

APPENDIX 8.1: TECHNICAL METHODOLOGIES

- 1.1.1 The following is a detailed methodology for production of technical outputs contributing to the assessment.
- 1.1.2 The Landscape and Visual Impact Assessment (LVIA) is informed by several technical models and drawings and the methods for producing these are described below. There are various guidance documents and standards which have informed their production and so, where relevant, references are included. A list of References is also provided at the end of this Appendix.
- 1.1.3 It should be remembered that *“visualisations, whether they are hand drawn sketches, photographs or photomontages, can never exactly match what is experienced in reality. They should, however, provide a representation of the proposal that is accurate enough for the potential impacts to be fully understood”* (SNH, 2017: para 96, p22) and that *“visualisations in themselves can never provide the full picture in term of potential impacts; they only inform the assessment process by which judgements are made”* (SNH, 2017; para 98, p22).
- 1.1.4 All photography, editing and modelling to inform the landscape visual impact assessment has been undertaken by ASH design+assessment Ltd.

1.2 Current Guidance

- 1.2.1 In February 2017, SNH published an update (Version 2.2) to their guidance document ‘*Visual Representation of Wind Farms*’.
- 1.2.2 As highlighted in Table 1, photographs for 11 viewpoints were taken in March 2018 to SNH (2017) guidance; and photographs for the remaining 16 viewpoints were taken between autumn 2013 and summer 2014 and reused from the Tangy III ES (2014). This approach was agreed in consultation with SNH, ECU and ABC at a meeting on 1st February 2018.
- 1.2.3 The photographs and visualisations in the Tangy III ES (2014) were completed in accordance with the SNH (2006) guidance, during the grace period before the SNH (2014) guidance was fully implemented. These 2013-2014 photographs have therefore been re-processed in line with the current SNH (2017) guidance.
- 1.2.4 Table 1 also notes where any alterations have been made to the baseline photography.

Table 1: Viewpoint Photography

Viewpoint	Baseline Photo	Notes
VP 1 A83 at Glenbarr Burial Ground	Tangy III LVIA (2014)	
VP 2 Glenbarr War Memorial	Tangy III LVIA (2014)	
VP 3 Barr Glen	Tangy III LVIA (2014)	Baseline photo enhanced to show existing turbines
VP 4 Islay Ferry Route	Tangy III LVIA (2014)	Single frame photo included for context only
VP 5 Gigha (South Pier)	New photo (2018)	Baseline photo enhanced to show existing turbines
VP 6 Machrihanish (Little Scone)	New photo (2018)	
VP 7 Stewarton	Tangy III LVIA (2014)	
VP 8 Southend Road	New photo (2018)	Baseline photo enhanced to show existing turbines
VP 9 Campbeltown (Ralston Road).	Tangy III LVIA (2014)	
VP 10 Beinn Ghuilean	New photo (2018)	

Viewpoint	Baseline Photo	Notes
VP 11 High Peninver	Tangy III LVIA (2014)	
VP 12 Bord a Dubh (Kintyre Way)	Tangy III LVIA (2014)	
VP 13 A' Cruach (Kintyre Way)	New photo (2018)	
VP 14 Allt a Choire	New photo (2018)	
VP 15 Ballywilline (Kintyre Way)	New photo (2018)	
VP 16 Kilbrannan Sound	Tangy III LVIA (2014)	Single frame photo included for context only
VP 17 Breakachy	New photo (2018)	
VP 18 Skeroblingarry (Kintyre Way)	Tangy III LVIA (2014)	Baseline photo and photomontage amended to remove section of forest that has been felled since original photo was taken.
VP 19 Drumlemble	New photo (2018)	Baseline photo enhanced to show existing turbines
VP 20 Rhunahaorine Point (Kintyre Way)	Tangy III LVIA (2014)	
VP 21 B842 North of Peninver	Tangy III LVIA (2014)	
VP 22 Campbeltown Airport	Tangy III LVIA (2014)	Baseline photo and photomontage edited to include operational cumulative sites (Beinn an Tuirc, Phase 2)
VP 23 Beinn Bharrain	Tangy III LVIA (2014)	Baseline photo and photomontage edited to include operational cumulative sites which have been introduced since original photo taken (Cour, Freasdail, Srondoire)
VP 24 Sea near Machrihanish	Tangy III LVIA (2014)	Single frame photo included for context only
VP 25 Ranachan Hill	New photo (2018)	
VP 26 Westport Beach	Photo taken for Tangy III LVIA (2014) LVIA, but not included previously	
VP 27 Machrihanish Dunes	New photo (2018)	

1.3 ZTV Production

1.3.1 Zone of Theoretical Visibility (ZTV) diagrams for the 40 km study area have been prepared using ArcGIS (Version 10.3) and an Ordnance Survey (OS) Terrain 5 digital terrain model (DTM) to illustrate the potential visibility of the wind farm. The turbines considered in this assessment were modelled as follows:

- Hub Height: 87 m
- Rotor Diameter: 126 m
- Overall Tip Height: 150 m

1.3.2 Terrain 5 is a grid of heightened points with regular five metre post spacing. The software uses this information to create a virtual, three dimensional, bare ground model which is representative of the earth's surface (including its curvature). It does not take into account elements above the ground such as buildings or trees. Therefore, while the ZTV indicates areas of potential visibility of

the proposed development, in reality, not all locations within the ZTV would necessarily afford a view of it. Nevertheless, the ZTV is a valuable tool in both landscape character and visual impact assessment.

- 1.3.3 While Terrain 5 is a product which is updated by OS on a quarterly basis, the design and assessment model was created using data available 2017 and supplied to ASH by SSE. This data has not been updated since that time. This prevents excessive reworking of models and allows for continuity during the assessment process.
- 1.3.4 ZTV diagrams produced within the 60 km study area (i.e. the cumulative assessment) have also been prepared using ArcGIS (Version 10.3) and the OS Terrain 5 data. Cumulative ZTVs have been 40 km from each cumulative site.

1.4 Photography

- 1.4.1 Photographs have been taken using one of two full frame sensor (equivalent to a 35 mm film frame), digital single lens reflex (DSLR) cameras: either a Canon EOS 5D Mark II or a Canon EOS 6D. Both of these cameras have been fitted with the Canon EF 50mm f/1.4 USM lens (a 50 mm prime lens) fitted with a HOYA UV filter.
- 1.4.2 For the twenty-four land-based viewpoints (all excluding VPs 4, 16 and 24), photographs were taken by a camera attached to a Manfrotto tripod and Manfrotto 300N Rotating Panorama Unit (set to 15° intervals) and a Manfrotto 338 Levelling Base. This was in order to maintain a stable platform for photography work, and to ensure an even overlap for successive panorama images. Where necessary, a Manfrotto 303 type panoramic head has been added to this arrangement in order to alter the axis of the camera and take photographs in portrait format (with the rotating unit reset to 10° intervals).
- 1.4.3 For the three water-based viewpoints (VP4, Islay Ferry Route; VP16 Kilbrannan Sound; and VP24 Sea Near Machrihanish), photographs were taken from a boat for the Tangy III ES and reused for visual context for the proposed Tangy IV development. Given the resulting movement of the camera, photographs were taken without the use of a tripod in order to minimise the potential for differences in level. These images are useful in illustrating the visual context of the viewpoint but have not been used to create photomontages. This approach was agreed with Argyll & Bute Council (ABC) and SNH for Tangy III ES (2014) and by ABC, SNH and ECU for Tangy IV.
- 1.4.4 On arrival at each viewpoint location, a Garmin eTrex global positioning system (GPS) navigation device was switched on and allowed to acquire satellite positions. This device will identify its location, to the nearest metre, using a 12 figure OS grid reference, e.g. 132807 925438 or NB 32807 25438. In order to increase the accuracy of readings, the grid reference was not recorded until all other work at the viewpoint was completed and the GPS device had been switched on for several minutes. This passage of time allows the GPS device to increase the accuracy of readings through repeated, automated measurements.
- 1.4.5 While at a viewpoint, the landscape architect or photographer recorded the grid reference, ground level and camera viewing height along with a brief description of the nature of view, weather conditions and visibility. The camera embeds details of the date, time, camera make and model, the lens focal length, shutter speed, f-number and ISO speed rating as metadata in each photograph file.
- 1.4.6 Baseline photographs were then downloaded and combined to create 360° baseline panoramic images at cylindrical projection using Kolor Autopano Pro 3 software. As detailed in Table 1 of this Appendix, some adjustments were required in Adobe Photoshop CC2017 to the baseline photographs. For example, to alter the brightness and/or contrast; to add operational cumulative turbines that were not present in the original photograph; to remove forest areas that have been felled since the original photograph was taken; and/or to enhance the depiction of the existing

turbines when they were not clear in the original photograph (or remove and re-montage them back in).

1.5 Wireline Preparation

- 1.5.1 Cumulative wirelines and planar projection wirelines of the proposed development were created for all viewpoints using the same turbine model, ReSoft WindFarm software and ground model detailed above, as well as Hugin to create the planar projection wirelines.
- 1.5.2 Similar to the limitations of the ZTV, these visualisations provide an indication of the proposed development's potential appearance but do not take account of screening elements such as buildings, trees or minor variations in topography.

1.6 Photomontage Preparation & Rendering

- 1.6.1 Photomontage visualisations were created using the wirelines and baseline panoramic photograph images described above as well as 3d georeferenced models of tracks, felled/replanted areas and other components, listed below. Their creation involved overlaying photographs with exported wireline bitmaps and rendering using Photoshop CC2017.
- 1.6.2 As part of the development proposals, the existing wind farm would be decommissioned and areas of commercial plantation felled prior to the new turbines being erected. To produce the photomontages, it was therefore necessary for the existing turbines and trees to be removed from before the new turbines and other components (detailed below) were added.
- 1.6.3 Photomontages illustrate:
- Removal of existing Tangy I and II turbines and temporary meteorological masts;
 - Removal of forest areas to be felled;
 - Proposed replanting (Sitka Spruce at 10 m height, Native Broadleaves at 5 m height, to reflect the situation in 25 years);
 - Existing Substation to be retained;
 - Proposed Tangy IV turbines (16 turbines at dimensions as detailed in 1.2.1, as per Figure 5.2);
 - Proposed permanent tracks (existing to be retained and proposed);
 - Proposed reinstatement of existing tracks.
- 1.6.4 The following components of the proposed development are not illustrated in photomontages due to their temporary nature and/or limited potential for permanent significant effects:
- Proposed turbine transformers;
 - Proposed meteorological masts;
 - Proposed substation;
 - Proposed operations building;
 - Proposed temporary tracks;
 - Proposed temporary laydown area;
 - Proposed temporary construction compound; and
 - Proposed temporary borrow pits