and visual impact assessment of each individual wind energy proposal (which will be required by the council with any planning application). These areas could feed into WLCs selection of broad areas of search, where proposals are likely to be supported, subject to satisfactorily addressing other material considerations and cumulative effects.

¹⁷ The Scottish Government (February 2011); *Onshore wind turbines*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore>

[Page left blank]

3 WIND ENERGY TYPOLOGIES

3-1 It was a requirement of the study brief that, as well as conforming to SPP to consider projects greater than 20MW output, the wind energy capacity study should also focus on commercial scale development less than 20MW, together with medium and small scale wind energy projects. The exact typologies were to be agreed with the Steering Group.

3-2 A number of different scenarios of turbine heights and groupings were discussed with the Steering Group. The almost endless permutations of turbine numbers and heights in planning applications/enquiries within West Lothian and adjacent districts made the choice of typologies applicable to the WLC area difficult. There was a clear need to establish appropriate typologies to enable the provision of meaningful guidance, including guidance on applications for pairs of large turbines above 100m high and single turbines in the 70m-80m height range which are becoming increasingly common in West Lothian.

3-3 A review of other recently completed wind capacity studies, including the Landscape Capacity Study for Wind Turbine Development in East Lothian¹⁸ and the Landscape Capacity Study for Wind Turbine Development in Midlothian,¹⁹ revealed the use of different typologies appropriate to particular circumstances within each area. No standard typologies have been established.

3-4 It was agreed with the Steering Group that the most appropriate approach to establish wind energy typologies within West Lothian would be to consider a range of possible scenarios as a result of splitting turbine heights (referring to the height to blade tip when the blade is in the fully vertical position above the tower) and groupings of turbines as follows:

Turbine Groups

Single Turbine:	1 turbine
Small Wind Farm:	2-7 turbines
Medium Wind Farm:	8-20 turbines
Large Wind Farm:	21+ turbines
Extensions to existing wind farms	

Turbine Heights

51-80m approximately
81-100m approximately
101-130m+ approximately

3-5 In adopting these typologies it is possible to assess the capacity of the West Lothian landscape to accommodate a range of scenarios, for example for a small wind farm of 2-7 turbines between 51-80m high or a small wind farm of 2-7 larger turbines between 101-130m+ in height.

3-6 Applications and enquiries for turbines above 100m high in and adjacent to West Lothian are most commonly associated with upland landscape character types (Upland Hills and Upland Hill Fringes within West Lothian) and high plateau areas. These generally relate to wind energy developments in excess of 20MW (with individual turbine outputs ranging between 2-3MW, for example Blacklaw extension in West Lothian and Bracco Farm in North Lanarkshire) but also include

¹⁸ Carol Anderson & Alison Grant (May 2005); *Landscape Capacity Study for Wind Turbine Development in East Lothian*, Final Report; http://www.eastlothian.gov.uk/downloads/Final_Report_May_05.pdf

¹⁹ Carol Anderson & Alison Grant (January 2007); *Landscape Capacity Study for Wind Turbine Development in Midlothian*, Final Report; http://www.midlothian.gov.uk/info/198/planning_policy/466/wind_energy_development

commercial-scale applications less than 20MW (for example Pates Hill in West Lothian and Muirhall in South Lanarkshire). Consideration of these will enable the Council to prepare a spatial framework analysis of renewable energy provision within West Lothian to meet Scottish Government policy.

3-7 Applications and enquiries for turbines between 50-100m high in and adjacent to West Lothian relate to medium and small scale wind energy projects particularly below 5MW which are most commonly associated with the lowland landscape character types (Lowland Hills and Valleys, Lowland Plateaux, Lowland Plains and Lowland Hill Fringes in West Lothian). In these more populated areas design elements and cumulative effects require particular management. Here turbine height (rather than the number of turbines) and how this relates to landscape scale and landform is considered to be the key consideration. Spatial capacity analysis provides guidance on a consistent approach for determining planning applications in West Lothian for wind energy development within this grouping, to meet Scottish Government policy.

3-8 The typology of the smaller turbine height of between 51-80m approximately is considered appropriate within the West Lothian context because:

- (a) applications for smaller-scale wind energy projects of less than 50m height do not generally need SNH consultation, requiring only a basic level of landscape and visual impact assessment;²⁰
- (b) guidance on siting and design aspects of proposals for small turbines between 15 and 50m height is already provided by SNH;²¹
- (c) the brief for this study lists this category of development as that which gives SNH cause for concern due to the difficult scale, requiring careful assessment of the landscape context;
- (d) there are several examples of applications for small turbines below 50m height permitted in West Lothian, including Ba'ad Park Cottage, Harperrig (1 turbine 17.75m ht); Bathgate Sports Centre (2 turbines 32.5m ht); Drovend Cottage, Harperrig (1 turbine 23m ht); Midseat Farm, Blackburn (1 turbine 24.8m ht). These are generally considered to be in scale with the landscape and nearby features which include, for example, 2 storey buildings approximately 8-10m tall, 3 storey buildings approximately 15m tall, mature trees between 20-30m tall and electricity pylons approximately 45m+.

²⁰ 'Natural Heritage assessment of small scale wind energy projects which do not require formal EIA', SNH March 2008

²¹ 'Siting and Designing Single and Groups of Small Turbines in the Landscape', SNH Draft for Consultation, March 2011

STAGE 1: REVIEW OF THE LOTHIAN LANDSCAPE CHARACTER ASSESSMENT, 1998

4 DEFINING THE LANDSCAPE UNITS

Review of The Lothians Landscape Character Assessment, 1998

4-1 Following review of The Lothians Landscape Character Assessment (LLCA), 1998, we have identified a number of landscape character types (LCTs) and smaller landscape units (referred to as landscape character areas in the existing LLCA) within the LCTs. Whilst respecting the broad landscape character types in the LLCA, our re-characterisation and re-classification provides an updated West Lothian Landscape Character Assessment (WL-LCA). The WL-LCA describes the key landscape characteristics that influence the capacity of any landscape character type to accommodate wind energy developments, of various types. The landscape characteristics recorded which are considered influential to the capacity of each LCT and unit to accommodate wind energy development, as agreed with the Steering Group, are landform (topography, shape and complexity), land use (including land use change, historical continuity), land cover (pattern and variety including settlement, infrastructure and other development), rarity (rare or unusual landscapes with a distinctive 'sense of place') and non-physical characteristics such as scale and openness (enclosure), together with characteristics of people's experience of the landscape such as wildness, solitude, tranquillity and sense of movement.

Principals for Defining Landscape Units

4-2 It was important from the outset to establish a consistent approach to the definition of landscape units. These are the geographic units, or mapped areas, which form the basis of the assessment of effects on landscape character. It was evident that the landscape character areas in the LLCA are very extensive and provided too coarse a grain of assessment for the study to define areas of landscape sensitivity to wind energy development. It records only six LCTs within West Lothian, and only one of these is sub-divided into a smaller landscape character area. It is evident from the LLCA that there is no distinction drawn between different parts of landscape character areas in the same landscape character type, despite their large geographic extent.

4-3 The following principles were adopted for defining landscape units:

- (a) All landscape units are based on landscape character assessment and each unit comprises no more than one landscape character type;
- (b) The LCTs are based on the types in the LLCA which were used as the starting point of the re-classification;
- (c) A landscape character type in the LLCA has only been divided into two or more different landscape character types (as opposed to two or more units) where it was considered that the landscape characterisation is too coarse and does not provide a fine enough grain for the distinction of areas with significantly different landscape sensitivity to wind energy development;
- (d) Division of a landscape character type in the LLCA into two or more different landscape character types in this study is based on landscape characterisation only, with particular attention being paid to the seven landscape sensitivity criteria L1 to L7 in Tables A and B of this report; no other factors have been taken into account;

- (e) The geographical extent (size) of landscape character areas of a single landscape character type in the LLCA were considered for subdivision into landscape units only where there appeared to be significant differences across the unit, relevant to the study (taking into consideration criteria L1 to L7 in Tables A and B);
- (f) Landscape units were adjusted where necessary following fieldwork and as other evidence emerged.

Identification of Landscape Character Types and Landscape Units

4-4 Table C below compares the classification of landscape types and landscape character areas in The Lothians Landscape Character Assessment, 1998, (falling within the West Lothian Council area only) with the landscape types and units identified in this West Lothian-Landscape Character Assessment 2011:

Table C: West Lothian Landscape Classification

Landscape Types in The LLCA 1998	Landscape Character Areas in The LLCA 1998	Landscape Types in this WL-LCA 2011	Landscape Units in this WL-LCA 2011
Uplands	4 Pentland Hills	1 Upland Hills	1(i) Western Pentland Hills
Upland Fringes	5 North-West Pentland Fringe	2 Upland Hill Fringes	2(i) North-West Pentland Fringe
			2(ii) Gladsmuir / Woodmuir / Camilty Fringe
			2(iii) Harburn / Hartwood Fringe
Lowland Hills & Ridges	17 Bathgate Hills	3 Lowland Hills & Valleys	3(i) Bathgate Hills
Lowland Plateaux	19 West Lothian Plateau	4 Broad Valley Lowlands	4(i) Almond Valley
			4(ii) Couston Valley
		5 Lowland Plateaux	5(i) Polkemmet Moor
			5(ii) Armadale / Bathgate Plateau
	5(iii) Livingston / Blackburn Plateau		
20 Slamannan Plateau	5(iv) Avonbridge to Armadale Plateau Edge		
5(v) Blackridge Heights			
Lowland Plains	21 Lower Almond Farmlands	6 Lowland Plains	6(i) Kirknewton Plain
			6(ii) East Calder / Livingston / Broxburn Plain
			6(iii) Winchburgh / Niddry Plain
		7 Lowland River Corridors	7(i) Avon Valley
			7(ii) Almond Valley
			7(iii) Murieston / Linhouse / Camilty Waters
			7(iv) West Calder Burn / Breich & Harwood Waters

Cont./

Landscape Types in The LLCA 1998	Landscape Character Areas in The LLCA 1998	Landscape Types in this WL-LCA 2011	Landscape Units in this WL-LCA 2011
Coastal Margins	26 Linlithgow / Queensferry Farmlands	8 Lowland Hill Fringes	8(i) Linlithgow Fringe
			8(ii) Bathgate Fringe
		9 Coastal Margins	9(i) West Lothian Coastal Farmlands
			9(ii) West Lothian Coastal Hills

4-5 Figure 1 shows the revised West Lothian landscape classification. Descriptions of each of the LCTs and landscape units are given in Appendix 1. It can be seen that the new WL-LCA significantly fine-tunes the current LLCA by identifying 9 LCTs (there are 6 LCTs in the current LLCA) and 23 smaller landscape units (there are only 7 landscape character areas in the current LLCA).

4-6 With regard to the wider landscape character types, the main differences between the current classification in the LLCA and the revised WL-LCA classification are as follows:

- Lowland Plateaux LCT in the LLCA is divided to separately distinguish the *Broad Valley Lowlands* from the *Lowland Plateaux* in the WL-LCA;
- Identification of a new LCT in the WL-LCA, the *Lowland River Corridors*, not previously identified in the LLCA;
- Coastal Margins LCT in the LLCA is divided to separately distinguish the *Lowland Hill Fringes* from the *Coastal Margins* in the WL-LCA.

4-7 With regard to the landscape units, the main differences between the current classification of landscape character areas in the LLCA and the landscape units in the revised WL-LCA classification are as follows:

- Division of the North-West Pentland Fringe in the LLCA into three separate units, namely 2(i) *North-West Pentland Fringe*; 2(ii) *Gladsmuir / Woodmuir / Camilty Fringe*, and 2(iii) *Harburn / Hartwood Fringe* in the WL-LCA. Within West Lothian the biggest influence on landscape character is topographical relief / landform, with land cover (principally the difference between good quality and poorer quality agricultural land and moorland) also influential. The *Upland Hill Fringes* LCT is a transitional area between upland and lowland, reflected in the varied scale and enclosure which defines the different landscape units but which have a unity of character due to the similarity of landform (see Table D below);
- Division of the extensive West Lothian Plateau in the LLCA into five smaller landscape units. We have separately identified 4(i) *Almond Valley* and 4(ii) *Couston Valley* as open, broad relatively flat lowland river plains within the *Broad Valley Lowlands* LCT. Key characteristics of this LCT are significantly different to justify the separate identification of the *Lowland Plateaux* LCT and three landscape units within the current West Lothian Plateau in the LLCA, namely 5(i) *Polkemmet Moor*, 5(ii) *Armadale / Bathgate Plateau* and 5(iii) *Livingston / Blackburn Plateau*;
- Division of the Slamannan Plateau in the LLCA into two smaller landscape units within the *Lowland Plateaux* LCT, namely 5(iv) *Avonbridge to Armadale Plateau Edge* and 5(v) *Blackridge Heights*;

- Division of the Lower Almond Farmlands in the LLCA into three landscape units within the *Lowland Plains* LCT, namely 6(i) *Kirknewton Plain*, 6(ii) *East Calder / Livingston / Broxburn Plain* and 6(iii) *Winchburgh / Niddry Plain*;
- The new *Lowland River Corridors* LCT within the WL-LCA is divided into four distinctive river valley landscape units, namely 7(i) *Avon Valley*, 7(ii) *Almond Valley*, 7(iii) *Murieston / Linhouse / Camilty Waters* and 7(iv) *West Calder Burn / Breich & Harwood Waters*;
- Division of the Linlithgow / Queensferry Farmlands landscape character area within the current LLCA into four smaller landscape units. Two of these units lie within the *Lowland Hill Fringes* LCT, namely 8(i) *Linlithgow Fringe* and 8(ii) *Bathgate Fringe*. These are transitional areas of open, rolling lowland hills lying between the complex landform of the Bathgate Hills to the south and the gently rolling lowland coastal farmlands and coastal hills to the north. The remaining two landscape units lie within the north-facing *Coastal Margins* LCT, gently falling to the Firth of Forth, namely the intensively managed and predominantly good quality arable unit 9(i) *West Lothian Coastal Farmlands* and the more topographically diverse and designed parkland landscapes of landscape unit 9(ii) *West Lothian Coastal Hills*.

4-8 It is important to note that at the strategic scale of the study, the boundaries of LCTs and landscape units are not precisely drawn. Landscape character rarely changes abruptly, and detailed assessment will be required in order to define precise boundaries.

STAGE 2: LANDSCAPE CAPACITY STUDY FOR WIND ENERGY DEVELOPMENT IN WEST LOTHIAN

5 LANDSCAPE SENSITIVITY ASSESSMENT

Landscape Character

5-1 In accordance with the methodology described in Section 2, we adopted a step-wise application of criteria to assess the landscape sensitivity of different landscape character types (as identified in the new WL-LCA 2011 as described in Section 4 above) to accommodate the different wind energy typologies. **Step 1** defines any landscape units, or parts of them, which are 'Areas of the Highest Sensitivity' (AHS), where wind energy development, and indeed any other large scale, uncharacteristic form of built development, would be inappropriate and therefore require significant protection. Table A on page 10 shows the criteria used in this step. **Step 2** uses different landscape criteria as shown in Table B, also on page 10, to indicate landscape units, other than those defined in step 1 as AHS, which if exhibiting all or the majority of the criteria specified could feed into the selection of the broad areas of search, where proposals are likely to be supported, subject to satisfactorily addressing all other material considerations. These are defined as areas of either Lower, Medium or Higher sensitivity.

5-2 The findings of **Steps 1 and 2** are shown in Table D below which indicates the application of the criteria L1 to L7 for each landscape unit identified in Table C above. The sensitivity assessment "Areas of Highest Sensitivity" (i.e. application of criteria L1 – L3) and High, Medium or Low Sensitivity (i.e. application of criteria L4 – L7) is illustrated in Figure 2 which reproduces the colour coding used in the table.

Table D: Landscape Character Sensitivity to Wind Energy Development in West Lothian

Landscape Unit	Landscape Character Sensitivity Criterion															Sensitivity Assessment
	L1	L2	L3	L4 Scale			L5 Openness			L6 Landform			L7 Land Cover			
	Experience	Land use	Rarity	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	
1 Upland Hills:																
1(i)	H	H														AHS
2 Upland Hill Fringes:																
2(i)				L				M			M			M		M
2(ii)					M			M			M		L			M
2(iii)						H			H		M			M		H
3 Lowland Hills & Valleys:																
3(i)	H	H														AHS
4 Broad Valley Lowlands:																
4(i)					M			M		L				M		M
4(ii)					M		L			L				M		M

Landscape Unit	Landscape Character Sensitivity Criterion															Sensitivity Assessment
	L1	L2	L3	L4 Scale			L5 Openness			L6 Landform			L7 Land Cover			
	Experience	Land use	Rarity	Low	Medium	High	Low	Medium	High	Low	Medium	High	Low	Medium	High	
5 Lowland Plateaux:																
5(i)					M			M		L			L			M
5(ii)					M			M		L				M		M
5(iii)					M			M		L					H	M
5(iv)						H			H		M			M		H
5(v)	H	H	H													AHS
6 Lowland Plains:																
6 (i)					M			M			M			M		M
6(ii)					M			M		L				M		M
6(iii)					M			M			M			M		M
7 Lowland River Corridors:																
7(i)						H			H			H		M		H
7(ii)						H			H			H		M		H
7(iii)						H			H			H		M		H
7(iv)					M			M				H		M		M
8 Lowland Hill Fringes:																
8(i)					M			M			M			M		M
8(ii)					M			M				H		M		M
9 Coastal Margins:																
9(i)					M			M		L				M		M
9(ii)		H														AHS
Key to Landscape Character Sensitivity Assessment:																
AHS Area of Highest Sensitivity to wind energy development																
H High Sensitivity to wind energy development																
M Medium Sensitivity to wind energy development																
L Low Sensitivity to wind energy development (n.b. not recorded in the assessment)																

5-3 It has been argued by appellants at public inquiries in the past that the criteria should be 'weighted' to give some criteria more importance than others. The SNH review of capacity studies²² advises against the weighting of criteria, thus consequently the criteria have not been weighted. Our approach has been to define the three criteria L1 – L3 to identify landscapes of the highest sensitivity (these are not weighted) and a further four criteria L4 – L7 to assess the sensitivity of the remaining landscape units (these too are not weighted). This provides a relatively simple, clear and easily understood methodology to assess landscape character sensitivity (as part of an overall sequential approach to assessing landscape capacity) whereas the addition of weighting (i.e. scoring) would be an unnecessary extra layer considered too sophisticated for this spatial study.

²² Grant, A. in association with Clark, P. and Lynch, S. (2010); *Landscape capacity studies in Scotland – a review and guide to good practice*; Scottish Natural Heritage Commissioned Report No. 385; http://www.snh.org.uk/pdfs/publications/commissioned_reports/385.pdf

5-4 Within Table D the sensitivity assessment is made on the basis of an area exhibiting all or the majority of the criteria specified, as described above. Where assignments of High, Medium or Low are equal, for example where an area is assessed as having Low sensitivity against two of the criteria and Medium sensitivity against another two criteria, a professional judgement has been made to arrive at an overall sensitivity assessment. Thus landscape unit 5(i) has Medium sensitivity in accordance with criteria L4 and L5 and Low sensitivity in accordance with criteria L6 and L7. Overall the sensitivity of this landscape unit is assessed as Medium. We have made this judgement by comparing the sensitivity assessment of other landscape units within the same LCT. Thus unit 5(i) is assessed as Medium because on balance we consider its sensitivity overall to be the same as that for units 5(ii) and 5(iii) but lower than the sensitivity assessment of units 5(iv) and 5(v). In this way the assessment remains landscape character based and is a relative, rather than an absolute or measurable judgement.

5-5 The areas shown as Areas of Highest Sensitivity (AHS) in the red cells in Table D are those assigned to the Areas of Highest Sensitivity – criteria L1 – L3. It can be seen that four landscape units are assessed as being AHS in accordance with landscape character criteria L1 – L3, also colour coded red in Figure 2, where wind energy development would be inappropriate, which are as follows:

- a) *Western Pentland Hills* unit 1(i), lying within the Upland Hills LCT. Extending beyond the western edge of the Pentland Hills Regional Park, there is a strong sense of place due to remoteness, wildness and stillness, limited evidence of land use change and strong cultural, literary, historical and heritage associations;
- b) *Bathgate Hills* unit 3(i), lying within the Lowland Hills and Valleys LCT. There is a strong sense of place due to remoteness, wildness and stillness in parts, and rich in ancient archaeological artefacts of significant historical / heritage interest;
- c) *Blackridge Heights* unit 5(v), lying within the Lowland Plateaux LCT. Extensive area of remoteness, wildness and stillness, with the distinctive, rare, unspoilt landscape of Blawhorn Moss (a National Nature Reserve, SSSI and cSAC) and embracing East Craigs Hill; and
- d) *West Lothian Coastal Hills* unit 9(ii), lying within the Coastal Margins LCT. Large designed historic parkland landscapes including policies associated with the historic, stately buildings of national and international renown at Hopetoun House and the House of the Binns.

5-6 Of the remaining landscape units, it can be seen that five units are assessed as being of High sensitivity in accordance with criteria L4 – L7, colour coded pink in Table D, where wind energy development could have significant effect on landscape character, which are as follows:

- a) *Harburn / Hartwood Fringe* unit 2(iii) within the Upland Hill Fringes LCT. A small scale, enclosed and in parts intimate landscape including the designed parkland landscape at Harburn House;
- b) *Avonbridge to Armadale Plateau Edge* unit 5(iv) within the Lowland Plateaux LCT. A small scale and in parts enclosed and confined transitional landscape between low lying arable farmland and pasture to the east and south, and rough hill grazing on higher ground to the north and west; and
- c) *Avon Valley* unit 7(i), *Almond Valley* unit 7(ii) and *Murieston / Linhouse / Camilty Waters* unit 7(iii), all lying within the Lowland River Corridors LCT. Predominantly incised, narrow, meandering, distinctive, intimate river valleys which are densely wooded, enclosed, gorge-like and sparsely settled.

5-7 As described in the introduction, in accordance with the study brief and the SNH review of capacity studies²³, no account is taken of locally designated landscapes in the capacity study. There are 12 areas in West Lothian (covering 51% of its area) that have been designated for special local landscape protection: the West Lothian Local Plan identifies six Areas of Great Landscape Value (AGLV); six Areas of Special Landscape Control; and Countryside Belts around Livingston, Bathgate/Whitburn and between Winchburgh and Broxburn. It is noticeable that the Areas of Highest Sensitivity and the landscape units assessed as being of High sensitivity in this capacity study relate well to five of the six AGLVs in West Lothian, namely the Bathgate Hills and River Avon Valley AGLV, the Forth Shore AGLV, Blackridge Heights AGLV, the Almond and Linhouse Valleys AGLV, and the Pentland Hills AGLV. The remaining AGLV in West Lothian, Airngath Hill, lies within the *Linlithgow Fringe* LCA 8(i) within the wider Lowland Hill Fringes LCT assessed as Medium sensitivity in Table D. However, Airngath Hill is further considered below during the identification of landmark landscape features in step 3 of the methodology.

5-8 The remaining fourteen landscape units (out of the total of 23 units) are assessed in Table D as Medium sensitivity (none are assessed as Low sensitivity) where there is the potential to accommodate wind energy development in terms of landscape character. In order to assess the overall capacity of these areas they are subject to further landscape character assessment of impact on landmark landscape features, and an assessment of visual sensitivity which will consider important viewpoints, principal routes and cumulative landscape and visual effects. Consideration of these steps in the methodology is described below.

Landmark Landscape Features

5-9 As discussed in the methodology above, it is recognised that whether or not a wind farm is perceived as a positive or negative contribution to landscape character, there are some ‘landmark’ landscape features which ought not to be affected by the construction of wind farms, or indeed any other large scale form of built development, in ways that would alter their landmark qualities. The approach taken in **Step 3** is to identify the landmark feature itself and the key setting of the landmark (i.e. its envelope) which should be protected to ensure it is not adversely affected by wind energy developments. The shape and extent of any envelope will vary according to the landmark and its setting, but careful consideration has been given to the appropriateness of defining the landscape features as ‘landmark’ features, and where appropriate the essential area needed to protect the integrity and / or context of the landmark, without imposing unreasonable constraints on wind energy developments that may be proposed.

5-10 The Steering Group initially identified the following six landmark landscape features where wind energy development would be inappropriate:

- (i) Binny Craig, a distinctive west – east ‘crag and tail’ glaciated igneous hill on the eastern edge of the Bathgate Hills;
- (ii) Cairnpapple Hill, an important historical site and Scheduled Monument in the Bathgate Hills where the raised position of the prehistoric ceremonial henge and burial cairn is significant;
- (iii) Linlithgow Loch, Royal Palace and Peel (its park) and St. Michael’s Church;

²³ Grant, A. in association with Clark, P. and Lynch, S. (2010); *Landscape capacity studies in Scotland – a review and guide to good practice*; Scottish Natural Heritage Commissioned Report No. 385; http://www.snh.org.uk/pdfs/publications/commissioned_reports/385.pdf

- (iv) Oil shale bings, distinctive artificial forms, often flat-topped and striking orange / pink colour, a legacy of the modern industrial heritage of West Lothian. Several are Scheduled Monuments including Faucheldean bing (at Winchburgh), The Five Sisters (southeast of Mid Breich) and Greendykes bing (at Broxburn);
- (v) The Pentland Hill uplands of the East Cairn Hill, West Cairn Hill, Colzium Hill, Craigengar and The Pike which are distinctive, recognisable skyline features; and
- (vi) The River Avon valley, including the River Avon Heritage Trail, nine miles of spectacular scenery between Avonbridge and Linlithgow Bridge including many riverside historic features such as bridges, mills, weirs, caves, viaducts and aqueducts (the Avon Aqueduct being the second longest in Britain at 810 ft. with spectacular views from the top).

5-11 Following further research and detailed field survey some features initially considered were not progressed as landmark landscape features and it was agreed with the Steering Group that only two features could be considered to be of significant quality and sensitivity to development to justify protection. The two landmark landscape features and their sensitive settings included in the capacity study are shown in Figure 3 and are as follows:

- Linlithgow Loch, Royal Palace and Peel (its park) and St. Michael's Church, including Airngath Hill considered important to the setting; and
- The Pentland Hill uplands of the East Cairn Hill, West Cairn Hill, Colzium Hill, Craigengar and The Pike form a distinctive, recognisable skyline backdrop in many views from the Lothians, together with LCAs 1(i) and 2(i) considered to be important to their setting (which includes Harperrig Reservoir, and Corston Hill and Auchinoon Hill north of the A70).

5-12 Four of the initial six features listed in paragraph 5-10 were not progressed as landmark landscape features for the following reasons:

- The 'crag and tail' formation of Binny Craig is distinctive above the lowland farmland but its interest is essentially local and it cannot be described as a major destination. It was decided that it would be more appropriate to include Binny Craig as an important viewpoint within step 5 of the methodology;
- Cairnpapple Hill summit is one of the most important prehistoric ceremonial and burial monuments in Scotland but defining a realistic envelope proved problematic. It was decided that due to the extensive views from the summit and its popularity as a major destination, it would be more appropriate to include it as an important viewpoint within step 5 of the methodology. To include it as both a landmark and an important viewpoint would amount to double-counting;
- The oil shale bings are unique to West Lothian but defining essential envelopes around them is difficult. It is considered that they are better protected as modern industrial relics by their Scheduled Monument status, which protects the site and setting of the monument, rather than for their landscape quality;
- The River Avon valley straddles the boundary between West Lothian and Falkirk districts and it would only be possible to define an appropriate sensitive envelope on the West Lothian side which would be limited to the steep, meandering wooded valley where wind energy development would not be possible.

[page left blank]

6 VISUAL SENSITIVITY ASSESSMENT

Principal Tourist and Amenity Routes

6-1 Step 4 of the methodology is the definition of sensitive visual corridors along ‘principal tourist and amenity routes’ considered to be of high amenity value and which should be protected to ensure they are not adversely affected by wind energy development. Corridor widths should be limited to principal views experienced by travellers, in order to avoid imposing unreasonable constraints on wind energy developments. The visual corridors so defined would be assigned the highest visual sensitivity, indicating that wind energy developments would be inappropriate.

6-2 As described in Section 2, the definition of ‘principal tourist and amenity routes’ proved difficult within the West Lothian context. There are no signed tourist routes (brown road signs, as opposed to signs to leisure facilities such as Beecraigs Country Park, Linlithgow or the Almond Valley Heritage Centre for example) within West Lothian and no scenic road routes shown on any motoring or tourist maps (such as the Michelin map of Scotland No. 501). Consideration was therefore given to defining key roads considered important within the West Lothian context.

6-3 The Steering Group identified a large number of roads including motorways, primary and main ‘A’ roads, secondary ‘B’ roads and other minor roads from where there are attractive views in and around West Lothian, particularly towards the Pentland Hills, the Bathgate Hills and across the Firth of Forth. These proved to be too numerous and likely to impose unreasonable constraints on wind energy developments. The following list of principal routes was selected, as shown in Figure 4, based on those listed in the West Lothian Local Plan (Policy Env 24) and local knowledge including the findings of the joint workshop between West Lothian planning staff and SNH held on the 27th January 2011:

- (i) A904 between Newton and Queensferry, with views principally northwards across the Firth of Forth to the iconic Forth bridges and the Ochil Hills beyond;
- (ii) M9 west of junction 2, with views westwards to Airngath Hill and towards the hills of Falkirk and Stirlingshire beyond;
- (iii) M9 west of junction 1a, eastbound, with views southwards to the Pentland Hills;
- (iv) B8046 at Tar Hill in the Bathgate Hills, directly north of Ecclesmachan, with panoramic views southwards towards the Pentland Hills;
- (v) A899 Livingston ‘spine road’, with views southwards to Auchinoon Hill, Corston Hill and the Pentland Hills;
- (vi) A800 and A801, with views eastwards to the Bathgate Hills and southwards towards the Pentland Hills;
- (vii) A89 between Blackridge and Armadale, with views northwards to the Blackridge Heights;
- (viii) A705 between Livingston and Seafield, with views principally southwards across the Almond Valley towards the Pentland Hills;
- (ix) A706 south of Whitburn, with views northwards to the Blackridge Heights and Bathgate Hills and south-eastwards towards the Pentland Hills;

- (x) A706 south of Longridge and B7010 west of Longridge, with views southwards to Leven Seat and the Gladsmuir Hills;
- (xi) A706 from close to the junction with the A704, with panoramic views northwards across Polkemmet Moor and the Bathgate Hills to the Ochils in the distance;
- (xii) A704, with views northwards across the Breich Valley and Almond Valley towards the Bathgate Hills;
- (xiii) A70 'Lang Whang' at the southern West Lothian boundary, with views northwards across Cobbinshaw Reservoir towards the Bathgate Hills;
- (xiv) A70 'Lang Whang' between Harperrig Reservoir and the eastern West Lothian boundary, with views southwards and eastwards to the Pentland Hills.

6-4 Field surveys proved that defining even relatively narrow corridors along these routes would simply take too long since a careful examination of the visual envelope around each route is needed, an approach which would be disproportionate to a strategic planning study. It was therefore decided not to include the principal routes within the assessment of visual sensitivity at this stage, but to include them in the consideration of cumulative effects which is discussed in Section 7.

6-5 Consideration was also given to the core path network in West Lothian being prepared by the council, including long distance footpath and cycle routes, national cycle routes, bridleways, rail paths, and river and canal towpaths. These provide recreational uses and access within and through West Lothian either as facilities in their own right or as links to other facilities such as the Country Parks at Almondell and Beecraigs. They can provide an important function enabling access from town to countryside. The visual amenity of these routes can play a significant part in the enjoyment of the route but defining the extent of key views from these routes would be disproportionate to a strategic planning study. It was therefore decided, as with the consideration of principal roads discussed above, not to include these other routes within the assessment of visual sensitivity at this stage, but to include them in the consideration of cumulative effects which is discussed in Section 7.

Important Viewpoints

6-6 Section 2 describes **Step 5** of the methodology to identify criteria for defining important views when looking out from 'iconic' viewpoints. From the initial identification of candidate viewpoints selected by applying the three criteria listed in paragraph 2-25, field survey revealed that it was unlikely that any viewpoint in West Lothian would meet criteria (i) in that arguably none could be considered as being of national status. However, there are a number of viewpoints that meet criteria (ii) (the viewpoint should be a major destination in its own right) and criteria (iii) (the viewpoint should be representative of the best scenery in West Lothian and how distinctive the Lothian landscape is) and which could therefore be considered important within the West Lothian context.

6-7 A final list of nine important viewpoints was agreed with the Steering Group as follows (these are shown in Figure 3):

- (i) West Cairn Hill, representing the highest point of the Pentland Hills in West Lothian and readily accessible from the footpath route through the Cauldstane Slap from a parking area off the A70 at Little Vantage;

- (ii) Harperrig Reservoir, from the informal carpark at the south-western end of the reservoir off the A70;
- (iii) The public viewpoint on the A904 east of Newton overlooking the Forth, Fife and related bridges;
- (iv) The folly tower at the House of the Binns (panoramic views from Binns Hill are mentioned within the Inventory of Gardens and Designed Landscapes in Scotland as being an important part of the designed landscape, including views of Linlithgow Loch and Palace);
- (v) Cockleroy viewpoint and hillfort in the Bathgate Hills adjacent Beecraigs Country Park;
- (vi) The high point between The Knock viewpoint and Cairnpapple Hill which are both key visitor attractions in the Bathgate Hills;
- (vii) Binny Craig, a local landmark and viewpoint at the eastern end of the Bathgate Hills;
- (viii) Avon Aqueduct from where there are spectacular views as mentioned in tourist publications describing The River Avon Heritage Trail; and
- (ix) Blawhorn Moss NNR, a historical view point from where the name derives.

6-8 Figure 3 shows the nine viewpoints and their visual cones / compartments used in this study, representing the important setting of the viewpoint where wind energy development would be inappropriate. These were finally defined on the basis of desk study and field validation, representing the principal cone, circle or span of the view from each viewpoint to the point where the view is terminated or enclosed, or out to a distance of up to 10km considered to be appropriate in the context of the view and without imposing unreasonable constraints on wind energy developments that may be proposed. Each visual compartment is described as follows:

(i) West Cairn Hill

A 360° circle extends from the summit to a distance of 10km, extending beyond the West Lothian boundary in to South Lanarkshire, Scottish Borders, Midlothian and City of Edinburgh districts. Views from the summit are panoramic and extensive in all directions, although within the 360° circle there are some areas screened from view by intervening topography or vegetation. However, the distance is considered appropriate within which wind energy development would create significant adverse visual effects and would impair the visual experience having climbed to the summit via the Cauldstane Slap footpath route or other routes from within the Pentland Hills Regional Park.

(ii) Harperrig Reservoir

The setting of the reservoir from the informal carpark off the A70 at the south-western end of the reservoir is defined by Auchinoon Hill and Corston Hill to the north, and extends 5km eastwards and south-eastwards into the Pentland Hills beyond the West Lothian boundary. Some views southwards may be screened by West Cairns Plantation but the distance is considered appropriate to define the setting within which wind energy development would create significant adverse visual effects and would impair the visual experience from the viewpoint.

(iii) Public viewpoint on the A904 east of Newton

A small car park has been created alongside the A904 to provide a safe viewing area northwards across the Firth of Forth to the iconic Forth bridges and the Ochil Hills beyond. The view extends in a

cone at an angle of approximately 150° from the viewpoint northwards across the West Lothian Coastal Hills landscape unit, out to 5km which takes it beyond the West Lothian boundary and into the City of Edinburgh district to the east.

(iv) Tower at the House of the Binns

A 360° circle extends from the folly tower situated on Binns Hill to a distance of 5km. There are panoramic views in all directions from the viewpoint but the distance is considered appropriate within which wind energy development would significantly impact on the setting of the designed landscape and also the western and southern fringes of Hopetoun House designed landscape.

(v) Cockleroy

There are extensive panoramic views from this important local visitor destination in the Bathgate Hills adjacent Beecraigs Country Park. The extent of sensitive views to the north and west has been limited to 10km but has been extended to 15km to the east beyond the West Lothian boundary where views extend to the Forth bridges. Views to the south have been curtailed at The Knock and Cairnpapple Hill which limit views in this direction. To the south-east the visual compartment is limited to a distance of 5km between the Bathgate Hills and the northern edge of Livingston.

(vi) The Knock viewpoint and Cairnpapple Hill

From the high point in the Bathgate Hills between The Knock and Cairnpapple Hill views are panoramic and extensive to the south and west where the visual circle has been limited to 10km in accordance with the methodology. To the north and east the circle has been limited to 5km. A segment has been removed from the sensitive visual circle to the south-east due to topography and vegetation close to the viewpoint at Raven Craig Wood which screens views in this direction.

(vii) Binny Craig

A 360° circle extends from the viewpoint at the top of the hill out to a distance of 5km to Cockleroy beyond Beecraigs Country Park in the Bathgate Hills to the west. There are panoramic and extensive views in other directions but the 5km distance has been continued all around the viewpoint.

(viii) Avon Aqueduct

Views from the Avon Aqueduct are a key feature of the River Avon Heritage Trail. Views are limited to the north, south and west by the steep topography and vegetation along the river valley sides. To the east the view is curtailed by the Cockleroy viewpoint in the Bathgate Hills. The view opens out to the north-east where it extends to approximately 5km to the West Lothian boundary on Airngath Hill.

(ix) Blawhorn Moss

From the viewpoint within the NNR a 360° circle extends out to only 3km. The extent of the sensitive circle is limited by topography and surrounding dense coniferous plantations.

7 LANDSCAPE CAPACITY FOR WIND ENERGY DEVELOPMENT IN WEST LOTHIAN

Introduction

7-1 Following on from the sensitivity assessment, **step 6** involves the identification and mapping of strategic zones potentially suitable for wind energy development. Figure 5 combines the findings of the landscape sensitivity assessment shown in Figure 2 with the visual sensitivity assessment shown in Figure 3 to identify landscape units which lie outwith the areas identified as important to the setting of the two key landmark features (as described in paragraph 5-11) and outwith the sensitive visual compartments / cones defining the setting of the nine important viewpoints (as described in paragraph 6-8).

7-2 In assessing capacity it has generally been assumed that landscape units of lower sensitivity will have greater capacity to accommodate development, and that change will be most difficult to accommodate (although there may be some very limited capacity depending on site-specific circumstances) in units of higher sensitivity. It is generally assumed that units of medium sensitivity have the capacity to accommodate some change. The capacity assessment makes the following assumptions in accordance with the potential for wind energy development shown in Figure 5 and the wind energy typologies adopted in this study (see paragraphs 3-4 above and 7-5 below):

- Wind energy development would be **inappropriate** within the sensitive visual compartments / cones (areas shown uncoloured in Figure 5), where the setting of landmark landscape features and important viewpoints require protection;
- Wind energy development would be **inappropriate** within landscape units assessed as Areas of Highest Sensitivity (coloured red in Figure 5), which lie outwith the sensitive visual compartments / cones where landscape protection is required to retain existing character;
- Wind energy development would be **inappropriate** within landscape units assessed as High sensitivity (coloured pink in Figure 5), which lie outwith the sensitive visual compartments / cones and where there are potential constraints requiring landscape protection;
- Some wind energy development **may be appropriate** within units assessed as High sensitivity (coloured pink in Figure 5), which lie outwith the sensitive visual compartments / cones where the overall character of these units is retained;
- Some wind energy development **may be appropriate** within units assessed as Medium sensitivity (coloured orange in Figure 5), which lie outwith the sensitive visual compartments / cones where the overall character of these units is retained or where landscape change due to wind energy development may be appropriate.

7-3 In making these assumptions consideration has been given to certain factors considered critical in the assessment of capacity to accommodate wind energy development, derived from SNH guidance²⁴, reviews of previous landscape capacity studies (see paragraph 2-12) and from our own experience. Critical factors are specific to the landscapes under consideration, and site-specific issues will dictate overall capacity due to differences in characteristics, sensitivities and constraints. Critical factors will include (these are considered in more detail in the following paragraphs):

²⁴ Scottish Natural Heritage (December 2009); *Siting and Designing Windfarms in the Landscape*, Version 1; <http://www.snh.gov.uk/docs/A317537.pdf>

- Key landscape characteristics;
- The scale of wind energy development that may be accommodated;
- The ‘baseline’ landscape which will include existing wind energy developments;
- Cumulative effects;
- Landscape objectives with reference to key thresholds for landscape protection, landscape accommodation or landscape change;
- Effects on sense of distance and skylining;
- Effects on other landscape / townscape interests.

Key Landscape Characteristics

7-4 The methodology in Section 2 describes the criteria used in this study to assess landscape sensitivity. The key landscape characteristics listed in paragraph 2-6 are generally considered influential to the capacity of each landscape unit to accommodate wind energy development as described in Table E below:

Table E: Key Landscape Characteristics and their General Influence on Wind Energy Capacity

Key Landscape Characteristics	Key Landscape Considerations	General Influence on Wind Energy Capacity
Landform	Topography, shape, complexity; distinctive features; influence on views	<ul style="list-style-type: none"> • Simple, smooth, flat or gently undulating landforms generally have greater capacity than complex, rugged or steep landforms • Larger turbine groups may sometimes be accommodated on simple, flat or gently sloping hill fringe or lowland landscapes • Smaller turbine groups are likely to fit better in a rolling or undulating hill fringe or lowland landscape • Generally turbine height should be proportionate to landform height, with taller turbines on higher hills and smaller turbines on lower ground, to help retain topographic distinctions and contrasts between upland and lowland landscapes • Where sited on ridges or hills, turbine height should be typically less than one-third the perceived height of the ridge or hill to be proportionate to the landform • Development could intrude or be visually confusing if close to distinctive topographical features • Development within lowland landscapes could affect sense of contrast where there is existing wind development on adjoining upland areas • Floodplain landscapes have little capacity due to their essentially open character • Extensive flat lowland plateau or lowland plain landscapes may have capacity to accommodate wind energy development • Development could affect sense of distance
Landuse	Landuse change, historical continuity	<ul style="list-style-type: none"> • Development could affect perceptions of ‘naturalness’ in landscapes largely unaffected by modern influences
Landcover	Pattern, variety and complexity due to	<ul style="list-style-type: none"> • Extensive areas of homogenous character and similar ground cover generally have greater capacity than landscapes with a

Key Landscape Characteristics	Key Landscape Considerations	General Influence on Wind Energy Capacity
	the number and diversity of landscape features; infrastructure, settlement & other development	<p>smaller pattern and variety of landcover</p> <ul style="list-style-type: none"> • Large turbine groups may have an adverse ‘flattening’ effect on landscapes with a complex character and varied landcover where smaller groupings are likely to fit better • Relationship of turbines with the pattern, scale, location, character and setting of other built development, in particular the height of existing tall structures, will influence capacity • May be the need for visual separation to avoid visual conflicts due to contrasts in scale where existing structures are seen in close proximity to turbines • May be the need for visual separation to avoid cumulative effects where existing structures are seen in close proximity to turbines
Rarity	Rare / unusual landscapes with a distinctive ‘sense of place’	<ul style="list-style-type: none"> • Development could affect perceptions of distinctiveness and could physically affect landscapes with a rare or unusual character
Scale	Horizontal and vertical ‘size’ of the landscape and extent of land visible (scale generally increases with elevation and distance); size of features in the landscape	<ul style="list-style-type: none"> • Development must be in scale with the landscape, including any features in it, otherwise it will either dominate or appear too small and trivial • Intimate and small scale landscapes generally have less capacity than large scale landscapes • Large turbine groups may have an adverse ‘flattening’ effect on small scale, more intricate landscapes where smaller groupings are likely to fit better • Development could affect perception of vertical scale if turbines are too tall in comparison with landscape features or smaller turbines
Openness	Extent of enclosure / containment due to the arrangement of landscape elements and the interaction of their height and distance between them	<ul style="list-style-type: none"> • Enclosed or confined landscapes generally have less capacity than more open landscapes
Experience	For example wildness, solitude, tranquillity, sense of movement, etc.	<ul style="list-style-type: none"> • Development could affect perceptions of remoteness, calmness etc.

The Scale of Wind Energy Development that may be Accommodated

7-5 Clearly, landscape capacity for wind energy is influenced by the nature of the proposed development i.e. by turbine groupings and heights in relation to the landscape. As described in Section 3, a range of turbine groupings and turbine heights appropriate to the West Lothian context has been used in this study, as follows:

Turbine Groups: Single Turbine: 1 turbine
Small Wind Farm: 2-7 turbines
Medium Wind Farm: 8-20 turbines
Large Wind Farm: 21+ turbines
Extensions to existing wind farms

Turbine Heights: 51-80m approximately
81-100m approximately
101-130m+ approximately

7-6 This typology enables an assessment of a range of scenarios to take account of past wind energy developments in the study area (as defined in Section 1) and anticipated future trends, to enable consideration by West Lothian Council of not only a spatial framework for wind farms of over 20MW but also wind energy development with less than 20MW output.

7-7 The strategic nature of the study limits the capacity assessment to consideration of turbines above 50m in height to blade tip. Applications for turbines below 50m in height in West Lothian will continue to be considered by the Council on their merits, including consideration of a number of localised issues including settlement separation, views from settlement edges and routes and avoiding landscape impacts which will require to be the subject of landscape and visual impact assessment. There will also be the need for the assessment of other non-landscape and visual related impacts such as aviation, noise and impacts on the natural and built environment, etc.

The 'Baseline' Landscape including Existing Wind Energy Developments

7-8 Information on operational and consented wind energy developments in the study area, including those within a distance of 10km beyond the West Lothian council boundary (as explained in paragraph 1-22) is used to assess where and how existing wind energy development may affect landscape capacity to accommodate further wind energy development.

7-9 The table in Appendix 2 includes examples of wind energy developments (including turbines installed, approved, applications under consideration and some known pre-application scoping / screening considerations, as well as a selection of those withdrawn / refused) extending 10km into neighbouring districts. Figure 6 shows the location of operational and approved wind farms within the study area.

7-10 There are currently two operational wind farms in West Lothian, Pates Hill and Blacklaw (where only 4 turbines out of the existing 54 turbine wind farm lie within West Lothian). These are located within the Upland Hill Fringes LCT and landscape unit 2(ii) *Gladsmuir / Woodmuir / Camilty Fringe*. In this same landscape unit, Blacklaw extension 1 has recently been approved whilst the Tormywheel wind farm was approved in June 2007 (it is understood that this permission will expire in June 2012 although it is likely that an application will be made to extend the permission for a further two years).

7-11 The huge Blacklaw wind farm and the Muirhall wind farm are located in South Lanarkshire adjacent to the West Lothian boundary, and are visible from within West Lothian. The South Lanarkshire Landscape Character Assessment, 2010,²⁵ acknowledges that large scale wind farm development has significantly changed the character of the plateau moorland landscape adjacent to West Lothian, and that scope for further wind energy development here is limited.

7-12 The West Lothian capacity study takes these operational wind farms into account in assessing the sensitivity of the existing 'baseline' landscape and any cumulative effects that might occur if further development takes place. Self evidently, a wind farm or combinations of wind farms are likely to dramatically change the landscape character of the area on which they are built and

²⁵ Ironside Farrar, (November 2010); *South Lanarkshire Landscape Character Assessment*; http://www.southlanarkshire.gov.uk/downloads/file/4146/landscape_character_assessment-final_report_november_2010

their immediate surroundings. Furthermore, a single turbine can appear as a single feature which may not affect the landscape character of the wider landscape unit. However, a single turbine out of scale with the landscape could change its character.

Cumulative Effects

7-13 As mentioned in Section 1, there is now a wealth of policy and guidance on the assessment of cumulative effects of wind farm development²⁶. The February 2011 web-based renewable energy advice on ‘*Process for preparing spatial frameworks for wind farms*’²⁷, which replaces PAN 45 and Annex 2 ‘*Spatial Frameworks and Supplementary Planning Guidance for Wind Farms*’, explains that cumulative impacts occur when two or more wind farms are visible in combination, in succession or sequentially. The cumulative effect of inappropriately sited multiple wind farm development could be to create the perception of a landscape dominated by wind farms, where the Landscape Character Assessment and Landscape Capacity Study indicate the landscape is unable to accept such a level of change. The advice makes the following suggestion to planning authorities in the preparation of their spatial frameworks for windfarms:

“Broad areas of search should be planned with the existing pattern of development with the intention of encouraging clusters of wind farms and the spaces between clusters as an essential element of the spatial framework. Spaces may need to be identified as areas requiring significant protection in order to avoid coalescence between two wind farms to protect a coherent pattern of wind farm development and thereby reduce the potential for adverse cumulative impacts.”

7-14 The February 2011 web-based renewable energy advice on ‘*Onshore wind turbines*’²⁸ replacing PAN 45 and Annex 2²⁹ advises that in areas approaching their carrying capacity the assessment of cumulative effects is likely to become more pertinent in considering new wind turbines, either as stand alone groups or extensions to existing wind farms. In other cases, where proposals are being considered in more remote places, the thresholds of cumulative impact are likely to be lower, although there may be other planning considerations. The advice continues:

“In assessing cumulative landscape and visual impacts, the scale and pattern of the turbines plus tracks, power lines and ancillary development will be relevant considerations. It will also be necessary to consider the significance of the landscape and the views, proximity and intervisibility and the sensitivity of visual receptors”.

7-15 This capacity study takes operational wind farms as of summer 2011 into account in assessing any cumulative effects on landscape character and visual amenity that might occur if further development takes place. This includes potential visual impact from principal roads and other routes as discussed in Section 6.

²⁶ Relevant guidance includes Entec (September 2008); *Review or Guidance on the Assessment of Cumulative Impacts of Onshore Windfarms*; <http://www.renewableeast.org.uk/uploads/ENTEC---0811-windfarm-cumulative-impacts-report.pdf> and Scottish Natural Heritage (April 2005) *Cumulative Effects of Windfarms*; <http://www.snh.gov.uk/docs/A305440.pdf>

²⁷ The Scottish Government (February 2011); *Process for preparing spatial frameworks for wind farms*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/spatialframework>

²⁸ The Scottish Government (February 2011); *Onshore wind turbines*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore>

²⁹ The Scottish Government (November 2008); *Planning Advice Note 45. Annex 2: Spatial Frameworks and Supplementary Guidance for Wind Farms*; <http://openscotland.net/Publications/2008/11/12125039/0>

Landscape Objectives with Reference to Key Thresholds for Landscape Protection, Accommodation or Change

7-16 In assessing overall capacity it is helpful to identify and consider key thresholds or ‘tipping points’ of landscape change that may occur as a result of wind energy development, as recommended in SNHs guidance on *Siting and Designing Wind Farms in the Landscape*³⁰. The guidance advises that in judging whether or not an area should be kept free of windfarm impacts it is helpful to develop a clear view about which of three possible landscape objectives should apply: landscape protection, landscape accommodation or landscape change. These should not be seen as rigidly distinct objectives.

7-17 Landscape Protection is required where the objective is to maintain the existing landscape character and visual resource, to retain or reinforce its present character and protect its quality and integrity. Capacity is limited since it is likely to be difficult to accommodate wind farms in these areas, although small scale turbine development and micro-generation may be acceptable where it relates well to the existing landscape in terms of scale and design, and where it relates well to the existing built environment. The landscape remains as a landscape with no wind farms or with infrequent wind energy development.

7-18 Landscape protection will be the most appropriate objective within the sensitive visual compartments / cones where the setting of landmark landscape features and important viewpoints require protection (shown uncoloured in Figure 5), and in areas assessed as being Areas of Highest Sensitivity (shown coloured red in Figure 5). This objective will also be appropriate in areas of High sensitivity (shown coloured pink in Figure 5) where there are potential constraints requiring landscape protection.

7-19 Landscape Accommodation is required where some wind energy development could be acceptable as long as overall landscape character and visual amenity is retained. Rather than seeking to protect the landscape, with this objective there may be important landscape-related constraints in terms of the siting and scale of wind energy development, but suitably designed wind farms which generally fit within the landscape could potentially be accommodated even though they may have an impact on the landscape locally. The landscape is a landscape with wind energy development.

7-20 Landscape accommodation will be the most appropriate objective within areas of High sensitivity (shown coloured pink in Figure 5) where there are no potential constraints requiring landscape protection, and in areas of Medium sensitivity (shown coloured orange in Figure 5) with some landscape-related constraints but where some wind energy development could be accommodated if overall landscape character is retained.

7-21 Landscape Change is appropriate in areas where it is accepted that landscape character can change as a result of wind energy development, creating new character and possibly the perception of a wind farm landscape. In general, there will be significant capacity for wind energy development in areas where landscape change is considered acceptable. In such areas, good landscape design principles still need to be followed to ensure that the development is appropriate in terms of scale and design.

7-22 Landscape change could be the most appropriate objective in areas assessed as Low sensitivity (however, no such areas have been identified in this study), or could possibly be

³⁰ Scottish Natural Heritage (December 2009); *Siting and Designing Windfarms in the Landscape*, Version 1; <http://www.snh.gov.uk/docs/A317537.pdf>

appropriate in some areas of Medium sensitivity (shown coloured orange in Figure 5) where there are no potential landscape-related constraints or where landscape character and visual amenity is already affected by existing wind energy development. Any further wind energy development would breach the threshold or 'tipping point' of landscape change but the council may consider the resulting landscape, visual and cumulative effects to be acceptable.

Effects on Sense of Distance and Skylining

7-23 Effects on perceptions of distance may be distorted with additional wind energy development. For example, if larger turbines are located in the foreground of smaller turbines, or vice versa. This is an important consideration in assessing the capacity of more open landscapes where long views and a sense of distance is a key characteristic.

7-24 Whether or not wind turbines are prominent on a skyline can have a significant effect on their acceptability in terms of landscape character and visual impact. Landscapes that have already been affected by other built development on a skyline are likely to be less sensitive and have greater capacity for wind energy development that does not affect distinctive sensitive features. Where an existing wind farm is already prominent on a skyline the introduction of additional structures along the horizon may result in development that is disproportionately dominant. The ratio of developed to non-developed skyline is an important consideration in assessing landscape capacity.

7-25 Where skylines are especially sensitive, it is likely to be more acceptable to site turbines so that they are backclothed against hillsides beyond, whilst recognising that the skyline could change in different weather conditions i.e. middle distance hills can become 'horizon hills' on cloudy days.

Effects on Other Landscape / Townscape Interests

7-26 Effects of additional development on other interests in the landscape is an important consideration in assessing capacity. For example, this may include consideration of effects on the setting of settlements or cultural / historical associations where they impact on landscape character. The definition of the study area in Section 1 explains that whilst taking broad settlement issues into account, in particular pattern and setting, the study addresses renewable energy issues outwith the main settlement boundaries as shown in the Local Plan. Smaller settlements are 'washed over' and included within the assessment of landscape character types where they exhibit a stronger countryside rather than urban character. It is envisaged that the Council will continue to address limits and thresholds for wind turbines within settlement envelopes and at settlement edges where pressure for development can be the greatest, especially where these coincide with edges of landscape designations such as AGLV or Areas of Special Landscape Control.

7-27 West Lothian has been successful in recent years in attracting new high technology electronics, software and biotechnology businesses located within purpose built business parks and campuses. The modern technological, well designed character of these areas could make them suitable locations for the siting of wind turbines, where there may be greater capacity than in some of the more sensitive, undeveloped countryside locations. Any sites considered suitable would need careful landscape and visual impact assessment, but could potentially become acceptable local landmarks even where located close to housing (in a similar way to the two 120m high turbines erected at the Michelin tyre factory in Dundee in 2006). Potential locations within West Lothian may be within the Houstoun Industrial Estate northeast of Livingston, Starlaw Business Park and Deans Industrial Estate west of Livingston, The Pyramids Business Park to the east of Bathgate, Junction 4 on the M8 close to the Whitehill Industrial Estate, and within the East Mains Industrial Estate to the east of Broxburn.

Locations with Potential for Wind Energy Development in West Lothian

7-28 Table F below summarises the findings of step 6, showing the capacity assessment of those parts of the landscape units which lie within strategic zones potentially suitable for wind energy development, following the sequential assessment of landscape and visual sensitivity. These strategic zones are shown in Figure 5. **It is important to recognise that the capacity assessment refers only to parts of the landscape units and not to the entire unit.** For each of these areas it shows the relevant landscape character type and landscape unit, the sensitivity assessment, landscape objective with reference to key thresholds, consideration of possible impact on principal routes and cumulative effects, and the overall capacity assessment.

7-29 As a result of the step-by-step capacity assessment, 12 landscape units (or rather **parts of 12 landscape units**) have been identified with the potential capacity to accommodate wind energy development. Of these, one unit, 3(i) *Bathgate Hills* within the Lowland Hills & Valleys LCT, is assessed as an Area of Highest Sensitivity where the objective should be landscape protection and where there is thus no capacity to accommodate any of the turbine groupings and heights included in the typologies. One unit, 7(ii) *Almond Valley* within the Lowland River Corridors LCT, is assessed as an area of High sensitivity with landscape constraints requiring protection, in particular the small scale, enclosed and distinctive steep sided river valley which is a significant recreational resource, where there is no capacity to accommodate any of the turbine groupings and heights included in the typologies.

7-30 Landscape unit 2(iii) *Harburn / Hartwood Fringe* within the Upland Hill Fringes LCT, is also assessed as High sensitivity overall. It is predominantly a small scale, settled, enclosed landscape lying within the Upland Hill Fringes landscape type where protection of these characteristics is considered an appropriate landscape objective. There is generally limited capacity for wind energy development within this landscape unit. However, the north-western end of the unit between the A704 and the A71 is less sensitive, being more unsettled with reminders of previous coal and oil shale works, including disused mines and other infrastructure from the Addiewell Oilworks and disused quarries, opencast workings and tips at Longford. Consequently there may be capacity here for some wind energy development to be accommodated without affecting overall character and visual amenity of the wider landscape unit. As noted in Table F, however, cumulative effects with Blacklaw wind farm (including approved extension), the operational wind farms of Pates Hill and Muirhall, and possibly Tormywheel (if constructed), together with impacts on views from the A704 and A706, need careful consideration before deciding on an acceptable approach to wind energy development in this location. These issues are considered in more detail in Section 8.

7-31 The remaining nine landscape units are all assessed as Medium sensitivity where some wind energy development could be acceptable. Landscape accommodation is considered the most appropriate objective (rather than landscape protection or landscape change) since there may be some important landscape-related constraints in terms of the siting and scale of wind energy development, but suitably designed wind energy developments which generally fit within the landscape could potentially be accommodated even though they may have an impact on the landscape locally. One of these landscape units is assessed as having medium capacity (unit 5(i)), two units are assessed as having low / medium capacity (units 2(ii) and 4(i)) with another six units assessed as having low capacity (5(iii), 6(i), 6(ii), 6(iii), 7(iv) and 8(ii)). Where the assessments are dependent on other considerations, in particular cumulative impacts, including impacts on views from principal routes as noted in the Table F, these issues are considered in more detail in Section 8.

7-32 There are no areas within West Lothian with significant capacity where landscape change and the creation of a new wind farm landscape (i.e. where wind turbines are the dominant element in the landscape) is likely to be an appropriate objective.

Table F: Locations with Potential for Wind Energy Development in West Lothian (refer to Figure 5)

Units with potential (Figure 5)	Landscape Character Type (Figure 1)	Landscape Unit (Appendix 1)	Landscape sensitivity assessment (Section 5 Table D)	Landscape objective (Section 7 paras 7-16 to 7-22)	Capacity assessment	Other considerations, including cumulative effects & views from principal sensitive routes (excluding any designations/zones) (Figure 4 & Figure 6)
2(ii)	Upland Hill Fringes	Gladsmuir / Woodmuir / Camilty Fringe	Medium	Accommodation	Low / Medium	<ul style="list-style-type: none"> • Cumulative effects with Blacklaw (including approved extension), Pates Hill, Muirhall and possibly Tormywheel • Impact on views from A706 and the Fauldhouse Rail Core Path
2(iii)	Upland Hill Fringes	Harburn / Hartwood Fringe	High	Protection / Accommodation	Low	<ul style="list-style-type: none"> • Cumulative effects with Blacklaw (including approved extension), Pates Hill, Muirhall and possibly Tormywheel • Impact on views from A704 and A706
3(i)	Lowland Hills & Valleys	Bathgate Hills	Area of Highest Sensitivity	Protection	None	<ul style="list-style-type: none"> • N/A
4(i)	Broad Valley Lowlands	Almond Valley	Medium	Accommodation	Low / Medium	<ul style="list-style-type: none"> • Cumulative effects with Blacklaw (including approved extension) and possibly Tormywheel • Impact on views from A704, A705, A706, the Fauldhouse Rail Core Path, Almond Valley Core Path and National Cycle Route 75
5(i)	Lowland Plateaux	Polkemmet Moor	Medium	Accommodation	Medium	<ul style="list-style-type: none"> • Cumulative effects with Blacklaw (including approved extension), Pates Hill, Muirhall and possibly Tormywheel • Impact on views from A704 and A706
5(iii)	Lowland Plateaux	Livingston / Blackburn Plateau	Medium	Accommodation	Low	<ul style="list-style-type: none"> • Impact on views from the Almond Valley Core Path and National Cycle Route 75

Units with potential (Figure 5)	Landscape Character Type (Figure 1)	Landscape Unit (Appendix 1)	Landscape sensitivity assessment (Section 5 Table D)	Landscape objective (Section 7 paras 7-16 to 7-22)	Capacity assessment	Other considerations, including cumulative effects & views from principal sensitive routes (excluding any designations/zones) (Figure 4 & Figure 6)
6(i)	Lowland Plains	Kirknewton Plain	Medium	Accommodation	Low	<ul style="list-style-type: none"> Impact on views from M9 and B8046
6(ii)	Lowland Plains	East Calder / Livingston / Broxburn Plain	Medium	Accommodation	Low	<ul style="list-style-type: none"> Impact on views from M9, B8046, the Union Canal Core Path, the Dechmont to Newbridge Cycle Path and National Cycle Route 75
6(iii)	Lowland Plains	Winchburgh / Niddry Plain	Medium	Accommodation	Low	<ul style="list-style-type: none"> Impact on views from M9 and the Union Canal Core Path
7(ii)	Lowland River Corridors	Almond Valley	High	Protection	None	<ul style="list-style-type: none"> Impact on views from the Union Canal Core Path, the Feeder Canal Path and National Cycle Route 75
7(iv)	Lowland River Corridors	West Calder Burn / Breich & Harwood Waters	Medium	Accommodation	Low	<ul style="list-style-type: none"> Cumulative effects with Blacklaw (including approved extension), Pates Hill and possibly Tormywheel Impact on views from A704, A706, A705 and the Fauldhouse Rail Core Path
8(ii)	Lowland Hill Fringes	Bathgate Fringe	Medium	Accommodation	Low	<ul style="list-style-type: none"> None

8 GUIDANCE FOR DEVELOPMENT MANAGEMENT OF WIND ENERGY PROPOSALS

8-1 A significant amount of guidance has been published on the siting and design of wind farms, in particular by SNH in *Guidance on the Environmental Impacts of Wind farms and Small Scale Hydroelectric Schemes* (2001) and *Siting and Designing wind farms in the landscape* (December 2009). This latter guidance supersedes the landscape sections of the former document and reflects the advance in the understanding of the key landscape and visual issues following more than a decade of wind farm development in Scotland. These and other SNH guidance documents of relevance are included in the Bibliography in Appendix 3.

8-2 In recognition of the policy in paragraph 187 of *Scottish Planning Policy*³¹ and the latest Scottish Government advice on renewable energy published in February 2011³² (see Section 7 above), this section provides guidance at the strategic level on the overall suitability, scale and location of the typologies for five turbine groups and three turbine heights for wind energy development in West Lothian (see Section 3) to assist the Council in considering planning applications within the development management process. This section does not repeat existing guidance on wind farm siting and design in respect of a detailed consideration of issues such as turbine form and design, colour, ancillary infrastructure and micro-siting.

8-3 Importantly, this guidance cannot undertake a landscape and visual impact assessment (LVIA) for a particular proposal, so that every wind turbine application submitted for planning determination must be subject to the LVIA process in order to fully assess its acceptability in landscape and visual terms.

8-4 **All proposals should comply with the principles set out in SNH guidance and all should be subject to detailed landscape and visual impact assessment including cumulative impacts in accordance with GLVIA³³. Planning applications for wind energy development to West Lothian Council are assessed and determined on their merits against a wide range of material considerations, including Environmental Impact Assessment requirements where applicable, of which landscape, visual and cumulative impacts are important factors.**

8-5 As discussed in the previous section, the study has identified ten locations where some wind energy development could be acceptable subject to further consideration of cumulative effects with existing wind farms and impact on views from principal routes, as noted in Table F. This guidance indicates where at the strategic level there may be cumulative impacts where two or more wind farms are visible either in combination, in succession or sequentially, in accordance with the February 2011 Scottish Government guidance.

8-6 **All proposals should provide detailed analysis to demonstrate combined, successive and sequential cumulative visual impacts of the proposal with other operational, consented and proposed wind energy developments along the principal routes, and should demonstrate to the Council's satisfaction that there would not be significant adverse cumulative impacts on any of these routes.**

³¹ The Scottish Government (February 2010); *Scottish Planning Policy*, <http://www.scotland.gov.uk/Publications/2010/02/03132605/0>

³² The Scottish Government (February 2011); *Process for preparing spatial frameworks for wind farms*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/spatialframework> and

The Scottish Government (February 2011); *Onshore wind turbines*; <http://www.scotland.gov.uk/Topics/Built-Environment/planning/National-Planning-Policy/themes/renewables/Onshore>

³³ The Landscape Institute and the Institute for Environmental Management and Assessment (Second Edition 2002); *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*

8-7 Guidance is given below to aid management of wind turbine/farm development only within those parts of the landscape units identified as having some landscape and visual capacity for wind energy, as shown in Figure 5. **As mentioned in paragraph 7-28, it is important to recognise that the capacity assessment refers only to parts of the landscape units and not the entire unit.** This should be read with reference to Table F and Figures 4, 5 and 6 and each proposal should also accord with other published good practice guidance on siting and design.

8-8 In accordance with the February 2011 Scottish Government advice, the guidance below considers where clusters of wind farms may be appropriate and where there is a need for spaces between clusters to avoid coalescence between two wind farms, and in order to protect a coherent pattern of wind farm development and thus reduce the potential for adverse cumulative impacts. It will be necessary for the Council to consider the degree of change that is acceptable, including whether wind farms should be ‘concentrated’ to limit the spread of effects on landscape and visual amenity or more widely spaced to reduce impacts on particular localities. In landscape and visual amenity terms there are benefits and disadvantages in both approaches, so this becomes a policy decision influenced by other material considerations. As the February 2011 guidance advises, it will be necessary to consider the significance of the landscape and the views, proximity and intervisibility and the sensitivity of visual receptors.

Landscape unit 2(ii) *Gladsmuir / Woodmuir / Camilty Fringe* within the Upland Hill Fringes landscape character type

8-9 The western half of the wider landscape unit lies within an area identified as having the potential to accommodate some wind energy development. Both of the two operational wind farms in West Lothian are located within this part of the landscape unit, namely Pates Hill (7 turbines @107m high) and Blacklaw (only 4 out of a total of 54 turbines @126.5m in West Lothian), with the majority of Blacklaw (50 turbines@ 126.5m) and Muirhall wind farm (6 turbines @125m high) lying outwith the study area immediately to the south of the unit, within South Lanarkshire. Permission has recently been granted for an extension to Blacklaw with an additional 23 turbines each 126.5m high to the east of the existing wind farm within the Gladsmuir Hills in West Lothian. Finally, there is an outstanding consent for the Tormywheel wind farm (15 turbines@102m high) at Leven Seat between the Gladsmuir Hills and Woodmuir Plantation.

8-10 This part of the wider landscape unit is currently ‘a landscape with wind energy development’. Large scale mineral workings, pylons and extensive forestry reduce the sensitivity of the landscape such that suitably designed wind energy development could potentially be accommodated. However, its character will change to ‘a wind farm landscape’ if the Blacklaw extension and Tormywheel wind farms become operational. Capacity for further wind energy development is thus low and would create unacceptable landscape and visual impacts. Key constraints are:

- Insufficient space between Blacklaw extension and Tormywheel will result in coalescence of the two wind farm clusters. The different turbine heights (126.5m / 102m respectively) could create an incoherent pattern, increasing cumulative impacts;
- The open, largely un-wooded nature of the Leven Seat area which rises to a height of 356m and provides a locally prominent backdrop in sensitive views southwards from Fauldhouse and from the A706 and B7010 at Longridge, and panoramic views westwards and northwards from the A706 close to its junction with the A704, and from the Fauldhouse Rail Path;

- The probable skylining effects of turbines on the open, prominent Leven Seat area.

8-11 Due to the open, prominent nature of the Leven Seat area, any wind development here, including turbines, tracks, power lines and ancillary infrastructure will create significant visual impact due to its proximity to sensitive visual receptors. Whilst the surrounding forestry at Pates Hill and the Gladsmuir Hills provides local screening to existing wind farms at Pates Hill and Blacklaw respectively, the Tormywheel development will be particularly prominent. In distant views Blacklaw is prominent on the skyline as will the permitted Blacklaw extension be. The introduction of additional structures along the horizon as a result of the construction of the Tormywheel wind farm may result in development that is disproportionately dominant on an otherwise undeveloped skyline.

8-12 If Tormywheel did not become operational there would be more capacity for a medium wind farm of possibly 8-12 turbines @101-125m approximately, possibly located somewhere within the Woodmuir Plantation subject to other environmental and non-environmental considerations. There could also be capacity for a small extension of the Pates Hill wind farm with turbines 107m tall to match existing. This would provide three clusters of wind farms within established forestry, i.e. Blacklaw in the Gladsmuir Hills, a new wind farm within Woodmuir Plantation, and Pates Hill wind farm within forestry at Pates Hill, with more appropriate spacing between them. This would create a more coherent pattern of development than if the Blacklaw extension and Tormywheel wind farms were to become operational within an open, undeveloped area of less than 2km between them, thereby increasing the potential for adverse cumulative impacts.

8-13 In accordance with the February 2011 Scottish Government guidance on the preparation of a spatial framework for wind farms, West Lothian Council could identify the spaces between the clusters as an essential element of the spatial framework, requiring significant protection from wind energy development. At Leven Seat this could be a further catalyst for restoration and environmental enhancement once existing quarrying and tipping has ceased.

Landscape unit 2(iii) Harburn / Hartwood Fringe within the Upland Hill Fringes landscape character type

8-14 As described in paragraph 7-30, landscape unit 2(iii) is a predominantly small scale, settled, enclosed landscape of High sensitivity where protection of these characteristics is considered an appropriate landscape objective. There is generally limited capacity for wind energy development within this landscape unit. However, the north-western end of the unit between the A704 and the A71 is less sensitive, being more unsettled with evidence of previous coal and oil shale works, including disused mines and other infrastructure from the Addiewell Oilworks and disused quarries, opencast workings and tips at Longford. Consequently there may be landscape capacity here for some wind energy development to be accommodated without affecting the character of the more sensitive wider landscape unit.

8-15 However, cumulative effects with Blacklaw wind farm (including approved extension) and the wind farms of Pates Hill, Muirhall and possibly Tormywheel (if constructed), particularly impacts on views from the A704 either side of Longford Bridge and the A706 south of Longridge, need careful consideration before deciding on an acceptable approach to wind energy development in this location.

8-16 This is a transitional landscape lying between the uplands to the south and the lowland river valleys to the north. Small turbines, either single or in small groups, are likely to be more proportionate to the scale of the landscape, to help retain topographic distinctions and contrasts

between the upland and lowland landscapes. Disused quarry buildings to the east of Breich provide scale comparators limiting appropriate turbine height to the lower end of the 51-80m typology, and more probably below 50m, to ensure scale compatibility and to avoid skylining effects in views from the north. Views northwards from the A704 are panoramic across the Breich and Almond Valleys towards the Bathgate Hills and are sensitive since travellers on the main road east-bound gain their first impression across West Lothian on emerging out of the Woodmuir Plantation. Consequently capacity for wind energy development within landscape unit 2(iii) is considered low.

Landscape Unit 4(i) *Almond Valley* within the Broad Valley Lowlands landscape character type

8-17 Two separate areas of landscape unit 4(i) have the potential for wind energy development as shown in Figure 5. A small triangular-shaped area lies immediately to the east of Fauldhouse on land falling gently south-westwards from Longridge. It is an unsettled, lowland valley landscape of predominantly pasture with roadside tree belts and coniferous plantation providing local landscape variation and screening. Disused quarries and tips are being restored and provide a legacy of the areas industrial past. Whilst these characteristics may suggest a landscape of medium sensitivity and some capacity to accommodate development, visual impact is likely to be significant given the proximity and the sensitivity of views from Fauldhouse, Longridge, the A704, A706 and B7010 and the Fauldhouse Rail Core Path. In particular there are long distance panoramic views southwards to Leven Seat and the Gladsmuir Hills where potentially two or more wind farms will be visible either in combination, in succession or sequentially, creating cumulative effects. Effects on perceptions of distance may become distorted with new wind energy development, no matter how small, within this part of landscape unit 4(i). Consequently capacity for wind energy development here is considered low.

8-18 A larger area of the *Almond Valley* landscape unit 4(i) is situated between Blackburn, Stoneyburn and Livingston, south of Seafield and north of the Breich Valley. This is a predominantly medium scale, open, broad, relatively flat lowland pastoral landscape, with scattered and frequent farm steadings linked by minor roads which bridge over the numerous tributary burns and the inconspicuous River Almond. Individual or small groups of trees provide the main vertical contrast to the horizontal valley, together with the distinctive oil shale bings including the 'Five Sisters'. Generally of medium sensitivity, this unit has medium capacity to accommodate some wind farm development of the appropriate scale, restricting turbine groups to single or small numbers and a height at the lower end of the 51-80m typology or more likely below 50m tall.

8-19 There are medium to long distance panoramic views across the area from higher ground in the north and south, in particular from the A705 between Livingston and Seafield and from the A704. More local sensitive viewpoints include the Almond Valley Core Path and National Cycle Route 75, as well as views from numerous individual properties and settlement edges. From these sensitive viewpoints the character and scale of the landscape and the features within it are evident within the foreground or middle distance of long distance views to the Bathgate Hills or the Pentlands, Pates Hill and the Gladsmuir Hills beyond. Existing wind farms are evident but distant, and cumulative effects relatively insignificant. Of greater concern in allowing wind energy development within this part of landscape unit 4(i) is the potential effect of distorting the perceptions of distance where sense of distance is a key characteristic.

8-20 Although there may be the capacity for some small scale wind energy development, careful assessment of the landscape context, such as field pattern and the presence and character of landscape features, and visual impact of each proposal is required, together with the assessment of other material considerations including environmental (for example impact on the setting of Scheduled Monuments such as the Five Sisters bing) and non-environmental considerations.

Landscape Unit 5(i) *Polkemmet Moor* within the Lowland Plateaux landscape character type

8-21 A significant proportion, probably two-thirds, of landscape unit 5(i) has the potential for wind energy development. A relatively flat plateau with a central west-east ridge of moorland and extensive coniferous plantations, the unit gently falls northwards from the Fauldhouse Hills at 290m AOD to the River Almond at around 190m AOD, and falls more steeply southwards down to the Breich Water at around 210m. The high plateau is almost entirely unsettled, with only one minor road linking Greenrig / Harthill to Fauldhouse and very little settlement apart from isolated farms on the lower slopes and some expansion of Fauldhouse and Longridge (just outside the area) up the slope. Past open cast coal mining is very evident in the numerous artificial humps and hollows, dismantled railway lines and disused mines and quarries. Coal bings are becoming vegetated but are conspicuous vertical features where located within the open moorland landscape.

8-22 There is great variety in views from Polkemmet Moor, from extensive, distant views out from the open moorland southwards to the Gladsmuir Hills and the Blacklaw wind farm, to more confined and enclosed views from within the plantations. Sensitive views into the area are distant from the A706 east of Leven Seat, and more local from the A706 south of Whitburn and the A706 & B7010 west of Longridge.

8-23 There may be some 'in combination', 'in succession' or 'sequential' cumulative visual effects where two or more wind energy developments would be visible if there was wind energy development within landscape unit 5(i). However it may be possible to locate a small wind farm with turbines approximately 100m tall within the Fauldhouse Hills, subject to detailed assessment of all material considerations (for example issues of noise and shadow flicker on nearby sensitive receptors, in particular dwellings in Fauldhouse). This would create another wind farm cluster within established forestry, similar in character to Blacklaw, Pates Hill and any other wind farm development that may be permitted within the Woodmuir Plantation (see paragraph 8-12) with a coherent pattern and spaces between them. The space between a wind farm within the Fauldhouse Hills and the extension to the Blacklaw wind farm, i.e. the lower northern edge of the Gladsmuir Hills south of the A71 and the Breich Water Valley between the A71 and Fauldhouse could be identified as an essential element of West Lothian Council's spatial framework, requiring significant protection.

Landscape Unit 5(iii) *Livingston / Blackburn Plateau* within the Lowland Plateaux landscape character type

8-24 Almost the entire unit lies within an area identified as having the potential to accommodate some wind energy development. It is a generally open or semi-open area, largely artificially drained but comprising raised peatland bogs and important wetland areas of nature conservation importance. The variety of land cover types creates a diverse landscape of high sensitivity in terms of its complexity, but an overall landscape character of probably medium sensitivity.

8-25 The area is isolated between principal roads including the M8 corridor, linking business parks on the edges of Bathgate and Livingston. It is managed as a recreational, educational and wildlife resource of importance within an increasingly built-up area. Mixed plantations and shelterbelt planting provide local enclosure around the wetlands, but elsewhere there are views northwards to the Bathgate Hills and long distance views southwards to the Pates Hill wind farm. National Cycle Route 75 passes through Easter Inch Moss and there are other sensitive views from the Almond Valley Core Path.

8-26 The significance of the landscape and the views, proximity and intervisibility and the sensitivity of visual receptors create a low capacity to accommodate wind energy development. However, as discussed in paragraph 7-27, the modern technological, well designed character of industrial estates and business parks could make them suitable locations for siting individual or small groups of wind turbines, possibly around 100m tall, where they could become local landmarks. Potential locations could be within The Pyramids Business Park on the edge of Bathgate, and the Starlaw Business Park and Deans Industrial Estate both on the edge of Livingston. The character of the M8 corridor through the area, with its huge modern warehouse buildings and further employment development planned at Junction 3a, could make it a suitable location for wind energy development integrated with business and employment estates, subject to careful assessment of all material considerations.

Landscape Unit 6(i) *Kirknewton Plain* within the Lowland Plains landscape character type

8-27 A very small part of landscape unit 6(i) *Kirknewton Plain* falls outwith the sensitive visual compartments / cones close to the West Lothian boundary to the east. Being of medium sensitivity, it has the potential to accommodate some wind energy development. It occupies low lying, gently rolling, medium scale arable land around Linburn, with the A71 passing west-east through the area. The gently meandering, tree-lined Gogar Burn also passes through the area in the same direction, and combines with other roadside and field edge trees to provide significant localised landscape enclosure. Views out of the area are limited by the northern edge of Corston Hill and the Pentlands to the south and Kaimes Hill and Dalmahoy Hill just beyond the district boundary to the east. Tall pylons and electricity lines cut through the area and intrude into the otherwise distinctly rural, farmed landscape.

8-28 The wider landscape unit potentially has the capacity to accommodate some well sited and designed wind energy development of appropriate scale, in landscape character terms. However, the area lies within view cones from principal routes in the north, as shown in Figure 4, in particular from the M9 west of Junction 1a, and the B8046 within the Bathgate Hills, with views southwards to the Pentland Hills. From these viewpoints long views and a sense of distance are important characteristics which may become distorted with wind energy development within unit 6(i).

8-29 The significance of the landscape and the views, proximity and intervisibility and the sensitivity of visual receptors create a low capacity to accommodate wind energy development. Small turbines below 50m in height may be acceptable if carefully located close to agricultural or other buildings of similar scale.

Landscape Unit 6(ii) *East Calder / Livingston / Broxburn Plain* within the Lowland Plains landscape character type

8-30 Two parts of landscape unit 6(ii) *East Calder / Livingston / Broxburn Plain*, lying either side of unit 7(ii) *Almond Valley*, are identified as having the potential to accommodate some wind energy development. The smallest area lies to the south, between the Almond Valley and the B7015. A low lying, relatively open, medium scale, flat or gently rolling, intensively farmed arable landscape, this area has low capacity except perhaps for individual small turbines below 50m associated with farm buildings. Turbines any larger than this would dominate and be out of scale and character with the landscape.

8-31 Immediately to the south of this area, between the B7015 and the A71 there are significant built structures including pylons and overhead electricity lines, farm buildings and the extensive mixed use Camps Industrial Estate built around a poultry farm off the B7015. This area is of lower

landscape sensitivity where key landscape characteristics of the wider landscape unit have broken down, and there is greater potential for further development as recognised in the West Lothian Local Plan. Wind energy development may not be compatible with the local plan's Core Development Area allocation, however.

8-32 The other part of landscape unit 6(ii) *East Calder / Livingston / Broxburn Plain* lies to the north of the Almond Valley, between Livingston and Broxburn. Close to the settlements it has a largely urban-edge character with the busy M8 corridor and mixed land uses including cement works, storage units and workshops, scrap dealers, a garden nursery, electricity sub-station and poultry sheds. There is a network of pylons and high and low voltage power lines and remnants from the oil shale industry include a remaining bing, disused mineral lines and other more subtle features in the landscape. Further east the character becomes more rural with intensively farmed, typically large scale, open, flat arable fields and scattered farms.

8-33 Large scale wind energy development is likely to be visually dominant and out of scale and character with the landscape, including significant features such as the Almond Valley Viaduct taking the railway over the River Almond, and the Almond Aqueduct where the Union Canal and River Almond meet at Lin's Mill.

8-34 As with landscape unit 6(i), the area lies within view cones from principal routes in the north, in particular from the M9 west of Junction 1a, and the B8046 within the Bathgate Hills, with views south-eastwards to the Pentland Hills. From these viewpoints long views and a sense of distance are important characteristics which may become distorted with wind energy development within unit 6(ii). Localised sensitive viewpoints include views from the Union Canal Core Path, the Dechmont to Newbridge Cycle Path and National Cycle Route 75.

8-35 Consequently capacity of landscape unit 6(ii) to accommodate wind energy development is low, likely to be restricted to individual small turbines below 50m associated with farm buildings or other similar built structures.

Landscape Unit 6(iii) *Winchburgh / Niddry Plain* within the Lowland Plains landscape character type

8-36 Close to the district boundary to the east, the eastern half of landscape unit 6(iii) *Winchburgh / Niddry Plain* is identified as an area with the potential to accommodate some wind energy development in landscape character and visual amenity terms. The southern end of the unit lies immediately to the east of Broxburn, sandwiched between the huge horizontal sheds within the East Mains Industrial Estate and the main Edinburgh to Glasgow railway which forms the district boundary here. The huge orange / pink, flat topped Greendykes oil shale bings are evident in most views from within and beyond the unit, whereas the Faucheldean bing is more difficult to distinguish as a bing at a distance due to its smaller size and owing to very successful plant colonisation.

8-37 Currently comprising a small number of flat, small scale grassland fields enclosed by dense woodland found at the edge of the industrial estate and on the railway embankment, this area is identified as a mixed use core development area in the West Lothian Local Plan. With the existing character and scale of the landscape there is low capacity for wind energy development. Turbines would introduce alien vertical structures into what is characteristically a horizontal landscape. Wind energy development is also unlikely to be compatible with the Council's Greendykes land use allocations for this area, although the East Mains Industrial Estate could be a suitable location for siting individual or small groups of wind turbines, possibly up to 100m tall. The Council should take

into account other material considerations such as impact on the setting of the Faucheldean and Greendykes Scheduled Monuments.

8-38 The northern end of this landscape unit lies to the east of Winchburgh and is a gently undulating, medium scale, semi-open lowland plain dominated by the artificial form of the Niddry oil shale bing, similar in character to the Faucheldean bing though smaller. The M9 motorway and the Edinburgh to Glasgow railway dilute the rural character of the landscape. Features in the landscape include Niddry Castle and small arched road bridges over the Union Canal. This part of unit 6(iii) also has low capacity for wind energy development. Turbines would introduce alien vertical structures into what is characteristically a horizontal landscape. Small turbines below 50m in height may be acceptable if carefully located close to agricultural or other buildings of similar scale, and where visual impact in long distance sensitive views from the M9 to the Pentlands and more local views from the Union Canal Core Path are taken into account.

Landscape Unit 7(iv) West Calder Burn / Breich & Harwood Waters within the Lowland River Corridors landscape character type

8-39 Almost the entire landscape unit 7(iv) *West Calder Burn / Breich & Harwood Waters* is identified as a landscape with the potential to accommodate some wind energy development in landscape character and visual amenity terms. This river corridor landscape differs from the other three lowland river corridors identified in the landscape character assessment (the Avon Valley; Almond Valley; and the Murieston / Linhouse / Camilty Water) in that it is generally of a larger scale and less enclosed. It has a less well defined corridor, being generally shallower, and opening out into a wider flood plain in some parts, consisting of improved grassland, wet pasture and a golf course to the south of Fauldhouse. In accordance with the landscape sensitivity criteria, the unit is assessed as medium sensitivity (rather than higher sensitivity of the other three lowland river corridor landscapes) where landscape accommodation is the most appropriate objective and where some wind energy development could be acceptable as long as overall landscape character is retained. In general, suitably designed wind energy development which fits with the landscape could potentially be accommodated even though there may be impacts on the landscape and views locally.

8-40 However, a key landscape characteristic of this unit is the essentially open character of the flood plain. There is little capacity for any development that would adversely impact on this key characteristic. Elsewhere the more enclosed, smaller scale landscape, for example south of Fauldhouse where the Breich Water meanders through a sheltered valley with native trees on steeper valley sides, similarly has little capacity for any development. Significant recreational value due to public access within the river corridor and at the Addiewell Bing Wildlife Reserve also reduces the capacity for development.

8-41 Cumulative effects of wind development within the landscape unit with existing wind farms at Blacklaw (including approved extension), Pates Hill and possibly Tormywheel could be significant. Development within the river corridor landscape could affect the sense of landscape contrast where there is existing wind development on the adjoining upland hill fringes. There may be some 'in combination', 'in succession' or 'sequential' cumulative visual effects where two or more wind energy developments would be visible in sensitive views from the A704, A706, A705 and the Fauldhouse Rail Core Path.

8-42 Any wind energy development within the *West Calder Burn / Breich & Harwood Waters* lowland river corridor would significantly affect its overall landscape character and visual amenity and thus is unlikely to be acceptable. It is unlikely that any turbine grouping could be designed to fit with the landscape and applications for all but the smallest single micro-turbines are likely to be

unacceptable unless supported by detailed landscape and visual impact assessment showing that localised impacts on sensitive receptors would be minimised by sensitive siting and design.

Landscape Unit 8(ii) *Bathgate Fringe* within the Lowland Hill Fringes landscape character type

8-43 A very small area at the western end of landscape unit 8(ii) *Bathgate Fringe* falls within the strategic zone identified as having the potential to accommodate some wind energy development. It lies immediately to the east of Boghall, between Bathgate and Livingston, on relatively flat land at the foot of the Bathgate Hills. Substantial new woodland was planted in the late 1990s to reinforce the small countryside separation between Livingston and Boghall/Bathgate. Although there may be some capacity for wind energy development within the wider landscape unit in landscape character terms, having medium sensitivity, it falls within sensitive visual compartments / cones from several important viewpoints within the hills. This small area is important to the setting of the hills and due to its size and location close to settlement it would not be suitable for wind energy development.

[Page left blank]

GLOSSARY & ACRONYMS used in the Study

Glossary

The definitions below of the meaning of the key terms used in the context of this study are drawn from, or closely based upon, current guidance and other documents listed in the bibliography or referenced below.

Landscape: *'An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors'*³⁴

Landscape character: The distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, that is, what makes one area 'different' or 'distinct' from another and creates a particular 'sense of place'

Landscape character assessment: An approach which classifies ('landscape classification' is a key part of characterisation and is concerned with dividing the landscape into areas of distinct, recognisable and consistent common character and grouping areas of similar character together) and describes the landscape character of an area (as defined above)

Landscape character type: A generic landscape, relatively homogenous in character and which possesses broadly similar combinations of natural and cultural characteristics, including patterns of geology, landform, soils, vegetation, land use, settlement and field pattern in every area where it occurs. Also referred to as a 'landscape type', they are usually named after the broad geographic features which are common to the landscape character type, such as 'Lowland Plateaux'

Landscape unit (also referred to as 'landscape character area' in *The Lothians Landscape Character Assessment*): A single, unique and discrete geographical area within a particular landscape character type. It shares generic characteristics with other areas of the same type but also has its own individual identity. They are usually named according to place names, rather than names describing generic characteristics, to reflect their distinct identity, such as 'Avonbridge to Armadale Plateau Edge'

Landscape capacity: refers to the degree to which a particular landscape character type or area is able to accommodate change without significant effects on its character, or overall change of landscape character type. Landscape capacity is a professional judgement reflecting the particular landscape characteristics and features of a given area and is likely to vary according to the type and nature of change being proposed. This study refers to the capacity of the landscape to accommodate wind energy development

Landscape sensitivity: refers to the extent to which a particular landscape character type or area is vulnerable to change due to potentially significant effects on its character, or overall change of landscape character type. Landscape sensitivity is a professional judgement reflecting the particular landscape characteristics and features of a given area, for example landscapes which are rare or unusual landscape types are likely to be more sensitive to change. Sensitivity is likely to vary according to the type and nature of change being proposed, and in this study refers to the sensitivity of the landscape to wind energy development

³⁴ Council of Europe (2000); European Landscape Convention, Article 1;
<http://conventions.coe.int/Treaty/en/Treaties/Html/176.htm>

Visual sensitivity: refers to the extent to which views from ‘important’ viewpoints and from key routes within West Lothian are vulnerable to changes in the appearance of the landscape. Visual sensitivity is a professional judgement of the likely affect on the relatively ‘unspoilt’ nature of the view by wind energy development

Landscape effects: changes in the physical landscape that give rise to changes in its character and how it is experienced, as a result of development or other change. Landscape effects may be beneficial (for example where a characteristic feature is restored) or adverse (for example where a characteristic feature is damaged or lost)

Visual effects: changes in the appearance or perceptions of a particular area or view, as a result of development or other change. Visual effects can be beneficial (for example where a new view is opened up) or adverse (for example where an existing view is spoilt by the addition of an intrusive feature such as a wind turbine)

Cumulative landscape effects: the combined effects that occur as a result of more than one project being constructed, giving rise to changes in the character of a landscape type and how it is experienced. For example, combinations of wind farms may change the character of a landscape type from ‘Upland Hill Fringes’ to ‘Upland Hill Fringes Windfarm’ where wind farm development dominates the landscape type such that it has become a ‘wind farm landscape’

Cumulative visual effects: the combined effects that occur as a result of more than one project being constructed, giving rise to changes in the appearance or perceptions of a particular area or view. Cumulative visual effects are usually expressed as being seen simultaneously ‘in combination’ (two or more seen by the observer from the same viewpoint at the same time i.e. in the same field of view) or ‘successive’ (two or more seen by the same observer from the same viewpoint but not in the same field of view i.e. only by turning to look in a different direction) and ‘sequential’ (two or more seen by the observer whilst travelling along a route, when no more than one may be seen at the same time)

Visual amenity: Characteristics or qualities of the landscape which contribute to people’s enjoyment of views of the landscape. For example prominent skylines, landmark features, or the settings of settlements

Shadow flicker: Shadow flicker is the flickering effect caused by rotating wind turbine blades which periodically cast shadows through constrained openings such as the windows of neighbouring properties

Acronyms

AGLV	Area of Great Landscape Value
AHS	Areas of Highest Sensitivity
AOD	Above Ordnance Datum
cSAC	Candidate Special Area of Conservation
DTA	David Tyldesley & Associates
GIS	Geographic Information System
LCA	Landscape Character Assessment
LCT	Landscape Character Type
LLCA	The Lothians Landscape Character Assessment

<i>MW</i>	Magawatt
<i>NNR</i>	National Nature Reserve
<i>OS</i>	Ordnance Survey
<i>PAN</i>	Planning Advice Note
<i>SNH</i>	Scottish Natural Heritage
<i>SPP</i>	Scottish Planning Policy
<i>SSSI</i>	Site of Special Scientific Interest
<i>WLC</i>	West Lothian Council
<i>WL-LCA</i>	West Lothian Landscape Character Assessment
<i>WLLP</i>	West Lothian Local Plan

[Page left blank]

APPENDICES

Appendix 1: Landscape Character Classification Descriptions

[For ease of referencing, please see below a copy of Table C: West Lothian Landscape Classification which compares the classification of landscape types and landscape character areas in The Lothians Landscape Character Assessment (LLCA) 1998, (falling within the West Lothian Council area only) with the landscape types and landscape units identified in this West Lothian-Landscape Character Assessment (WL-LCA) 2011]

Landscape Types in The LLCA 1998	Landscape Character Areas in The LLCA 1998	Landscape Types in this WL-LCA 2011	Landscape Units in this WL-LCA 2011
Uplands	4 Pentland Hills	1 Upland Hills	1(i) Western Pentland Hills
Upland Fringes	5 North-West Pentland Fringe	2 Upland Hill Fringes	2(i) North-West Pentland Fringe
			2(ii) Gladsmuir / Woodmuir / Camilty Fringe
			2(iii) Harburn / Hartwood Fringe
Lowland Hills & Ridges	17 Bathgate Hills	3 Lowland Hills & Valleys	3(i) Bathgate Hills
Lowland Plateaux	19 West Lothian Plateau	4 Broad Valley Lowlands	4(i) Almond Valley
			4(ii) Couston Valley
		5 Lowland Plateaux	5(i) Polkemmet Moor
	5(ii) Armadale / Bathgate Plateau		
	5(iii) Livingston / Blackburn Plateau		
	20 Slamannan Plateau		
5(v) Blackridge Heights			
Lowland Plains	21 Lower Almond Farmlands	6 Lowland Plains	6(i) Kirknewton Plain
			6(ii) East Calder / Livingston / Broxburn Plain
			6(iii) Winchburgh / Niddry Plain
		7 Lowland River Corridors	7(i) Avon Valley
			7(ii) Almond Valley
			7(iii) Murieston / Linhouse / Camilty Waters
			7(iv) West Calder Burn / Breich & Harwood Waters
Coastal Margins	26 Linlithgow / Queensferry Farmlands	8 Lowland Hill Fringes	8(i) Linlithgow Fringe
			8(ii) Bathgate Fringe
		9 Coastal Margins	9(i) West Lothian Coastal Farmlands
			9(ii) West Lothian Coastal Hills

It is important to note that at the strategic scale of the study, the boundaries of landscape types and units shown in Figure 1 are not precisely drawn. Landscape character rarely changes abruptly, and detailed assessment will be required in order to define precise boundaries.

[Page left blank]

Landscape Character Type: 1 *Upland Hills*

Landscape Unit: there is one Unit in this LCT within West Lothian:

1(i) *Western Pentland Hills*



Key Characteristics of the LCT / Unit

- Distinctive upland hills of Devonian Old Red Sandstone –age lavas and sediments with open, gently rolling, sweeping slopes rising to level topped ridges and pronounced hill masses of varying shape, mass, height and scale
- Individual hill masses often separated by steep-sided valley features of different scales creating distinctive, recognisable skylines
- Heather, coarse acidic grassland and upland raised / blanket bog peatland dominant on the highest ground
- Large areas dominated by sedge and rush, with unimproved rough grazing on the lower slopes
- Distinctively shaped straight sided conifer plantations and shelterbelts on the lower slopes and valley sides
- Constantly changing colour and texture of land cover throughout the seasons
- Occasional long, low traditional stone dykes flow over rising landform providing a sense of scale, perspective and distance
- Strong sense of place due to remoteness, wildness & stillness, with huge skies, wide horizons and infinite complexity of distant unobstructed views
- Infinite number of long distance views to the hills from within West Lothian and beyond; A70 ‘Lang Whang’ historic route between Edinburgh & Lanark offers some of the best views from close to the hills
- Strong cultural and literary associations: the Pentland Hills have long been a source of inspiration to some of Scotland’s most celebrated artists including Allan Ramsay, Robert Fergusson, Sir Walter Scott and Robert Louis Stevenson
- Strong historical and heritage associations: archaeological remains including East and West Cairn Hills, and the Cauldstane Slap was an important drove road used to drive cattle to and from trysts (markets)
- An important, frequently visited recreational facility: enjoyed by medieval kings and queens from Edinburgh, by train loads of people at the weekends during the 1930s and 1940s, and by visitors to today’s Pentland Hills Regional Park in pursuit of a diverse range of activities or just the peaceful enjoyment of the countryside
- Very low settlement density confined to a number of isolated dwellings
- Number of small disused quarries at the western end



[Page left blank]

Landscape Character Type: 2 Upland Hill Fringes

Key Characteristics of the LCT

- Generally broad, sweeping, gentle slopes with a subtle landform and occasional igneous intrusions exposed through the Carboniferous sedimentary bedrock, strongly characteristic of the Pentland Hills
- Generally between 180m – 300m AOD but rising to 350m in places
- Area characteristically dips SW-NE in which direction numerous burns flow towards the River Almond to the north of the area, and, where deeply incised, add complexity to the landform
- Open standing water ranges from upland bogs and ponds to large reservoirs
- Varied scale, openness and land use reflects the transitional nature between upland and lowland; a mosaic of extensive open moorland, large scale open semi-improved and improved grassland, extensive coniferous plantations, and smaller scale more intimate landscape of naturally wooded burns, wide mixed shelterbelts, and designed parkland
- Extensive views from high points
- Major transport corridors generally follow the pattern of the landform either through the area or bordering it

Landscape Units: there are three Units in this LCT within West Lothian:

2(i) North-West Pentland Fringe

2(ii) Gladsmuir / Woodmuir / Camilty Fringe

2(iii) Harburn / Hartwood Fringe

Landscape Unit: 2(i) North-West Pentland Fringe



Key Characteristics of the Landscape Unit

- Generally large scale landscape with generally open or semi-open, sweeping gentle slopes at the northern foot of the Pentlands which tower over the area
- Auchinoon Hill (312m) and Corston Hill (348m) provide vertical emphasis contrasting with gentle sweeping moorland slopes and unimproved grassland
- Open standing water at Crosswood Reservoir and Harperrig Reservoir
- Few trees in the north of the area but tree clumps, linear roadside belts and coniferous planting (e.g. at West Cairns Plantation) towards the centre and in the south
- Linear belts of trees, including mature beech trees creating avenues, and remnant stone dykes or post and wire fences provide a locally distinctive pattern on the lower slopes



- Varied landscape experience from the remote, simple undisturbed high moorland to the busy but inconspicuous A70 'Lang Whang' which passes SW-NE through the area
- The setting of Harperrig Reservoir with the surrounding Pentlands, Auchinoon and Corston Hills is one of the key viewpoints in West Lothian, with two parking areas and an interpretation board off the A70. The historical drove road through the Cauldstane Slap is way-marked from one of the parking areas
- Very low settlement density confined to a number of isolated dwellings including Cairns House and Tower on the edge of and adding to the setting of Harperrig Reservoir
- Electricity pylons and overhead lines are an obvious intrusion between Auchinoon Hill and Corston Hill

Landscape Unit: 2(ii) *Gladsmuir / Woodmuir / Camilty Fringe*



Key Characteristics of the Landscape Unit

- Contrasting scale and openness due to land cover ranging from large scale, open moorland to extensive coniferous plantations at Camilty Plantation, Woodmuir Plantation and in the Gladsmuir Hills on the higher ground in the south
- Generally more remote, simple, undisturbed and unsettled with few dwellings
- Meandering, incised course of the Camilty Water / Linhouse Water cuts through the area adding complexity to the landform
- Balance of scale, openness and land cover changes due to de-forestation and re-planting on a large scale although naturally wooded steep sided burns with sheep grazing on the gentler grassland slopes
- This affects the extent of views, but generally extensive views northwards from A70 across open moorland and open water at Cobbinshaw Reservoir to the Bathgate Hills (this view shown above with the Pates Hill wind farm in the middle distance) and southwards to the Pentlands
- Cobbinshaw Reservoir is large but relatively inconspicuous, set back from the A70 amongst surrounding plantation
- Open water of the man-made fishing lake at Morton Reservoir is well screened
- Contrasting views northwards from high points over the Almond valley to large areas of built development, roads, pylons, bings etc.
- Major transport corridors of the A70 and the Edinburgh to Lanark railway follow the grain of the landscape running SW-NE; in contrast the A706 and A704 cut through the western part of the area with the A706 in particular running against the grain and providing a 'roller coaster' ride



- Major development in the west of the area on the Carboniferous coalfields with quarrying at Leven Seat and in the Gladsmuir Hills above Fauldhouse where spoil heaps, dismantled railway lines, associated works and infrastructure and disused quarries give a despoiled unsettled character, although surrounding woodland limits visibility in some views
- Blacklaw and Pates Hill wind farms are located within this character area from where they are generally well screened locally by forestry plantations (except during the timber harvest cycle when they can become more exposed for a number of years) although their wider visual impact extends over many kilometres throughout West Lothian

Landscape Unit: 2(iii) Harburn / Hartwood Fringe



Key Characteristics of the Landscape Unit

- This northern area of the wider LCT is more settled, with farms and other dwellings evenly distributed
- General SW-NE grain of the landscape is strongly reinforced by the linear pattern of burns and minor roads which criss-cross the area with extensive, wide shelterbelt planting including beech
- Regular pattern of hedges around improved grazing and occasional poor quality arable fields gives vertical relief and a smaller more enclosed and in parts intimate scale to the landscape than the wider LCT
- Manicured appearance of the golf course at Harburn and extensive designed parkland landscape at Harburn House give this part of the area an even smaller, enclosed, managed character (included in Historic Scotland's Inventory of Gardens and Designed Landscapes)
- Harwood Water, Murieston Water and Bog Burn in particular cut in part meandering incised courses through the area, with native trees on steeper slopes. The natural sinuous shapes contrast with the straight angular shelterbelts
- The Murieston Trail is an important recreational facility
- Relatively undisturbed by modern industry, noise or heavy traffic, but electricity pylons and overhead lines are an obvious intrusion
- Northern edge close to the Edinburgh to Glasgow railway and Addiewell is more unsettled with reminders of previous coal and oil shale industries, including disused mines and other infrastructure from the Addiewell Oilworks and disused quarries, opencast workings and tips at Longford
- Approved lowland crafting scheme at Nether Longford Farm will provide local softening and screening as trees and woodland matures
- Views up to the Pentlands from the local road network and the Edinburgh to Lanark railway where on embankment or where they bridge over the watercourses



[Page left blank]

Landscape Character Type: 3 *Lowland Hills & Valleys*

Landscape Unit: there is one Unit in this LCT within West Lothian:

3(i) *Bathgate Hills*



Key Characteristics of the LCT / Unit

- Complex, rounded, glaciated and prominent range of igneous hills and craggy outcrops with distinctive 'crag and tail' skylines (such as Binny Craig) rising above the lowland landscape
- Interlocking groups of dolerite sills forming hills varying between 200m-300m AOD
- Narrow band of Carboniferous limestone adds further to the complex topography and land cover
- Evidence of past quarrying for the hard rock, limestone, lead, silver, coal and oilshale
- Lower slopes are smoother, contrasting with the more rugged broken higher ground
- Frequent minor burns create locally incised valleys draining northwards and eastwards to the Midhope Burn and River Almond, and westwards to the River Avon
- Open water at several reservoirs. Beecraigs Loch is used for fishing
- Bold, relatively pastoral or mixed, small scale and intimate farmed lowland hill landscape with post and wire fences, gappy hedges and broken lines of oak, ash and beech
- Predominantly improved grassland with rough pasture and heather, and in spring the hills are ablaze with yellow gorse which thrives on the thin stony dolerite soil
- Linear tree belts and occasional stone dykes on higher steeper slopes add to the intricate pattern of landform, land use and land cover
- Towards the east more gentle slopes and arable fields break up the extensive pastureland
- Largely unaffected by afforestation but coniferous woodland very prominent on hill tops, especially Beecraigs Country Park
- Distinctive lines of mixed shelterbelts, trees often shaped by the wind
- Area rich in ancient archaeological artefacts of significant historical / heritage interest, including Cairnpapple Hill prehistoric henge and cairn
- Winding minor roads and tracks link scattered farmsteads, small settlements and isolated mansion houses on the lower slopes
- Strong sense of place due to remoteness, wildness & stillness of the high ground, and huge skies, wide horizons and infinite complexity of distant unobstructed views



- An important, frequently visited, recreational resource either for peaceful enjoyment of the countryside or a range of activities at Beecraigs Country Park
- Telecommunications mast on the highest ground is a visible landmark feature for many kilometres
- Extensive views out from several notable viewpoints within the hills, such as The Knock and Cockleroy, and to the hills from several kilometres beyond them

Landscape Character Type: 4 *Broad Valley Lowlands*

Key Characteristics of the LCT

- Open, broad relatively flat lowland plain within a gently undulating valley landform formed of folded sedimentary rocks of Carboniferous age, holding significant oil shale and coal measures with sand and gravel below alluvial river valleys
- Inconspicuous rivers and smaller tributary burns create shallow undulations with gentle side slopes
- Pastoral landscape of medium to large scale fields, predominantly improved grassland for sheep grazing
- Weak field pattern with field boundaries poorly defined by post and wire fences and gappy hedges with occasional hedgerow trees
- Poor quality arable land on the margins provides landscape variety
- Occasional woodland provides local enclosure
- Long distance views out to higher ground
- Few noticeable landform features
- Distinctive rural character but with significant man-made modifications and intrusions harking back to the area's industrial heritage
- Major transport corridors throughout the LCT due to the advantageous topography

Landscape Units: there are two Units in this LCT within West Lothian:

4(i) *Almond Valley*

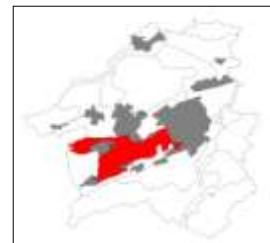
4(ii) *Couston Valley*

Landscape Unit: 4(i) *Almond Valley*



Key Characteristics of the Landscape Unit

- Distinctive west-east grain of the gently undulating landscape as a number of small burns gradually fall from the moorland into the River Almond before it continues eastwards through Livingston and beyond to the Forth
- Predominantly medium scale pastoral landscape with some arable farmland close to settlement at the edges of the unit
- Broadleaved woodland within Polkemmet Country Park provides considerable natural heritage value and significant landscape character within an uncharacteristic sheltered river valley
- Beyond the Country Park woodland is not extensive but is found predominantly to the centre and west of the area, with coniferous and mixed woodland including some in Woodland Trust ownership (e.g. East Whitburn, Cousland)
- Roadside treebelts are a feature along the B7015 and at Gavieside to the east, with shelterbelts elsewhere



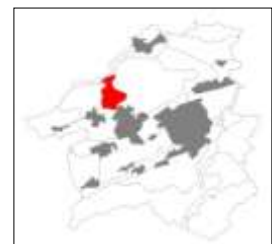
- Scattered scrubby birch are a landscape feature
- Scattered but frequent steadings linked by several minor roads criss-crossing the area in either an east-west or north-south direction
- The balance of tree cover is increasing as tree and woodland planting matures north of West Calder associated with several lowland crofting schemes to the east of Longridge
- Rural character of open areas is diluted by features providing a legacy of the areas industrial past, most notably the Five Sisters oilshale bing at Westwood and others, disused railway lines, and modern features including quarries, sewage works, recycling centre, electricity pylons and overhead lines, etc.
- Several linear settlements on the edge of the area have developed as either coal or oil shale mining towns, such as Whitburn, Fauldhouse, Stoneyburn, Addiewell, Loganlea and Seafield, some retaining the neat rows of former miners cottages
- Major roads pass through or alongside the settlements along the boundaries of the area, including the M8 and A705 to the north, A71 to the south and A706 through the west of the area

Landscape Unit: 4(ii) *Couston Valley*



Key Characteristics of the Landscape Unit

- Broad, open, medium scale valley of the Couston Water which gradually falls north-westwards from the Bathgate Hills to the River Avon
- Almost exclusively pastoral with small areas of arable farmland
- Few isolated farms
- Generally featureless, with little tree cover and few hedges
- Roadside planting alongside the A800 and A801 is a feature in the landscape
- Small areas of semi-improved acidic and neutral grassland, for example around South Couston Farm, for sheep grazing
- West of the A801 is more of a transitional area up to the Avonbridge to Armadale Plateau Edge and the Blackridge Heights further west, which is more enclosed and diverse with textural variety of woodland and wetland including remnant raised bog
- Open water and former workings at Couston sand quarry are a major intrusion in the landscape, currently being restored
- Clear views eastwards to the steep western edge of the Bathgate Hills, and westwards to the more gradually rising Blackridge Heights



Landscape Character Type: 5 *Lowland Plateaux*

Key Characteristics of the LCT

- Extensive, smoothly undulating, lowland plateau formed of folded sedimentary rocks of Carboniferous age, holding significant coal measures with sand and gravel below alluvial river valleys
- Typically lying at between 150m-200m AOD although higher in the southwest and lower in the east
- Significant areas of less cultivable lowland wetland bog in badly drained areas, with wet grassland, heather moorland with sedge, rush and marsh communities and few trees
- Elsewhere predominantly improved grassland with sheep grazing
- Some arable farmland close to settlements but generally poor quality
- Woodlands provide significant landscape features, local enclosure and important relief from surrounding urban and industrial intrusions
- Landscape character is heavily influenced by the areas industrial past, close to the mining settlements of Whitburn, Fauldhouse and Armadale
- Extensive long distance views from the more open higher ground, including views to the Blacklaw wind farm and Pates Hill wind farm, and the Pentland Hills to the south

Landscape Units: there are five Units in this LCT within West Lothian:

5(i) *Polkemmet Moor*

5(ii) *Armadale / Bathgate Plateau*

5(iii) *Livingston / Blackburn Plateau*

5(iv) *Avonbridge to Armadale Plateau Edge*

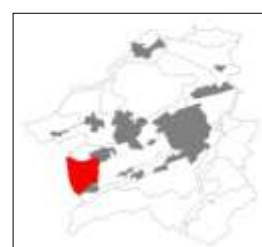
5(v) *Blackridge Heights*

Landscape Unit: 5(i) *Polkemmet Moor*



Key Characteristics of the Landscape Unit

- A relatively flat plateau with a central west-east ridge of moorland and extensive coniferous plantations gently falling northwards from the Fauldhouse Hills at 290m AOD to the River Almond at around 190m AOD, and falling more steeply southwards down to the Breich Water at around 210m



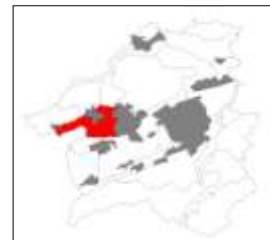
- Past open cast coal mining is very evident in the numerous artificial humps and hollows, coal bings, dismantled railway lines and disused mines and quarries
- Poorly drained peatland bogs with heather, cotton grass and rough unimproved tussocky grass on the higher slopes
- Open pasture on the lower slopes, with wire fencing rather than hedges
- Coal bings are becoming vegetated but are still conspicuous features in the landscape
- Great variety in views, from extensive, distant views out from open moorland southwards to the Gladsmuir Hills and the Blacklaw wind farm, to more confined and enclosed views from within the plantations
- The high plateau is almost entirely unoccupied, with very little settlement apart from isolated farms on the lower slopes and some expansion of Fauldhouse and Longridge (just outside the area) up the slope
- Only one minor road crosses the plateau, with other minor tracks and plantation rides

Landscape Unit: 5(ii) *Armadale / Bathgate Plateau*



Key Characteristics of the Landscape Unit

- A poorly drained, medium scale watershed between the Couston / Avon Valley to the north and the Almond Valley to the south
- A predominantly rural area between Armadale, Bathgate, Blackburn and Whitburn, but with significant modern intrusions
- Rolling moorland plateau becoming wild and exposed to the west and more enclosed with more urban influences to the east within the Armadale / Bathgate fringe
- Distinctive simple, exposed, plateau bog-like character of open rolling moorland with heather and gorse around the high point at Hall Torbane Farm south-east of Armadale
- By way of contrast, to the east is a more enclosed landscape where mature woodland policies of the former Boghead House and extensive shelterbelts are important landscape features providing an attractive western edge to Bathgate
- Large areas of open water are features in the landscape, including to the east of the A801 (Half Loaf Pond) and to the west around Hall Torbane Farm south-east of Armadale
- A801 is a dominant major transport corridor passing mostly on embankment north-south through the area, with the A706 and new Bathgate-Airdrie railway and associated infrastructure creating major intrusions in the landscape
- Overhead power lines and pylons, and an electricity sub-station also dilute the rural character of the landscape
- Telecommunications masts on high ground are features within the unit visible from many kilometres. From the west of the unit the huge radio and TV transmitter masts at Black Hill and Kirk o'Shotts within North Lanarkshire are visible approximately 6-7km away



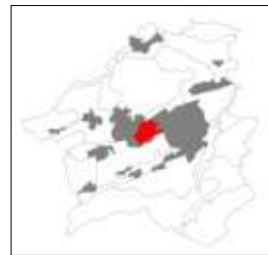
- South of the A89 is a series of gentle lowland undulations of improved grassland, including restored mine workings
- In the north of the area the restored Easton colliery bing on the west side of Bathgate provides an elevated feature now well integrated into the landscape
- Long distance views eastwards to the Bathgate Hills and southwards to the Pates Hill wind farm

Landscape Unit: 5(iii) Livingston / Blackburn Plateau



Key Characteristics of the Landscape Unit

- Generally open or semi-open, isolated raised peatland bogs of Tailend Moss and Easter Inch Moss are important wetlands with a diverse range of wetland habitats
- Artificially drained and managed as a recreational, educational and wildlife resource of importance within an increasingly built-up area
- Mixed plantations and shelterbelt planting provides local enclosure around the wetlands
- Wetland areas are isolated between the key road network linking business parks on the edges of Bathgate and Livingston either side of the M8 corridor
- Roadside shelterbelts, stone dykes and wire fencing around gently undulating arable farmland and grassland, with isolated farms provide a patchwork and variety of land cover types in small units within a generally medium scale landscape
- Oil shale bing at Seafield Law has been shaped and re-colonised and is a feature in the plateau landscape visible over several kilometres
- Views northwards to the Bathgate Hills and long distance views southwards to the Pates Hill wind farm
- The recently re-built Bathgate-Airdrie rail link passes through Easter Inch Moss



Landscape Unit: 5(iv) Avonbridge to Armadale Plateau Edge



Key Characteristics of the Landscape Unit

- Gently rolling eastern edge of the higher Slamannan Plateau which covers an extensive area to the west within Falkirk district
- Distinctive west-east grain to the landscape due to drainage by a series of tributary burns, including Mad Burn, which flow eastwards off the higher plateau into the Barbauchlaw Burn which in turn flows northwards into the River Avon
- The Unit represents a transition between arable farmland on the lower ground, to pasture and up to rough hill grazing on higher ground
- Small scale, semi-enclosed pattern of rural roads, mixed farming, woodland and shelterbelts in parts of the unit, but generally with no strong pattern of field boundaries
- Former woodland policies of Bridge Castle and within the Barbauchlaw Burn valley along the eastern edge of the area, and around the top of Blackridge Heights at North Rhodens, East Rhodens and West Rhodens, are significant landscape features providing an attractive, mature, managed character with broadleaved woodland, fine roadside beech avenues and clipped beech hedges
- Extensive mixed forest plantation at Drumtassie Burn managed by the Forestry Commission as part of the Central Scotland Forest
- Meandering form of the Barbauchlaw Burn and in places the steep sided Barbauchlaw Glen north of Armadale, with localised raised ground between the burn and the A801 at Kinnen Hill and Tantallan Hill, provides variety of landform and contrasts with the flatter Couston Valley to the east
- The northern edge of Armadale is a generally low lying, open, gently terraced pastoral landscape for sheep grazing
- Relatively unspoiled apart from overhead lines and electricity pylons, small disused quarries and an active open cast coal mine north of Armadale (Woodend Colliery). The Gowanbank gas compressor station is relatively well screened



Landscape Unit: 5(v) *Blackridge Heights*



Key Characteristics of the Landscape Unit

- As with the *Avonbridge to Armadale Plateau Edge* unit this area also represents an eastern extension of the Slamannan Plateau which extends within Falkirk district to the west, but is significantly different in character
- Blawhorn Moss, a National Nature Reserve of considerable nature conservation value, occupies a significant part of the unit
- Large scale, open, exposed, gently undulating moorland plateau
- Extensive areas of peatland and other poorly drained areas with a mosaic of mosses, heather, bog cotton and wet tussocky grassland
- Active raised mire/bog, watered from rainfall rather than via burns or rivers, which is rare in lowland Scotland
- Criss-cross of ditches shows past attempts at drainage for conversion to farmland
- Strong sense of place due to remoteness, wildness & stillness, with huge skies and wide horizons
- Historically an important viewpoint, with an infinite complexity of distant unobstructed views
- An important wildlife and recreational resource with public access across a boardwalk over the Blawhorn Moss National Nature Reserve
- Steep southern edge culminates in the prominent dolerite rocky outcrop scarp at Eastcraigs Hill providing a rugged and dramatic backdrop to Blackridge and the A89
- Almost devoid of settlement, buildings, roads, intensive agriculture or forestry, the only man-made intrusion within the 'Heights' being the Eastcraigs water tank complex alongside the minor road between Blackridge and Avonbridge



[Page left blank]

Landscape Character Type: 6 *Lowland Plains*

Key Characteristics of the LCT

- Part of an extensive, smoothly rolling, lowland landscape of predominantly folded sedimentary rocks of Carboniferous age, holding significant oil shale measures to the north of the River Almond
- Predominantly open, large scale, high quality arable farmland lying between Livingston and Edinburgh
- The lowland plain averages around 100m AOD, rising gradually to the south to up to 240m AOD
- Numerous burns are generally inconspicuous but minor valleys add complexity to the landform
- The deeply incised and well wooded valley of the River Almond cuts through the area
- Characteristic medium-large scale arable farmland becomes increasingly fragmented within the urban fringe to the east of Livingston and East Calder, and south of Broxburn, with a variety of land uses
- Shelter and local enclosure provided by woodland belts
- Waste shale bings from oilworks punctuate the skyline and are a legacy of the industry north of the River Almond, as are neat rows of miners cottages (known as “the rows”) in several villages
- Localised humps, hollows and other subtle traces in the landscape such as disused mines and mineral railways
- Generally long views across the open, large scale farmland
- Minor roads over the burns and Union Canal are often features of local interest in the landscape

Landscape Units: there are three Units in this LCT within West Lothian:

6(i) *Kirknewton Plain*

6(ii) *East Calder / Livingston / Broxburn Plain*

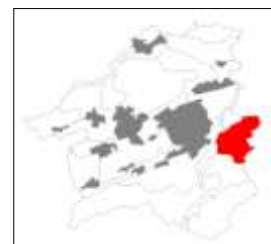
6(iii) *Winchburgh / Niddry Plain*

Landscape Unit: 6(i) *Kirknewton Plain*



Key Characteristics of the Landscape Unit

- A relatively undisturbed, distinctly rural, gently rolling lowland plain
- Drained by a series of minor burns running eastwards off higher ground to the west (Selms Hill) and south (Corston Hill) into the Gogar Burn
- North of Kirknewton the drainage pattern has created a series of minor ridges and valleys running east-west, with mixed woodland, small to medium sized and generally open fields with isolated farms and small holdings linked by minor narrow roads, creating variety in land cover



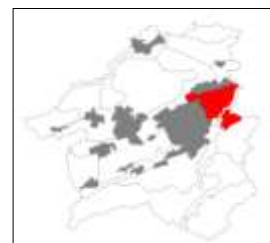
- South of Kirknewton, burns run eastwards into the Water of Leith, producing a series of minor ridges and valleys creating a distinctive terraced pattern to the arable landscape
- South of Kirknewton, fields are medium to large scale, of regular size and rectangular pattern, with wire fences or well maintained hedges, managed by several farm estates at Overton, Ormiston and Belstane
- Extensive, wide shelterbelts and woods add to the enclosure and well managed character south of Kirknewton, including a large coniferous Forestry Commission wood at Selm Muir Wood
- Structural and formal gardens at Hatton House (partially within West Lothian and included in Historic Scotland's Inventory of Gardens and Designed Landscapes) add to the enclosed, managed character of the area to the north-east of Linburn
- Stone dykes and taller roadside walls are important landscape features within the estate farmlands
- Kirknewton is the only settlement of any size, on the main railway line passing east-west through the area; elsewhere there are small groups of residential properties, isolated dwellings and farmsteads throughout the area
- Recent residential development at Newlands comprises large detached properties generally well screened by surrounding woodland
- Several minor roads pass north-south through the area linking with the A70 to the south and the A71 to the north
- Pylons and overhead electricity lines cut through and intrude into the farmed landscape
- Other land uses include a disused quarry and poultry sheds at Lawheads,
- Views out of the area are limited by the northern edge of Corston Hill and the Pentlands to the south and Kaimes Hill and Dalmahoy Hill just beyond the district boundary to the east

Landscape Unit: 6(ii) *East Calder / Livingston / Broxburn Plain*



Key Characteristics of the Landscape Unit

- Character of this area is dominated by the busy transport corridors of the M8, A89, A71 and the Edinburgh – Glasgow railway line which generally follow an east-west alignment through the area
- Elsewhere sinuous narrow lanes criss-cross the area between isolated, flat, open arable fields which lie amongst a variety of urban-fringe land uses, including cement works, storage units and workshops, scrap dealers, a garden nursery, electricity sub-station and poultry sheds
- Remnants from the oil shale industry include a remaining bing and surviving shale miner's cottages from the Pumpherston, Roman Camps and Broxburn Oilworks, disused mineral lines and other more subtle features in the landscape
- There is a network of pylons and high and low voltage power lines, railway sidings and the Lothian and Borders Battalion Army Cadet training centre in woodland at Drumshoreland



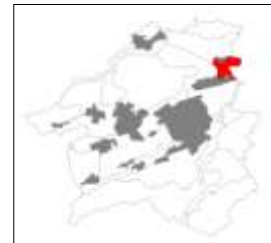
- Views northwards over huge white horizontal sheds in the industrial estates east of Broxburn, and the huge orange / pink oil shale bings at Winchburgh / Faucheldean add to the fragmented urban-edge character
- Further east the character becomes more rural with typical large scale, open, flat arable fields and scattered farms
- The steep sided, well vegetated River Almond corridor, including the Almondell & Calder Wood Country Park, divides the unit in two. The Almond Valley Viaduct taking the railway over the River Almond, and the Almond Aqueduct where the Union Canal and River Almond meet at Lin's Mill, both at the district boundary, are also significant features visible in the landscape
- Elsewhere road bridges over the canal are local features of interest in the landscape

Landscape Unit: 6(iii) Winchburgh / Niddry Plain



Key Characteristics of the Landscape Unit

- The gently undulating lowland plain is dominated by the artificial forms and striking orange / pink colours of the huge flat-topped Niddry and Faucheldean oil shale bings, Scheduled Monuments, to the east and south of Winchburgh
- Winchburgh is a former mining town with rows of miners cottages and unsettled areas of poor land quality associated with past mining activity
- Niddry Burn is the main watercourse but is inconspicuous
- The Union Canal passes through the area and road overbridges are local features of interest in the landscape
- Woodland is scarce and small in size, with some mixed plantation at Duntarvie Castle and sporadic coniferous plantation elsewhere, but not a landscape feature
- Niddry golf course to the south-east of Winchburgh has a parkland appearance
- East of the area is more open and intensively farmed with good quality arable farmland more typical of the lowland plain further east beyond the district



[Page left blank]

Landscape Character Type: 7 Lowland River Corridors

Key Characteristics of the LCT

- Predominantly deeply incised, narrow, meandering, distinctive, intimate river valleys formed by the rise and fall of sea levels since the end of the ice age
- Changing to more open, shallower and less well defined corridors towards the upstream and downstream ends within the district
- Densely wooded, enclosed steep sided valleys with mainly semi-natural broadleaved woodland
- The gorge-like valleys are sparsely settled, with isolated steadings amongst pastoral farmland on the higher, shallower slopes
- Significant recreational value due to public access
- Outstanding landscape features include aqueducts and viaducts
- Other features of interest in the landscape include rapids, weirs, waterfalls and mills

Landscape Units: there are four Units in this LCT within West Lothian:

7(i) Avon Valley

7(ii) Almond Valley

7(iii) Murieston / Linhouse / Camilty Water

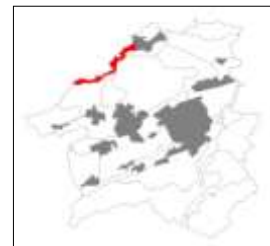
7(iv) West Calder Burn / Breich & Harwood Water

Landscape Unit: 7(i) Avon Valley



Key Characteristics of the Landscape Unit

- Deep gorge-like, incised river valley with mixed broadleaved woodland from Westfield to the canal aqueduct crossing rapidly changes to an open, less wooded, gently undulating pastoral landscape used for dairying / cattle stock rearing with fields of hay, silage and ryegrass and unimproved grassland for sheep grazing on steeper slopes
- Significant recreational resource via the River Avon Heritage Trail along the river bank between Avonbridge and Linlithgow, with features of interest including weirs, waterfalls, the Westfield Viaduct, Avon Viaduct at Linlithgow (taking the Edinburgh to Glasgow railway across the Avon valley) and the Avon Aqueduct (the second longest in Britain, taking the Union Canal over the River Avon), and the remains of mills and Carriber Castle
- Also access from the Falkirk side at Muiravonside Country Park

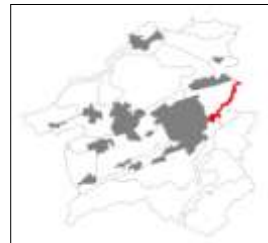


Landscape Unit: 7(ii) Almond Valley



Key Characteristics of the Landscape Unit

- River Almond to the east of Livingston is a more gently meandering downstream section of the Murieston / Linhouse / Camilty Water unit described below [landscape unit 7(iii)]
- Significant recreational resource via the Almondell & Calder Wood Country Park with extensive broadleaved woodland and ornamental planting
- Elsewhere the relatively narrow valley edges comprise remnant semi-natural woodland, mixed shelterbelts and plantations, and more open grassland grazed by sheep
- Valley peters out at the eastern end where the river is much more inconspicuous
- Features of interest include many weirs and bridges, disused mills, the Almond Valley Viaduct (taking the railway over the River Almond) and the Almond Aqueduct (where the Union Canal and River Almond meet at Lin's Mill), both at the district boundary
- National Cycle Route 75 follows the valley, and the Union Canal Feeder path, from east of Almondell Country Park Visitor Centre to Lin's Mill, offers stunning seasonal views of the former rural estate and the narrow gorge like section of the river

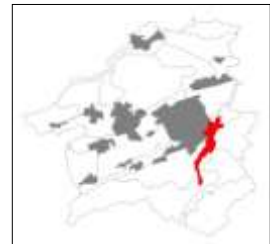


Landscape Unit: 7(iii) *Murieston / Linhouse / Camilty Waters*



Key Characteristics of the Landscape Unit

- Drains the Pentland Hills as the Crosswood Burn through Camilty Plantation, before continuing northwards as Camilty Water and then Linhouse Water, which is joined by Murieston Water and then the River Almond at Mid Calder to continue northwards to the Forth
- Incised, steep sided, meandering and well wooded for much of its course, but with a more open, less wooded central section
- Gently sloping valley edges are sheep grazed
- Features of interest include bridges, weirs, a waterfall, disused mill and an impressive ruin of a 19th century gunpowder mill surrounded by woodland policies
- Significant recreational and wildlife resource via the 'East Calder, Calder Wood and Linhouse Path' along the river valley, the Calder Wood Country Park (lying as a large island between Murieston Water and Linhouse Water) and Linhouse Glen Nature Reserve



Landscape Unit: 7(iv) *West Calder Burn / Breich & Harwood Waters*



Key Characteristics of the Landscape Unit

- South of Fauldhouse the Breich Water meanders through a sheltered valley with native trees on steep valley sides and a flat flood plain of grazed improved grassland
- Railway crosses the Breich Water near Fauldhouse then follows the valley eastwards, often on embankment or in cutting
- Important local recreational and wildlife resource via the Addiewell Bing Wildlife Reserve
- At the eastern end of the unit, the West Calder Burn and Harwood Water follow separate valleys to the Breich Water, joining together north of Polbeth before continuing northwards in to the River Almond. They generally share similar characteristics with the Breich Water, meandering through narrow, enclosed valleys which open out into shallower, less well defined corridors



Landscape Character Type: 8 *Lowland Hill Fringes*

Key Characteristics of the LCT

- Transitional areas of open rolling slopes of volcanic and intrusive outcrops forming lowland hills and ridges lying between gently rolling lowland coastal farmlands and coastal hills to the north, and the more complex landform of the Bathgate Hills to the south
- Important to the setting of surrounding hills and other landscape features
- Strong rural, managed character of large farms and estates
- Almost entirely good quality, medium to large scale, regular, rectangular arable farmland, with improved pasture for sheep and stock grazing on steeper slopes, creating a distinctive patchwork field pattern reinforced by field hedges
- Mature policy woodlands are distinctive features, linking and enclosing the fields
- Roadside trees, avenues and shelterbelts, and well maintained stone dykes are also distinctive features in the landscape
- Isolated farms and cottages with little other settlement
- Some evidence of past industrial use, but limited

Landscape Units: there are two Units in this LCT within West Lothian:

8(i) *Linlithgow Fringe*

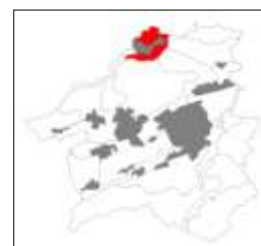
8(ii) *Bathgate Fringe*

Landscape Unit: 8(i) *Linlithgow Fringe*



Key Characteristics of the Landscape Unit

- Linlithgow urban area and Loch nestles in a basin contained by gently rising, undulating slopes of foothills to the north and south
- North of the town the south-facing slopes gradually rise to localised hills at Parkhead and Bonnytoun, culminating at 171m AOD at Airngath Hill on the district boundary, close to the Hope Monument, providing panoramic views in all directions and a striking setting to Linlithgow Loch, Palace and modern spire at St. Michael's Church
- M9 passes between the Loch and the northern foothills but is well screened and inconspicuous
- South and east of the town the north-facing foothills of the Bathgate Hills provide an important setting to the town, gradually rising in the south to 134m AOD at Williamcraigs, whilst to the east the foothills rise more steeply to a height of 144m



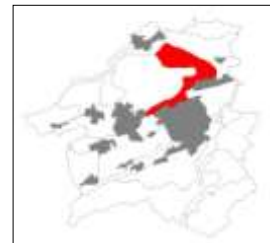
- Medium scale, angular arable fields with alternating ley grasslands for stock grazing creates a patchwork landscape, reinforced by many hedges
- Policy woodland and mature estate woods of Grange House and Bonnytoun to the north, Clarendon House to the east, and at Kettlestoun, Preston House and Williamcraigs to the south, add significant confinement
- Stone dykes are well maintained around many of the farm estates, in particular Bonnytoun and Preston
- Appearance of two golf clubs north and south of the town is manicured
- Disused sand quarry at Kettlestoun between the River Avon and the A706

Landscape Unit: 8(ii) *Bathgate Fringe*



Key Characteristics of the Landscape Unit

- Semi-open, gently rolling, farmland of the Bathgate foothills, with a distinctive west-east grain
- Complex landform of a series of ridges gently rising and falling, strongly linked to the Haugh Burn, Ecclesmachan Burn and Binny Burn running in the same direction, with distinctive igneous intrusions rising to 130m AOD at Nancy's Hill in the west and to 144m AOD to the east at Tar Hill
- Series of rocky outcrops have similar distinctive 'crag and tail' glaciated formation as in the Bathgate Hills immediately to the south
- Other craggy outcrops such as at Newbigging Craig
- 'B' roads follow the west-east grain, linked by other minor roads running north-south creating a distinctive grid pattern
- An even scatter of farmsteadings with predominantly good quality arable farmland giving way to more sheep grazing on improved pasture to the east
- Bridgend is the only sizeable settlement, with significant woodland, shelterbelts and roadside avenues providing local enclosure
- Elsewhere only isolated farms and cottages
- Some distinctive buildings in the landscape, including Ochiltree Castle
- Small disused quarries at Riccarton, Binny and at the eastern end where landscape character becomes more unsettled, fragmented and influenced by the nearby mining settlements of Broxburn and Winchburgh
- Long distance views southwards to the Pentland Hills



Landscape Character Type: 9 Coastal Margins

Key Characteristics of the LCT

- Open, sweeping and gently rolling agricultural area of mostly intensively managed arable farmland on the fertile soils of the underlying Carboniferous rock
- Landform reflects local geological variations but with only limited rock outcrops
- Generally north-facing towards the coast
- Drained by inconspicuous burns falling to the Firth of Forth
- Significant policy and shelterbelt woodland associated with farm estates
- Significant gardens & designed landscapes associated with historic houses
- Generally medium scale fields but in areas smaller or larger scale, defined by hedgerows, hedgerow trees, stone dykes or wire boundaries
- Some pasture for sheep grazing, but limited
- An even scatter of farmsteadings, estates and cottages, with a limited number of other settlements
- Distinctive grid pattern of major transport corridors of the M9, A904, the Edinburgh to Glasgow / Perth-shire railway and the Union Canal pass through the area in a west-east direction and linked by a series of minor roads running north-south
- Often extensive views northwards across the Firth of Forth and its bridges to the Ochil Hills and beyond, and to the south to the Bathgate Hills and the Pentland Hills beyond

Landscape Units: there are two Units in this LCT within West Lothian:

9(i) West Lothian Coastal Farmlands

9(ii) West Lothian Coastal Hills

Landscape Unit: 9(i) West Lothian Coastal Farmlands



Key Characteristics of the Landscape Unit

- A smooth, gently rolling and subtle landform, devoid of significant rocky outcrops and generally north-facing towards the coast
- Predominantly good quality, intensively managed arable farmland with some improved pasture around farmsteadings and cattle and sheep grazing, creating a patchwork of agricultural land use
- Estates at Champfleurie House, Philipstoun and Craigton House have native broadleaved and mixed policy and shelterbelt woodland creating significant features in the landscape and local enclosure
- Area drained by the minor Errick Burn and Pardovan Burn falling into the Midhope Burn which drains to the Forth through the Coastal Hills unit to the north
- Large bings are features in the open landscape providing a legacy of the areas industrial heritage; bings at Philipstoun (north and south) are becoming colonised and gradually assimilated into the landscape; large bing north-west of Winchburgh creates a more artificial form and colouring in contrast to the surrounding farmland



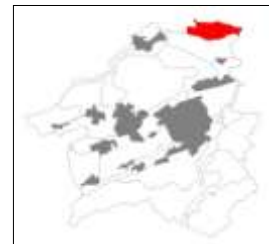
- Bridges over the railway and canal are features in the open, rolling landscape of local interest

Landscape Unit: 9(ii) West Lothian Coastal Hills



Key Characteristics of the Landscape Unit

- Gently undulating, predominantly north-facing countryside rising up to the south and west from the tidal zone, and levelling out to the east
- Landform reflects local geological variations, rising to 113m AOD at Binns Hill, with few rock outcrops
- Diverse, well tended, high quality landscape of intensively farmed agricultural land with significant areas of ancient and semi-natural native woodlands and improved grasslands grazed by sheep
- Large, well managed, designed parkland landscapes around the historic, stately buildings of national and international renown at Hopetoun House and the House of the Binns ('The Binns'), both included in Historic Scotland's Inventory of Gardens and Designed Landscapes
- Other buildings are farm cottages or tenanted farms, but with an incongruous factory at the east end
- Small scale landscape with a regular field pattern defined by hedgerows and some stone dykes, in particular around the Hopetoun estate where they are a strong feature of the landscape
- Area drains northwards to the Firth of Forth via the meandering and in parts incised and well wooded Midhope Burn which bisects the area
- A904 runs along the southern boundary with only a few minor roads running from it through the Hopetoun estate, creating a quiet, calm experience
- Landform and landcover provide contrasts of enclosed, small scale areas with open, elevated outward viewpoints from higher land (in particular from the Tower folly at the House of the Binns), where long distance views provide a sense of place and context with the Firth of Forth, bridges and Fife beyond



Appendix 2: Wind Energy Developments in and Adjacent to West Lothian
(as at August 2011)

	No. of Turbines	Height to Blade Tip	Output	Location in West Lothian by Landscape Type (2011 WL-LCA classification) or Neighbouring Council
Installed / Approved:				
Blacklaw	54	126.5m	@2.3 = 124.2MW	Upland Hill Fringes but mostly within South Lanarkshire
Blacklaw extension 1	23	126.5m	@2.3 = 53MW	Upland Hill Fringes
Muirhall	6	125m	@3 = 18MW	Within South Lanarkshire
Tormywheel	15	102m	@2.75 = 41.25MW	Upland Hill Fringes
Pateshill	7	107m	@2 = 4MW	Upland Hill Fringes
Greendykeside	2	100m	@4 = 8MW	Within North Lanarkshire
Torrance Farm	3	125m	@3 = 9MW	Within North Lanarkshire
Awaiting Decision (a selection):				
Bracco Farm	7	125m	@3 = 21MW	Within North Lanarkshire
Harthill	3	90m	@2.5 = 7.5MW	Within North Lanarkshire
Burnhead/Stoneridge	13	127m	@2 = 26MW	Within Falkirk
Greengairs	9	125m	@2.5 = 22.5MW	Within North Lanarkshire
Muirhouse [NW of Airgath Hill]	6	40m approx	@15kW = 90kW	Within Falkirk
Lochend Farm	1	67m	500kW	Within North Lanarkshire
Treesbank Farm	1	67m	500kW	Within North Lanarkshire
Newhouse	1	67m	500kW	Within North Lanarkshire
Shotts	1	67m	500kW	Within North Lanarkshire
Refused / Withdrawn (a selection):				
East Craigs Service Reservoir	1	91m	2 MW	Lowland Plateaux
Woodend Farm	2	110m	@2 = 4MW	Lowland Plateaux
Harrows Law	17	115m	@2.5 = 42.5MW	Within South Lanarkshire
Scoping / Enquiry (a selection):				
Fauch Hill	33	125m	@3 = 99MW	Upland Hills
Blacklaw extension 2	12	126.5m	@2.3 = 27.6MW	Within North Lanarkshire
Pearie Law	7	125m	@2.5 = 17.5MW	Upland Hill Fringes
Harburnhead	28	125m	@2.5 = 70MW	Upland Hill Fringes
Greengairs East	11	132m	@3 = 33MW	Within North Lanarkshire
Salsburgh	3	125m	@2.5 = 7.5MW	Within North Lanarkshire
Damside, Shotts	16	125m	@3 = 48MW	Within North Lanarkshire
Overhillhouse Farm	2	71m	@275kW = 0.55MW	Lowland Plateaux
Extension to Torrance Farm (see 'Installed / Approved' above)	3	125m	@3 = 9MW	Within North Lanarkshire

[Page left blank]

Appendix 3: Bibliography

Ash Consulting Group (1998); *The Borders Landscape Assessment*; Scottish Natural Heritage Review No. 112; <http://www.scotborders.gov.uk/pdf/26582.pdf>

Ash Consulting Group (1998); *The Lothians Landscape Character Assessment*; Scottish Natural Heritage Review No. 91; <http://www.snh.gov.uk/publications-data-and-research/publications/search-the-catalogue/publication-detail/?id=322>

Ash Consulting Group (1999); *Central Region Landscape Character Assessment*; Scottish Natural Heritage Review No. 123; <http://www.snh.org.uk/publications/on-line/LCA/centralregion.pdf>

Carol Anderson & Alison Grant (2005); *Landscape Capacity Study for Wind Turbine Development in East Lothian*, Final Report; http://www.eastlothian.gov.uk/downloads/Final_Report_May_05.pdf

Carol Anderson & Alison Grant (January 2007); *Landscape Capacity Study for Wind Turbine Development in Midlothian*, Final Report; http://www.midlothian.gov.uk/info/198/planning_policy/466/wind_energy_development

City of Edinburgh Council, East Lothian Council, Midlothian Council & West Lothian Council (2004); *The Edinburgh and Lothians Structure Plan 2015*; http://www.elsp.gov.uk/Downloads/ELSP_Approved_Complete_doc.pdf

The Countryside Agency and Scottish Natural Heritage (2002); *Landscape Character Assessment: Guidance for England and Scotland* by University of Sheffield and Land Use Consultants; <http://www.landscapecharacter.org.uk/lca/guidance>

The Countryside Agency and Scottish Natural Heritage (2002); *Landscape Character Assessment: Guidance for England and Scotland. Topic Paper 6: Techniques and Criteria for Judging Capacity and Sensitivity*; <http://www.landscapecharacter.org.uk/lca/topicpapers>

East Lothian Council (December 2010); *Planning Guidance for the Location and Design of Wind Turbines in the Lowland Areas of East Lothian*; http://www.eastlothian.gov.uk/downloads/Approved_Document_December_2010_Revised_Jan_2011.pdf

Grant, A. in association with Clark, P. and Lynch, S. (2010); *Landscape capacity studies in Scotland – a review and guide to good practice*; Scottish Natural Heritage Commissioned Report No. 385; http://www.snh.org.uk/pdfs/publications/commissioned_reports/385.pdf

Ironside Farrar (2010); *South Lanarkshire Spatial Framework and Landscape Capacity for Windfarms*; http://consult.southlanarkshire.gov.uk/portal/planning/re_spg/respg?tab=files

Ironside Farrar (November 2010); *South Lanarkshire Landscape Character Assessment*; http://www.southlanarkshire.gov.uk/downloads/file/4146/landscape_character_assessment_final_report_november_2010

Land Use Consultants (1999); *Glasgow and the Clyde Valley landscape assessment*; Scottish Natural Heritage Review No. 116; <http://www.snh.org.uk/publications/on-line/LCA/glasgow.asp>

Land Use Consultants (January 2010); *Edinburgh Landscape Character Assessment*;
http://www.edinburgh.gov.uk/downloads/file/1948/edinburgh_landscape_character_assessment

The Landscape Institute and the Institute for Environmental Management and Assessment (Second Edition 2002); *Guidelines for Landscape and Visual Impact Assessment (GLVIA)*

MacRoberts LLP and Enviros Consulting Ltd. (2008 – 2009); *SPP6 Supplementary Planning Guidance for Wind Farms*; www.spgadvice.co.uk; including *Landscape and Visual Good Practice Guidance*;
http://www.spgadvice.co.uk/docs/Landscape%20and%20Visual_Good%20Practice%20Guidance_141008.pdf

Scottish Natural Heritage (2001); *Guidelines on the Environmental Impacts of Wind Farms and Small Scale Hydro-electric Schemes*;
<http://www.snh.org.uk/pdfs/publications/heritagemanagement/Guidelines%20Windfarms%20Hydroelectric%20Schemes.pdf>

Scottish Natural Heritage (2002); *Strategic Locational Guidance for Onshore Wind Farms In Respect of the Natural Environment*; Policy Statement 02/02; <http://www.snh.gov.uk/docs/A247182.pdf>

Scottish Natural Heritage (2005); *Guidance: Cumulative Effect of Wind Farms*;
www.snh.org.uk/pdfs/strategy/cumulativeeffectsonwindfarms.pdf

Scottish Natural Heritage (2006); *Visual Representation of Wind Farms – Good Practice Guidance*;
<http://www.snh.gov.uk/docs/A305436.pdf>

Scottish Natural Heritage (2009); *Siting and Designing Windfarms in the Landscape*;
<http://www.snh.gov.uk/docs/A317537.pdf>

Tyldesley, D and Associates (1999); *Stirling to Grangemouth landscape character assessment*;
Scottish Natural Heritage Review No. 124; <http://www.snh.org.uk/publications/online/LCA/stirling.pdf>

University of Newcastle (2002); *Visual Assessment of Windfarms Best Practice*; Scottish Natural Heritage Commissioned Report F01AA303A;
<http://www.snh.gov.uk/docs/A305437.pdf>

West Lothian Council, Development Planning; (January 2009); *West Lothian Local Plan*;
<http://www.westlothian.gov.uk/media/downloadoc/1799514/1849418/2083838/adoptedwllp>

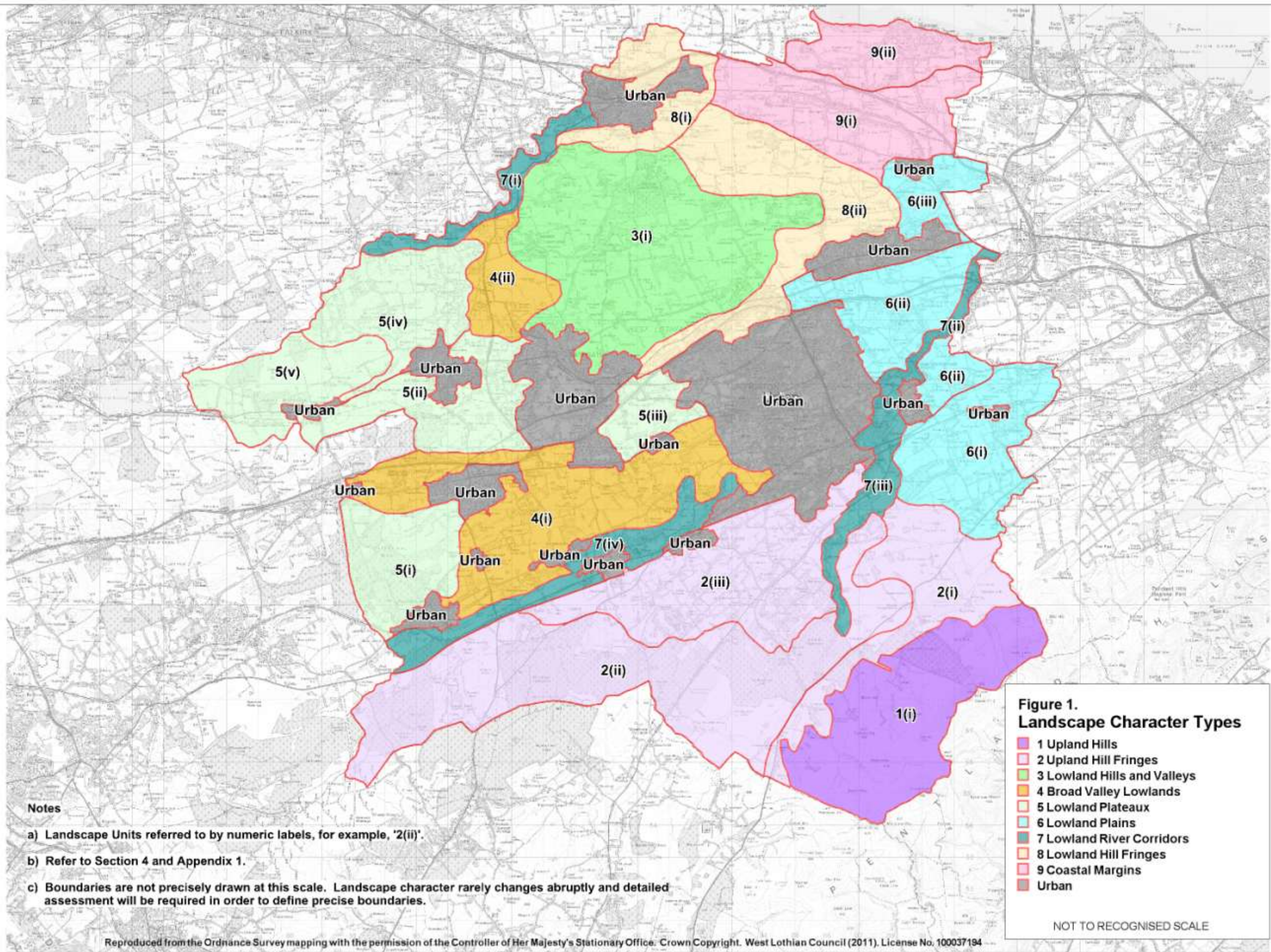
West Lothian Council & Scottish Natural Heritage (June 2004); *West Lothian Soil Sustainability Report*;
http://www.westlothian.gov.uk/media/downloadoc/1799514/1842967/soil_sustainability_report

West Lothian Forum (2000); *A Countryside Access Strategy for West Lothian*; adopted and produced by West Lothian Council.

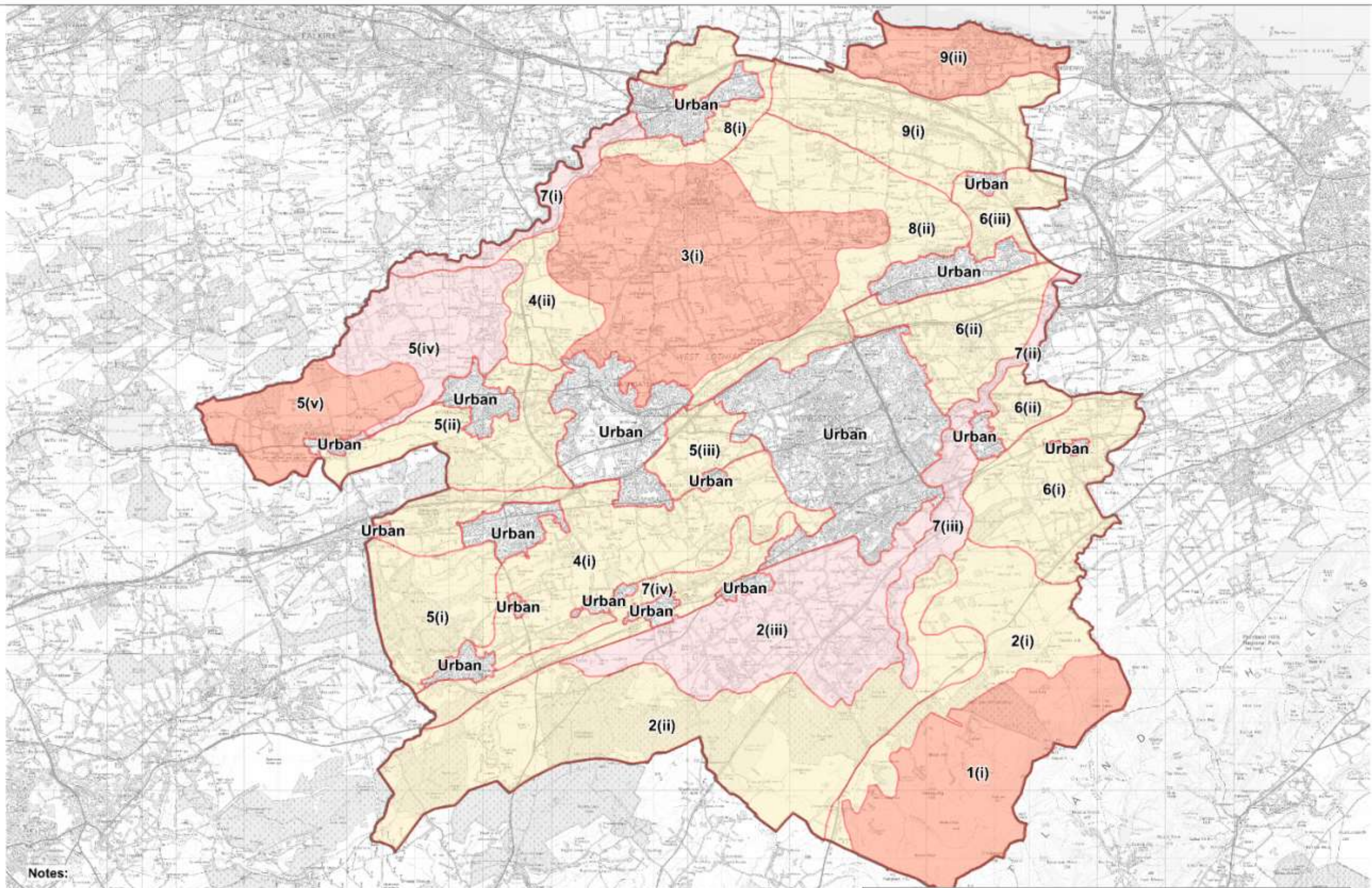
West Lothian Local Biodiversity Plan Partnership (2005); *West Lothian Local Biodiversity Action Plan: Planning for Biodiversity Action 2005 – 2009*;
http://www.westlothian.gov.uk/media/downloadoc/1799514/1842967/Biodiversity_action_plan

FIGURES

[Page left blank]



[Page left blank]



Notes:

- a) Landscape Units referred to by numeric labels, for example, '2(ii)'.
- b) Refer to Section 5 and Table D.

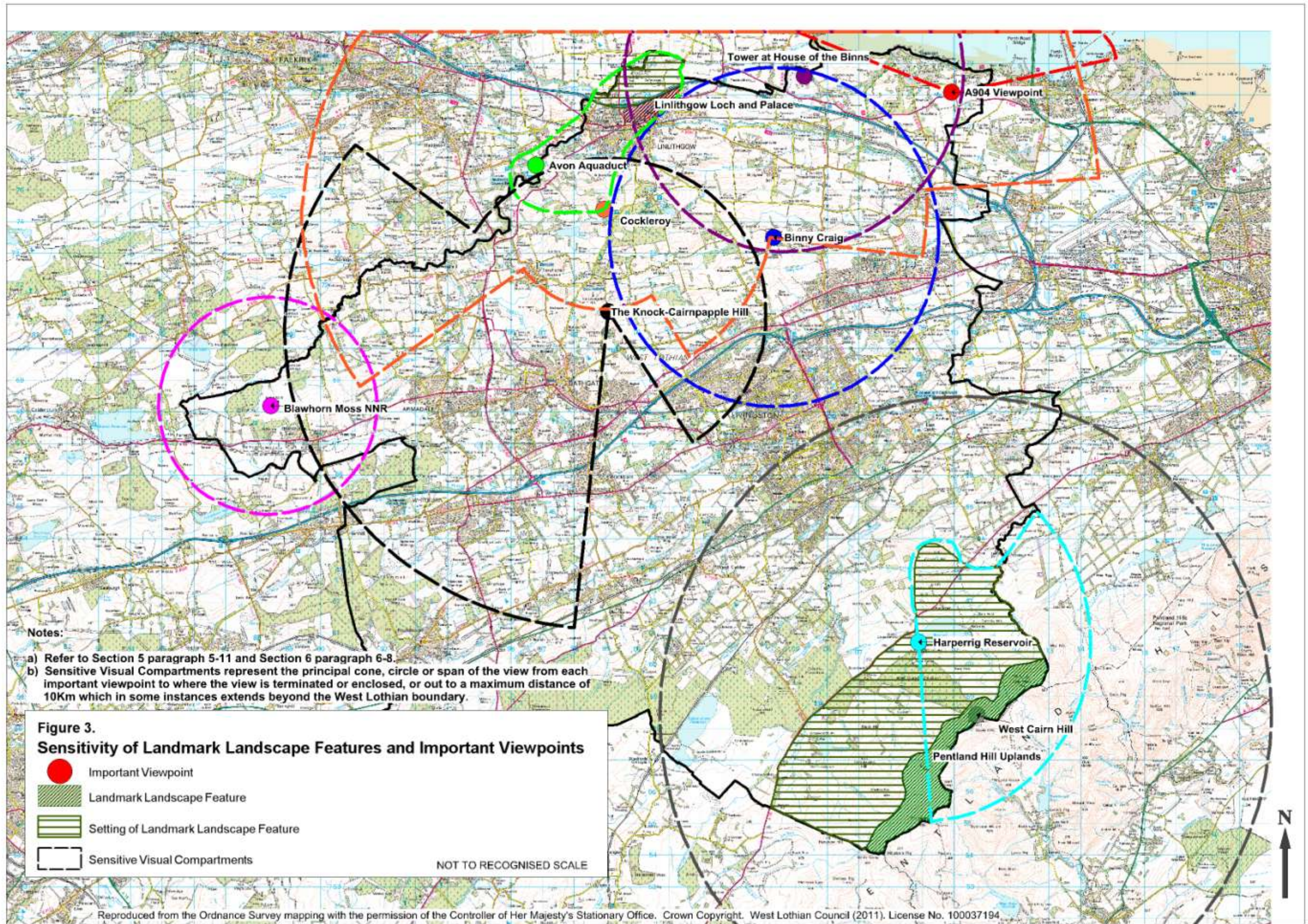
Figure 2.
Landscape Sensitivity to Wind Energy Development

■	Highest
■	High
■	Medium

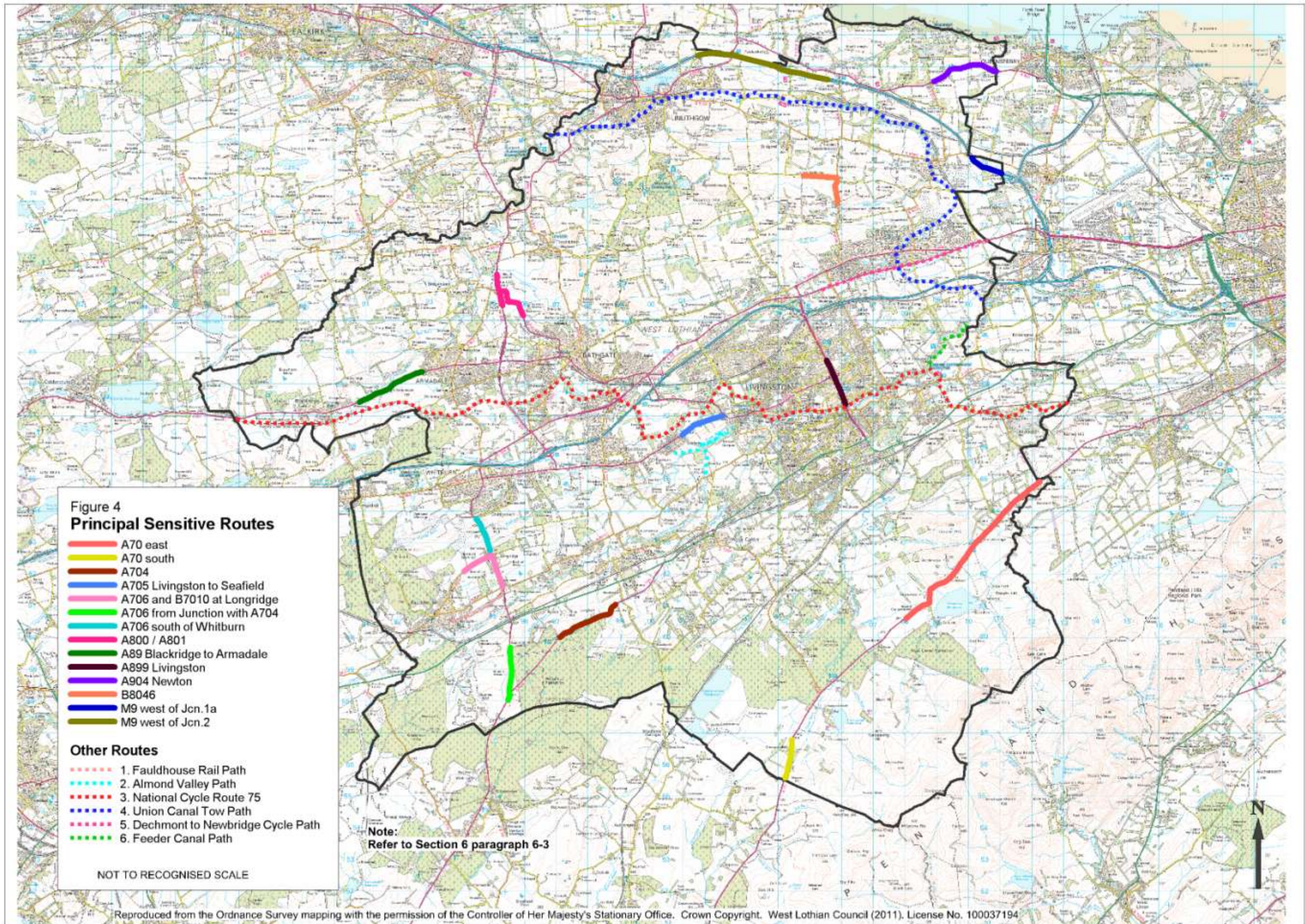
NOT TO RECOGNISED SCALE

Reproduced from the Ordnance Survey mapping with the permission of the Controller of Her Majesty's Stationary Office. Crown Copyright. West Lothian Council (2011). License No. 100037194

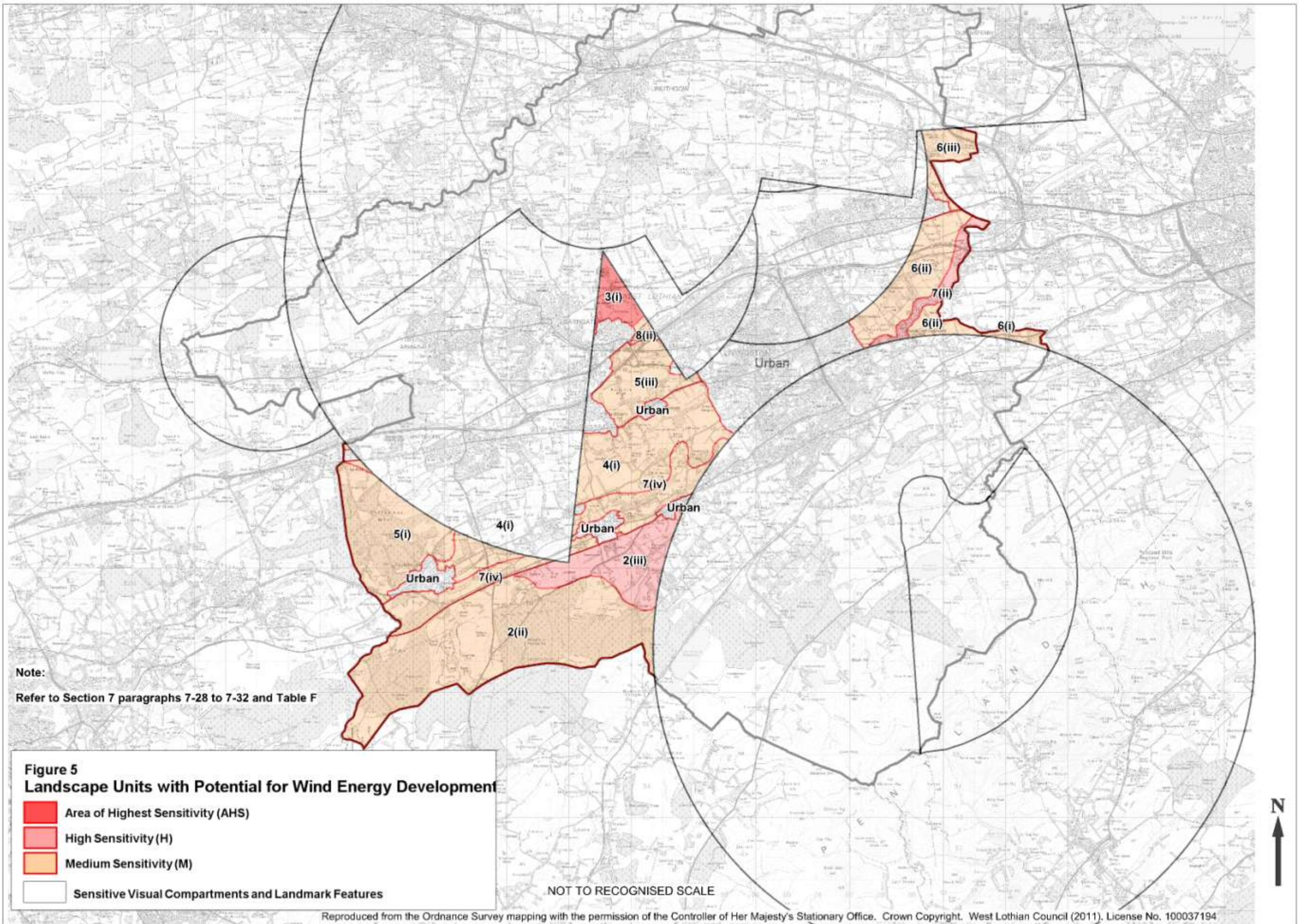
[Page left blank]



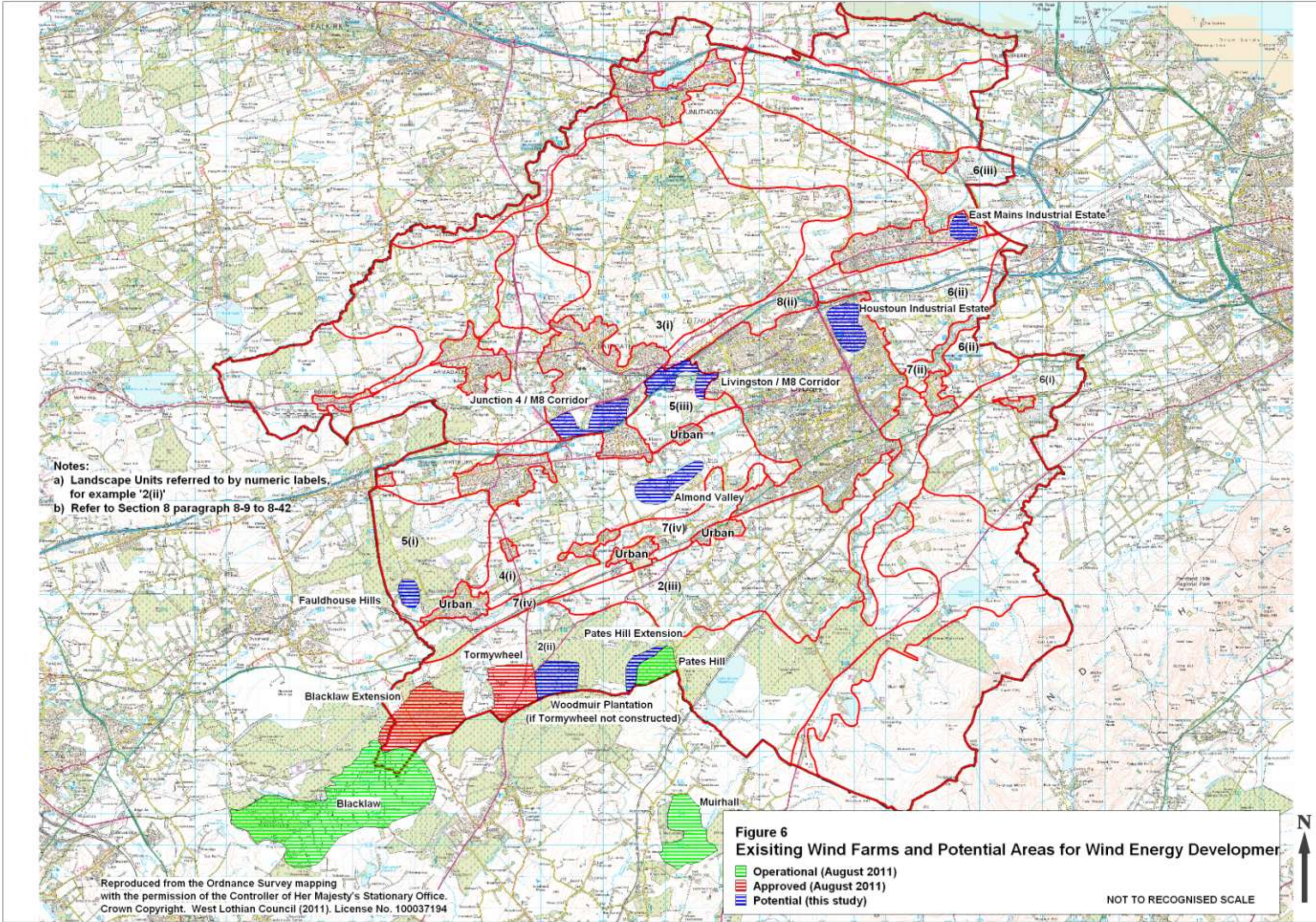
[Page left blank]



[Page left blank]



[Page left blank]



[Page left blank]