Volume 2

Heads of the Valleys
Smaller Scale Wind Turbine Development

Landscape Sensitivity and Capacity Study Final Report

Prepared by Gillespies LLP
April 2015

SECTION 5: GUIDANCE FOR WIND ENERGY DEVELOPMENT

The following guidance should be read in conjunction with the specific locational guidance for each Landscape Unit in Section 4. This guidance is intended to aid the integration of wind turbines into the landscape through good siting and design. The first section below relate specifically to the Heads of the Valleys study area and provides strategic guidance for local authorities and developers to consider in terms of the whole study area and its overall landscape context.

Heads of the Valley specific guidelines

The European Landscape Convention defines landscape as: '*An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors*.' The Heads of the Valleys study area is a perfect example of a landscape whose distinct landscape character has been formed though the interaction of natural and human forces, most notably by industrialisation of the 19th and early 20th centuries within the distinct steep sided glaciated valleys that dissect the plateau landscape. The area contains unique geological features in particular in Rhondda Cynon Taf where a number of Regionally Important Geological sites (RIGs) have been identified. The valleys are heavily settled but development has been constrained by landform, resulting in open steep valley sides and open ridges and uplands. The varied landform with ridges and plateaus of fairly consistent height dissected by steep sided valleys results in intervisibility across the uplands of the study area and north to the BBNP. Opportunities for development within or close to the BBNP will be limited and any proposals would have to show that they do not affect the purposes of the National Park designation.

The uplands play an important role in separating the built form of the settled valley floors, provide a unique contrast in landscape types over a relatively small geographic area and act as a valued backdrop to the settlements. Wind turbine development that dilutes this contrast should be avoided. Currently there are extensive views within the study area across all the upland areas. Apart from the uplands in which TAN8 SSA F is located, the character of the uplands is not noticeably affected by turbine development. Wind turbine development should be avoided if it causes significant change to the remote and unspoilt qualities of the uplands within the study areas due the value placed on them.

Wind turbine development to date has concentrated on the TAN8 SSA F to the west of the study area (both within the study area and adjacent to it). A significant proportion of the consented development has not yet been implemented. As accepted under TAN 8, when implemented there will be a significant change in landscape character and this will affect the capacity of the surrounding area to accept additional wind turbine development without significant adverse cumulative effects. Any proposals in this area must be carefully considered in terms of cumulative impacts.

The valley sides are important in providing the immediate setting for the settlements. There is local sensitivity to re-industrialisation of hillsides that have been reclaimed since the end of coal mining in the area. Wind turbine development on the valley sides surrounding the settlements should avoid dominating the settlements either in height, proximity or extent. No settlement should have the sense of being surrounded by wind turbines such as developments on both sides of a valley. The uplands provide important separation between settlements and the location of wind turbines should avoid reducing this sense of separation.

The capacity of each landscape unit to accommodate wind turbine development is partly dependent on development in neighbouring units. It may be that when one landscape unit reaches capacity it will significantly reduce the capacity of adjoining units, particularly for smaller landscape units and for units where cumulative effects have been identified as a particular issue.

Additional Guidance

The following notes are summarised from guidelines set out in Scottish Natural Heritage (2012) Siting and Design of Small Scale Wind Turbines of between 15 and 50 metres in height. Useful guidance is also provided in the following documents:

- Design Commission for Wales (2012) Designing Wind Farms in Wales
- Scottish Natural Heritage (204) Siting and Designing Wind Farms in the Landscape Version 2

Although aimed at larger wind farm developments, the guidance set out in the two documents above is frequently transferable and should be considered when designing and siting smaller scale developments.

Factors Relating to Design

Turbine Choice
Small turbines offer a greater choice of variety, styles, design and colours than large commercial scale turbines and their selection should be carefully considered in relation to the site in which they are to be located. This is particularly important when other turbines are present to ensure that there aren't conflicting styles in the same locality.

Turbine Colour
Turbine colour should be chosen to help blend the structure into the landscape. The same colour should be used for all components of the turbine and should be non-reflective. A very light grey is commonly used because it minimises the visibility of the turbines when they are seen against the skyline, which is how most large scale turbines are viewed. In all cases the aim should be to minimise visibility and reflectivity of the turbine components.

Turbine Size and Scale
Although small scale turbines are likely to have fewer landscape and visual effects than large commercial models, they can still visually dominate nearby landscape features. Identifying the main landscape and visual characteristics of the landscape in which the turbines are to be sited is an important determinant in selecting the most appropriate size. Landscapes with a simple, strong and mainly horizontal form are better able to accommodate taller turbines and large turbine groups as the height of turbines appears more proportionate to the landscape. Small scale turbines, smaller groupings or individual turbines tend to be better suited to smaller scale, more complex landscapes where there are other features such as buildings, trees or hedges.

Turbine Layout
Although there is scope to present a small group of turbines as a coherent visual image, this may be difficult where there are other built elements such as buildings, wood poles and masts present with the result that visual conflict can arise. Where possible turbine layout should respond to existing landscape patterns, whether field boundaries, buildings or vegetation patterns.

In all cases, turbine layout should respect the underlying landform. Where possible turbines should be located along contours rather than crossing them.

Micro-siting
Micro-siting of turbines often takes place during construction due to unforeseen circumstances such as ground conditions. This can affect the original design concept, particularly the relationship with nearby vertical features such as tress and masts. It is preferable if developers undertake pre-application ground surveys to minimise the requirement for micro-siting at the construction stage.

Ancillary Infrastructure
Visual impacts of any ancillary developments and visual conflicts between turbines and ancillary structures should be minimised by:

- Sensitive siting and design of ancillary equipment and infrastructure (e.g. using local landform, locally appropriate materials, architectural style and colours to more successfully integrate them into their surroundings).
- Using turbines with integral transformers.
- Siting turbines as close as possible to the point of use or grid connection to avoid long sections of overhead power lines or cable runs (more applicable to large scale wind farm developments).
- Utilising existing tracks to avoid tree and hedgerow removal, which may have adverse landscape effects. New tracks if required should follow existing landscape features such as field and woodland boundaries.
- Minimising cut and fill operations.
- Designing fencing or walling to fit the local situation, whilst maintaining the required security.
- Identifying locations for new tree and shrub planting to provide long term screening.

Factors Relating to Location

Landscape Character

This study provides the basis for identifying the key landscape characteristics of the site and the wider area. It also identifies the sensitivity of the landscape to turbines and any special qualities which should be protected. However, this is a strategic study and in all cases turbine applications must be considered on their individual merits and detailed analysis is required to fully appreciate the nature of the development, site and its surroundings.

Impacts on landscape character are likely to be related to:

- Scale of the landscape – whether it is small or large and whether the proposed turbines are of an appropriate scale.
- Topography – turbines can dominate the landform if not carefully sited.
- Skylines – turbines can affect the simplicity of skyline or ridges even if located below such features.
- Settlement pattern – turbines should be carefully sited in relation to existing buildings.
- Influence on the tranquillity of the landscape – turbines create movement, the amount depending on the particular model.

Areas with a Sense of Remoteness

Rural areas which are particularly valued for their remoteness can be affected by the introduction of turbines, although this is less likely to be the case if the turbines are located close to farms or other existing buildings. However, incremental erosion of the special qualities of remoteness and tranquillity should be avoided. Some locations close to centres of population are valued as an important recreational resource and have a sense of being unspoilt and remote even though they are close to urban areas. Locating turbines in these areas should be very carefully considered.

Valued Landscapes

This study identifies landscapes which are designated for their international, national or regionally valued qualities. This is a strategic study and in all cases turbine applications must be considered on their individual merits and detailed analysis will be required to fully appreciate the nature of the development, the site and its surroundings and effect on any locally designated or valued landscapes.

Factors relating to Siting

Landform

Smaller turbines have more potential to utilise landform (often in conjunction with vegetation) to help lessen their visual impact than larger scale commercial models.

As the viewer's eye tends to be drawn towards the skyline, turbines should be set back from ridges and skylines to reduce their visibility within the wider landscape.

Siting of turbines on distinctive or prominent summits or skylines should generally be avoided. Shallower side slopes or gently undulating landform below ridgelines should be selected where possible.

It is often preferable for wind energy developments to be grouped upon the most level part of the site so the development appears to be less visually confusing when viewed from different elevations and directions.

Landscape Pattern

Turbines can be sited to reflect patterns in the landscape, for example field and woodland boundaries. Conversely, care must be taken not to site turbines so that they conflict with patterns in the landscape.

Groupings of turbines can affect how they appear in the landscape. For example three dispersed turbines could be grouped to form a single feature in a visually complex landscape, whilst in a larger scale landscape, a larger single turbine with the same generating capacity may be preferable. A small group of small turbines is most likely to be preferable in valley bottoms and on lower valley slopes where there are other scale indicators.

Focal Features

Turbines are likely to become focal features in the landscape particularly when new or unfamiliar designs are introduced. Care is required to ensure that they do not cause visual conflict or competition with other focal points. The siting of turbines should therefore be carefully considered to protect views to and from important landscape and cultural heritage features and their wider setting.

Turbines can highlight features which would otherwise be hidden. For example a turbine next to a farm could draw attention to its presence when the farm itself is hidden by buildings or trees.

Settlements and Urban Landscapes
Turbines should be carefully located in relation to nearby settlements, buildings and other structures. In sparsely settled rural landscapes, turbines should be located near to existing buildings or structures.

Views to/from, or on the approach to settlements (including dispersed properties) should be carefully considered when siting wind energy developments. Turbines should be located in the least visually prominent location. The type of turbine may be influenced by its proximity to a settlement.

Turbines should be sited to minimise impacts on public viewpoints, roads and public rights of way.

Woodland & Trees
Although trees and woodlands can cause turbulence which interferes with the efficiency or longevity of turbines, in some locations there may be the opportunity to screen small scale turbines by locating them close to trees and woodland. Care should be taken to site turbines so that they do not visually dominate or compete with prominent vegetation such as parkland trees, trees on knolls, avenues etc.

Turbines should be located without the need to fell trees and woodlands particularly where they are important features in the local landscape.

Seasonal variation in leaf cover should be considered when using trees to screen turbines. The felling and restocking regimes of commercial forestry should be considered when locating turbines close to commercial forestry.

Cumulative Considerations
Potential cumulative landscape and visual effects should be carefully considered on a case by case basis, assisted by the production of Zones of Theoretical Visibility (ZTVs) and appropriate visualisations (preferably from agreed viewpoints). Existing, consented and proposed turbines should be taken into account, in addition to any similar developments, which together may give rise to cumulative effects.

See Pembrokeshire and Carmarthenshire: Cumulative Impact of Wind Turbines on Landscape and Visual Amenity guidance April 2013 for detailed guidance on how to assess cumulative impacts.

In Combination with Micro-Renewables
Groups of micro turbines can be prominent in some locations, by drawing the eye to their rotating blades. Rotation speeds vary considerably between small and larger bladed turbines, which if viewed together can create visual disturbance and clutter. Variations in rotor blade diameter should therefore be avoided.

In Combination with Other Small Scale Developments
Multiple small scale developments can dominate the landscape. Turbines should not create visual clutter and cumulative impact with existing built development and vertical structures such as high voltage overhead power lines and communications masts. To avoid this consider the following principles:

- Avoid inconsistent turbine height, layout and design between multiple wind energy developments that are intervisible.
- Identify opportunities to lessen intervisibility between multiple developments – intervening landform and forestry are all useful in this respect.

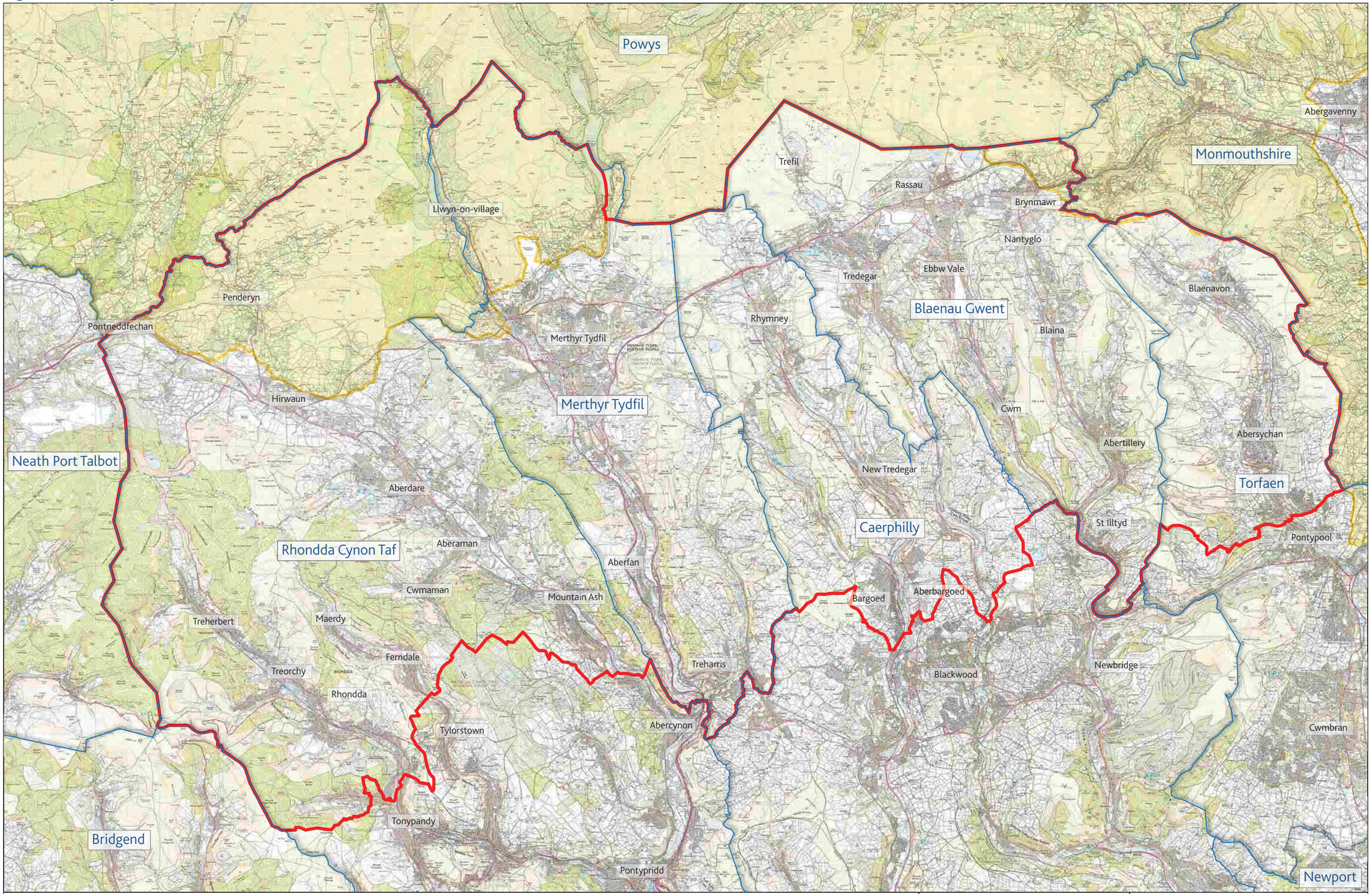
In Combination with Larger Turbines in an area
Smaller turbines when seen in combination with large turbines can create a confusing visual image. This can be lessened by:

- Using turbine layouts of a similar arrangement where more than one turbine group is present.
- Avoid situations where turbine rotary speeds are significantly different.

Filling in Gaps between Clusters of Wind Turbines
Where there are large scale windfarms in an area, the introduction of single or double turbines between clusters can create visual links between developments. There is also potential for incongruous juxtapositions between the different scales of developments. Therefore, where site analysis indicates that maintaining visual separation between and around windfarm clusters is desirable, the gap between developments should be maintained.

SECTION 6: FIGURES

Figure 01 : Study Area



Legend

- Heads of the Valley Study Area
- Local Authority Boundary
- Brecon Beacons National Park (BBNP)

Notes:

1. Local Authority boundary information derived from OS Open Data Boundary Line ESRI Shapefile.
2. National Park boundary derived from Cadw.

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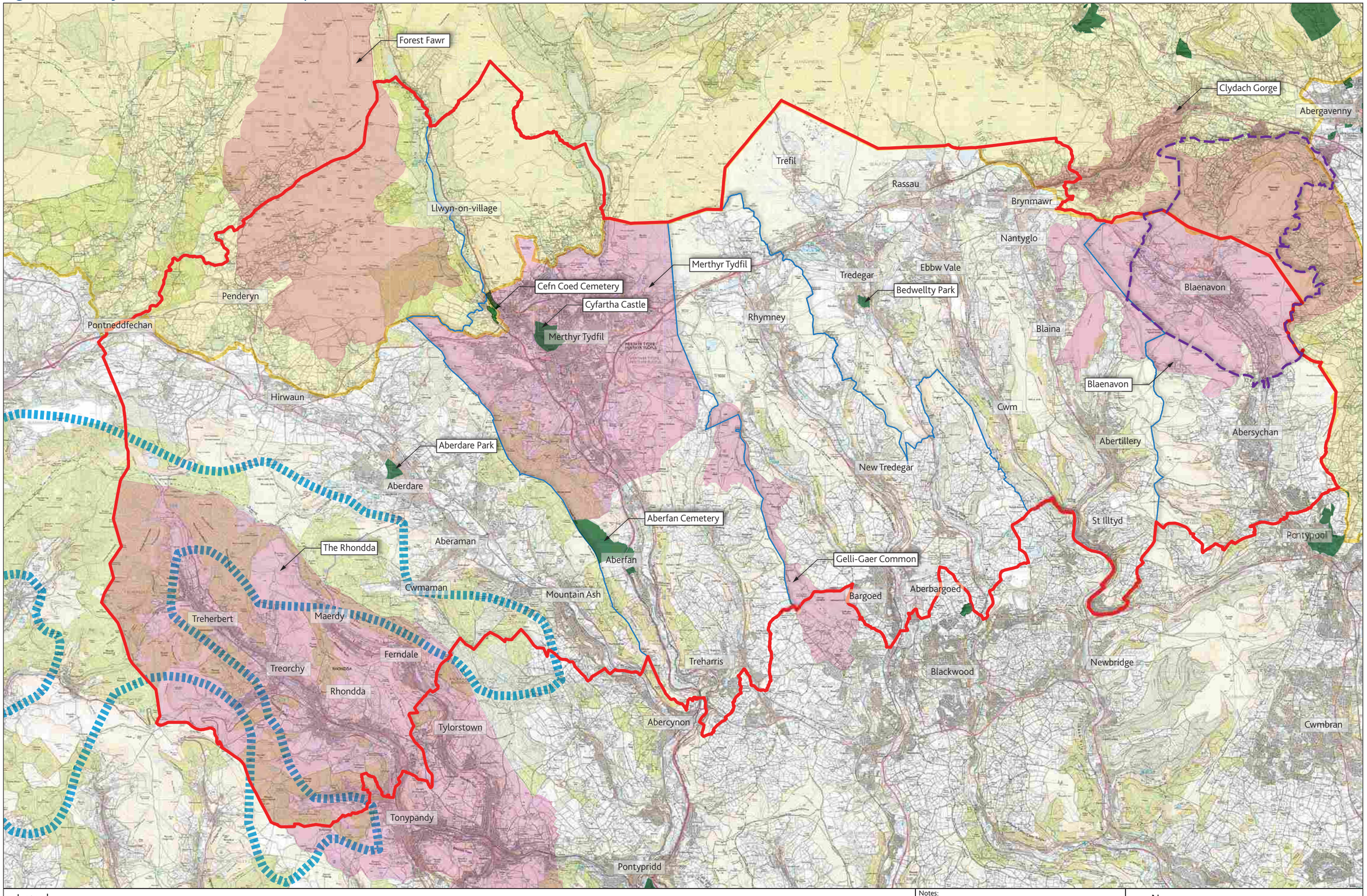
Figure 02 : Study Area and Areas of Landscape Interest



Legend

- Heads of the Valley Study Area
- Local Authority Boundary
- Brecon Beacons National Park (BBNP)
- Blaenavon World Heritage Site (WHS)
- Registered Landscapes of Historic Interest
- Registered Historic Park
- TAN 8 Strategic Search Area (SSA): F - Coed Morgannwg

Notes:

1. Local Authority boundary information derived from OS Open Data Boundary Line ESRI Shapefile.
2. National Park boundary derived from Cadw.
3. Designation information derived from the relevant local authority.
4. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7

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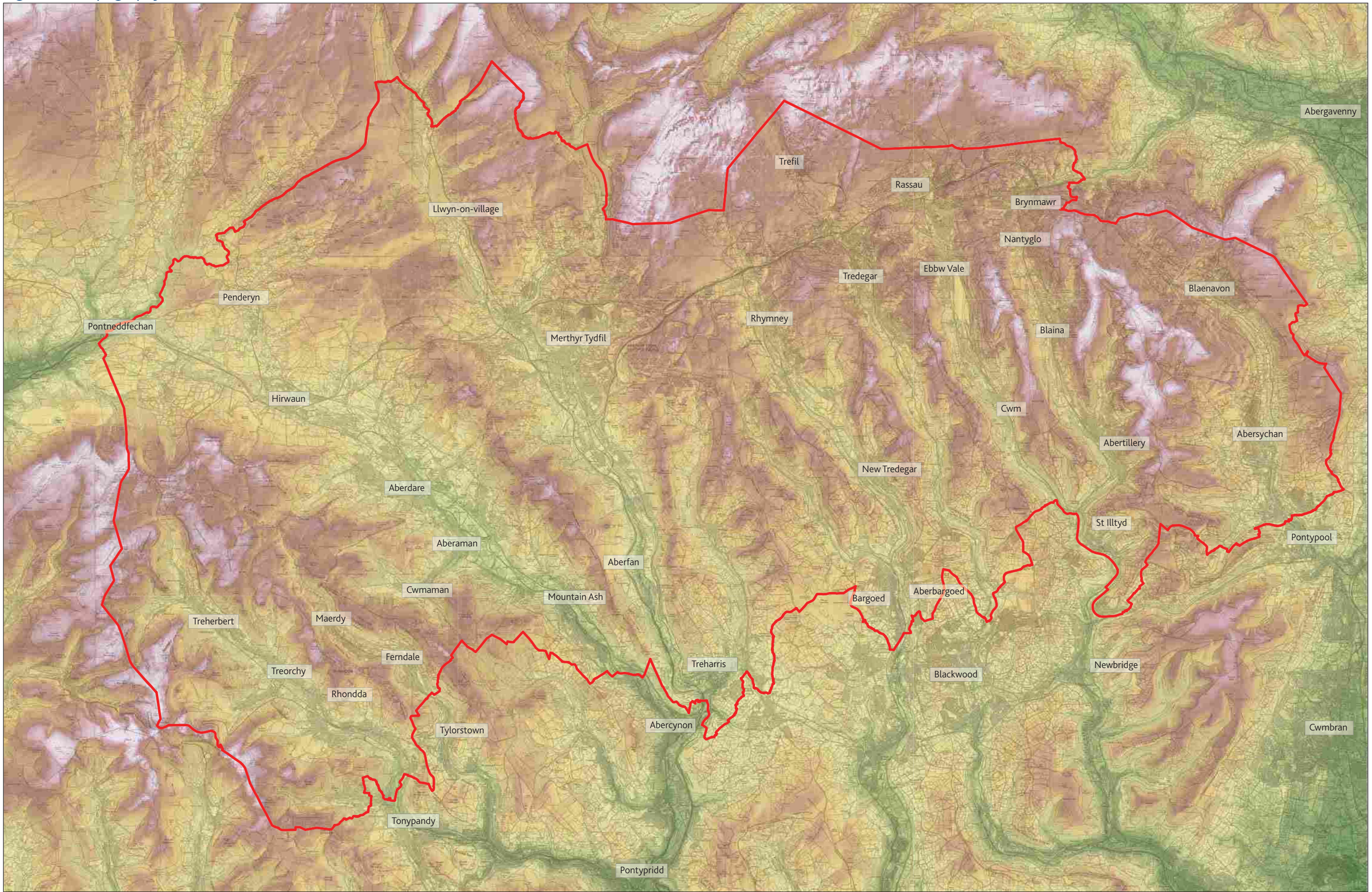
Figure 03 : Topography



Legend

Heads of the Valley Study Area

Topography

- 780m

- 0m

Notes:

1. Topography Data produced using ESRI ArcMap 10.2 Software from OS Terrain 50® OS OpenData.

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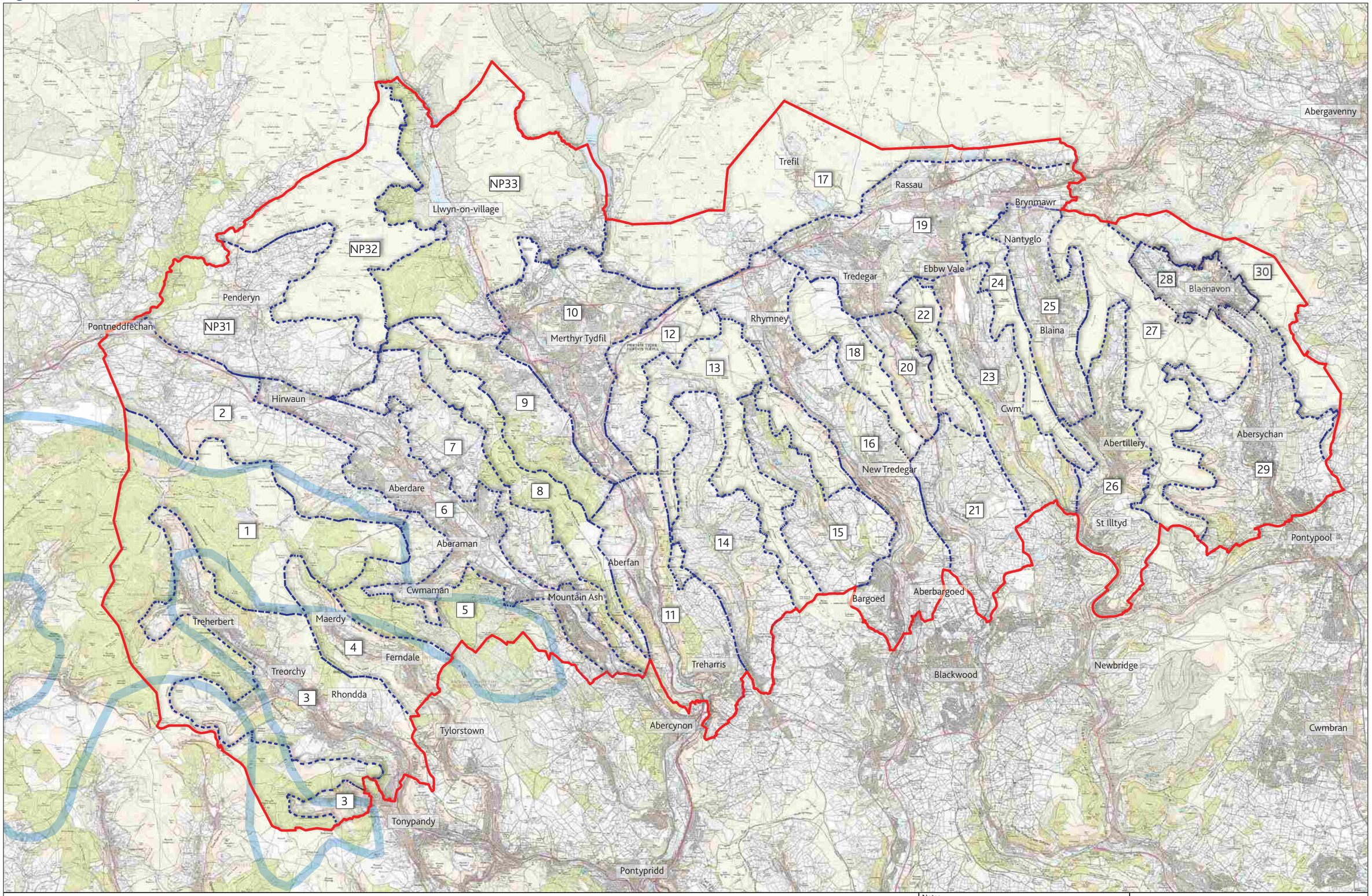
Figure 04 : Landscape Units



Legend

- Heads of the Valley Study Area
- Landscape Units (LU)
- TAN 8 Strategic Search Area (SSA): F - Coed Morgannwg

Notes:

1. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7

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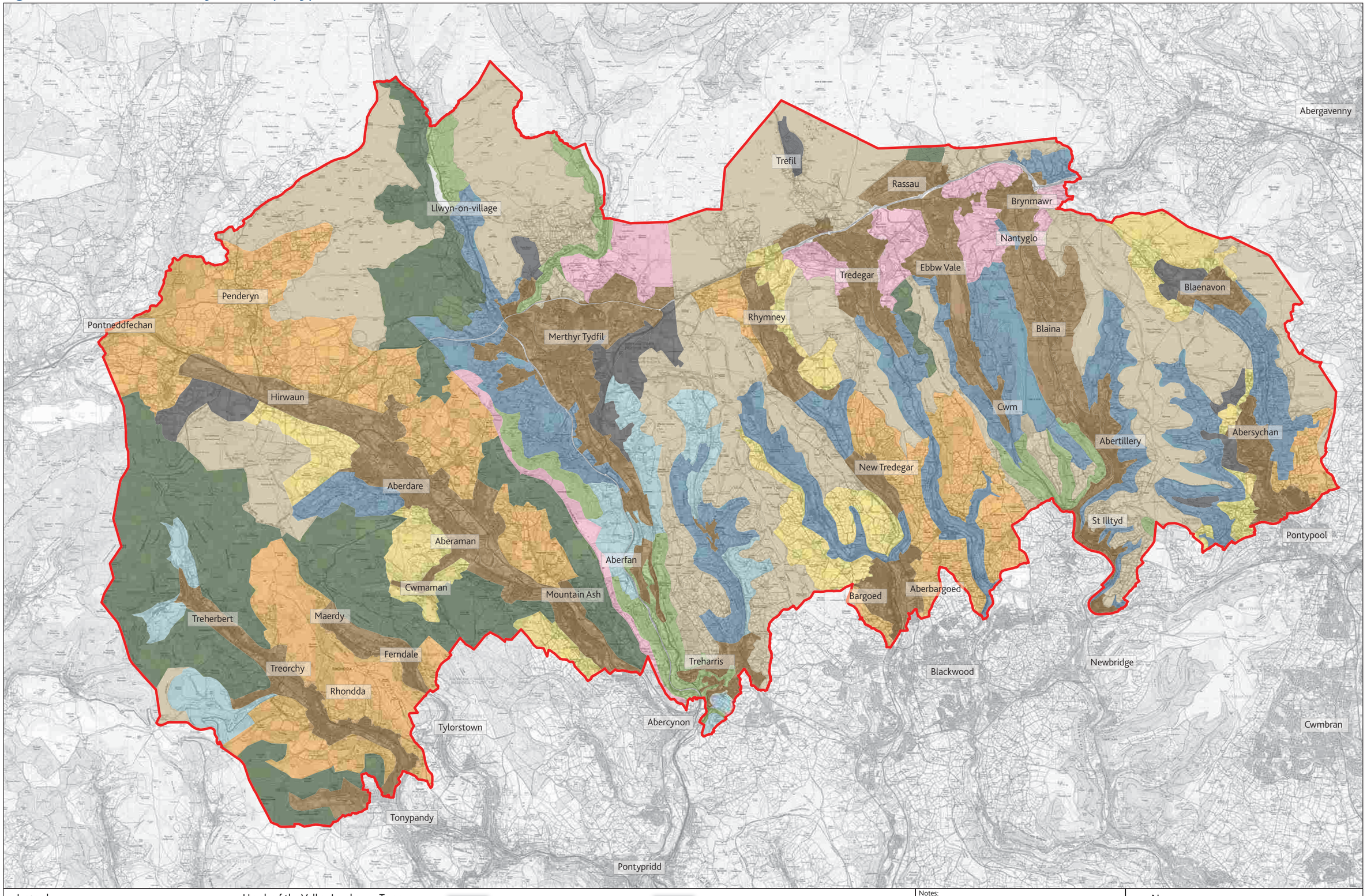
Figure 05 : Heads of the Valley Landscape Types



Legend

Heads of the Valley Study Area

Heads of the Valley Landscape Types

- Upland Moorland / Grassland
- Upland Mosaic
- Forested Upland and Plateau
- Open Upland Valley
- Mosaic Upland Valley
- Wooded Upland Valley
- Hillside and Scarp Slope Grass
- Hillside and Scarp Slope Mosaic
- Settlement
- Earthworks / Excavation / Landfill

Notes:

1. Heads of the Valley landscape types information derived from LANDMAP Visual and Sensory Classification Level 3.

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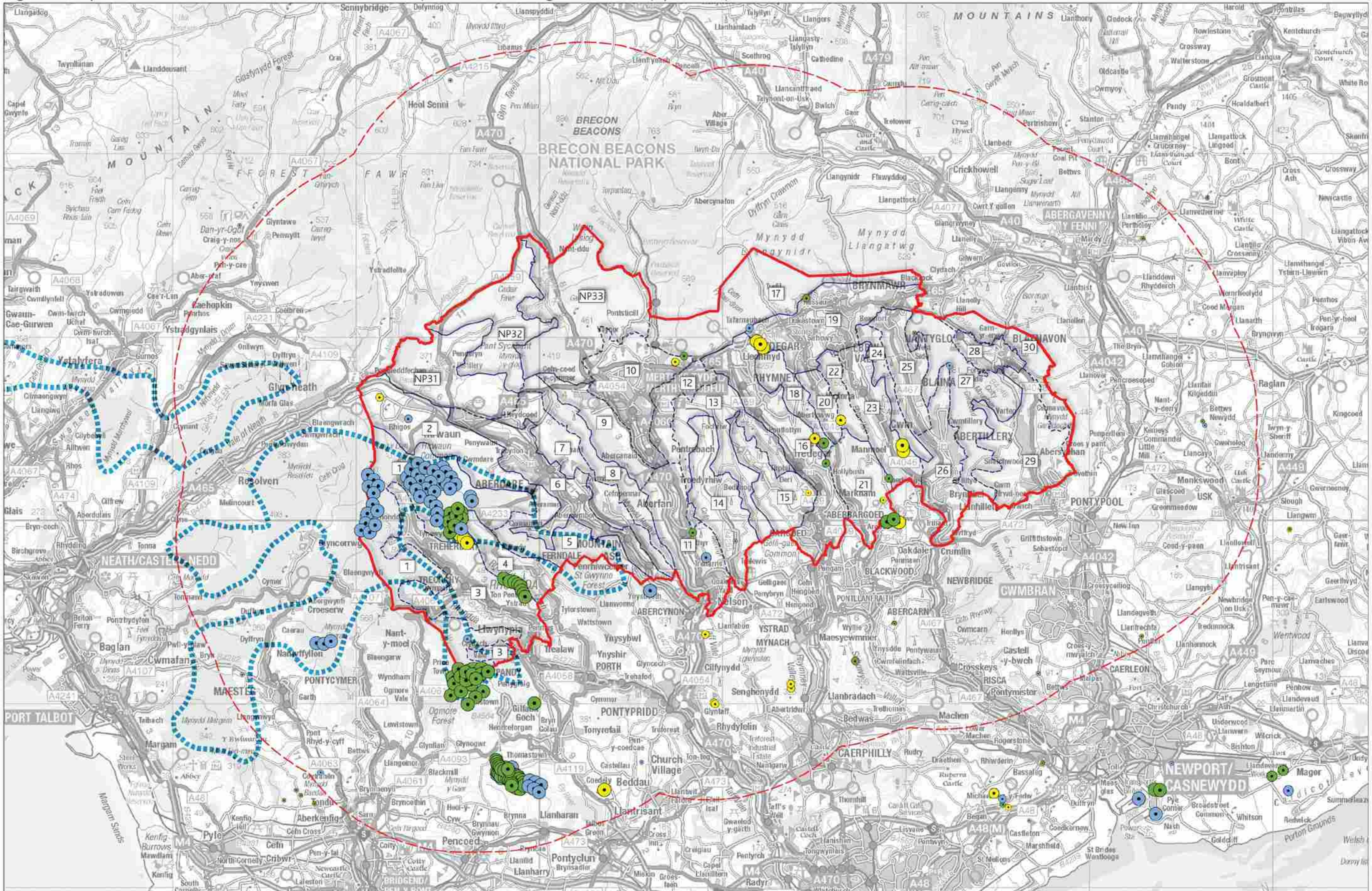
Figure 06: Operational/Consented and Wind Turbine Developments in Planning within 10km (April 2015)



Legend

- Heads of the Valley Study Area
- Study Area 10km Buffer
- Landscape Units
- TAN 8 Strategic Search Areas (SSA): E - Pontardawe & F - Coed Morgannwg

Operational Wind Turbines
- Micro
- Medium
- Large
- Very Large

Consented Wind Turbines
- Micro
- Small
- Medium
- Large
- Very Large

Wind Turbines In Planning
- Small
- Medium
- Large
- Very Large

Notes:
1. Wind Turbine locations, size and operational status information derived from submitted planning applications.
2. SSA E Pontardawe Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 6
3. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7
4. Figures 06 and 07 have been updated in April 2015 with information from the online database. The sensitivity study records the situation at March 2014.

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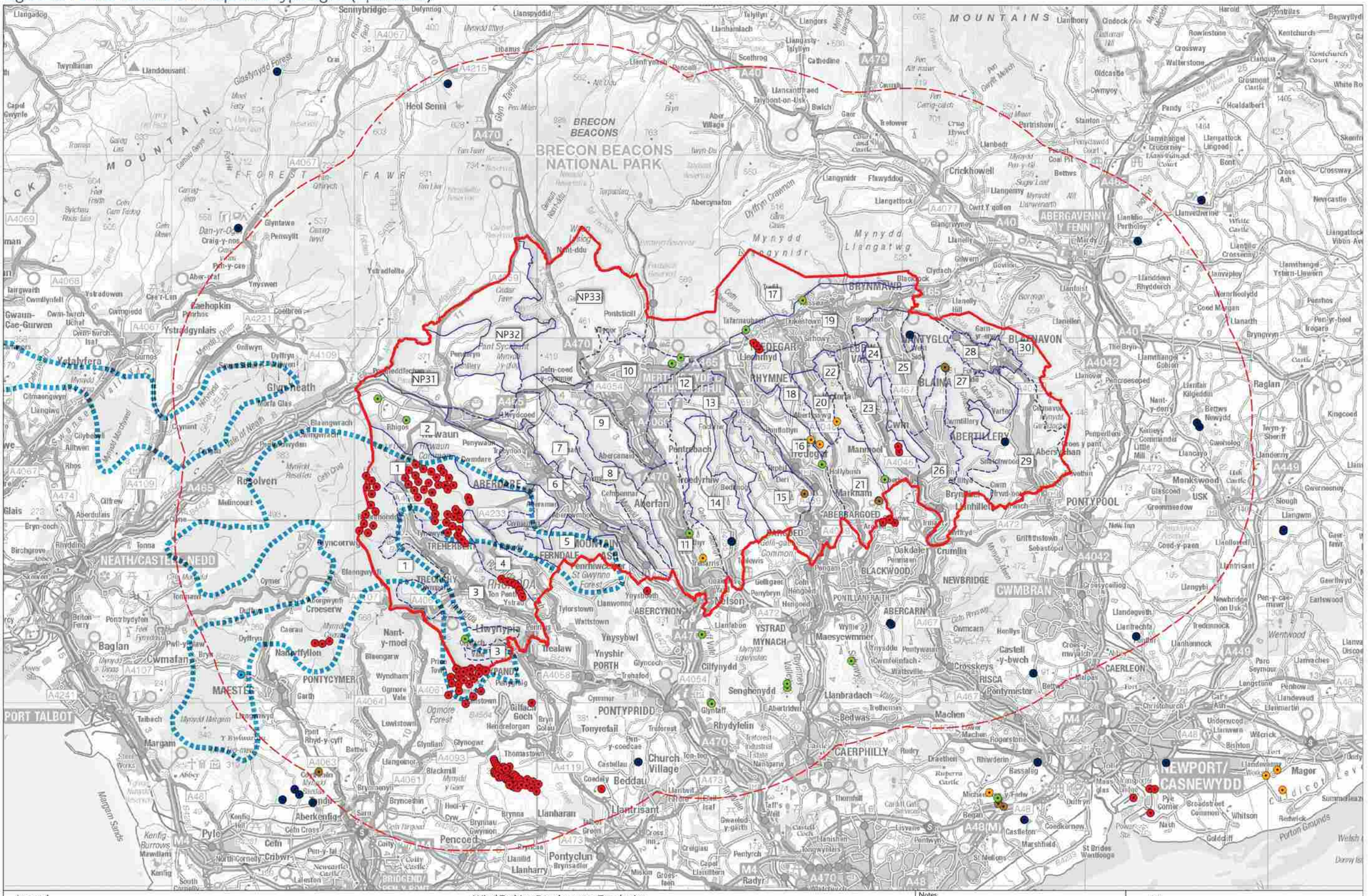
Figure 07 : Wind Turbine Development Typologies (April 2015)



Legend

- Heads of the Valley Study Area
- Study Area 10km Buffer
- Landscape Units
- TAN 8 Strategic Search Areas (SSA): E - Pontardawe & F - Coed Morgannwg

Wind Turbine Development Typologies

- Micro
- Small
- Medium
- Large
- Very Large

Notes:
1. Wind Turbine locations, size and operational status information derived from submitted planning applications.
2. SSA E Pontardawe Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 6
3. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7
4. Figures 06 and 07 have been updated in April 2015 with information from the online database. The sensitivity study records the situation at March 2014.

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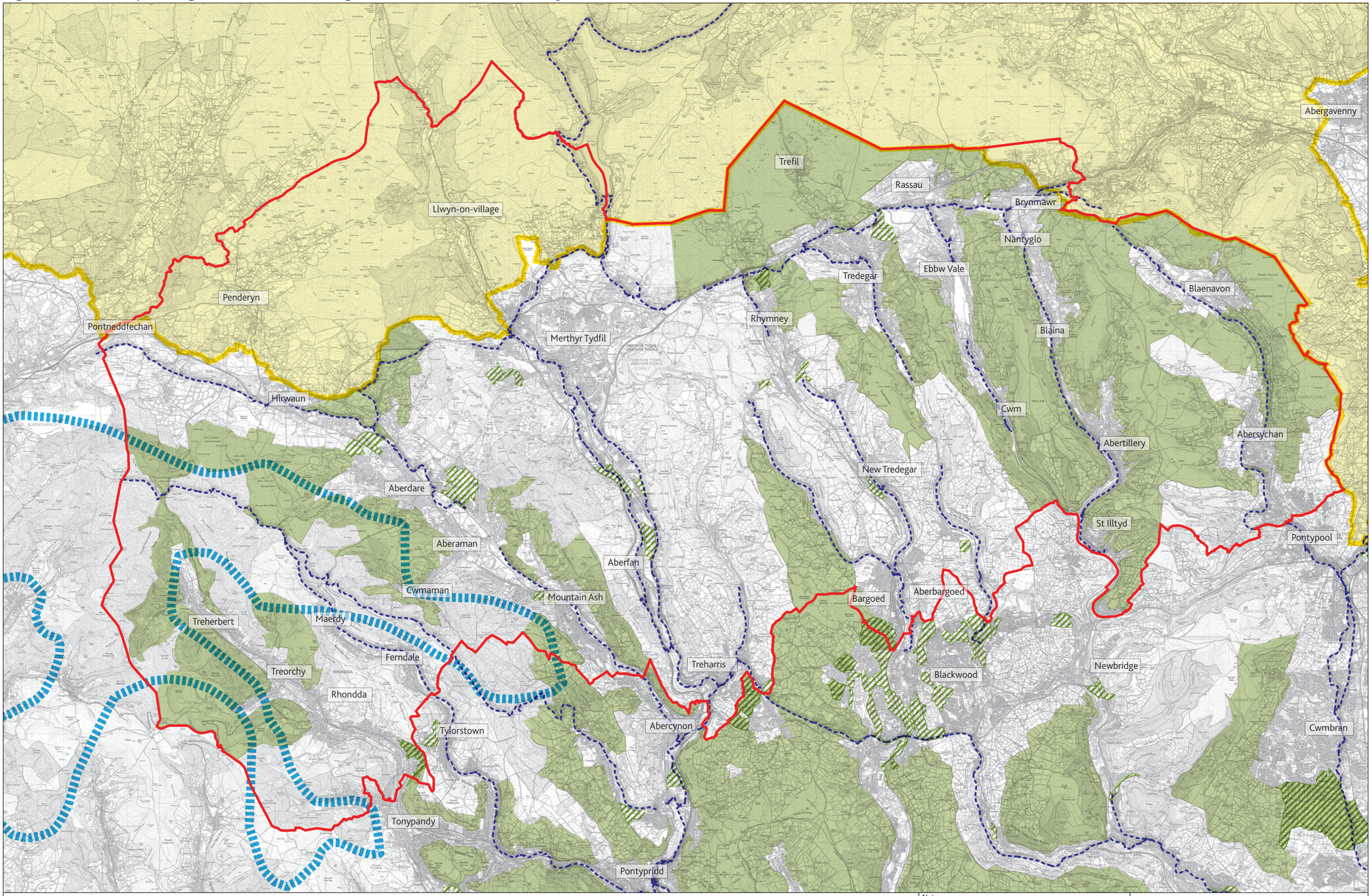
Figure 08 : Landscape Designations, TAN 8 Strategic Search Area and National Cycle Routes



Legend

- Heads of the Valley Study Area
- TAN 8 Strategic Search Area (SSA): F - Coed Morgannwg
- Brecon Beacons National Park (BBNP)
- Special Landscape Areas (SLA)
- Sustrans - National Cycle Routes
- Green Wedges

Notes:

1. National Park boundary derived from Cadw.
2. Designation information derived from the relevant local authority.
3. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7

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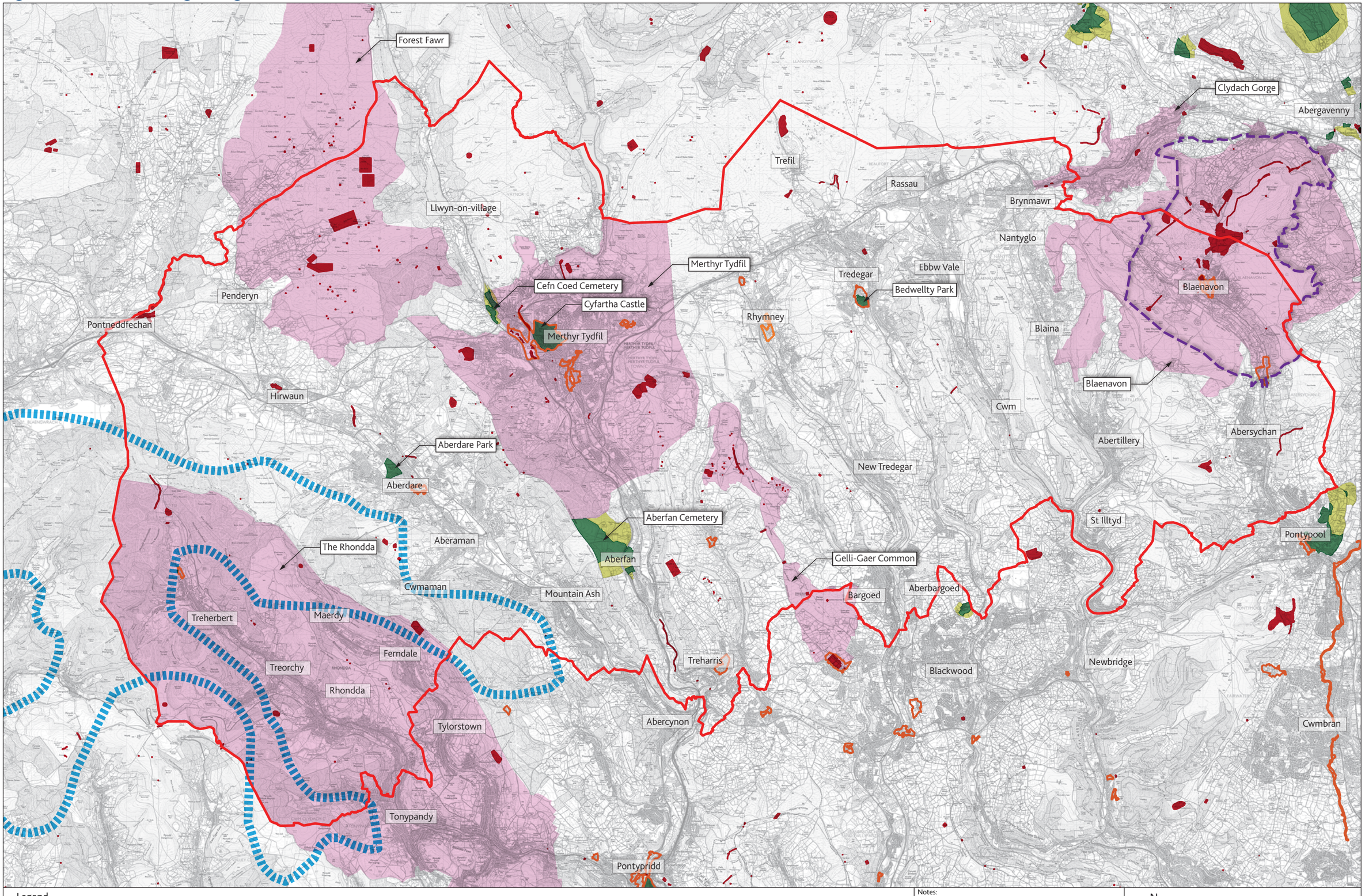
Figure 09 : Cultural Heritage Designations



Legend

- Heads of the Valley Study Area
- TAN 8 Strategic Search Area (SSA): F - Coed Morgannwg
- Blaenavon World Heritage Site (WHS)
- Conservation Area
- Scheduled Ancient Monuments
- Registered Landscape of Historic Interest
- Registered Parks and Gardens
- Registered Parks and Gardens - Essential Setting

Notes:

1. Designation information derived from the relevant local authority.
2. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7

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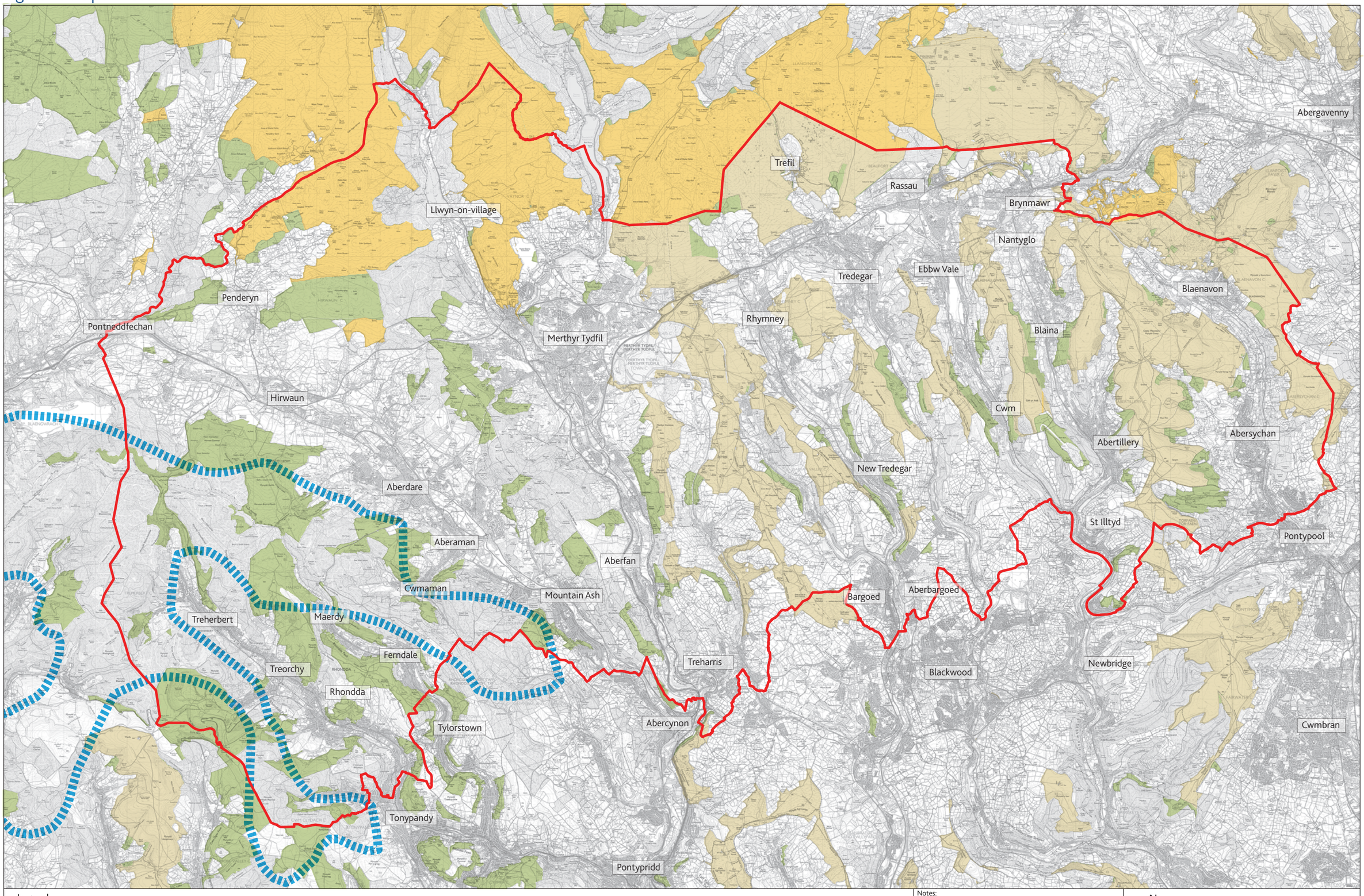
Figure 10 : Open Access Land



Legend

- Heads of the Valley Study Area
- TAN 8 Strategic Search Area (SSA): F - Coed Morgannwg
- Open Access Land - Registered Common Land
- Open Access Land - Open Country
- Open Access Land - Other Statutory Access Land

Notes:

1. Open Access Data derived from Cadw.
2. SSA F Coed Morgannwg Boundary derived from Technical Advice Note (TAN) 8: Renewable energy (2005) - Map 7

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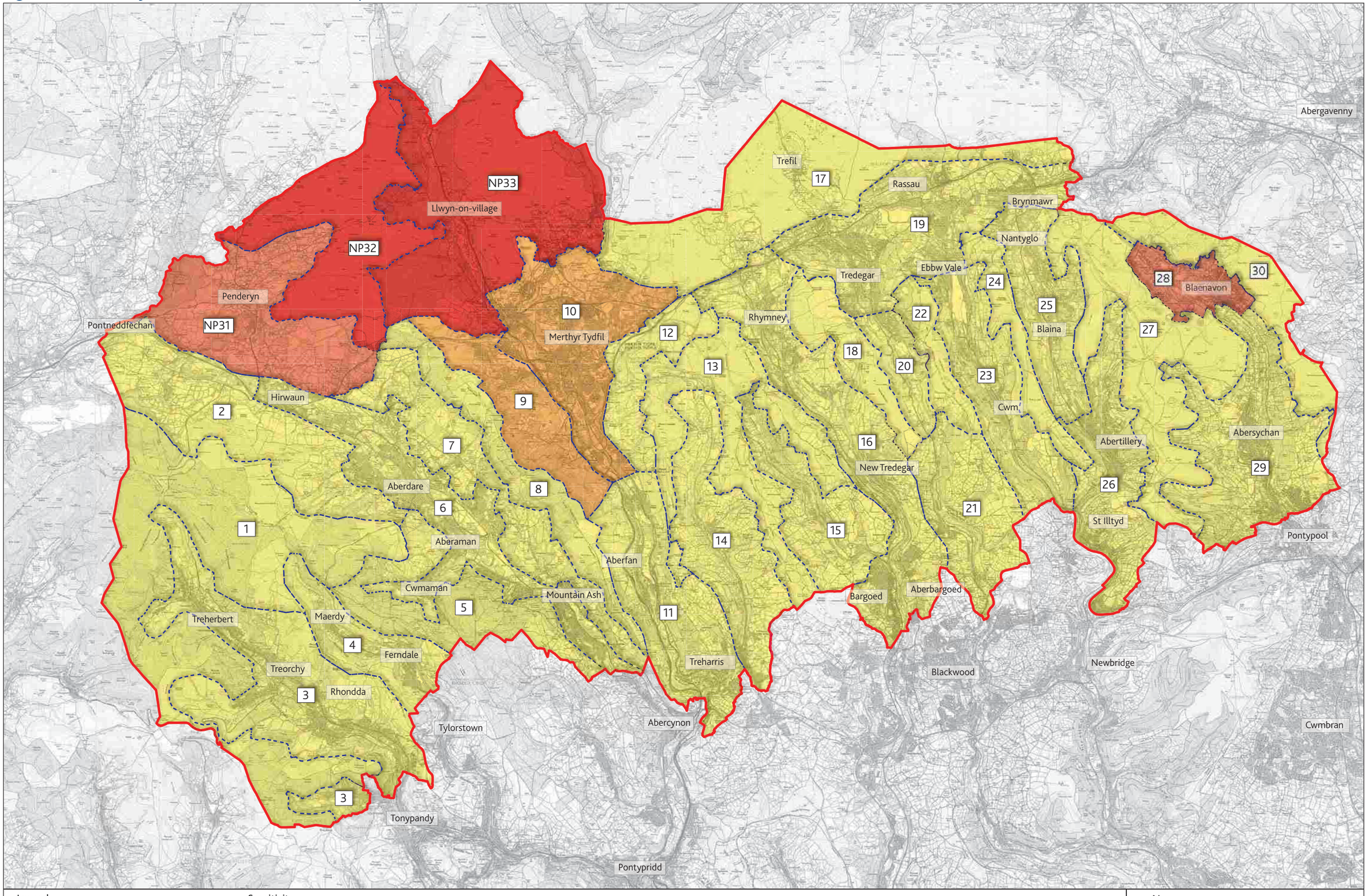
Figure 11 : Sensitivity to Micro Wind Turbine Development



Legend

- Heads of the Valley Study Area
- Landscape Units (LU)

Sensitivity

- Low Sensitivity
- Low to Medium Sensitivity
- Medium Sensitivity
- Medium to High Sensitivity
- High Sensitivity

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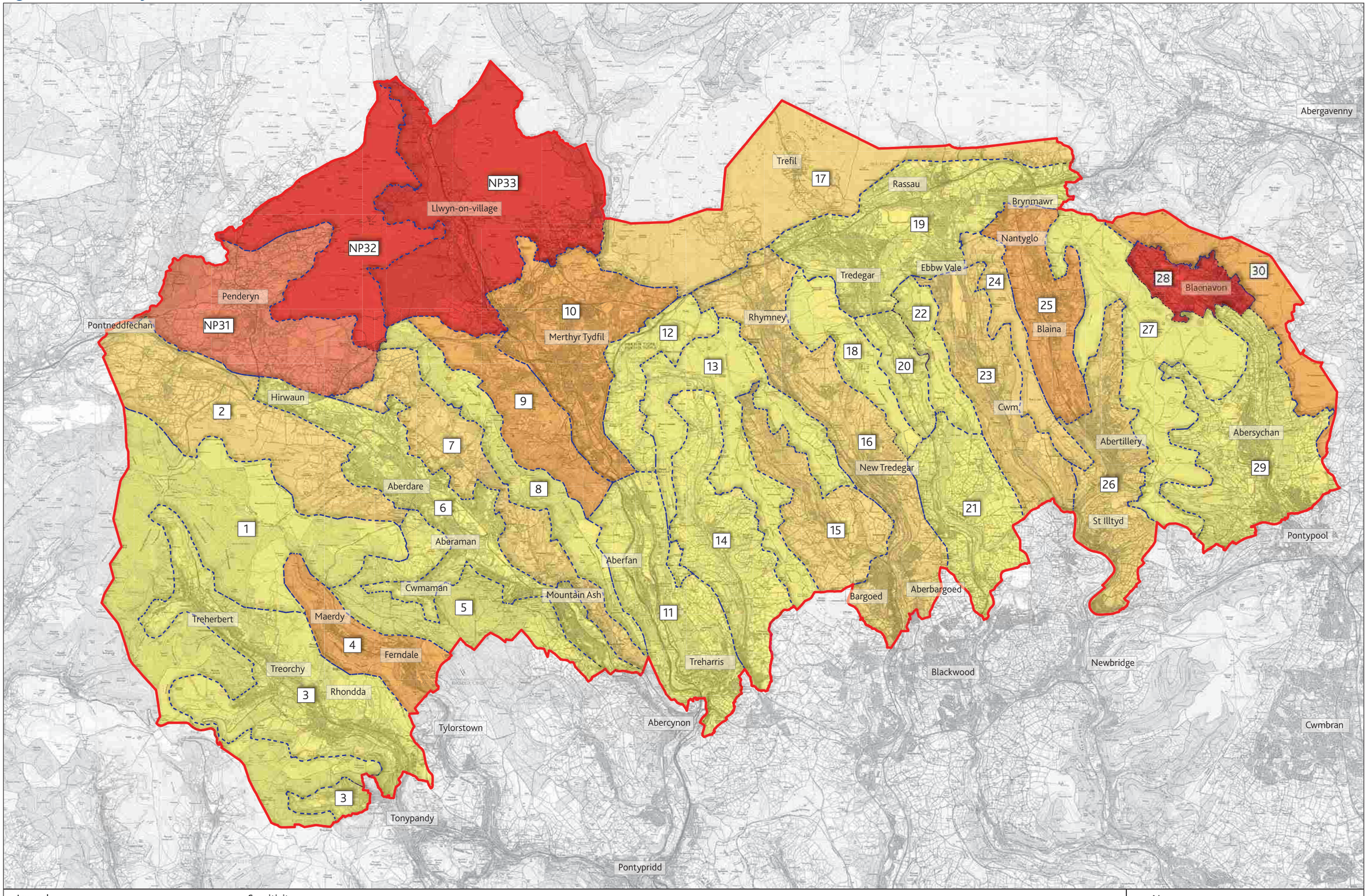
Figure 12 : Sensitivity to Small Wind Turbine Development



Legend

- Heads of the Valley Study Area
- Landscape Units (LU)

Sensitivity

- Low Sensitivity
- Low to Medium Sensitivity
- Medium Sensitivity
- Medium to High Sensitivity
- High Sensitivity

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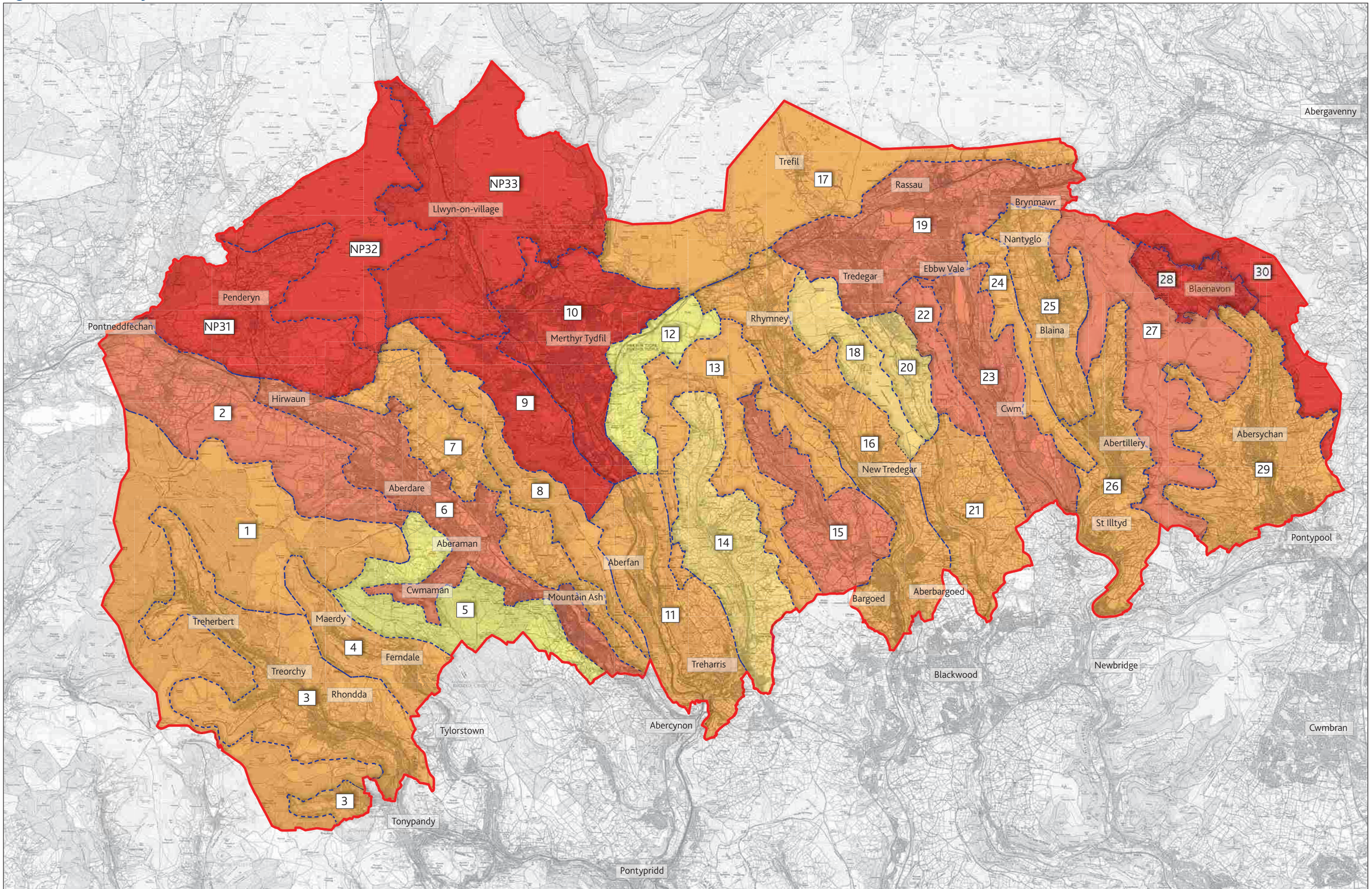
Figure 13 : Sensitivity to Medium Wind Turbine Development



Legend

- Heads of the Valley Study Area
- Landscape Units (LU)

Sensitivity

- Low Sensitivity
- Low to Medium Sensitivity
- Medium Sensitivity
- Medium to High Sensitivity
- High Sensitivity

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Figure 14 : Sensitivity to Large Wind Turbine Development

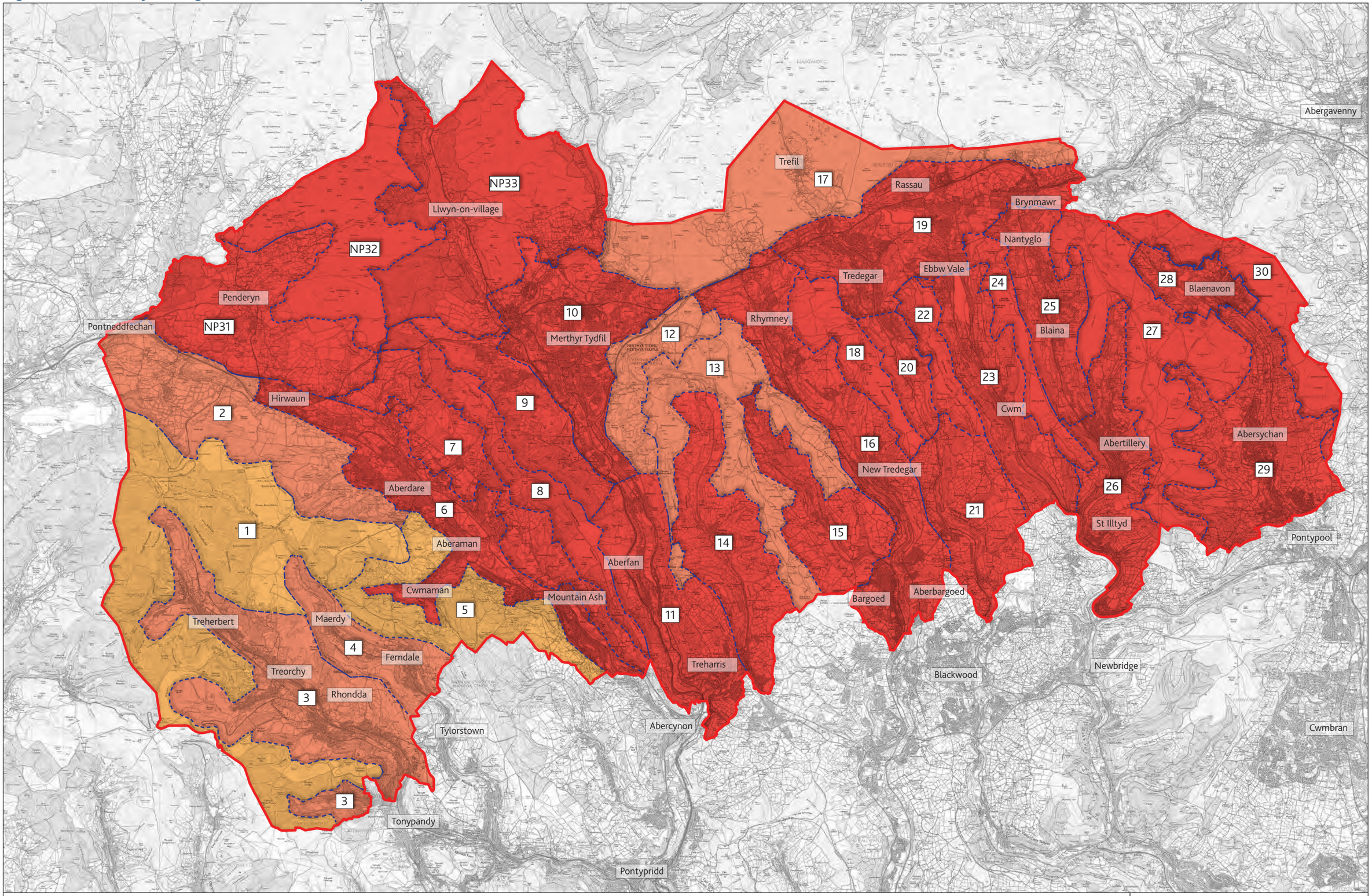
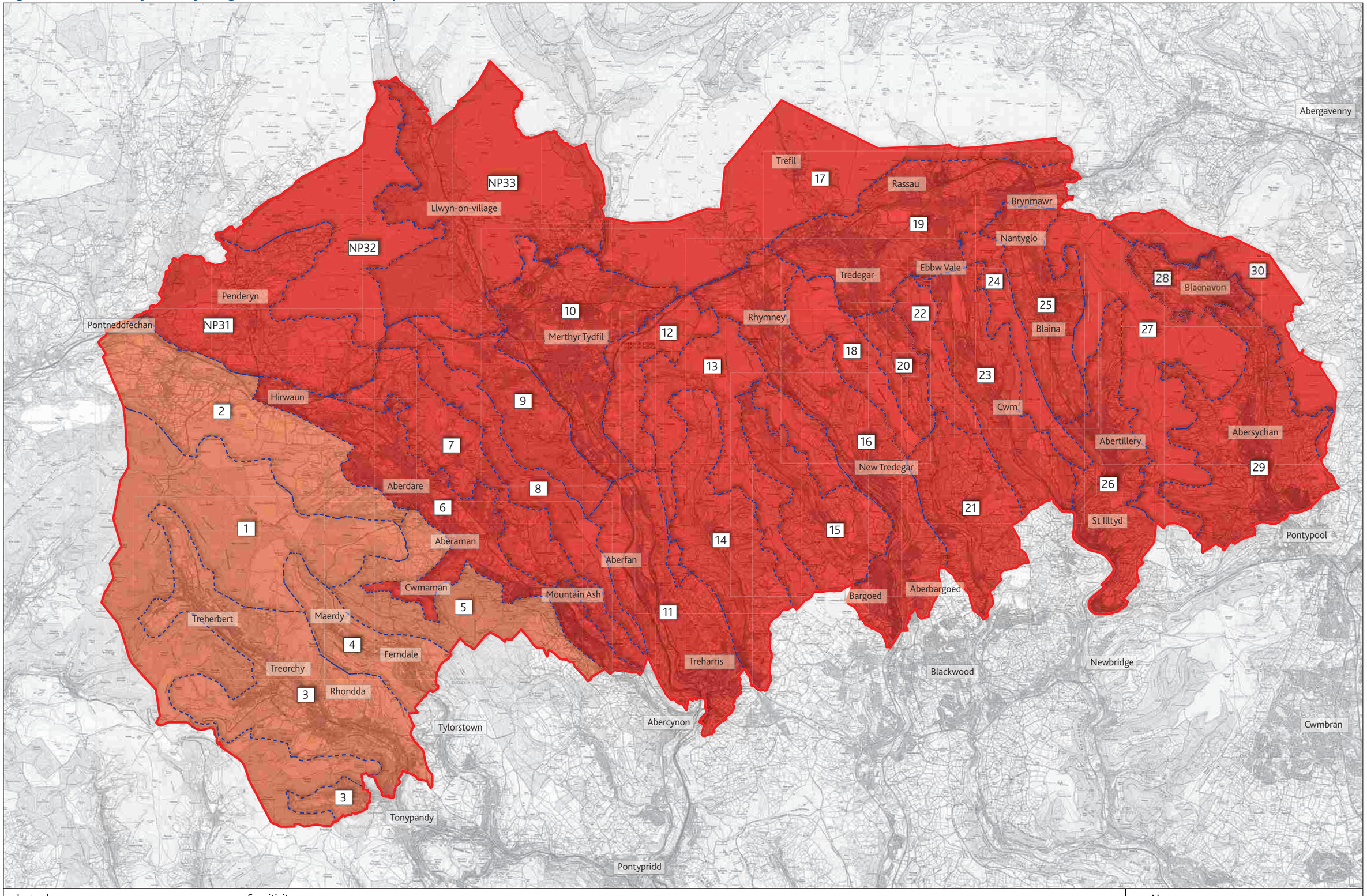


Figure 15 : Sensitivity to Very Large Wind Turbine Development



Legend

- Heads of the Valley Study Area
- Landscape Units (LU)

Sensitivity

- Low Sensitivity
- Low to Medium Sensitivity
- Medium Sensitivity
- Medium to High Sensitivity
- High Sensitivity

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APPENDIX 1: ABBREVIATIONS & GLOSSARY OF KEY TERMS

Abbreviations

Below is a list of abbreviations used in this study.

AOD	Above Ordnance Datum
AONB	Area of Outstanding Natural Beauty
BBNP	Brecon Beacons Nation Park
CCW	Countryside Council for Wales (Now Natural Resources Wales)
CROW	Countryside & Rights of Way Act (2005)
DCfW	Design Commission for Wales
GIS	Geographical Information Systems
GLVIA3	Guidelines for Landscape and Visual Impact Assessment. Third Edition. Landscape Institute and Institute for Environmental Management and Assessment (2013)
LCA	Landscape Character Area
LCT	Landscape Character Type
LU	Landscape Unit
MW	Megawatt
NRW	Natural Resources Wales (formerly the Countryside Council for Wales)
PPW	Planning Policy Wales
SLA	Special Landscape Area
SNH	Scottish Natural Heritage
SSA	Strategic Search Area
SSA F	Strategic Search Area F Coed Morgannwg
TAN	Technical Advice Note
WHS	World Heritage Site
ZTV	Zone of Theoretical Visibility

Glossary of Key Terms

Landscape is defined as 'An area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors.' GVLIA3 notes that the term does not only mean landscapes that are recognised as being special or valuable but is also about the ordinary and the everyday landscapes where people live and work, and spend their leisure time. This includes rural landscapes, seascapes and townscapes.

Landscape Sensitivity is a term applied to specific receptors, combing judgements of the susceptibility of the receptor to the specific type of change or development proposed and the value related to that receptor.

Landscape Value is defined as the relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.

Landscape Capacity relates to how much change arising from wind energy development can be accommodated without unacceptable adverse effects on the character or perception of the landscape and without compromising any values attached to it.

Cumulative Effects are the additional effects caused by the proposed development when considered in conjunction with other proposed developments or as the combined effect of a set of developments taken together.

Cumulative Landscape Effects 'can impact on either the physical fabric or character of the landscape, or any special values attached to it'.

Cumulative Visual Effects can be caused by combined visibility, which 'occurs where the observer is able to see two or more developments from one viewpoint' and/or sequential effects which 'occur when the observer has to move to another viewpoint to see different developments'[3].

Tranquillity is defined as a state of calm and quietude associated with peace, considered to be a significant asset of landscape.

European Landscape Convention (2007)
Scottish Natural Heritage 2012:10
Scottish Natural Heritage 2012:11

APPENDIX 2: REFERENCE DOCUMENTS

General Landscape and Visual Assessment Documents

- Landscape Institute and IEMA, (2013) *Guidelines for Landscape and Visual Impact Assessment* (GLVIA), *Third Edition*
- Tudor, Christine, Natural England, (October 2014) *An Approach to Landscape Character Assessment*
- Swanwick, Carys and LUC, Scottish Natural Heritage with the Countryside Agency, (2004) *Topic Paper 6 'Techniques and criteria for judging landscape sensitivity and capacity'*
- Landscape Institute, (2011) *Photography and photomontage in landscape and visual impact assessment, Advice Note 01/11*

Welsh Documents

- Welsh Assembly Government (2014) *Planning Policy Wales, Edition 6*
- Welsh Assembly Government (2005) *Technical Advice Note 8: Renewable Energy*
- Countryside Council for Wales (2008) *LANDMAP Methodology: Guidance for Wales*
- Countryside Council for Wales (2008) *LANDMAP Information Guidance Note 1: LANDMAP and Special Landscape Areas*
- Countryside Council for Wales, (May 2013) *LANDMAP information Guidance Note 3: Using LANDMAP for landscape and visual impact assessment of onshore wind turbines.*
- Countryside Council for Wales, Cadw and Welsh Assembly Government (2007) *Guide to Good Practice on Using the Register of Landscapes of Historic Interest in Wales in the Planning and Development Process*
- Countryside Council for Wales (2008) *Energy & Natural Heritage. Countryside Council for Wales Policy Position Statement*
- Design Commission for Wales (2012) *Designing Wind Farms in Wales*
- Pembrokeshire and Carmarthenshire (2013) *Cumulative Impact of Wind Turbines on Landscape and Visual Amenity guidance*
- Conwy and Denbighshire (2013) *Landscape Sensitivity and Capacity Assessment for Wind Energy Development*
- • Consortium of South Wales Valleys Authorities (2006) *TAN 8 Annex D Study of Strategic Search Areas E and F: South Wales Valleys* Final report

Scottish Documents

- Scottish Natural Heritage (2002) *'Visual Assessment of Windfarms: Best Practice'*
- Scottish Natural Heritage (March 2012) *Assessing the cumulative impact of onshore wind energy developments*
- Scottish Natural Heritage (2012) *Siting and design for small scale wind turbines between 15 and 50 metres in height*
- Scottish Natural Heritage (2012) *Assessing the Impact of Small Scale Wind Energy Proposals on the Natural Heritage*
- The Highland Council (2013) *Visualisation Standards for Wind Energy Developments*
- Scottish Natural Heritage (2014) *Siting and designing windfarms in the landscape, Version 2*
- Scottish Natural Heritage. (2014) *Visual Representation of Windfarms: Version 2.1*

Other Documents

- Department of Energy and Climate Change (2009) *Guidance on the Assessment of Cumulative Effects of Onshore Wind Farms. Entec Phase 2 Report 2nd draft.*

APPENDIX 3: BASELINE INFORMATION

Background Documents

- Blaenau Gwent County Borough Council (2009) *Proposals for Designation of Special Landscape Areas in Blaenau Gwent. Final Report* Prepared by Bronwen Thomas Landscape Architect
- Torfaen County Borough Council (2011) *Designation of Special Landscape Areas* Prepared by TACP Consultants
- Caerphilly County Borough Council (2008) *Designation of Special Landscape Areas* Prepared by TACP Consultants
- Brecon Beacons National Park (2012) *Landscape Character Assessment* prepared by Fiona Fyfe Associates.
- Cadw (1998) *Register of Landscapes of Outstanding Historic Interest in Wales*
    - *Merthyr Tydfil Landscape of Outstanding Historic Interest Full description*
    - *Blaenavon Landscape of Outstanding Historic Interest Full Description*
- Cadw (2001) *Register of Landscapes of Special Historic Interest in Wales*
    - *Clydach Gorge Landscape of Special Historic Interest Full Description*
    - *Forest Fawr Landscape of Special Historic Interest Full Description*
    - *Gelli-Gaer Common Landscape of Special Historic Interest Full Description*
    - *The Rhondda Landscape of Special Historic Interest Full description*
- Cadw (1998) *Register of Landscapes, Parks and Gardens of Special Historic Interest in Wales*
- Forestry Commission for Wales (2010) *Heads of the Valley Woodland Plan.*
- Rhondda Cynon Taf County Borough Council (2008) Local Development Plan (2006-2021) *Natural Environment Topic Paper*
- Torfaen County Borough Council (2008) *Forgotten Landscape Partnership Landscape Partnership Project, Landscape Strategy*
- Torfaen County Borough Council (2011) *Blaenavon Industrial Landscape World Heritage Site Management plan 2011 – 2016*

APPENDIX 4: USING LANDMAP DATA TO INFORM SENSITIVITY ASSESSMENTS

Landscape sensitivity is a combination of the susceptibility of landscape attributes and the value placed on the landscape. LANDMAP is a GIS based landscape resource that consists of five layers which have been recorded as five datasets concerning Cultural Landscape, Geological Landscape, Historic Landscape, Landscape Habitats, and Visual and Sensory aspects. It is possible to use the five LANDMAP datasets to generate consistent information across Wales on those aspects of the landscape that indicate how susceptible a landscape may be to adverse impacts as a result of wind turbine development. The text below and the following diagrams explain how the information in the database is extracted.

Certain questions in each layer/dataset have been identified as indicating susceptibility to wind. These are set out in Table 3: Criteria for Assessing Landscape and Visual Susceptibility to Wind Turbine Development

The defined landscape units will include aspect areas from all five layers but is also likely to include two or more aspect areas from the same layer.

The example provided is from the Caerphilly Landscape Sensitivity and Capacity Study. It shows that Caerphilly Landscape Unit 6: Mynyddislwyn includes:

- All or part of four Visual and Sensory aspect areas; -
- Two main Geological aspects areas; and
- Two main Historic aspect areas.

The criteria for assessing the landscape and visual sensitivity of a landscape to wind turbine development include a number of questions from the LANDMAP dataset.

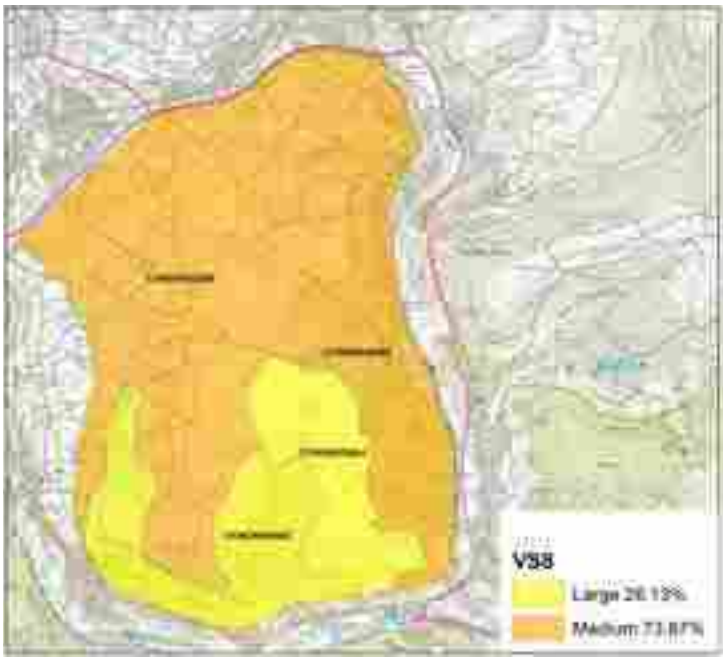
Plan 1, for example, shows the answers to the question 'Aesthetic Qualities: Scale?' for Caerphilly Landscape Unit 6. This is question 8 of the Visual and Sensory layer – VS8.

Within Caerphilly Landscape Unit 6 two of the Visual and Sensory Aspect Areas are assessed as being large scale whilst two are medium scale. This can be seen in Plan 1. It is possible to know exactly how much of how much of Caerphilly Landscape Unit 6 is assessed as large and how much is assessed as medium because the information is recorded in a GIS dataset. In this case 74% is assessed as large and 26% as medium. This information is used, alongside other criteria to decide how susceptible that particular attribute is to wind turbine development.

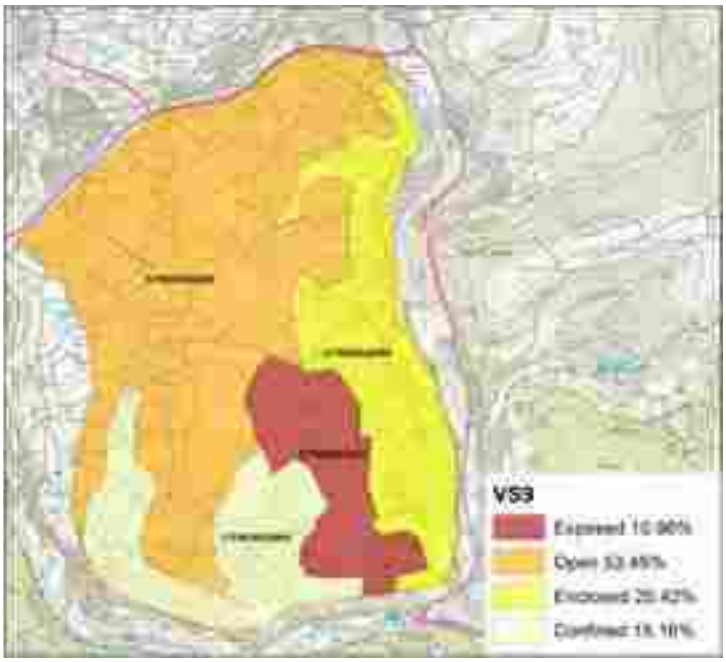
Plans 2-4 show the answers to three other Visual and Sensory questions including the overall Visual and Sensory evaluation where 88% of the unit has been assessed as moderate and 11% assessed as high.

Plans 5-7 show the same process for the overall evaluation for the Geological aspect areas and two of the questions for the Historic layer. It can be seen that whilst the whole of the unit is considered to have high integrity (very small percentages are ignored) the overall historic evaluation for the unit is moderate.

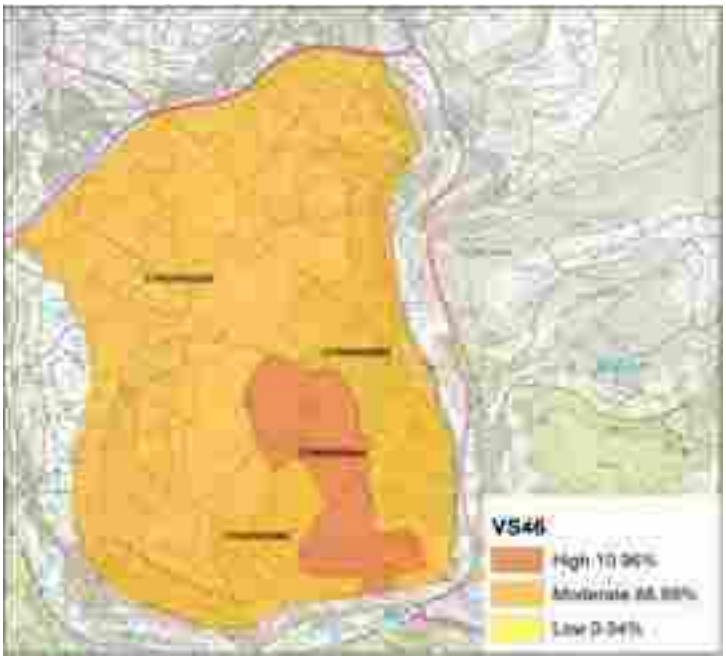
PLAN 1
Visual and Sensory - VS8: Scale



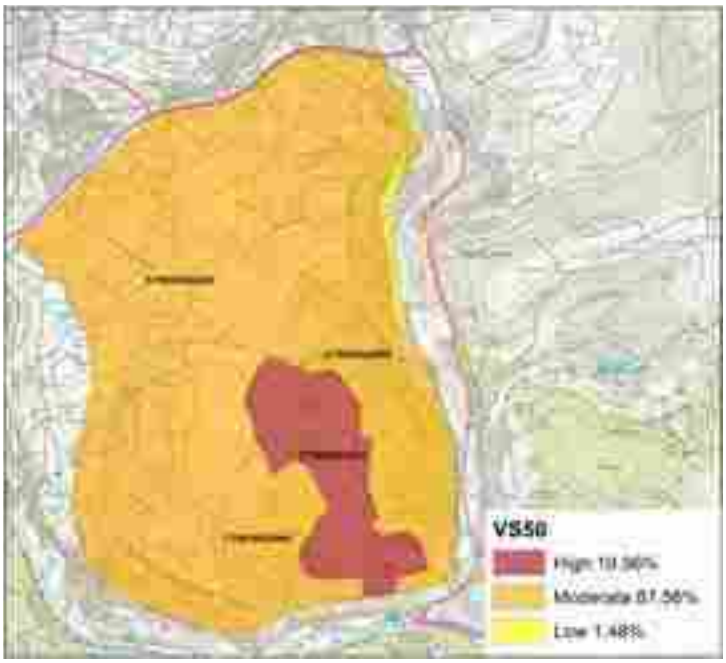
PLAN 2
Visual and Sensory – VS9: Enclosure



PLAN 3
Visual and Sensory – VS46: Scenic Quality

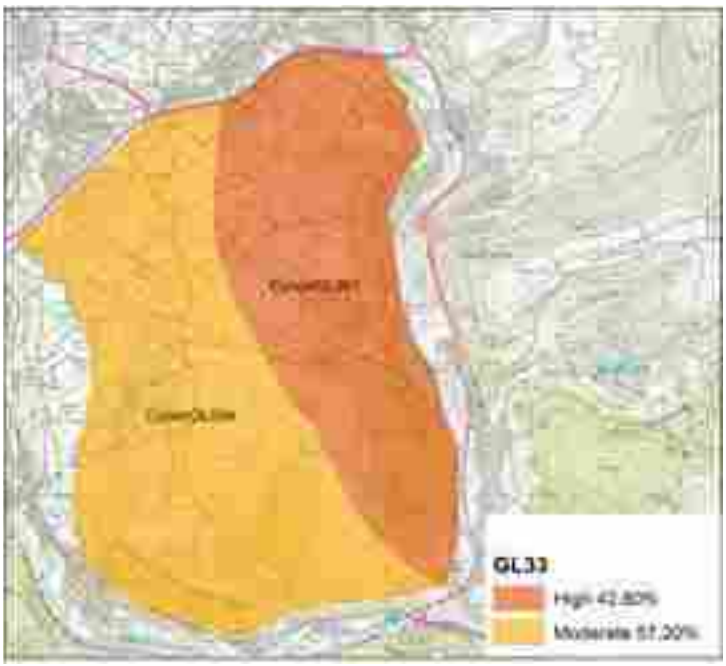


PLAN 4
Visual and Sensory – VS50: Overall Evaluation



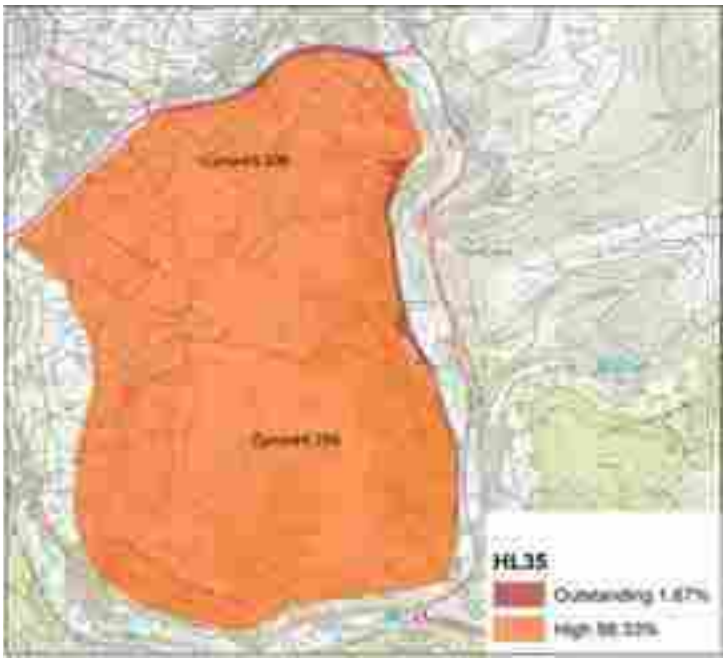
PLAN 5

Geological Landscape – GL33: Overall Evaluation



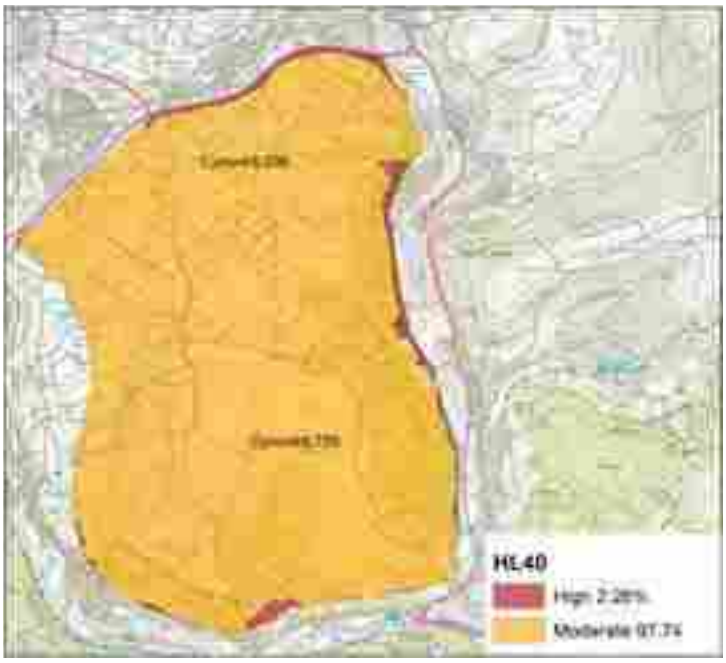
PLAN 6

Historic Landscape – HL35: Integrity



PLAN 7

Historic Landscape – HL40: Overall Evaluation



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