

Appendix 4.1b EIA Consultation Responses

East Ayrshire Council

Energy Consents Unit – Meeting Minutes

Glasgow Airport

Glasgow Prestwick Airport

Historic Environment Scotland

NATS Safeguarding

Scottish Natural Heritage

Scottish Environment Protection Agency

South Lanarkshire Council – Roads and Transportation Services

South Lanarkshire Council – Planning Department

SYSTRA Ltd

West of Scotland Archaeology Service

For some developments (e.g. wind energy developments) it is important not to confuse the concept of visual sensitivity with the perception of the development. For example, it is recognised that some people consider wind turbines to be unattractive, but others enjoy the sight of them.

Nature (magnitude) of effects – General note

The following discussion sets out the approach adopted in this LVIA in relation to a specific issue arising in GLVIA3 which requires a brief explanation.

Prior to the publication of GLVIA3, LVIA practice had evolved over time in tandem with most other environmental disciplines to consider the level of effect (relative significance) principally as a function of two factors, namely: sensitivity of the receptor and magnitude of the effect (the term ‘magnitude’ being a word most commonly used in LVIA and most other environmental disciplines to describe the size or scale of an effect).

Box 3.1 on page 37 of GLVIA3 references a 2011 publication by IEMA entitled ‘The State of EIA Practice in the UK’ which reiterates the importance of considering not just the scale or size of effect but other factors which combine to define the ‘nature of the effect’ including factors such as the probability of an effect occurring and the duration, reversibility and spatial extent of the effect.

The flow diagram on page 39 of GLVIA3 suggests that the magnitude of effect is a function of three factors (the size/scale of the effect, the duration of the effect and the reversibility of the effect).

For certain types of development (e.g. residential) the proposed development is permanent and non-reversible. For other types of development (e.g. wind and solar energy) the proposed development is for a time-limited period and would be largely reversible at the end of the scheme’s operational period. Reversibility of a proposed development is a material consideration in the planning balance but does not reduce the scale of the effect (i.e. the ‘magnitude’ in the traditional and commonly understood sense of the word) during the period in which the scheme is operational. In this regard, it would be incorrect to report a lesser magnitude of change to a landscape or view as a result of a time-limited effect or the relative reversibility of the effect.

For clarification, the approach taken in this LVIA has been to consider magnitude of effect solely as the scale or size of the effect in the traditional sense of the term ‘magnitude’. Having identified the magnitude of effect as defined above, the LVIA also describes the duration and reversibility of the identified effect, taking these factors into account as appropriate in the consideration of the level (relative significance) of the effect.

In the context of the above discussion the following criteria have been adopted to describe the magnitude of effects.

Nature (magnitude) of effects on landscape features

Professional judgement has been used as appropriate to determine the magnitude of direct physical effects on individual existing landscape features using the following criteria as guidance only:

- **Very Low Magnitude of Change** - Negligible loss or alteration to existing landscape features;
- **Low Magnitude of Change** - Minor loss or alteration to part of an existing landscape feature;
- **Medium Magnitude of Change** - Some loss or alteration to part of an existing landscape feature; and
- **High Magnitude of Change** - Major loss or major alteration to an existing landscape feature.
- **Very High Magnitude of Change** - Total loss or alteration to an existing landscape feature.

Nature (magnitude) of effects on landscape character

The magnitude of effect on landscape character is influenced by a number of factors including: the extent to which existing landscape features are lost or altered, the introduction of new features and the resulting alteration to the physical and perceptual characteristics of the landscape. Professional judgement has been used as appropriate to determine the magnitude using the following criteria as guidance only. In doing so, it is recognised that usually the landscape components in the immediate surroundings have a much stronger influence on the sense of landscape character than distant features whilst acknowledging the fact that more distant features can have an influence on landscape character as well.

- **Very Low Magnitude of Change** - Negligible loss or alteration to existing landscape features; no notable introduction of new features into the landscape; and negligible change to the key physical and/or perceptual attributes of the landscape.
- **Low Magnitude of Change** - Minor loss or alteration to existing landscape features; introduction of minor new features into the landscape; or minor alteration to the key physical and/or perceptual attributes of the landscape.
- **Medium Magnitude of Change** - Some notable loss or alteration to existing landscape features; introduction of some notable new features into the landscape; or some notable change to the key physical and/or perceptual attributes of the landscape.
- **High Magnitude of Change** - A major loss or alteration to existing landscape features; introduction of major new features into the landscape; or a major change to the key physical and/or perceptual attributes of the landscape.
- **Very High Magnitude of Change** - Total loss or alteration to existing landscape features; introduction of dominant new features into the landscape; a very major change to the key physical and/or perceptual attributes of the landscape.

Nature (magnitude) of effects on views and visual amenity

Visual effects are caused by the introduction of new elements into the views of a landscape or the removal of elements from the existing view.

Professional judgement has been used to determine the magnitude of impacts using the following criteria as guidance only:

- **Very Low Magnitude of Change** - Negligible change in views;
- **Low Magnitude of Change** - Some change in the view that is not prominent but visible to some visual receptors;
- **Medium Magnitude of Change** - Some change in the view that is clearly notable in the view and forms an easily identifiable component in the view;
- **High Magnitude of Change** - A major change in the view that is highly prominent and has a strong influence on the overall view.
- **Very High Magnitude of Change** – A change in the view that has a dominating or overbearing influence on the overall view.

Using this set of criteria, determining levels of magnitude is primarily dependent on how prominent the development would be in the landscape, and what may be judged to flow from that prominence or otherwise.

For clarification, the use of the term ‘prominent’ relates to how noticeable the features of the development would be. This is affected by how close the viewpoint is to the development but not entirely dependent on this

factor. Other modifying factors include: the focus of the view, visual screening and the nature and scale of other landscape features within the view. Rather than specifying general bands of distance at which the proposed development would be dominant, prominent or incidental to the view etc. the prominence of the proposed development in each view is described in detail for each viewpoint taking all the relevant variables into consideration.

Type of effect

The assessment identifies effects which may be **beneficial, adverse or neutral**. Where effects are described as neutral this is where the beneficial effects are deemed to balance the adverse effects.

For some developments (e.g. wind energy developments) it is recognised that some people consider the development to be unattractive but others enjoy the sight of it. A landscape and visual assessment for these developments therefore assumes that all identified landscape and visual effects are 'adverse' unless stated otherwise. This allows decision makers to assess a worst-case scenario.

Duration of effect

For the purposes of this assessment, the temporal nature of each effect is described as follows:

- **Long Term** – over 5 years
- **Medium Term** – between 1 and 5 years
- **Short Term** – under 1 year

Reversibility of effect

The LVIA also describes the reversibility of each identified effect using the following terms:

- **Permanent** – effect is non reversible
- **Non permanent** – effect is reversible

Level of effect and identification of significant effects

The purpose of an LVIA when produced in the context of an EIA is to identify and describe any significant effects on landscape and visual amenity arising from the proposed development.

The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 do not define a threshold at which an effect may be determined to be significant. In certain other environmental disciplines there are regulatory thresholds or quantitative standards which help to determine the threshold of what constitutes a significant effect. However in LVIA, any judgement about what constitutes a significant effect is ostensibly a subjective opinion expressed as in this case by a competent and appropriately qualified professional assessor.

The level (relative significance) of landscape and visual effects is determined by combining judgements regarding the sensitivity of the landscape or view, magnitude of change, duration of effect and the reversibility of the effect. In determining the level of residual effects, all mitigation measures are taken into account.

The relative level of effect is described as **major, major/moderate, moderate, moderate/minor, minor or minor/no effect**. **No effect** may also be recorded as appropriate where the effect is so negligible it is not even noteworthy.

Those effects described as major, major/moderate and in some cases moderate may be regarded as **significant** effects as required by the EIA Regulations.

APPENDIX 2 - VISIBLE TURBINE LIGHTING ASSESSMENT: PROPOSED CRITERIA AND METHODOLOGY

1. The primary source of best practice for Landscape and Visual Impact Assessment (LVIA) in the UK is ‘*The Guidelines for Landscape and Visual Impact Assessment*’, 3rd Edition (GLVIA3) (Landscape Institute and the Institute for Environmental Management and Assessment, 2013). The assessment criteria proposed to inform the assessment of effects of visible turbine lighting has been developed in accordance with the principles established in this best practice document. It should however be acknowledged that GLVIA3 establishes guidelines not a specific methodology. The preface to GLVIA3 states:

‘This edition concentrates on principles and processes. It does not provide a detailed or formulaic ‘recipe’ that can be followed in every situation – it remains the responsibility of the professional to ensure that the approach and methodology adopted are appropriate to the task in hand.’
2. The assessment criteria set out below have therefore been developed specifically for this appraisal to ensure that the methodology is fit for purpose.
3. The purpose of an LVIA when undertaken in the context of an Environmental Impact Assessment (EIA) is to identify any likely significant landscape and visual effects arising as a result of the proposals. An LVIA should consider both:
 - ***effects on the landscape as a resource in its own right (the landscape effects); and***
 - ***effects on specific views and visual amenity more generally (the visual effects).***
4. It is recognised that in some circumstances, it may be possible for turbine lighting to result in a significant effect on the character of the surrounding landscape. For example, if the proposed wind energy development is located within or in close proximity to a designated dark sky area, or is remote from existing sources of visible lighting, such as residential areas, commercial or industrial sites, or major roads.
5. For wind energy developments which are not located in such areas, it is considered that there would be no potential for significant effects on landscape character to arise from visible turbine lighting of the type proposed. This is because in these areas the character of the landscape during low natural light levels is already in part characterised by the presence of artificial lighting. Therefore, the addition of visible turbine lighting would not have the potential bring about a fundamental change to the characteristics of the landscape.
6. The proposed wind farm lies away from recognised dark sky areas, within a surrounding landscape context which contains some existing sources of artificial light, particularly within surrounding settlements, industrial developments and along highways. However, it is understood that an assessment of the potential for significant effects on landscape character should be undertaken, due to the location of the site itself within an area which is less characterised by the presence of visible light. Therefore, criteria are set out below for the assessment of both landscape character and visual effects.
7. For a daytime assessment, one assesses the worst case situation (i.e. clear full visibility as if a perfect day). A daytime assessment can therefore describe the full extent of that clear visibility, or lack of it, as a moment in time. For this study, it is not just the reverse. What is required is an understanding of low light level conditions which seeks to cover all the periods, both evening; dawn; gloomy winters day and after dark, in which the lights will to some degree be visible. This also seeks to cover the period just after it begins to get dark; the period just before it actually gets dark; the period in the middle as it moves from one to the other and the time after it is dark but a moonlit night affords some view of the landscape.
8. If one described a situation in detail, (e.g. just before sunset with the setting sun still illuminating part of the landscape; part going into deep shadow; a ridgeline in silhouette; the mid-ground in semi-darkness

and a partially lit foreground because the street lights had just come on) this would be a snapshot in time for that viewpoint. Half an hour earlier it would have been different, as it would half an hour later, or at dawn, and that is before the matter of how it would have looked on another day earlier or later in the year is considered. Whether the description was looking east at sunset, or east at dawn would also radically change the description of what was seen and its impact. The report shall try to capture a single assessment that represents a typical judgement for the location in low light conditions, but not a specific set of conditions.

9. Such an assessment that was more specific would become very much larger, with the need to visit viewpoints at multiple times and in a range of light conditions, including dawn and dusk, to get the east - west, sunset - sunrise element. This could lead to multiple written descriptions and assessments for each location for both visual amenity and character effects. It is understood that this represents a proportional approach to the production of the low light assessment.

Nature (Sensitivity) of Landscape Character

10. The nature or sensitivity of landscape character reflects its susceptibility to change and any values associated with it. It is essentially an expression of a landscape's ability to accommodate a particular type of change. It varies depending on the physical and perceptual attributes of the landscape including but not necessarily limited to: scale; degree of openness; landform; existing land cover; landscape pattern and complexity; the extent of human influence in the landscape; the degree of remoteness/wildness; perception of change in the landscape; the importance of landmarks or skylines in the landscape; intervisibility with and influence on surrounding areas; condition; rarity and scenic quality of the landscape, and any values placed on the landscape including any designations that may apply. Additionally, for a consideration of landscape character during low light levels, a key further consideration is the extent to which existing artificial light sources are present in the landscape during low natural light levels.
11. In this assessment, the nature or sensitivity of landscape character shall be considered with reference to published landscape character areas/types. Information regarding the key characteristics of these character areas/types shall be extrapolated from relevant published studies. Together with on-site appraisal, an assessment of landscape sensitivity to visible wind turbine aviation lighting shall be undertaken, employing professional judgement.
12. The nature or sensitivity of landscape character shall be described as very high, high, medium, low or very low.

Nature (Sensitivity) of Visual Receptors

13. The nature or sensitivity of a visual receptor group reflects their susceptibility to change and any values associated with the specific view in question. It varies depending on a number of factors such as the occupation of the viewer, their viewing expectations, duration of view and the angle or direction in which they would see the site. Whilst most views are valued by someone, certain viewpoints are particularly highly valued for either their cultural or historical associations and this can increase the sensitivity of the view. The following criteria are provided for guidance only and are not exclusive:
 - ***Very Low Sensitivity – People engaged in industrial and commercial activities, or military activities, who would be unlikely to have any particular expectation of their wider night time view.***
 - ***Low Sensitivity - People at their place of work (e.g. offices); shoppers; users of trunk/major roads and passengers on commercial railway lines (except where these form part of a recognised and promoted scenic route). The primary interest of such receptors would not generally be on the dusk/night time view.***

- ***Medium Sensitivity*** - Users of public rights of way and minor roads which do not appear to be used primarily for recreational activities or the specific enjoyment of the landscape; recreational activities not specifically focused on the landscape (e.g. football). Such receptors may have some interest in their dusk/night time view of the wider landscape, but generally their primary concern would be their immediate landscape context;
 - ***High Sensitivity*** – Residents at home; users of caravan parks, campsites and ‘destination’ hotels; tourist attractions open after daylight hours with opportunities for views of the landscape (but not specifically focused on a particular vista); users of public rights of way or minor roads which appear to be used for recreational purposes or the specific enjoyment of the landscape during dusk/night time (often likely to be in close proximity to residential areas).
 - ***Very High Sensitivity*** - People at recognised vantage points (often with interpretation boards) which are designed to take in a dusk/ night time view, people at tourist attractions with a focus on a specific view which is available at dusk/ night time, visitors to historic features/estates where the setting is important to an appreciation and understanding of cultural value and can be visited and appreciated during dusk/night time.
14. It is important to appreciate that it is the visual receptor (i.e. the person) that has a sensitivity and not a property, public right of way or road. Therefore, a large number of people may use a motorway during dusk/ night time, for example, but this does not increase the sensitivity of the receptors using it. Conversely, a residential property may only have one person living in it but this does not reduce the sensitivity of that one receptor.
15. Where judgements are made about the sensitivity of assessment viewpoints, the sensitivity rating provided shall be an evaluation of the sensitivity of the receptor represented by the viewpoint and not a reflection of the number of people who may experience the view.
16. It is also important not to confuse the concept of visual sensitivity with the perception of wind turbines. It is acknowledged that some people consider wind turbines to be unattractive, but many people also enjoy the sight of them. This matter is therefore not a factor when determining sensitivity.

Nature (Magnitude) of effects on Landscape Character

17. The magnitude of effect on landscape character from visible lighting during low light periods is influenced by the resulting alteration to the physical and perceptual characteristics of the landscape. Professional judgement shall be used as appropriate to determine the magnitude using the following criteria as guidance only. In doing so, it is recognised that usually the landscape components in the immediate surroundings, including any visible lighting, have a stronger influence on the sense of landscape character than distant features whilst acknowledging the fact that more distant features can have an influence on landscape character as well.
- Very Low Magnitude of Change – No notable introduction of new visible lighting into the landscape; resulting in negligible change to the key physical and/or perceptual attributes of the landscape during the low light period.
 - Low Magnitude of Change - Introduction of a minor new extent of visible lighting into the landscape; resulting in a minor alteration to the key physical and/or perceptual attributes of the landscape during the low light period.
 - Medium Magnitude of Change - Introduction of some notable new visible lighting into the landscape; resulting in some notable change to the key physical and/or perceptual attributes of the landscape during the low light period.
 - High Magnitude of Change - Introduction of major new visible lighting into the landscape; resulting in a major change to the key physical and/or perceptual attributes of the landscape during the low light period.

- Very High Magnitude of Change - Introduction of dominant new visible lighting into the landscape; resulting in a profound change to the key physical and/or perceptual attributes of the landscape during the low light period.

Nature (Magnitude) of effects on views and visual amenity

18. Visual effects are caused by the introduction of new elements into the views of a landscape, or the removal of elements from the existing view. In this case the effects would be brought about by the addition of visible lighting.
19. Professional judgement shall be used to determine the magnitude of impacts using the following criteria as guidance only:
 - **Very Low Magnitude of Change - No change or negligible change in views;**
 - **Low Magnitude of Change - Some change in the view that is not prominent but visible to some visual receptors;**
 - **Medium Magnitude of Change - Some change in the view that is clearly notable in the view and forms an easily identifiable component in the view;**
 - **High Magnitude of Change - A major change in the view that is highly prominent and has a strong influence on the overall view.**
 - **Very High Magnitude of Change – A change in the view that has a dominating or overbearing influence on the overall view.**
20. Using this set of criteria, determining levels of magnitude is primarily dependant on how prominent the lighting associated with the development would be in the landscape, and what may be judged to flow from that prominence or otherwise.
21. For clarification, the use of the term ‘prominent’ relates to how noticeable the lighting associated with the development would be. This is affected by how close the viewpoint is to the development but not entirely dependent on this factor. Other modifying factors include: the focus of the view, visual screening and the nature and scale of other landscape features and visible lighting within the view. Rather than specifying crude bands of distance at which the turbines will be dominant, prominent or incidental to the view etc, the prominence of the turbines in each view is described in detail for each viewpoint or receptor group taking all the relevant variables into consideration.

Consideration of the Duration and Reversibility of effect

22. Prior to the publication of GLVIA3, LVIA practice had evolved over time in tandem with most other environmental disciplines to consider significance principally as a function of two factors, namely: the sensitivity of the receptor and the magnitude of the effect (the term ‘magnitude’ being a word most commonly used in LVIA and most other environmental disciplines to describe the size or scale of an effect).
23. The flow diagram on page 39 of GLVIA3 now suggests that the magnitude of effect is a function of three factors (the size/scale of the effect, the duration of the effect and the reversibility of the effect). This however is somewhat problematic in the context of assessing wind energy development. This is because wind energy developments are generally consented for a time limited period and are largely reversible at the end of their operational period. Whilst this is a material consideration in the planning balance it does not however reduce the scale of the effect during the period in which the scheme is operational (i.e. the ‘magnitude’ of the effect in the traditional and commonly understood sense of the word). In this regard, it would be incorrect to report a lesser magnitude of change to the view during the operational phase as a result of the time limited period of the effect, or the relative reversibility of the effect.

24. The approach proposed to be taken in this assessment is therefore to consider magnitude of effect solely as the scale or size of the effect in the traditional sense of the term ‘magnitude’.

Level of effect

25. The purpose of an LVIA when produced in the context of an EIA is to identify any significant effects on landscape and visual amenity arising from the proposed development.
26. The Electricity Works (Environmental Impact Assessment) (Scotland) Regulations 2017 do not define a threshold at which an effect may be determined to be significant. In certain other environmental disciplines there are regulatory thresholds or quantitative standards which help to determine the threshold of what constitutes a significant effect. However, in LVIA, any judgement about what constitutes a significant effect is the judgement of a competent and appropriately qualified professional assessor.
27. The level (relative significance) of the landscape and visual effects is determined by combining judgements regarding sensitivity of the landscape or the viewer, the magnitude of change, duration of effect and the reversibility of the effect. In determining the level of residual effects, all mitigation measures are taken into account.
28. The level (relative significance) of effect shall be described as Major, Major/Moderate, Moderate, Moderate/Minor, Minor, Slight/No Effect or No Effect. No Effect may also be recorded as appropriate where the effect is so negligible it is not even noteworthy.
29. In the assessment, those effects described as Major, Major/Moderate and in some cases Moderate may be regarded as significant effects as required by the EIA Regulations. These are the effects which the authors of the LVIA consider to be most material in the decision making process.

Production of the Zone of Theoretical Visibility (ZTV) Plan

30. A Zone of Theoretical Visibility (ZTV) illustrates the extents from which a feature (in this case the visible lighting from several wind turbines) would theoretically be visible within a defined study area.
31. ZTVs are generated assuming a ‘bare ground’ terrain model. This means that the ZTVs presented are generated from topographical data only and they do not take any account of vegetation or the built environment, which may screen views of the development. They are, as such, a ‘worst case’ zone of visual influence and considerably over-emphasises the actual visibility of the scheme. In reality trees, hedges and buildings may restrict views of the development from many of the areas rendered as within the ZTV.
32. A further assumption of ZTVs is that climatic visibility is 100% (i.e. visibility is not impeded by moisture or pollution in the air). In reality, such atmospheric conditions are relatively rare. Mist, fog, rain and snow are all common weather occurrences, which would regularly restrict visibility of the lighting associated with the development from some of the areas within the ZTV; this being an incrementally more significant factor with distance from the site. Atmospheric pollution is not as significant as it is in other parts of the country but is still present and would also restrict actual visibility on some occasions, again more so with distance from the site.
33. A ZTV shall be generated using specialist computer software package ‘WindFarm’ by ReSoft Ltd. The programme uses topographical height data (OS Terrain 50) to build a terrain model. The programme then renders the model using a square grid to illustrate whether the turbine lighting would be visible in each 50m x 50m square on the grid for a specified distance in every direction from the site.
34. A digital ZTV shall be prepared to illustrate the theoretical visibility of the turbine lighting for a radius of 10km around the site. It should be noted that when light travels from its source it diminishes in intensity,

limiting the area that its source can illuminate, a process known as ‘light attenuation’ or ‘fall-off’. Therefore, whilst the ZTV would not illustrate any reduction in intensity it should be recognised that the aviation lighting would diminish in intensity with distance from the wind farm.

35. It should be noted that there are several limitations to the use of ZTVs. For a discussion of these limitations please refer to Visual Representation of Wind farms – Version 2.2 (SNH February 2017). In particular, it should be noted that the ZTV plan shall simply illustrate theoretical visibility and will not imply or assign any level of significance to those areas identified as being within the ZTV. A ZTV is a tool to assist the Landscape Architect to identify where the turbine lighting would potentially be visible from, however the assessment of landscape and visual effects shall not rely solely on the ZTV and in all cases professional judgement shall be used to evaluate the significance of effects.

Production of the Dusk Period Visualisations

Introduction

36. SNH Guidance, Visual Representation of Wind Farms, Version 2.2, February 2017, considers the matter of visible turbine lighting at paragraphs 174 to 177. This highlights that ‘*Where an illustration of lighting is required, a basic visualisation showing the existing view alongside an approximation of how the wind farm might look at night with aviation lighting may be useful*’. It goes on to note that ‘*This is only likely to be required in particular situations where the wind farm is likely to be regularly viewed at night (e.g. from a settlement, transport route) or where there is a particular sensitivity to lighting (e.g. in or near a Dark Sky Park or Wild Land Area)*’. It is also clear that ‘**Not all viewpoints will need to be illustrated in this way**’.
37. The following section provides background information in relation to the Dusk Period Visualisations which it is proposed are prepared to illustrate the visible lighting proposed as part of the wind farm. The text explains how the photography shall be taken and how the visualisations are to be prepared and presented. It includes instructions for how it is expected that the visualisations should be viewed and explains the limitations of the visualisation material.

Viewpoints to be Illustrated with Dusk Period Visualisations

38. The starting point for consideration for which locations should be illustrated with dusk period visualisations was the 16 locations proposed as assessment viewpoints for the main daytime period visual assessment. Of these viewpoints a review was then undertaken in order to establish which were likely to be representative of visual receptors during low light conditions. In this regard, viewpoints at distances of beyond 10km from the site were discounted, along with viewpoints at hills summits and on long distance footpaths which would be unlikely to be visited after daylight hours.
39. Following this review, it is considered that the following viewpoints would be most appropriate for the production of Dusk Period Visualisations in addition to daytime visualisations:
- Viewpoint 1: Braehead, Coalburn; and
 - Viewpoint 16: Douglas.

Dusk Period Photography

40. SNH advises that ‘*The visualisation should use photographs taken in low light conditions, preferably when other artificial lighting (such as street lights and lights on buildings) are on, to show how the wind farm lighting will look compared to the existing baseline at night. It is only necessary to illustrate visible lighting, not infrared or other alternative lighting requirements*’. It goes on to note that ‘*We have found that approximately 30 minutes after sunset provides a reasonable balance between visibility of the landform*

and the apparent brightness of artificial lights, as both should be visible in the image. It is important that the photographs represent the levels of darkness as seen by the naked eye at the time and the camera exposure does not make the image appear artificially brighter than it is in reality. It can also be helpful to note the intensity of other lights in the area to enable comparison (e.g. television transmitters) as this can aid the assessment process'.

41. In this context, the following text explains how the baseline photography shall be taken for each viewpoint to be illustrated with a visualisation.
42. Each viewpoint to be illustrated with a visualisation shall be visited during the 'dusk period' and photographs taken at regular intervals as the light levels decrease across the dusk period. In particular, we shall seek to gather photographs during the period where street lighting and other light sources of visible light in the baseline are illuminated, but the landform remains partially visible. The ambient light conditions shall be recorded during each round of photography with a light meter to seek to ensure consistency across the visualisations prepared.
43. Baseline photographs of the existing view shall be taken using a high quality Canon 5D Mark II digital camera with a Canon EF 50mm f/1.4 USM lens. In accordance with SNH guidance, this camera shall have a full frame digital sensor.
44. As far as possible, photographs shall be taken in good weather and clear visibility conditions.
45. Neutral density graduated filters shall be used as appropriate at some viewpoints to balance the exposure within some scenes – typically where there is a contrast between bright sky and darker landform. Other than this no other filters shall be used during the photography.
46. Photographs shall be captured in high resolution JPEG format and as RAW metadata files.
47. At each viewpoint the camera shall be mounted on a levelled tripod at a height of approximately 1.5m above ground level (providing an approximation of average adult eye level).
48. The camera shall be set up on a panoramic rotating head and photographs taken at 30 degree increments of rotation from left to right.
49. In each case the camera focus shall be locked on the distant horizon (infinity). In doing so the photographs are in each case focussed on the development site whilst very close objects in the foreground may in some cases be out of focus. This approach is in line with best practice photography techniques. The exposure shall be set correctly for the centre of the development site and then locked off so that it remained constant as the camera is rotated through the panorama.

Stitching of Panoramas and Post-Photographic Processing

50. Each of the panoramic images presented for the Photographic Record and used for the Visualisations shall be comprised of three single frame photographs stitched together and then cropped down to a particular horizontal and vertical field of view.
51. The panoramic baseline photographs which illustrate a 90 degree horizontal angle of view shall be stitched in cylindrical projection as per the SNH guidance.
52. The photomontages which show a 53.5 degree horizontal field of view shall be based on the same single frame panoramic photographs but stitched in planar projection in accordance with the SNH guidance.
53. In some cases a degree of post photography processing of the raw image files may be undertaken to enhance the quality of the baseline photographs. As stated in the SNH guidance:

'Photographic processing involves judgements - there is no process by which a 'pure' photograph can be produced without the application of human decision-making, from exposure timing to the specification of the camera, and whether this is applied manually or automatically.....'

'In reality there is no way to avoid a photograph being enhanced as this is an integral part of photography and photomontage production.'

54. The extent of image enhancement undertaken in the production of the any photomontages will however be limited to that which would conventionally occur in a darkroom to improve the clarity of an image, and will not in each case change the essential character of the image. Overall, a minimum of post-photography image enhancement will take place and during the stitching process none of the photographs shall be distorted in terms of scaling (other than that which is an inherent and unavoidable product of stitching photography in planar projection).

Production of Wirelines and Photomontages

Wirelines

55. A wireline visualisation (sometimes also referred to as a wireframe visualisation) is a computer generated 3D outline of a particular structure (in this case a wind farm) placed on top of a 3D ground terrain model, which again is represented by a wireline. No rendering is given to any of the surfaces.
56. The wireline images of the proposed turbines (as well as any other cumulative turbines modelled) will be generated utilising the actual dimensions of the proposed turbines and a model of the structures placed in position over a ground terrain model generated from Ordnance Survey Terrain 50 DTM data.
57. The coordinates of the viewpoints will be recorded using a Global Positioning System (GPS) in the field. Checks on these coordinates will be made with reference to Google Earth. These coordinates will be used to set up viewpoints in the model from which to view the turbines. The wirelines will be generated using specialist computer software package 'WindFarm' by ReSoft Ltd.
58. The wireline images are generated on a bare ground model and therefore do not take account of any vegetation or the built environment between the viewpoint and the development. As such, they represent a worst case view.
59. For each of the viewpoints which are illustrated with a Visualisation, a wireline will be presented to scale beneath a baseline photograph to illustrate the view. The wireline images illustrate the anticipated scale and position of the turbines in relation to the terrain.

Dusk Period Photomontages

60. In simple terms, a photomontage is the superimposition of a rendered, photorealistic, computer generated model of a development (in this case a wind farm with visible lighting) on to a baseline photograph to illustrate how it will appear in the surrounding landscape context.
61. The production of the photomontages shall begin with the generation of a 3D digital ground terrain model and wireline images of the turbines, using ReSoft Ltd WindFarm software (as described above). The model of the structures is then rendered, and the lighting levels set appropriate to the date, time and orientation on which the photograph was taken.
62. Using world coordinates in the computer modelling programme, the photographic viewpoints for which a photomontage is to be prepared is replicated such that a view is set up looking at the structures from exactly the same location as where the baseline photograph was taken from. The view from the model is then superimposed over the original photograph and edited as necessary in Adobe Photoshop to give a

- final photomontage. Several known landmarks in the far distance of the baseline photographs are recorded on site using a GPS and used to check that the positioning and scale of the structures is correct.
63. Whilst every effort shall be made to ensure the accuracy of the photomontages, it must be appreciated that no photomontage could ever claim to be 100% accurate as there are a number of technical limitations in the model relating to the accuracy of information available from Ordnance Survey and from the GPS. In particular, it should be recognised that baseline photographs on which photomontages are based can, at best, only ever be a 'flattened' 2D representation of what the eye sees in 3D on site. A photograph will never capture as much detail as the eye would see in the field, it therefore follows that a photomontage can never truly capture the sense of perspective and detail which would be possible in reality.
64. Additionally, it has been established during the field work undertaken for previous similar studies that dusk period photographs of visible lighting do not always capture the extent to which the eye perceives light sources during the dusk period. Often photography will appear to show the lighting to be more recessive than it is actually perceived in the field. The photomontages therefore do not seek to replicate the manner in which a dusk period photograph would capture the aviation lighting, rather they seek to replicate the manner in which the lighting is perceived when it is viewed in the field.
65. In some cases, the visibility of the turbines may also be slightly digitally enhanced to ensure that they are visible when printed out.
66. Each of the photomontages should be viewed from the stated viewing distance to give an accurate representation of what the development will look like. However, the photomontages are simply a tool to assist the Landscape Architect in their assessment of effects. The assessment of visual effects does not rely solely on the accuracy of the photomontages as it is ultimately professional judgement which is used to evaluate the significance of effects.

Presentation of the Visualisation Sheets

67. For each Dusk Period Viewpoint Visualisation, the following visualisation sheets shall be presented:
- Sheet 1: Baseline Photograph of the Existing Dusk Period View and Cumulative Wireline of the Proposed Scheme and all other Operational or Proposed Wind Farms*
68. The baseline photograph is an unedited existing dusk period view from the viewpoint. The image illustrates a 90 degree horizontal field of view and a 25 degree vertical field of view. This image is presented in cylindrical projection and the principal viewing distance (the distance at which one should view the image to obtain a geometrically accurate impression) is 500mm when the image is curved through the same radius.
69. A cumulative wireline image of the proposed development, and all other operational and proposed wind farms is set out directly beneath the corresponding baseline view. This image also presents a 90 degree horizontal field of view. This sheet presents the information required of the 'Baseline Panorama and Wireline' as set out in Annex C of the SNH guidance. Both of these images are presented in cylindrical projection and the principal viewing distance (the distance at which one should view the image to obtain a geometrically accurate impression) is 500mm when the image is curved through the same radius.

Sheet 2: Dusk Period Photomontage of the Proposed Scheme

70. This sheet provides an enlarged and cropped dusk period photomontage of the proposed development. The image illustrates a 53.5 degree horizontal field of view and an 18 degree vertical field of view. It is presented in planar projection. As such the image should be viewed on a flat surface. The principal

viewing distance (the distance at which one should view the image to obtain a geometrically accurate impression) is 812.5mm. This sheet presents the information required of the 'A1 Panorama' as set out in Annex C of the SNH guidance.

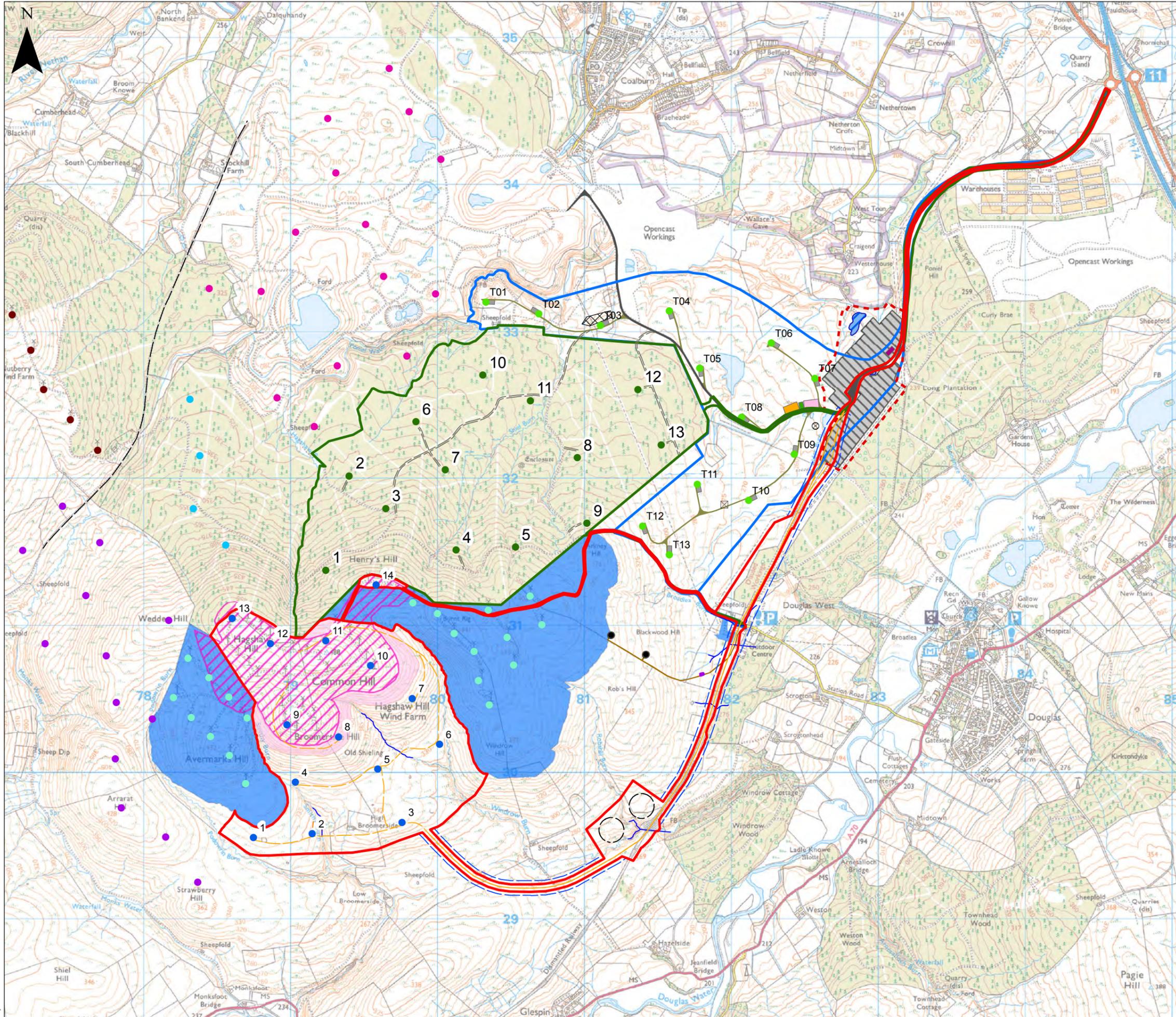
Limitations of the Visualisations

71. Annex A of 'Visual Representation of Wind Farms, Version 2.2 (SNH, February 2017) sets out a summary of the key limitations of visualisations and recommends that these are set out for each windfarm application. The following text is therefore reproduced from Annex A of the aforementioned SNH guidance:

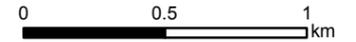
'Visualisations of wind farms have a number of limitations which you should be aware of when using them to form a judgement on a wind farm proposal. These include:

- *A visualisation can **never show exactly** what the wind farm will look like in reality due to factors such as: different lighting, weather and seasonal conditions which vary through time and the resolution of the image;*
- *The images provided give a reasonable impression of the scale of the turbines and the distance to the turbines, but **can never be 100% accurate**;*
- *A static image cannot convey turbine movement, or flicker or reflection from the sun on the turbine blades as they move;*
- *The viewpoints illustrated are representative of views in the area, but cannot represent visibility at all locations;*
- *To form the best impression of the impacts of the wind farm proposal these images **are best viewed at the viewpoint location shown**;*
- *The images **must** be printed at the right size to be viewed properly (260mm by 820mm);*
- *You should hold the images **flat at a comfortable arm's length**. If viewing these images on a wall or board at an exhibition, you should stand at arm's length from the image presented to gain the best impression.*
- *It is preferable to view printed images rather than view images on screen. If you do view images on screen you should do so using a normal PC screen with the image enlarged to the full screen height to give a realistic impression. Do not use a tablet or other device with a smaller screen to view the visualisations described in this guidance'.*

72. It should also be noted that the quality of all printed visualisations is also dependent on the printing methods, paper and ink used.



- KEY**
- Hagshaw Hill Repowering**
- Site Boundary
 - Existing Hagshaw Extension Lease Area
 - Hagshaw Repowering Turbines
 - Proposed Access Road
 - Potential Borrow Pits
- Douglas West Wind Farm Extension**
- Site Boundary
 - Turbine Locations
- Douglas West Wind Farm**
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 - Substation & Control Room
 - Construction Compound
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- Douglas West Industrial Area (M74 Heat and Power Park)**
- Red Line Boundary
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 - Cumberhead Wind Farm
 - Dalquhandy Wind Farm
 - Galawhistle Wind Farm
 - Nutberry Wind Farm



Scale 1:25,000 @ A3



Hagshaw Hill Repowering & Douglas West Extension

For Information

Proposed Development and Cumulative Sites

Date: 01/08/2018	Drawn by: JY/JH	Checked by: TP	Version: V1
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Project Number: 10229_006

Task Phase	Expected Duration (working days)	Construction Month											
		2	4	6	8	10	12	14	16	18	20	22	24
Foundations 1-7	60												
Off-site cabling installation	55												
Substation works	60												
Substation commissioning	15												
Turbine Delivery 1-7	60												
Turbine Erection 1-7	60												
Commission/ Test 1-7	60												
Phase 2													
Existing Wind Farm switch off	1												
Decommission existing Wind Farm	241												
Mobilisation	20												
Access tracks 8-14	50												
Off-site cabling	30												
Substation works	60												
Crane Hardstandings 8-14	40												
Foundations 8-14	60												
Turbine Delivery 8-14	60												
Turbine Erection 8-14	60												
Commission/Test 8-14	40												
Site Re-instatement	20												

I hope that this provides clarity with respect to the matters raised.

Regards,
Dale

Dale Turner

Associate Environmental Planner

Pegasus Group

PLANNING | DESIGN | ENVIRONMENT | ECONOMICS

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T [REDACTED] | E [REDACTED]

Birmingham | Bracknell | Bristol | Cambridge | Cirencester | East Midlands | Leeds | Liverpool | London | Manchester | Peterborough

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From: O'Kane, Alison [REDACTED]
Sent: 31 August 2018 17:14
To: Theo Philip <[REDACTED]>
Cc: consents_admin@gov.scot; planning@southlanarkshire.gov.uk
Subject: FW: Hagshaw Hill Wind Farm Repowering, South Lanarkshire (1 of 2) [OFFICIAL] [PUBLIC]
Importance: High

CLASSIFICATION: PUBLIC

Dear Theo,

Please find attached a response from East Ayrshire Council on the Hagshaw Hill repowering proposal.

I trust this is useful.

Many thanks,

Alison

From: Dobson, Fiona **On Behalf Of** submittoplanning
Sent: 06 August 2018 08:39
To: Purves, Karen
Cc: Iles, Craig
Subject: FW: Hagshaw Hill Wind Farm Repowering, South Lanarkshire (1 of 2) [OFFICIAL]
Importance: High

CLASSIFICATION: OFFICIAL

For information/response.

From: Theo Philip [REDACTED]
Sent: 03 August 2018 17:30
To: submittoplanning
Cc: Ruth.Findlay [REDACTED]; Dale Turner; brian.denney [REDACTED]; jenny.hazzard [REDACTED]; Jennifer Chapman
Subject: Hagshaw Hill Wind Farm Repowering, South Lanarkshire (1 of 2)

Dear Sir/Madam,

Further to my discussion with Craig Iles this morning, I now enclose a document which sets out the background to our proposed repowering of Scotland’s first wind farm on our land at Hagshaw Hill in South Lanarkshire. I will send in a second email a document prepared by our Landscape Consultants (Pegasus Group) which sets out the proposed scope of the LVIA for the project. This includes a ZTV, a list of proposed viewpoints and the proposed scope of a Night-time Lighting Assessment.

The basic components of the Repowering project are shown in the cumulative plan attached and set out in the table below:

Table 1 – Hagshaw Hill Wind Farm | Existing & Proposed Site Characteristics

Characteristic	Existing Hagshaw Hill Wind Farm (1995)	Proposed Repowering of Hagshaw Hill Wind Farm (2018)
Number of Wind Turbines	26	14
Turbine Capacity	600 kW each	5 MW each
Maximum Tip Height	55 m	200 m
Maximum Rotor Diameter	40 m	132 m
Maximum Blade Length	20 m	64.5 m
Total Generating Capacity	15.6 MW	70 MW
Total Storage Capacity	None	Up to 15 MW
Total Power Generation p.a.	38.2 GWh	182.5 GWh
Community Benefit p.a.	c.£29,000	£350,000

We are in the process of preparing a S.36 Consent application for submission to the Scottish Government Energy Consents Unit, and would welcome any comments you may have on the viewpoints proposed and the scope of both the LVIA and NLA.

If you have any queries on the project, or would like to discuss anything further please do not hesitate to contact me.

Thanks and regards,
Theo

Theo Philip
3R Energy
Lanark Auction Market
Hyndford Road
Lanark
ML11 9AX

T: [REDACTED]
M: [REDACTED]
W: www.3REnergy.co.uk

Economy and Skills

Depute Chief Executive and Chief Financial Officer
Alexander McPhee ACMA



Head of Planning and Economic Development: Michael Keane
Direct Dial: (01563) 576767 Fax: (01563) 554592
Email: michael.keane@east-ayrshire.gov.uk

If telephoning or calling please ask for : Alison O'Kane on 01563 576757

Our Ref: - INF 1/4

Date: 31 August 2018

Theo Philip
3R Energy
Lanark Auction Market
Hyndford Road
Lanark
ML11 9AX

Dear Theo

HAGSHAW HILL WIND FARM REPOWERING, SOUTH LANARKSHIRE

Thank you for consulting with East Ayrshire Council on the above proposal. I note that you are preparing to submit a Section 36 application to the Scottish Government Energy Consents Unit for the re-powering of the existing Hagshaw Hill wind farm. The proposed repowering scheme will replace the existing 26 turbines at 55 metres in height with 14 turbines at 200 metres in height. It is recognised that the Hagshaw wind farm has been operational since 1995 at which time it was Scotland's only wind farm.

In terms of the repowering proposal, it is noted that it has been agreed with the Energy Consents Unit and South Lanarkshire Council that formal scoping, in terms of the Environmental Impact Assessment Regulations will not be undertaken in this instance. East Ayrshire Council is surprised and concerned by this approach, primarily as the Council recognises the value of scoping, particularly in relation to large scale infrastructure proposals, in terms of shaping and agreeing the extent of the Environmental report and helping to avoid matters arising further down the line.

Landscape and Visual Impact Assessment

At this stage, the Council has primarily been asked for its views on the proposed approach to the Landscape and Visual Impact Assessment, with particular reference to the proposed viewpoints.

In general terms, the Council is satisfied that the viewpoints selected are appropriate and will adequately demonstrate the impacts of the proposal.

The Council does, however, have concerns over the proposed approach to the night time visible turbine lighting assessment. It is proposed that visualisations will be prepared for only two viewpoints; Coalburn and Douglas. From the 16 viewpoints selected for the daytime visual impact assessment the other 14 were discounted as they were either more than 10km

from the site boundary or because they were representative of hill summits or long distance walking routes, which would not be likely to be visited after daylight hours. The Council would suggest that the extent of the lighting assessment/VP selection should not necessarily be restricted to a 10km study area but instead should use the ZTV to understand the nature of the likely effects which should then inform such assessment/VP selection. It would have been useful for this visual to have been prepared at this stage to allow the Council and other consultees to comment on the appropriateness of the approach to turbine lighting assessment on a more informed basis.

Notwithstanding the above, East Ayrshire Council is unclear why a viewpoint within Muirkirk has not been included. Muirkirk is within 10km of the site and is a relatively isolated rural settlement with limited exposure to existing lighting in the surrounding landscape. The Council considers that it is important that the impact of the current proposal is fully explored. The Council therefore requests that the night time lighting assessment includes a viewpoint and associated analysis from Muirkirk.

The findings of the ZTV should guide the exact position of the viewpoint in Muirkirk or, if the ZTV indicates there will be no visibility from Muirkirk, this should be confirmed.

The Council also encourages the applicant to explore all forms of lighting mitigation including any potential for proximity activated lighting.

Cumulative assessment

The proposed methodology states that in terms of cumulative impact the study will focus on schemes within 20 km of the application site, plus the Clyde grouping of turbines. Presumably for information, figure 3 has also been included which shows operational, consented and proposed wind farms within 35km. It is noted there are several developments not included on this map: Enoch Hill, South Kyle and High Park Extension.

It is noted that it is intended to include the Douglas West Wind Farm Extension within the assessment, which is soon to be at scoping stage. Whilst it is agreed that for completeness this should be included in the assessment, it should be made clear the status of this proposal. By its nature, an application at scoping could still be subject to significant change.

It is important that the night time lighting assessment considers cumulative impacts. As proposals for turbines in excess of 150 metres are now becoming more prevalent, the requirement for turbine lighting is becoming more common place.

Visualisations

Paragraph 1.6.14 of the Approach to Assessment of Landscape and Visual Effects document indicates that where a 360 degree panorama view is not available, a 90 degree baseline panorama in the direction of the site will be produced, along with any other 90 degree angle views to illustrate the wider panorama as appropriate. It is not clear how it will be decided

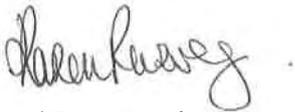
what 90 degree viewpoints will be produced i.e. is there a criteria for this or will it just come down to professional judgement on-site. This should be clarified.

Phasing

The application should be clear on how the phasing of the construction will be undertaken and should demonstrate how this will be carried out to minimise any potential negative impacts. In terms of landscape and visual impact it would be favourable for the 55 metre turbines to be removed in their entirety before the larger proposed turbines are erected. However, from the information provided, it would appear this is not the intention. It is not clear for how long and in what sort of layout/combination, the Hagshaw site will contain both original 55 metres turbines and proposed 200 metres turbines. Given the level of development that is operational and proposed around the Hagshaw Hill cluster and the range of turbine heights involved, it is critical that the impacts during the construction phase are fully demonstrated through the LVIA process.

I trust the above comments are useful. Should you require any further information on the points raised above or wish to discuss any matter, then please contact Alison O'Kane on the above number or on alison.o'kane@east-ayrshire.gov.uk.

Yours sincerely



18

Karl Doroszenko

DEVELOPMENT PLANNING AND REGENERATION MANAGER

From: Theo Philip

Sent: 24 August 2018 16:28

To: 'Fiona OMahony' [redacted]; [Ruth.Findlay](#) [redacted];

[brian.denney](#) [redacted]; [jenny.hazzard](#) [redacted];

Cc: [Nikki.Anderson](#) [redacted]; Lyndsey Kinnes [redacted];

[James.Wright](#) [redacted]; Jennifer Chapman <[redacted]>;

[Lesley.Tosun](#) [redacted]; [Carolanne.Brown](#) [redacted]; [Paul.Taylor](#) [redacted]; [David.Bell](#) [redacted]

Subject: RE: Hagshaw Hill Repowering | Proposed Scope of LVIA - Follow Up Points

Hi Fiona,

Thanks for your email, and confirmation of the viewpoints. I can confirm we will include the additional viewpoint at Station Road. We will also cover the different design scenarios we have looked at within the Design Statement.

Re lighting, I'm not aware of the specific lighting requirements for the Cumberhead Revised Scheme. My understanding was that their proposed new tip height is 149.9m so it wouldn't attract civil aviation lighting requirements, but it may well require lighting to mitigate MoD concerns? On that point, our existing Hazelside turbine, the consented Douglas West, and consented Dalquhandy Wind Farms all require lighting to mitigate MoD concerns and this is required by planning conditions. The dusk visualisations will therefore include a future baseline scenario which shows the proposed aviation lighting on Hagshaw along with that already required by planning conditions for the Douglas West, Dalquhandy and Hazelside projects.

I hope this makes sense but happy to discuss further if you want to call.

Thanks,

Theo

Theo Philip

3R Energy

Lanark Auction Market

Hyndford Road

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ML11 9AX

T: [redacted]

M: [redacted]

W: www.3REnergy.co.uk

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From: Fiona OMahony [redacted]
Sent: 08 August 2018 12:03
To: Theo Philip <Theo@3renergy.co.uk>; Ruth.Findlay2@gov.scot;
brian.denney [redacted]; jenny.hazzard [redacted]
Cc: Nikki.Anderson [redacted]; Lyndsey Kinnes [redacted];>;
James.Wright [redacted]; Jennifer Chapman <[redacted]>;
Lesley.Tosun [redacted]; Carolanne.Brown [redacted]; Paul.Taylor [redacted]; David.Bell [redacted]
Subject: Hagshaw Hill Repowering | Proposed Scope of LVIA - Follow Up Points

Dear All,

Thank you for the meeting yesterday. I said I would get back to you as regards the viewpoints, I consider the viewpoints appear representative enough and don't suggest any other additional ones for the LVIA of your Hagshaw proposal apart from the viewpoint that I raised at the meeting (corner of A70 and Station Rd.). At the meeting you also raised that you had scenario tested different turbine options (in terms of height), can these scenarios be included as wirelines somewhere within the EIAr, I suggest within the design statement as part of a design iteration section, but ultimately that is up to you where you place them. This would be helpful in looking at the effects of such a step change in turbine height and spacing within a developed cluster where a number of different changes are proposed.

One final point, I know that you dismissed /hadn't really considered the use of radar activated lighting as mitigation, however I have just heard from the consultant for Cumberhead this morning (who are also out taking photos for their LVIA), who has confirmed that two of the turbines within their proposal are likely to require lighting, and I wondered whether there would be any possibilities to look again at this type of mitigation especially if the cost of which could be shared between neighbouring developments? Otherwise we are now looking at upwards of 25+ lights in this cluster, which I question whether that is what we should be aiming for, especially given the very close proximity to settlement (especially in the case of Douglas West Extension).

Regards

Fiona O'Mahony | Landscape Advisor

Scottish Natural Heritage | Silvan House | 3rd Floor East 231 Corstorphine Road | Edinburgh | EH12 7AT | m:

[redacted]

Dualchas Nàdair na h-Alba | Taigh Silvan | 3mh Làr an Ear 231 Rathad Chros Thoirphin | Dùn Èideann | EH12 7AT

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From: Theo Philip [redacted]
Sent: 06 August 2018 16:20
To: Ruth.Findlay [redacted]; James.Wright [redacted]; Lyndsey Kinnes [redacted]
Cc: Nikki.Anderson [redacted]; brian.denney [redacted]; jenny.hazzard [redacted];
Jennifer Chapman; Lesley.Tosun [redacted]; Carolanne.Brown [redacted]; Paul.Taylor [redacted];
David.Bell [redacted]
Subject: RE: Hagshaw Hill Repowering | Proposed Scope of LVIA

All,

Please find attached a provisional ZTV for the proposed Douglas West Extension project at 200m to tip. We will bring a printed copy tomorrow.

Thanks,
Theo

Theo Philip
3R Energy
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ML11 9AX

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M: [REDACTED]
W: www.3REnergy.co.uk

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From: Theo Philip

Sent: 18 June 2018 18:08

To: Finn, Tony <[REDACTED]>; Wright, James

<[REDACTED]>; 'Findlay, Ruth' <[Ruth.Findlay@\[REDACTED\]](mailto:Ruth.Findlay@[REDACTED])>

Cc: Jennifer Chapman <[REDACTED]>; William Mitchell <[REDACTED]>

Subject: Hagshaw Hill Repowering & Douglas West Extension

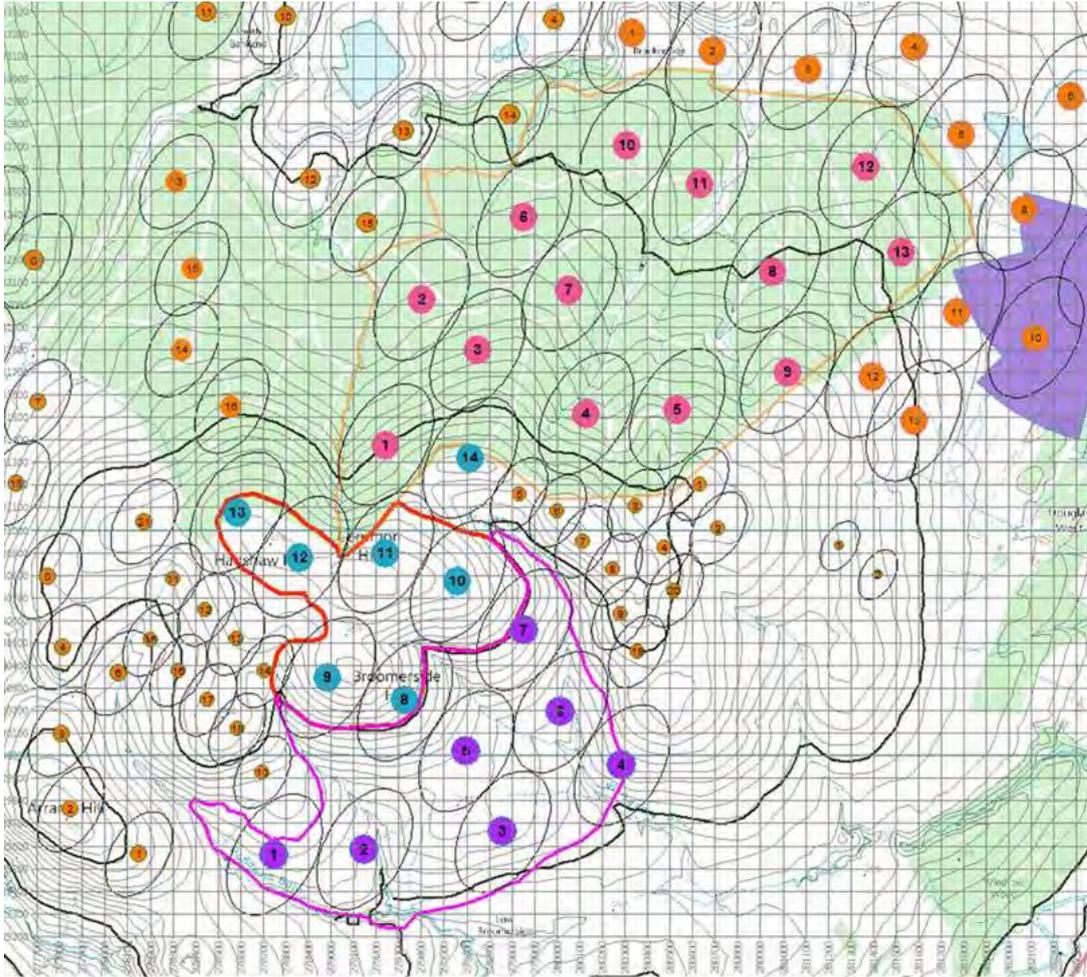
Tony/James/Ruth,

Further to recent discussions with you all and in advance of our meeting on Wednesday, I thought it would be useful to send a couple of plans across. Firstly, please find attached a cumulative plan that shows the two projects in the context of the neighbouring built or consented turbines. I have also attached a more detailed plan of the Hagshaw site which shows the route of a proposed new access road from the M74 motorway. We propose to use this new access road to repower Hagshaw Hill, as opposed to the previous access route which took traffic along the A70 through Douglas. In this regard, we have included within the indicative site boundary the bing at Douglas West (which I understand is owned by SLC) as we would like to explore the potential to reuse some material from the bing in the construction of the new road (providing it is suitable). This would reduce the volume of material required to be imported, or the volume of virgin rock to be excavated from any on-site borrow pits. It would be good to discuss road options with you on Wednesday.

I have also attached a copy of our Forward Strategy document which sets out more background on both projects, the proposed phasing of Hagshaw Hill Repowering, outline community benefit proposals, and other relevant information on the business in general. The most pertinent sections are:

- 3.1.3 (Energy – Wind);
- 4 (Energy, Economic & Policy Context);
- 5.2 (Renewable Energy Business); and,
- 5.3 (Wind Energy Opportunities).

One item that is not shown on the plans attached but is relevant to the design of both projects is the wake separation ellipses (separation distances required by the turbine manufacturers for warranty purposes) which are illustrated in the screenshot below, taken from our OpenWind software. For both projects, we wish to look at turbines of up to 200m to tip, with 132m diameter rotors, to maximise yield in the new post-subsidy era. These dimensions are reflected in the wake separation distances shown below.



(HHR Phase 1 = purple, HHR Phase 2 = blue, DW Ext = pink)

Environmental surveys for both projects have commenced and we are keen to issue formal EIA Scoping Reports in the coming weeks.

I hope this is helpful and look forward to discussing things in more detail on Wednesday.

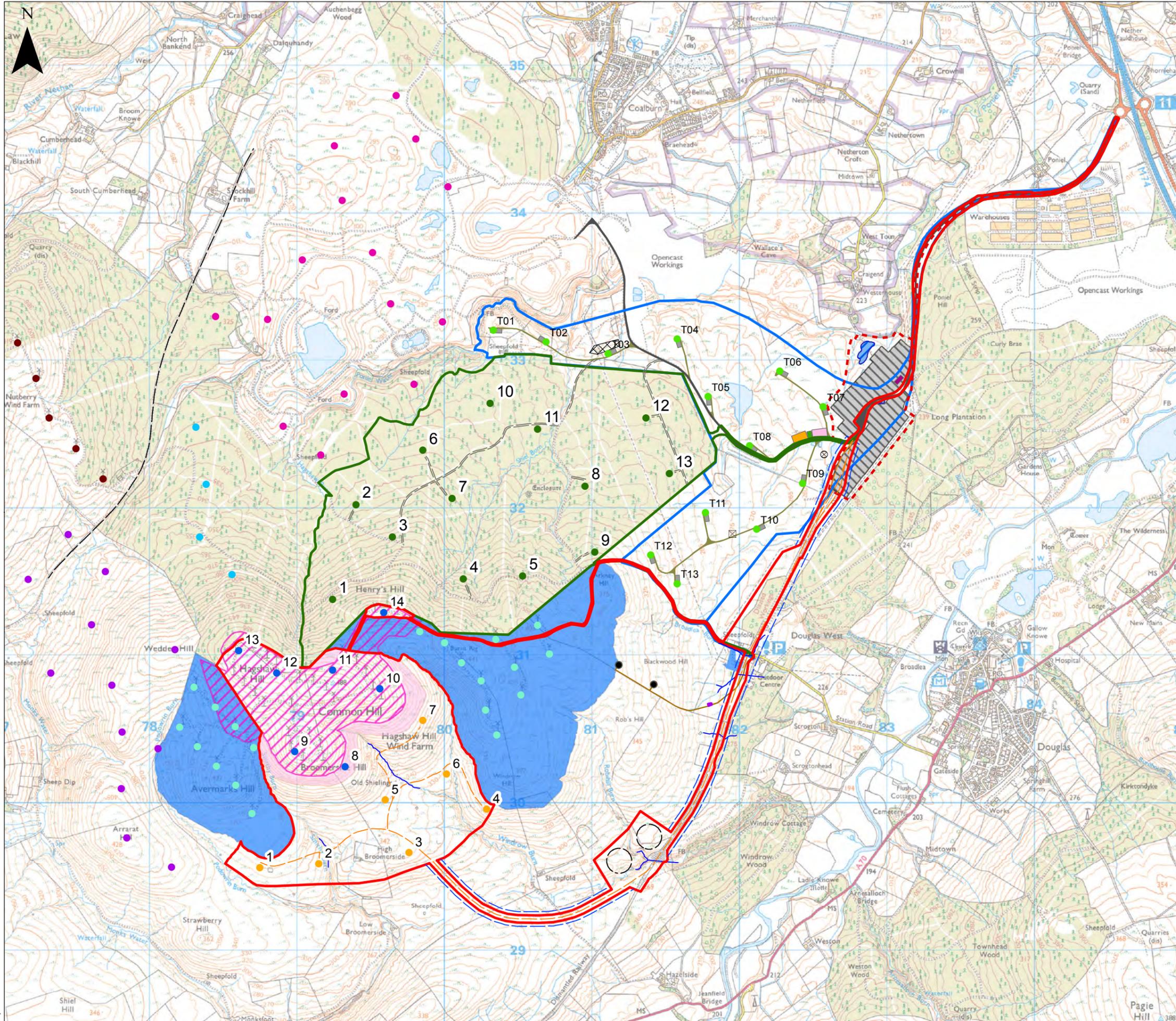
Thanks and regards,
Theo

Theo Philip
3R Energy
Lanark Auction Market
Hyndford Road
Lanark
ML11 9AX

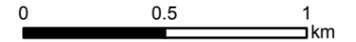
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- Cumulative Development Turbines**
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 - Cumberhead Wind Farm
 - Dalquhandy Wind Farm
 - Galawhistle Wind Farm
 - Nutberry Wind Farm



Scale 1:25,000 @ A3



Hagshaw Hill Repowering & Douglas West Extension

Figure 1

Cumulative Sites

Date: 18/06/2018	Drawn by: JY	Checked by: TP	Version: V1
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Project Number: 10229_006

