South Lanarkshire Landscape Capacity Study for Wind Energy

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Legend

- SLC Boundary
- Study Area 15km buffer
- Scottish Local Authority Boundaries
- Landscape Character Areas

Landscape Capacity (Over 120m)

- High
- Medium
- Low
- None

Note:
Refer to Table 6.1 for more detail on background assessment and capacity for specific turbine sizes.

Landscape Character Types	
Code	**Type**
1	Urban Fringe Farmland
2	Incised River Valley
2A	Incised River Valley Broad Valley Floor
3	Broad Urban Valley
4	Rolling Farmland
4A	Plateau Farmland Forestry
5	Plateau Farmland
5A	Plateau Farmland Forestry
5B	Plateau Farmland Opencast Mining
5C	Plateau Farmland Windfarm
6	Plateau Moorland
6A	Plateau Moorland Forestry
6B	Plateau Moorland Forestry Windfarm
6C	Plateau Moorland Windfarm
6D	Plateau Moorland Opencast Mining
7	Rolling Moorland Foothills
7A	Rolling Moorland Forestry
7B	Rolling Morrland Windfarm
8	Upland River Valley
8A	Upland River Valley Incised
8B	Upland River Valley Opencast Mining
9	Broad Valley Upland
10	Foothills
10A	Foothills Forestry
11	Prominant Isolated Hills
12	Old Red Sandstone Hills
13	Southern Uplands
13A	Southern Uplands Forestry
13B	Southern Uplands Windfarm
13C	Southern Uplands Leadhills
14	Upland Glen

Figure 6.1e

Underlying Landscape Capacity for Wind Turbines (Over 120m)

N

0 2.5 5 10 Km

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Legend

Windfarm: Status, Height

- Operational / Consented, Unknown
- Operational / Consented, 15m to <30m
- Operational / Consented, 30m to <50m
- Operational / Consented, 50m to <80m
- Operational / Consented, 80m to <120m
- Operational / Consented, Over 120m
- SLC Boundary
- Study Area 15km buffer
- Scottish Local Authority Boundaries
- Landscape Character Areas

Typology

- Landscape with no Wind Turbines
- Landscape with Occasional Wind Turbines
- Landscape with Wind Turbines
- Wind Turbine Landscape

Landscape Character Types	
Code	Type
1	Urban Fringe Farmland
2	Incised River Valley
2A	Incised River Valley Broad Valley Floor
3	Broad Urban Valley
4	Rolling Farmland
4A	Plateau Farmland Forestry
5	Plateau Farmland
5A	Plateau Farmland Forestry
5B	Plateau Farmland Opencast Mining
5C	Plateau Farmland Windfarm
6	Plateau Moorland
6A	Plateau Moorland Forestry
6B	Plateau Moorland Forestry Windfarm
6C	Plateau Moorland Windfarm
6D	Plateau Moorland Opencast Mining
7	Rolling Moorland Foothills
7A	Rolling Moorland Forestry
7B	Rolling Morrland Windfarm
8	Upland River Valley
8A	Upland River Valley Incised
8B	Upland River Valley Opencast Mining
9	Broad Valley Upland
10	Foothills
10A	Foothills Forestry
11	Prominant Isolated Hills
12	Old Red Sandstone Hills
13	Southern Uplands
13A	Southern Uplands Forestry
13B	Southern Uplands Windfarm
13C	Southern Uplands Leadhills
14	Upland Glen

Figure 6.2

Cumulative Landscape Typology: Operational & Consented Wind Turbines (March 2015)

N

0 2.5 5 10 Km

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Legend

Windfarm: Status, Height

- Operational / Consented, Unknown
- Operational / Consented, 15m to <30m
- Operational / Consented, 30m to <50m
- Operational / Consented, 50m to <80m
- Operational / Consented, 80m to <120m
- Operational / Consented, Over 120m
- SLC Boundary
- Study Area 15km buffer
- Scottish Local Authority Boundaries
- Landscape Character Areas

Typology

- Landscape with no Turbines
- Landscape with Occasional Turbines
- Landscape with Wind Turbines
- Wind Turbine Landscape

Landscape Character Types	
Code	**Type**
1	Urban Fringe Farmland
2	Incised River Valley
2A	Incised River Valley Broad Valley Floor
3	Broad Urban Valley
4	Rolling Farmland
4A	Plateau Farmland Forestry
5	Plateau Farmland
5A	Plateau Farmland Forestry
5B	Plateau Farmland Opencast Mining
5C	Plateau Farmland Windfarm
6	Plateau Moorland
6A	Plateau Moorland Forestry
6B	Plateau Moorland Forestry Windfarm
6C	Plateau Moorland Windfarm
6D	Plateau Moorland Opencast Mining
7	Rolling Moorland Foothills
7A	Rolling Moorland Forestry
7B	Rolling Morrland Windfarm
8	Upland River Valley
8A	Upland River Valley Incised
8B	Upland River Valley Opencast Mining
9	Broad Valley Upland
10	Foothills
10A	Foothills Forestry
11	Prominant Isolated Hills
12	Old Red Sandstone Hills
13	Southern Uplands
13A	Southern Uplands Forestry
13B	Southern Uplands Windfarm
13C	Southern Uplands Leadhills
14	Upland Glen

Figure 6.3

Cumulative Landscape Typology: Proposed Maximum Development Capacity

N

0 2.5 5 10 Km

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Legend

- SLC Boundary
- Study Area 15km buffer
- Scottish Local Authority Boundaries
- Landscape Character Areas
- Main Settlements
- Areas with Highest Underlying Landscape Capacity (see 6.4.2)
- Areas with Limited Underlying Landscape Capacity (see 6.4.3)
- Areas with Little or No Underlying Landscape Capacity (see 6.4.4)
- Areas of Significant Cumulative Development (see table 6.2)
- Southern Upland Foothills & Pentland Hills Area (see 6.4.6)

Landscape Character Types	
Code	**Type**
1	Urban Fringe Farmland
2	Incised River Valley
2A	Incised River Valley Broad Valley Floor
3	Broad Urban Valley
4	Rolling Farmland
4A	Plateau Farmland Forestry
5	Plateau Farmland
5A	Plateau Farmland Forestry
5B	Plateau Farmland Opencast Mining
5C	Plateau Farmland Windfarm
6	Plateau Moorland
6A	Plateau Moorland Forestry
6B	Plateau Moorland Forestry Windfarm
6C	Plateau Moorland Windfarm
6D	Plateau Moorland Opencast Mining
7	Rolling Moorland Foothills
7A	Rolling Moorland Forestry
7B	Rolling Morrland Windfarm
8	Upland River Valley
8A	Upland River Valley Incised
8B	Upland River Valley Opencast Mining
9	Broad Valley Upland
10	Foothills
10A	Foothills Forestry
11	Prominant Isolated Hills
12	Old Red Sandstone Hills
13	Southern Uplands
13A	Southern Uplands Forestry
13B	Southern Uplands Windfarm
13C	Southern Uplands Leadhills
14	Upland Glen

Figure 6.4

Wind Turbine Development Opportunities and Constraints

N

0 2.5 5 10 Km

REFERENCES

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Glasgow Caledonian University and others (March 2008). *The Economic Impact of Wind Farms on Scottish Tourism. A report for the Scottish Government*

Gordon, D (May 2007). *Electricity Act 1989 Town and Country Planning (Scotland) Act 1997: Report of Public Local Inquiry, Clyde Windfarm, South Lanarkshire File Reference: IEC/3/90*

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SNH (2002) *Visual assessment of windfarms best practice*

SNH (2004). *Commissioned Report No.042 Landscape capacity study for onshore wind energy development in the Western Isles (ROAME No. F02LC04)*

SNH (2008). *Natural Heritage assessment of small scale wind energy projects which do not require formal Environmental Impact Assessment (EIA).SNH Guidance.*

SNH (2012) *Assessing the cumulative impact of onshore wind energy developments: March 2012*

SNH (2012) *Assessing the impact of small-scale wind energy proposals on the natural heritage*

SNH (2012) *Guidance on Assessing Connectivity with Special Protection Areas (SPAs)*

SNH (March 2012) *Siting and Design of Small Scale Wind Turbines of between 15 and 50 metres in height*

SNH (2014) *Visual Representation of Windfarms*

SNH (2014) *Siting and designing windfarms in the landscape (V2)*

SNH (June 2015) *Spatial planning for onshore wind turbines – natural heritage considerations*

SNH and The Countryside Agency (2002). *Landscape Character Assessment Guidance for England and Scotland Topic paper 6: Techniques and Criteria for Judging Capacity and Sensitivity.*

The Scottish Government (2014). *Scottish Planning Policy*

The Scottish Government (Aug 2012).*Process for preparing spatial frameworks for wind farms (Web Guidance)*

The Scottish Government (Oct 2012).*Onshore Wind Turbines (Web Guidance)*

The Scottish Government Planning Policy and Advice (Legislation, circulars, SPP and PANs)

The Scottish Government online renewables planning advice

The Scottish Government Policy on Control of Woodland Removal

SNH online planning and renewable energy guidance a regularly updated list of current SNH publications and guidance notes

APPENDICES

APPENDIX 1: CURRENT POLICY AND GUIDANCE FOR ONSHORE WIND ENERGY

1.1 National Policy and Guidance

Scottish Planning Policy

National policy in relation to renewable energy development is expressed in SPP 2014 with related web-based guidance, currently being updated. This reflects the Scottish Government's commitment to greatly increasing the amount of energy produced by renewable sources. Inevitably it focuses on wind power as, at least in the short term, the most available resource suitable for expansion.

SPP is thus very positively disposed to renewable energy production and directs all councils to create development plan policies that seek to ensure an area's full potential for electricity and heat from renewable sources is achieved, in line with national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations.

SPP states that development plans should set out a Spatial Framework for windfarms identifying those areas that are likely to be most appropriate for onshore wind farms and should indicate the minimum scale of development their spatial framework is intended to apply to. Development plans are also required to set out the criteria that will be considered in deciding *all* applications for wind farms of different scales – including extensions and re-powering – taking account of detailed considerations set out at paragraph 169, which lists a series of criteria. Paragraph 169 clearly indicates cumulative impacts should be considered as a potentially significant constraint:

> *'cumulative impacts – planning authorities should be clear about likely cumulative impacts arising from all of the considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development;'*

This applies to, amongst other factors, landscape and visual impacts including wild land

Scottish Natural Heritage

Scottish Natural Heritage provides comprehensive guidance on most aspects of onshore wind energy development and the landscape:

- Assessment of landscape and visual impacts and visual representation of wind turbines;
- Siting and design guidance;
- Assessment of cumulative impacts.

1.2 Development Plan Policies

Strategic Development Plan

Strategic Policy

The Glasgow and Clyde Valley SDP was approved in May 2012. The SDP identified broad areas of search (BAOS) for wind farms (diagram 16 in SDP) and advised that it will be for local development plans to take forward the refinement of these areas to establish their long term potential. However the publication of SPP 2014 means that the 2012 SDP is now out of date with regard to its approach to wind energy. The Main Issues Report for SDP2 (Clydeplan) advises that the preferred option for SDP2 is to develop a spatial framework using the approach set out in SPP, update the existing SDP1 policy and to take account of the landscape capacity study to ensure a consistent approach is taken across the city region.

Strategic Landscape Capacity Assessment 2014

SPP notes that strategic and local development planning authorities should identify where there is strategic capacity for wind farms and areas with the greatest potential for wind development, considering cross boundary constraints and opportunities.

It is recognised that landscape capacity studies (LCS) can assist in identifying the strategic potential of the area for windfarms and assessing cumulative impacts, which can often be cross boundary in nature. In this context a study was undertaken in partnership with Scottish Natural Heritage and the eight Clydeplan local authorities to examine cumulative development within the landscape and to provide a view of current residual capacity for further development. The Study established that there is residual capacity in some lower sensitivity landscapes, but that the capacity threshold is being approached in others.

Local Development Plan

The South Lanarkshire LDP (adopted June 2015) sets out the land use planning framework for South Lanarkshire over the next 5 years. The plan contains 19 policies which identify opportunities for new development and set out requirements to protect the environment and safeguard local communities. Policy 19 in the LDP covers all aspects of renewable energy development, with the detail of the spatial framework for wind farms and the considerations for assessing renewable energy proposals being deferred to Supplementary Guidance . The LDP contains Policy 19 worded as follows:

Policy 19 – Renewable Energy

Applications for renewable energy infrastructure developments will be supported subject to an assessment against the principles set out in the 2014 SPP, in particular, the considerations set out at paragraph 169 and additionally, for onshore wind developments, the terms of Table 1: Spatial Frameworks.

The Council will produce statutory supplementary guidance which accords with the 2014 SPP, and which contains the spatial framework for onshore wind energy, and sets policy considerations against which all proposals for renewable energy infrastructure developments will be assessed.

Development proposals must also accord with other relevant policies and proposals in the development plan and with supplementary guidance.

Supplementary Guidance – Renewable Energy

The Council is preparing Statutory Supplementary Guidance on Renewable Energy, which will be approved by mid 2015. When approved, Statutory SG forms part of the Development Plan and as such will be used for decision making in accordance with Section 25 of the Planning Act.

The Renewable Energy SG will contain detailed policy and guidance in support of LDP policy 19, setting out the spatial framework for onshore wind energy developments, and guidance in respect of the considerations listed in paragraph 169 of SPP 2014 for the assessment of renewable energy proposals. This will be accompanied by a detailed assessment checklist for renewable energy proposals.

The landscape capacity study for wind energy will assist the Council in formulating the sections of the SG which contain guidance in relation to the following considerations listed in section 169 of the SPP:

- *'cumulative impacts - planning authorities should be clear about likely cumulative impacts arising from all of the considerations below, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development;*
- *impacts on communities and individual dwellings, including visual impact, residential amenity, noise and shadow flicker;*
- *landscape and visual impacts, including effects on wild land; '*

Other Supplementary Guidance

Various Supplementary Guidance is being prepared to support the LDP. These SG's will contain other detailed policies which are relevant to renewable and wind energy developments. Of particular relevance are the SG on Climate Change, Natural and Historic Environment and Development Management.

Further Sources of Information:

1. Scottish Government Planning Policy and Advice (Legislation, circulars, SPP and PANs)
http://www.scotland.gov.uk/Topics/Built-Environment/planning

2. Scottish Government Energy Consents Unit
http://www.scotland.gov.uk/Topics/Business-Industry/Energy/Infrastructure/Energy-Consents/

3. Scottish Government Policy on Control of Woodland Removal
http://www.forestry.gov.uk/pdf/fcfc125.pdf/$FILE/fcfc125.pdf

4. Calculating carbon savings from wind farms on Scottish peat lands - A New Approach – Scottish Government 2007
http://www.scotland.gov.uk/Publications/2008/06/25114657/0

5. Guidance from SEPA on Water Environment
http://www.sepa.org.uk/water.aspx

Additional guidance is available from SEPA's CAR Practical Guide accessible from http://www.sepa.org.uk/water/regulations.aspx.

5. NATS en route safeguarding maps.
http://www.nats.co.uk/environment/windfarms/nerl-self-assessment-maps/

6. SNH Guidance
http://www.snh.gov.uk/planning-and-development/renewable-energy/onshore-wind/

Various guidance is available on the SNH website. SNH publications referred to in this SG include the following:

- Visual Representation of Windfarms (2014)
- Assessing the impact of small-scale wind energy proposals on the natural heritage (2012)
- Guidance on Assessing Connectivity with Special Protection Areas (SPAs) (2012)
- Siting and Design of Small Scale Wind Turbines of between 15 and 50 metres in height (2012)
- Assessing the cumulative impact of onshore wind energy developments (2012)
- Renewables Trends in Scotland 2010
- Good practice during wind farm construction (Oct 2010)
- Siting and designing windfarms in the landscape (V2) (2012)
- Visual representation of wind farms. Good Practice Guidance (February 2007)
- Visual assessment of windfarms best practice (2002)
- Survey methods for assessing the impacts of onshore wind farms (2005 – revised 2010)
- Bats and Wind Turbines (2012)

Other:

Scottish Government: Guidance on Dealing with Aviation Objections and Associated Negative Conditions in Wind Turbine Consents

Wind Energy developments and Natura 2000 (EU Guidance Document) (October 2010)

APPENDIX 2: CUMULATIVE IMPACT AND LANDSCAPE CAPACITY ASSESSMENT METHODOLOGIES

1.0 Background

Cumulative environmental impact is the impact that results from incremental changes caused by past, present or reasonably foreseeable future actions. Scottish Natural Heritage guidance on wind energy[18] states:

> *'Cumulative impacts can be defined as the additional changes caused by a proposed development in conjunction with other similar developments or as the combined effect of a set of developments, taken together'.*

Cumulative impact is a critical consideration in the case of landscape and visual impacts of onshore wind turbines and windfarms in Scotland due to the current number of existing and consented developments in the landscape, proposed developments in the planning system and the long term implications of national policy that encourages the development of onshore wind energy generation.

The characteristics of wind turbines that lead to cumulative impacts include:

- The large scale and striking visual appearance of wind turbines and windfarms in most landscapes;
- The great extent of their visibility and the potential for intervisibility between wind turbine developments and as seen by receptors;

The larger modern turbines are prominent, large scale, man-made features and there are few other precedents in terms of scale, height and appearance in most landscapes. Topography aside, they are much taller than any natural features such as trees or most buildings and other structures. Of similar built structures in rural landscapes, electricity pylons are significantly smaller than the largest turbines and although broadcasting masts are often taller they are usually singular and infrequent, whereas wind turbines are built in multiples, often in great numbers. Furthermore, most landscape features are static whereas wind turbines rotate. Smaller turbines may also present issues of scale and appearance in more localised contexts, as well as visual confusion when seen together with larger turbines.

This study on behalf of South Lanarkshire Council requires the assessment of cumulative development and landscape capacity. However it is recognised in guidance that the determination of landscape capacity and cumulative impacts is not a straightforward exercise. The background and considerations involved in this process are detailed in this Appendix.

Definitions of the term 'capacity' applied to landscape generally refer to the ability to accept a development without a 'significant' 'adverse' or 'unacceptable' level of change to a landscape. This implies that criteria must be identified and thresholds must be determined to give meaning to the words 'significant' 'adverse' or 'unacceptable'.

Guidance on the assessment of cumulative impacts and landscape capacity is available from a number of sources, most particularly Scottish Natural Heritage *Assessing the cumulative impact of onshore wind energy developments (March 2012)* but also in UK guidance (e.g. *Landscape Character Assessment Guidance for England and Scotland Topic paper 6: Techniques and Criteria for Judging Capacity and Sensitivity. SNH and The Countryside Agency, 2002*) and will be referred to in the following sections.

The determination of 'cumulative impacts' and 'capacity' is subject to debate. No clear guidance is given in the published information beyond the need for the individual impact assessor or Development Plans to determine what the assessment criteria and significance thresholds are. Reasoned argument applicable to the specific circumstances applies, rather than the establishment of an absolute or universal definition. Inevitably this approach is subject to differences of opinion, with thresholds of significance and views on acceptability often differing depending on the background or vested interests of those involved in the debate.

In the absence of any clearly stated or agreed criteria or thresholds and to progress this study some form of threshold or thresholds need to be defined. In order to do this a number of terms and concepts need to be clarified, defining exactly what is being assessed and how. The following section focuses the subsequent assessment and provides guidance and a basis for decisions to be made by the appropriate authorities.

2.0 Defining Terms: Sensitivity, Significance, Capacity and Acceptability of Change

Topic Paper 6 of *Landscape Character Assessment: Guidance for England and Scotland (2002)* refers to the fact that the terms 'sensitivity' and 'capacity' have often been used in an interchangeable manner in landscape character assessment, essentially referring to the ability of a landscape to absorb change without a significant effect on its character. A landscape of high sensitivity is often considered to have a low capacity for change, and vice-versa. Furthermore sensitivity is used as a key criterion in determining both significance of impact and landscape capacity. In fact there are subtle but important differences between sensitivity and capacity. This section discusses the differences and interrelationships between sensitivity, capacity and significance in landscape character assessment and how the acceptability of change may be determined.

2.1 Landscape Sensitivity

The sensitivity of a landscape is a measure of its inherent vulnerability to potential changes and their effects on fabric and character. Vulnerability to change can be considered in two ways:

1) As an inherent part of the landscape's characteristics, regardless of possible types or scales of change that may occur; or

2) In relation to a specific proposed type and scale of change.

[18] SNH (March 2012).*Guidance: Assessing the Cumulative Impact of Onshore Wind energy Developments*

In the former case the assessment of sensitivity would be applied in landscape character assessment where no particular change is being contemplated or assessed, and the landscape is being considered in a resource planning context. In the latter case the assessment of sensitivity would typically be applied in an environmental impact assessment where specific changes are envisaged. In the EIA case the sensitivity of the receiving landscape would be assessed against the magnitude of change in order to determine impact significance.

2.2 Landscape Capacity

Landscape capacity is variously described as the ability of a landscape to accommodate (or absorb) change without a significant (or unacceptable) change in fabric or character. This is usually taken to mean whether or not one or more of the key defining characteristics of the landscape is changed such that the overall fabric or character of the landscape is changed, i.e. a 'capacity threshold' is crossed. In the case of windfarms it is primarily landscape character that is being considered, particularly in cumulative assessments.

The determination of landscape capacity is closely related to landscape sensitivity and the determination of significance of impact. However assessment of capacity is a not necessarily based around the assessment of known development proposals, but rather the hypothetical ability to accommodate particular types of development, such as windfarms before a threshold or series of increasing thresholds are crossed.

According to *Topic Paper 6,* in determining capacity not only the sensitivity of the landscape to the particular type of development is considered but also the *landscape value* of the area concerned. Value may be determined in a number of ways, including by landscape designations (national, regional or local); cultural and historic associations and in terms of how it is valued by those who live in it or use it in some way.

The determination of capacity is primarily a planning tool rather than a reactive or assessment tool. Nevertheless the determination of capacity thresholds can also be used to assess existing levels of development or potential development scenarios such as is the case with windfarm developments in South Lanarkshire.

2.3 Determination of Impact Significance

The principles involved in determining impact significance are the same whether a single or multiple developments are being considered. This involves assessing:

1) The sensitivity of the receptor to the type of change proposed; and

2) The magnitude of change that would result from the proposals.

Sensitivity and magnitude are considered in combination, leading to an overall assessment of impact. This informs a determination of whether the impact is significant in terms of the EIA regulations. In doing this the considerations about what exactly is being assessed should be taken into account and clearly delineated including baseline, types of impacts and specific developments.

The threshold at which significance is determined in relation to the EIA regulations should also be defined prior to assessment. However, this threshold is particularly open to debate and often subject to the perceptions of different groups of stakeholders.

2.4 The Nature of Impacts

The issue of whether impacts are positive, beneficial or neutral is also an important consideration when making decisions on the acceptability of impacts, regardless of their significance. If an impact were considered positive or neutral in nature it is likely that its level of significance would be considered less critical than were it considered negative. Most windfarm assessments address this issue by reference to public opinion polls indicating support for renewable energy and the division of public opinion that is apparent over most windfarm developments. This masks the underlying landscape issue that should be considered independently of a windfarm's primary function or other effects.

The purpose of a windfarm is to provide renewable energy involving low levels atmospheric carbon pollution. This accords with current policy and is considered positive and beneficial. Conversely, wind turbines are objects that are unprecedented in scale and appearance in most landscapes, especially the rural areas in which they are mainly located. Many published landscape character assessments of rural areas do not specifically mention wind turbines and windfarms, although increasingly there are guidelines relating to placing them within particular character types. Furthermore, whilst government policy and advice (e.g. SPP, SNH guidance) and local authority policy (Development Plans) support their development, it is always with a precautionary note relating to balancing benefits and impacts.

The tone of most guidance is that of achieving a balance of impacts against the positive returns of renewable energy. For example SPP states in paragraph 155:

> *'Development plans should seek to ensure an area's full potential for electricity and heat from renewable sources is achieved, in line with national climate change targets, giving due regard to relevant environmental, community and cumulative impact considerations'.*

and;

> *'The approach to spatial framework preparation set out in the SPP should be followed in order to deliver consistency nationally and additional constraints should not be applied at this stage. The spatial framework is complemented by a more detailed and exacting development management process where the merits of an individual proposal will be carefully considered against the full range of environmental, community, and cumulative impacts'*

Wind turbines are placed in the landscape for a specific purpose other than causing landscape change. Given this fact and the nature of Government advice, a precautionary approach should be taken in the assessment of impacts by concluding that in most cases the impacts are to some degree negative. The degree of negative impact and level of significance will of course depend on the characteristics of the landscape in which the

windfarm is located. It is conceivable that in some degraded or industrial landscapes the construction of a windfarm could be considered a neutral or positive change.

In terms of visual impacts the issue of public opinion is more relevant, but a precautionary note applies in this case as well. Particularly the issue of positive responses to the provision of clean energy needs to be separated from the consideration of visual impact of turbines in the landscape.

2.5 Acceptability of Change

As discussed above there is published guidance on methods of assessment of cumulative landscape and visual impacts of windfarms (e.g. SNH, 2012[19]) and separate guidance on the factors that determine impact significance (e.g. LI & IEMA, 2013[20]). However there is currently no generic guidance that defines how to determine the *acceptability* of impacts. Indeed generic guidance on acceptability may be inappropriate as any judgement on this is contextual and often a case of weighing perceived impacts against perceived benefits. The impacts and benefits will often be different in type and the balance of judgement is to an extent subjective. The acceptability of change in any particular landscape will depend on the nature of the landscape, the significance of the impacts and the purpose of the change. The final judgement is often informed by and weighed against specific development plan policies and material considerations.

The determination of significant change should theoretically be a clearly defined stage in this process, similar to an impact assessment. Nevertheless, as previously discussed, significance in landscape and visual impact assessment is not universally defined and is open to debate. If the significance of change is open to interpretation, then 'acceptability' of change is a still less definable term that is often based on opinion and is open to debate.

What is acceptable to one individual or organisation may not be acceptable to another. What may be seen as unacceptable change in a narrow context (e.g. landscape and visual impacts) may be seen as acceptable when considering the overall balance of positive and negative impacts (e.g. provision of carbon-neutral energy). In a study of windfarms in the Western Isles (SNH, 2004[21]) the idea of a predetermined 'carrying capacity' is questioned and the concept of *Limits of Acceptable Change* (LAC) is discussed:

> *'LAC is first and foremost a process through which decisions are made on the conditions which are acceptable and then prescriptions are made for the actions needed to protect or achieve those conditions. So the objective of the LAC process is not to prevent change but rather to control it and to decide on the actions required to maintain or achieve the desired conditions. Other key features of LAC are the use of indicators and a monitoring programme. As a process, LAC is always participatory and multi-disciplinary, and may or may not involve a wide range of stakeholders. Whilst the term capacity may still be used in LAC, (recreational) carrying capacity is not a simple, single, absolute value. It is the amount, kind and distribution of use that can occur without causing unacceptable impacts on either natural resources or the perceptions and experiences of the users'.*

This concept requires qualitative judgements about what is important in a landscape or to people using that landscape and what level of change is acceptable (i.e. what types and levels of change can take place before the landscape is considered to be critically or significantly changed). In the context of this study, acceptability of change will be related to cumulative landscape and visual impacts judged against landscape capacity as determined by structured a process of judgement; the provisions of criteria-based landscape policies; other material considerations and the wider Scottish picture of windfarm development. No account will be taken of the other potential impacts or benefits of windfarms. The resulting judgements of this study will need to be balanced against the other benefits or disadvantages of the proposals.

2.6 National and Local Policy

The acceptability of proposed windfarms and cumulative landscape and visual impacts of multiple windfarm development has to be considered in the light of national and development plan policy. National policies and strategic and local development plan policies are described in Appendix 1 above.

2.7 Developing a Cumulative Impact Assessment Methodology

2.7.1 Cumulative Impacts

For the purposes of this study, cumulative impacts are taken to be those arising from more than one development of the same type, rather than the accumulation of changes making up one development. In the case of windfarms and turbines, cumulative studies concentrate on other windfarms and turbines. In practice, other features in the landscape or views (e.g. communications masts or electricity pylons) should also be taken into account. Nevertheless, given the singular appearance of windfarms and turbines and their generally isolated rural locations, the potential for overlap of cumulative impacts with other developments is more limited.

2.7.2 Baseline

The baseline for a cumulative, or indeed any, assessment is usually taken to include the existing landscape and visual receptors in the study area at the time of assessment. The baseline should include all operating windfarms and, arguably, all consented windfarms as this is effectively the 'permitted landscape'. The assessment of change and significance of impact should be carried out relative to this baseline whether carrying out a standard or cumulative assessment.

Nevertheless, a landscape capacity study leading to the determination of an 'acceptable' level of windfarm development requires consideration of a full picture of all the windfarms in the landscape: operating, consented and proposed, in order to determine the extent and acceptability of change. The fact that there are operating or consented windfarms in an

[19] SNH (March 2012).*Guidance: Assessing the Cumulative Impact of Onshore Wind energy Developments*

[20] LI and IEMA (2013) *Guidelines for Landscape and Visual Impact Assessment* (3rd Edn.)

[21] SNH (2004). *Commissioned Report No.042 Landscape capacity study for onshore wind energy development in the Western Isles* (ROAME No. F02LC04)

area is not necessarily an indication that the landscape is less sensitive to further development and that capacity is available. Indeed, depending on the landscape type, degree of development and objectives of policy in relation to landscape character, it may mean that most or all of the capacity is already occupied. Therefore, despite the existing baseline, the development must also in effect be considered relative to the 'underlying' landscape.

2.7.3 Types of Cumulative Impact

Landscape

The assessment of cumulative landscape impacts involves an assessment of change in the fabric and character of the landscape as a result of the combined changes of more than one development. The changes are assessed in relation to defined areas of landscape such as a project study area, landscape character area or designated landscape. As previously discussed, it is effects on landscape character that are the primary focus in relation to windfarms from which all other assessments are derived.

Visual

The assessment of cumulative visual impacts involves an assessment of the change in views and visual amenity as a result of combined changes of more than one development, as experienced by people at their homes and during recreation, travel or work. There are three types of cumulative impact in relation to visual receptors:

1) Combined: more than one development is seen from a single static viewpoint in one arc of view (i.e. within the span of one view, without the receptor turning around). This would include particular directional viewpoints or the view from the principal aspect of a residential property.

2) Successive: more than one development is seen from a single static viewpoint by a receptor turning around to encompass more than one arc of view, up to 360^0. This includes high and open viewpoints, or views from all aspects of a residential property.

3) Sequential: more than one development is seen by a receptor visiting a series of viewpoints. This may involve travelling along a linear route or through an area in which views of the developments may be continuous or intermittent and different developments may be seen at different locations. This includes roads, railways, paths and other defined routes or could involve an area such as a designated landscape.

In practice most assessment will include all of these types of impact in order to gain a full picture of how cumulative impacts will be experienced by receptors.

2.7.4 Effect of Pattern of Development on Perception of Impact

Cumulative studies tend to focus on the number of windfarms, turbines or output capacities within a particular area as an indication of level of cumulative impact. Nevertheless, there is not necessarily a simple relationship between numbers, areas and cumulative impact. The pattern of windfarm and wind turbine development, in terms of size, layout and proximity may also affect the perception of cumulative impacts.

The effect of proximity of different windfarms and turbines to one another has a bearing on impacts. Whilst close proximity of two or more windfarms may reduce the potential area visually affected, the level of perceived cumulative impact may be increased by juxtaposition of windfarms or turbines of significantly different appearance (due for example to differing turbine sizes or site layouts) leading to a jarring visual clash or an untidy, disorganised appearance.

Furthermore, studies and planning decisions have indicated that there is less resistance to expansion of existing windfarms than to creation of separate new windfarms. In particular, respondents to a survey on impacts of windfarms on tourism in Scotland (Glasgow Caledonian University and others, March 2008) showed little concern about views being affected by one windfarm compared with more than one windfarm being visible in the same view.

> *"A significant proportion of respondents (44%) agreed that they don't like to see several wind farms in the same view. These results suggest that those respondents who have indicated having a neutral or even positive perspective on individual wind farm sites are less likely to have a similar opinion on a landscape that has several developments in view.*
>
> *This clear result compares with analysis in the previous section where there was a small increase in the negative response as the visual impact increased for an individual wind farm development. This suggests that people see one large scale development in an area as preferable to several smaller scale developments dotted on the landscape.*
>
> *On the other hand, both sets of results also confirm that a definite tipping point exists where wind farm development becomes untenable for a significant number of visitors".*

Current guidance and recent planning decisions are tending towards the concept of concentration of wind turbines into large clusters in certain areas. This is on the basis that this reduces the potential for a widespread dispersal of effects over a larger area and allows areas more sensitive to windfarm development to remain free of windfarm development. SNH guidance now highlights this issue and supports this type of approach where appropriate (*SNH, June 2015 1.2.1 p.11*).

The policy may also offer advantages in terms of economies of scale for site servicing and electricity transmission. The disadvantages are likely to be that areas chosen for concentration of the turbines are likely to be significantly and adversely affected by development – this being effectively a 'sacrificial' landscape policy. Furthermore, this concept does not necessarily sit well with encouragement for smaller scale wind energy development promoted by the Feed in Tariff where turbines are likely to relate to individual properties scattered across the landscape.

2.7.5 Setting Assessment Objectives

What exactly is being assessed depends on the purpose of the cumulative assessment. In the case of an EIA for a single development it is primarily the impacts of the proposal and its contribution to cumulative impacts that is being assessed. Such a study would therefore

typically concentrate on areas in which the impact of the windfarm under consideration is significant and give only slight consideration to areas in which it is not, even if there were significant cumulative impacts from other windfarms.

In the case of a more broad-based cumulative study such as this, it is the overall impact of windfarm developments on a defined study area that is being assessed. Nevertheless this study requires a consideration of the both the full cumulative impact *and* the contribution that specific developments (proposed or operating) make to that impact, in order to inform decisions.

2.7.6 Defining Thresholds of Cumulative Development

The discussion above has defined the terminology and our approach to cumulative assessment. It has isolated the central issues that inform the assessment of acceptability of levels of change. The key requirement is to develop a methodology for defining thresholds of significance and acceptability that are clear and robust enough to be accepted by all sides of the debate. This study is a stage in the debate about acceptable levels of change in the landscape of South Lanarkshire. Whilst we can describe and define what those levels of change might be it is not possible to enforce a universal view as to what levels of change are significant or acceptable.

SPP para 169 underlines the issues associated with increasing levels of cumulative wind turbine development:

> *'cumulative impacts – planning authorities should be clear about likely cumulative impacts arising from all of the considerations below* (note: this includes landscape and visual effects)*, recognising that in some areas the cumulative impact of existing and consented energy development may limit the capacity for further development'*

SNH guidance on cumulative assessment[22] lists the factors that affect the perception of cumulative impact of windfarm development:

> *'The cumulative impact of windfarm development on landscape and visual amenity is a product of:*
>
> *• the distance between individual windfarms (or turbines),*
> *• the distance over which they are visible,*
> *• the overall character of the landscape and its sensitivity to windfarms,*
> *• the siting and design of the windfarms themselves, and*
> *• the way in which the landscape is experienced.*
>
> *The combination of single turbines and small clusters of turbines can raise the same issues'.*

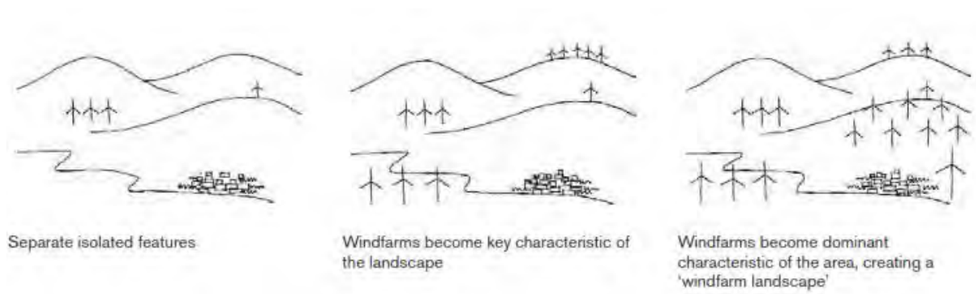
To this list might be added turbine height and windfarm size. In determining an acceptable level of development, it is necessary to clearly define what differing levels of development actually entail.

The SNH guidance identifies three broad levels of cumulative change in the landscape that may be set by local authorities depending on landscape sensitivity and value and local policy objectives:

- **Landscape Protection:** Maintain existing landscape character.
- **Landscape Accommodation:** Accept a degree of change providing this is not detrimental to key landscape characteristics and key visual resources.
- **Landscape Change:** Accept large amounts of change that may have detrimental effects on key landscape characteristics and visual resources.

In determining an acceptable level of development, it is necessary to clearly define what differing levels of development actually entail. The methodology therefore sets out defined levels of change to the landscape and visual environment that might occur or be experienced depending on the size, number and location of turbines to be built within an area.

The descriptions in Table 2.1 below set out a gradated landscape typology that defines the terms of reference for increasing levels of cumulative landscape and visual impact of turbines. It does this by describing their effect on landscape character and the experience of those living in or travelling through the landscape. Further generic illustration of this concept is provided in SNH Guidance, Section 4 of *Siting and Designing Windfarms in the Landscape,* May 2014:



The purpose of this approach is to address the gap between results of cumulative impact assessment and judgements on acceptability of change. It does not set thresholds of significance or acceptability but it does present a framework that describes levels of change in landscape character and the experience of visual receptors in the landscape. This can then be used to inform and shape the debate concerning the degree of change in a landscape and the acceptability of cumulative impacts and the *Limits of Acceptable Change*.

[22] SNH (March 2012).*Guidance: Assessing the Cumulative Impact of Onshore Wind energy Developments*

Table 1: Description of Levels of Cumulative Wind Turbine Development

Landscape Type	Landscape Character	Visual Experience
Landscape with no Wind Turbines	A landscape type or area in which no, or a minimal number/size of wind turbines is present, or visible from neighbouring areas.	There would be no, or negligible, effects on visual receptors.
Landscape with Occasional Wind Turbines	A landscape type or area in which windfarms or wind turbines are located and/or are close to and visible. Turbines are not of such a size, number, extent or contrast in character that they become one of the defining characteristics of the landscape's character.	Visual receptors would experience very occasional close-quarters views of a windfarm or turbines and more frequent background views of windfarms or turbines. Some of the turbines would not be perceived as being located in the landscape character type or area. No overall perception of wind turbines being a defining feature of the landscape.
Landscape with Wind Turbines	A landscape type or area in which a windfarm, windfarms or wind turbines are located and/or visible to such an extent that they become *one* of the defining characteristics of the landscape character. However, they are clearly separated and not the single most dominant characteristic of the landscape.	Visual receptors would experience frequent views of windfarms or wind turbines as foreground, mid-ground or background features, affecting their perception of the landscape character. However there would be sufficient separation between windfarms and turbines and sufficient areas from which wind turbines are not visible such that they would not be seen as dominating the landscape over all other landscape features.
Wind Turbine Landscape	A landscape type or area in which windfarms or wind turbines are extensive, frequent and nearly always visible. They become the dominant, defining characteristic of the landscape. Nevertheless there is a clearly defined separation between the principal developments.	Visual receptors would experience views of windfarms and wind turbines as foreground, mid-ground and background features, to the extent that they are seen as the most dominant aspect of landscape character. Few areas would be free of views of wind turbines, although the principal groupings would appear separated.
Windfarm	Landscape fully developed as a windfarm with no clear separation between groups of turbines. Few if any areas where turbines not visible.	Visual receptors would always be close to and nearly always in full view of wind turbines, with no clear separation between groups of turbines.

The above descriptions of levels of turbine development within a landscape are necessarily simple, factual and generic. They can be applied to any chosen scale of study area, from a region to a landscape type or a single landscape character area. They do not apply to any specific baseline landscape type or types: indeed the character of the landscape is likely to affect judgements on the assignation to a particular level of development. For instance, a large scale landscape may be less dominated and affected than a smaller scale landscape; or a more complex topography, or a densely wooded landscape may reduce the visibility of wind turbines within an area and hence affect the perception by visual receptors. A large landscape character area will require a greater extent and frequency of development than a smaller area to become affected by wind turbines. Furthermore, as discussed in Chapter 5 of this report, there are a number of design and siting factors that affect the perception of cumulative impacts. This includes not only size and number of turbines and windfarms in an area but also the juxtaposition of different layouts including turbine size, positioning and distribution.

The descriptions assume conditions of good visibility covering the 30-35km range that visibility studies and visual impact assessments of larger windfarms adopt as best practice. Clearly this exceeds the requirements for assessments of smaller turbines.

The descriptions are intended to be neutral in that they are purely descriptions of levels of development and the frequency or proximity at which wind turbines and windfarms may be seen. They do not attempt to define the levels of development as being good, bad, acceptable or unacceptable. This is a judgement that would be made when considering specific cases against the landscape type, its capacity for windfarm development, the development policy framework and other material considerations. In this case it is the determination of areas in which cumulative impact has reached the capacity of the landscape.

2.8 Capacity Assessment Method

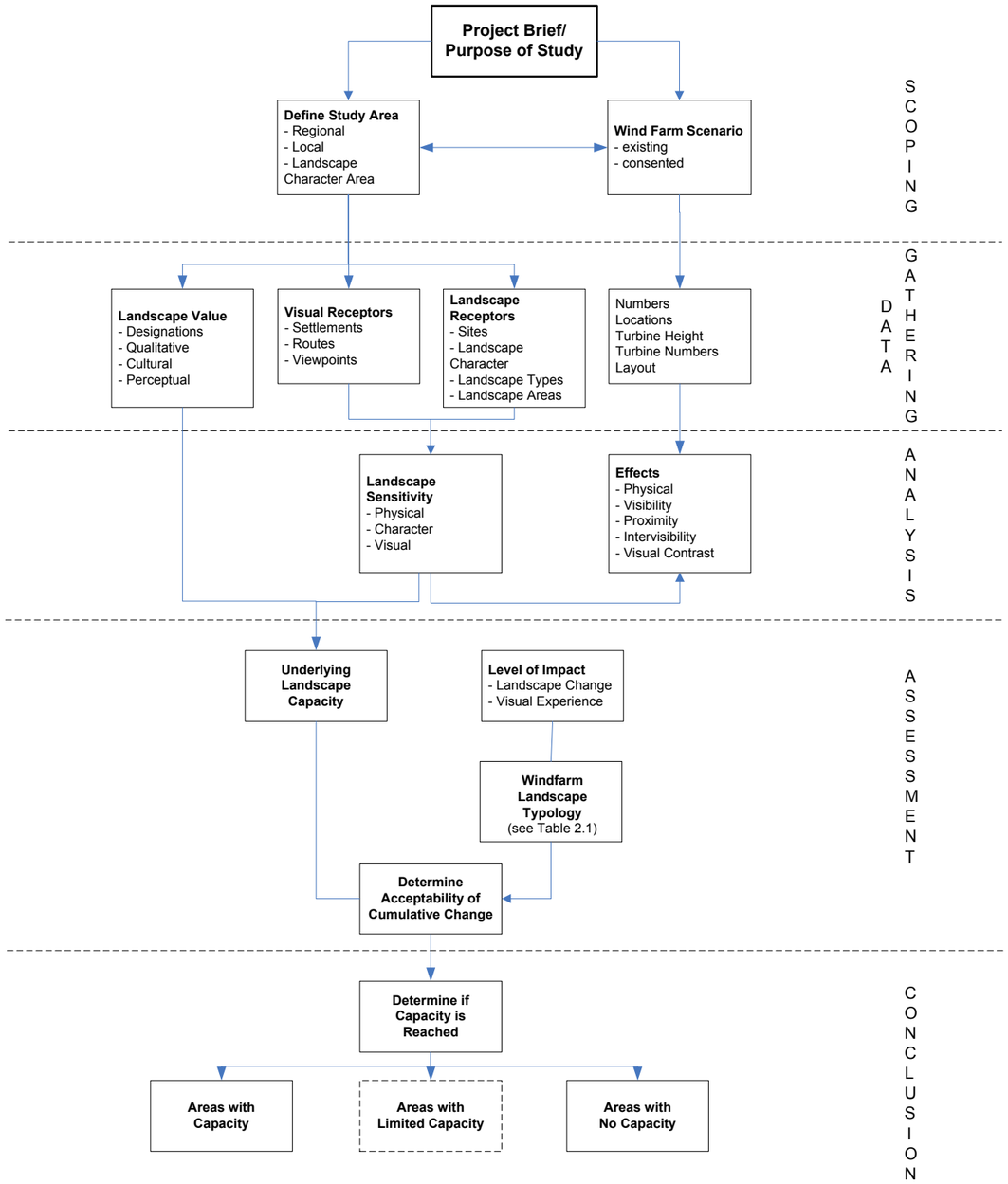
2.8.1 Assessment Process

The considerations discussed above have been taken into account in the staged methodology. This is illustrated by the flow diagram in Figure 1 overleaf. There are 5 stages in the process as shown in Table 2 below:

Table 2: Stages in Landscape Capacity Assessment

Scoping:	Define the purpose of the study, the study area and the wind energy development scenario that is to be assessed.
Data Gathering:	Gather information on receptors (visual and/or landscape); landscape designations and potential constraints; windfarms/ turbines (existing, proposed etc).
Analysis:	Determine landscape character sensitivity, visual sensitivity and landscape value. Determine visibility, direct and indirect landscape effects of the consented windfarms and turbines.
Assessment:	Determine landscape capacity from landscape sensitivity and value. Determine level of cumulative change caused by consented wind turbines, leading to a wind turbine landscape/ visual typology.
Conclusions:	Determine significance and/ or acceptability of existing and future potential cumulative change to the landscape and visual environment.

Figure 1: Cumulative Impact and Landscape Capacity Methodology Flowchart



This is a flexible framework which can be adapted to include the whole study area or focus on subdivisions of landscape, windfarm groupings or development scenarios as required. In this case local landscape character types have been considered, then building up to a picture of the whole of South Lanarkshire.

The assessment for South Lanarkshire includes:

1) Assessment of landscape capacity, cumulative change and acceptable limits of cumulative development in:

   - landscape character types and areas in South Lanarkshire;
   - broad regional landscape character areas of South Lanarkshire;
   - South Lanarkshire as a whole.

The cumulative development in each case is expressed via the wind turbine landscape/ visual typologies described in Table 2.1.

The cumulative and capacity assessment for onshore wind energy in South Lanarkshire considers:

1) Current wind turbine landscape typology resulting from operating and consented wind turbines, where there is a high degree of certainty in the cumulative assessment scenario.

2) The limits of acceptable cumulative change expressed in terms of the wind turbine landscape typologies (e.g. acceptable level of development in an area might be judged as no more than a *Landscape with Occasional Windfarms*). This is based on a judgement considering landscape capacity but also including policy considerations, emerging guidance on wind turbine development and strategic landscape considerations in South Lanarkshire.

3) The effects of consented wind turbines together with wind turbines currently under planning application – where there is a level of uncertainty regarding the potential cumulative scenario.

Further comment is made on the extent to which the current and proposed type and pattern of development (e.g. turbine size, windfarm size and separation between developments) affects the cumulative impacts and, if appropriate, how the area should be developed in order to keep within an acceptable cumulative change.

This information is used to determine where existing development has reached or come close to reaching landscape capacity and further development should be limited. On a more strategic level it identifies areas where development should be limited to provide separation between concentrations of wind turbine development. It also allows the identification of areas where further development may be possible and, in these cases, what level of development would be acceptable.

The assessment is carried out on the basis of the structured methodology in line with SPP and Scottish Government web based guidance in combination with professional judgement, on the basis of a desk analysis of available information on the landscape, on wind turbine developments and through site visits. Whilst a GIS application has been used, this is only as a tool for managing, mapping and illustrating spatial data.

The following sections detail the stages in determining landscape capacity.

2.8.2 Determining Landscape Character Sensitivity

The determination of landscape character sensitivity for a landscape character type involves a breakdown of the physical and perceptual characteristics that contribute to landscape character. Each criterion described below is evaluated in terms of **high, medium** or **low** for sensitivity to wind energy development. An overall assessment is derived from a composite of all the criteria. Whilst scale is often important, there is no consistent relative weighting for each criterion, as in each landscape type different criteria may to be critical to the ability to accommodate wind energy development.

Table 3. Determination of Landscape Character Sensitivity

Landscape Character Criteria	Factors affecting level of sensitivity
Scale (primarily in character but also in geographical size of area)	Consideration of horizontal and vertical scale. Larger scale landscapes are generally considered more able to accommodate commercial wind turbines, although a smaller size of turbine may reduce impacts. A larger physical area would be able to accommodate more development depending on other aspects determining capacity.
Landform	The relationship between wind turbines and landform is complex and also dependent on scale. Generally simple landforms: flat, undulating or gently rolling, are considered less sensitive and complex landforms more sensitive, especially if smaller scale. Landforms of sufficient scale may provide opportunities for screening or backgrounding turbines, reducing their visual sensitivity.
Pattern	The pattern of landcover (woodland, field boundaries, crops, roads, settlements etc). Degree of strength, regularity, fragmentation. Minimal or simple landscape patterns are considered less sensitive to wind turbine development. Again the relationship to scale is important.
Development	The degree of built or infrastructure development will affect suitability. In general a greater level of development is more suitable, particularly large scale industrial and extractive industries, or potentially large scale agriculture. Areas with small scale residential development would potentially be more sensitive. Undeveloped areas with remote or wilderness characteristics would also be more sensitive.
Quality	This is a measure of the condition and integrity of the landscape fabric and character. A landscape in good condition with a high degree of integrity is more likely to be sensitive to development. A landscape of poor quality may represent an opportunity to compensate for impacts.
Elements and Features	The elements that make up a landscape, such as woodlands, fields, hedges, buildings and landforms create its pattern but add to its distinctive composition and character. Prominent or distinctive focal features such as steep hills, towers, lochs add further distinctiveness. The relationship of wind turbines to these affects overall sensitivity.
Context	The characteristics of surrounding landscape areas provide a context that affects perception of a landscape and may affect how wind turbine developments are perceived. Landscapes acting as a backdrop or foreground to other areas are particularly sensitive.
OVERALL RATING	**High/ Medium/ Low**

The following definitions apply to the thresholds of low, medium and high landscape character sensitivity:

Low Sensitivity: A landscape type or area with key characteristics that would be capable of successfully accommodating or co-existing with wind energy development of all or most scales.

Medium Sensitivity: A landscape type or area with some key characteristics that would be capable of successfully accommodating or co-existing with wind energy development but also some characteristics that would be adversely affected and where scale of development may be a limiting factor.

High Sensitivity: A landscape type or area in which most or all key characteristics would be adversely affected by wind energy development and is not capable of successfully accommodating this type of change.

2.8.3 Determining Visual Sensitivity

The visual sensitivity of a landscape area is determined by who is likely to see it, (types and numbers of receptors) and how visible in general the area is. The assessment is made in relation to the visibility of tall structures.

2.8.4 Visibility Analysis

A systematic analysis of the relative visibility of areas of South Lanarkshire has been undertaken. Three sets of visual receptors were determined as follows, and these are identified in Section 4:

- Settlements;
- Routes;
- Viewpoints

Each of the receptor types and locations is representative of locations frequented by people in South Lanarkshire. The visibility analysis included each set of receptors, and generated visibility diagrams of different scenarios for different heights of objects in the landscape.

The analysis was carried out using a computer based technique in which the intervisibility between receptors and landforms, or objects of specific heights on the landforms, is determined. The more intervisibility, the greater the visual sensitivity is likely to be. In the case of area receptors (settlements) or linear receptors (routes) these are broken up into units of the same area or length such that this represents different population sizes or length exposed to view. No value judgement has been made as to relative sensitivity of receptors.

The extent of the visibility assessment was limited to a 15km radius from the receptors. In our experience, this is the distance within which the great majority of significant impacts from wind farms are likely to occur. Whilst it is recognised that impacts occur beyond this distance, up to 35km and beyond, as recognised by EIA best practice, this is not an EIA assessment and the results are considered to adequately distinguish between locations of potentially greater or lesser sensitivity.

Each receptor type was assessed at five different heights above ground level in order to distinguish between the potential visibility of windfarm infrastructure and turbines of differing height:

- 1m representing objects at or near existing ground levels such as tracks and small buildings;
- 45m representing hub height of smaller commercial turbines or blade tip of a farm turbine;
- 75m representing hub height of larger turbines or blade tip height of many single turbines;
- 125m representing blade tip height of typical commercial turbines.

A receptor height of 2m was assumed.

Results of the visibility analysis are illustrated in Appendix 3: Figures 4.2a-d to 4.4a-d. The colours show the differences in visual sensitivity across South Lanarkshire. Red colours indicate areas that are most visible from the greatest numbers of receptors, grading through orange and yellow for areas that are seen by fewest receptors and uncoloured areas where objects of that height would not be seen at all from receptors.

The three key criteria which determine visual sensitivity are listed in Table 4 below. Each is rated in terms of high, medium or low and a composite rating derived based on professional judgement. The following definitions apply to the thresholds of low, medium and high visual sensitivity:

Low Visual Sensitivity: A landscape type or area which due to its location and characteristics has limited internal and/or external visibility and where wind energy developments would not be visible to many sensitive receptors.

Medium Visual Sensitivity: A landscape type or area which due to its location and characteristics has a moderate degree of internal and/or external visibility and where wind energy developments would be potentially visible to a wide range of receptors, some of which are sensitive.

High Visual Sensitivity: A landscape type or area which due to its location and characteristics has extensive internal and external visibility and where wind energy developments would be potentially visible to a wide range and number of sensitive receptors.

Table 4. Determination of Visual Sensitivity

Visual Sensitivity Criteria	Factors affecting level of sensitivity
Receptors	A greater number of potential receptors including higher population densities, visitor attractions or the presence of busy transport routes will lead to a higher visual sensitivity. The sensitivity and expectations of the receptors is also a contributory factor.
Internal Visibility	Views within a landscape area may be open or restricted by landform, vegetation or buildings. The greater the degree of openness and intervisibility the greater the sensitivity.
External Visibility	A landscape area that is visible from surrounding areas by virtue of its prominence or being overlooked is more visually sensitive than an area that is seldom seen.
OVERALL RATING	**High/ Medium/ Low**

2.8.5 Overall Landscape Sensitivity

The combination of landscape character and visual sensitivities leads to an overall assessment of landscape sensitivity for an area. Whilst landscape character is more likely carry more weight in determining sensitivity, no consistent weighting is given to either factor. It is likely that different landscapes will express them to varying extents depending on their unique characteristics. Professional judgement is used in the case of each landscape type.

2.8.6 Determining Landscape Value

Landscape value reflects the value that society and individuals put on a landscape. This can be officially recognised by some form of local or national designation, or simply by its value to a 'community of interest' (this could be for example a local population, recreational users or conservation interest).

Other characteristics affecting value of a landscape include its historic and cultural associations, particularly if expressed by surviving features and patterns in the landscape. Finally there are more intangible characteristics generally valued by society, such as tranquillity remoteness and wilderness.

The key criteria which determine value are listed in Table 5 below. Each is rated in terms of high, medium or low and a composite rating derived based on professional judgement. The following definitions apply to the thresholds of low, medium and high landscape value:

Low Landscape Value: A landscape type or area which has no landscape designation; little apparent value to communities; no or few cultural heritage designations or associations and has no distinctive or unusual perceptual values.

Medium Landscape Value: A landscape type or area which has at least in part local landscape or landscape related designations; value to local communities; some cultural heritage designations or associations and has some distinctive perceptual values.

High Landscape Value: A landscape type or area, all or much of which is covered by national landscape or landscape related designations; has value to local and wider communities; widely recognised cultural heritage designations or associations and has clearly distinctive and/or unusual perceptual values.

Table 5. Determination of Landscape Value

Landscape Value Criteria	Factors contributing to value
Designations	International, national, regional or local designations relating to landscape in particular, although ecological designations also contribute to the landscape value of an area.
Community value	An undesignated area may be particularly valued by a community of interest: local, or activity-based.
Cultural value	Valued landscapes will have historic associations, be rich in historic features and buildings and/or have literary or artistic associations.
Perceptual	Tranquillity, remoteness or wilderness are valued characteristics, whereas landscapes that are highly modified, developed and populated would have low value in this respect. Landscapes regarded as particularly scenic would also be more sensitive.
OVERALL RATING	**High/ Medium/ Low**

2.8.6 Determining Landscape Capacity

The final assessment of capacity combines sensitivity and value and is expressed as **High, Medium** or **Low**. The following definitions broadly define the relationship between landscape sensitivity/ value and capacity:

Low Capacity: A landscape that is both sensitive to wind turbine development and has a high value, and where only a slight level of change can be accommodated without significantly affecting any of the key defining criteria.

Medium Capacity: A landscape that has some sensitivity to wind turbine development and has some aspects of value, and where a moderate level of change can be accommodated which may significantly affect some of the defining criteria

High Capacity: A landscape that has low sensitivity to wind turbine development and has low value, and can accommodate substantial change that significantly affects many of the key defining criteria

Broadly speaking there is an inverse relationship between capacity and landscape sensitivity and value. Nevertheless it is not a simple relationship and we have not employed the use of a matrix in this study: a balance of judgement is made in each case as landscape value may be a more important factor than sensitivity in some cases; and vice versa in others.

It should be noted that in landscapes where there is existing wind turbine development the remaining capacity for turbines may be reduced. This is because the landscape would be approaching the maximum level of change that it can acceptably accommodate.

2.9 Determining Acceptability of Change

The final stage involves bringing together the cumulative impact assessment and the landscape capacity assessment in a reasoned judgement of the effects of windfarm development on the South Lanarkshire landscape. As explained above, the likely acceptability of a proposed level of development may be determined by considering against the underlying capacity of the landscape. This should also be considered against policy criteria and objectives.

2.10 Scope of Assessment

The scope of the assessment can be varied according to the extent of the study area and the purpose of the study. It can also vary according to the depth and detail required to assess impacts within the defined study area. In the case of a detailed study the method should build up to the wider study area from smaller units.

The current study focuses primarily on the local authority area of South Lanarkshire, although areas beyond the boundary are being considered in terms of the visual influence of nearby windfarms and neighbouring contiguous landscape types. Nevertheless the results of the study will be discussed in terms of South Lanarkshire and its landscapes.

Wind Energy Development Types

The study considers all sizes of turbines and developments operating, consented or proposed, as well as potential future scenarios where appropriate. However the capacity assessment and guidance for smaller turbines (under 15m to blade tip) is limited to localised generic siting and design considerations. The smallest turbines are not considered to have the same qualities of scale, prominence and widespread visibility that lead to the wider cumulative impacts that characterise larger turbines.

APPENDIX 3: VISIBILITY ANALYSIS FOR WIND TURBINES IN SOUTH LANARKSHIRE

Figures 4.2 a-d: Visibility from Settlements

Figures 4.3 a-d: Visibility from Transport Routes

Figures 4.4 a-d: Visibility from Viewpoints

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Legend

- SLC Boundary
- Study Area 15km buffer
- Scottish Local Authority Boundaries
- Landscape Character Areas
- Settlement Boundaries

No. of settlement grid squares visible

1 - 138	**(max total 2711)**
139 - 274	
275 - 411	
412 - 547	
548 - 684	
685 - 821	
822 - 957	
958 - 1094	
1095 - 1230	
1231 - 1367	

Landscape Character Types	
Code	**Type**
1	Urban Fringe Farmland
2	Incised River Valley
2A	Incised River Valley Broad Valley Floor
3	Broad Urban Valley
4	Rolling Farmland
4A	Plateau Farmland Forestry
5	Plateau Farmland
5A	Plateau Farmland Forestry
5B	Plateau Farmland Opencast Mining
5C	Plateau Farmland Windfarm
6	Plateau Moorland
6A	Plateau Moorland Forestry
6B	Plateau Moorland Forestry Windfarm
6C	Plateau Moorland Windfarm
6D	Plateau Moorland Opencast Mining
7	Rolling Moorland Foothills
7A	Rolling Moorland Forestry
7B	Rolling Morrland Windfarm
8	Upland River Valley
8A	Upland River Valley Incised
8B	Upland River Valley Opencast Mining
9	Broad Valley Upland
10	Foothills
10A	Foothills Forestry
11	Prominant Isolated Hills
12	Old Red Sandstone Hills
13	Southern Uplands
13A	Southern Uplands Forestry
13B	Southern Uplands Windfarm
13C	Southern Uplands Leadhills
14	Upland Glen

Figure 4.2a

Visibility from Settlements of Areas at 1m Height

N

0 2.5 5 10 Km