HORIZON NUCLEAR POWER

WYLFA NEWYDD

ENERGY WORKING FOR BRITAIN

Wylfa Newydd Project

6.5.23 ES Volume E - Off-Site Power Station Facilities: AECC, ESL and MEEG App E10-5 - Photomontage viewpoints

PINS Reference Number: EN010007

Application Reference Number: 6.5.23

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Regulation Number: 5(2)(a)

Planning Act 2008
Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Horizon Internal DCRM Number: WN0902-JAC-PAC-APP-00100

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1 Introduction

1.1.1 This methodology is intended to provide transparency of the photomontage production process undertaken in accordance with the following core guidance documents:

- *Landscape Institute Advice Note 01-11 Photography and photomontage in landscape and visual impact assessment* [RD1]; and
- *Guidelines for Landscape and Visual Impact Assessment*, Third Edition [RD2].

1.1.2 The approach aligns with the methodologies used for photomontages in the following volumes (with the exception of WNDA Development D10 – (landscape and visual) (Application Reference Number: 6.4.10), (see Appendix D10-8 photomontage views Application Reference Number: 6.4.65) which differs in some minor aspects:

- Park and Ride F10 (landscape and visual) (Application Reference Number: 6.6.10);
- A5025 Off-line Highway Improvements G10 (landscape and visual) (Application Reference Number: 6.7.10); and
- Logistics Centre H10 (landscape and visual) (Application Reference Number: 6.8.10).

1.1.3 The photomontages have been produced for illustrative purposes only, meaning that they have not been used to inform the landscape and visual impact assessment but are provided to sit alongside the chapter for information.

1.1.4 The figures reflect a reasonable 'worst case' based on the best available information at the time of preparation and have been undertaken to show scale and massing of the proposals only (refer to section 2 for further information). The figures show the proposed buildings, internal roads, loading areas and car parking, earthworks, planting and boundary fencing for the Off-site Power Station Facilities identified in chapter E1 (proposed development) (Application Reference Number: 6.5.01). They reflect two scenarios from each viewpoint location:

- operation Year 1 scenario (winter) (viewpoints 7 and 8): with proposed buildings, highways and landscape mitigation at the beginning of the operational stage; and
- operation Year 15 scenario (winter (Viewpoint 8) and summer (viewpoint 7)): with proposed buildings, highways and landscape mitigation blocks following 15 years of establishment.

1.1.5 The locations of photomontages are shown on figure E10-5 Viewpoint locations and visual receptors (Application Reference Number: 6.5.27) which accompanies chapter E10 (Application Reference Number 6.5.10).

2 Assumptions and limitations and modelling work

2.1 Accuracy

2.1.1 Whilst every effort has been made to ensure a suitable level of accuracy was maintained throughout the production of the photomontages, no final image is 100% accurate. Where possible, all design information provided by the landscape architects and engineers has been represented accurately (a list of the core design information used is located in section 4.2 below). Where further work has been required by the modelling team, this has been identified in this section.

2.1.2 The following sections identify the assumptions made, data discrepancies and limitations encountered during the production of photomontages.

2.2 Survey, photography and existing base information

2.2.1 Viewpoint 7 has been illustrated for winter in Year 1 and summer in Year 15 as is standard to represent a worst case in winter Year 1 and to reflect the function of embedded mitigation in summer Year 15.

2.2.2 Due to access restrictions it was only possible to take photographs to represent the winter season for Viewpoint 8. Whilst both operation Year 1 and operation Year 15 scenarios for this viewpoint have been reflected in winter, this has a benefit to enable representation of the schemes' embedded mitigation function in winter.

2.2.3 The following list summarises the accuracy of the base information:

- Handheld Global Positioning System (GPS) surveys are only as accurate as the amount of available satellites at the time of recording, as identified by Ordnance Survey: "*positional accuracy with a single receiver, to civilian users approximately equals 5m to 10m, 95% of the time, and the height accuracy is generally 15m to 20m 95% of the time. Military users receive a more accurate coded signal from the satellite*" [RD3].
- The tolerance of the Satmap Active12 used for this project is between +/- 1m and 4m in horizontal and vertical axes.
- Ordnance Survey 2m contour data used for topography terrain is based on Digital Terrain Modelling generally considered to be accurate to +/- 2m.
- Toposurvey undertaken for the site (supplied as AutoCAD drawings 60PO8049-JAC-MD-MOD-00015 and 60PO8049-JAC-MD-MOD-0001) are accurate up to centimetre level of accuracy.
- The baseline photographs that form the basis of the photomontage are a flattened 2D representation of what the eye would see.

2.3 Modelling assumptions

2.3.1 The following lists summarise the additional modelling work undertaken to the core set of design information.

2.3.2 These were required to inform the final 3D model as agreed for use by the client for the purposes of these photomontages:

General

- Photomontages have been restricted to show the scheme buildings, internal roads, earthworks, fencing and Year 1 planting as wireframe massing in a grey material. Further detailed design development would be undertaken following the grant of Development Consent Order, including architectural treatment for the buildings and selection of materials for all hard landscaping.
- Existing vegetation growth has not been represented due to uncertainty of age, growth rates as well as landowner maintenance regimes.
- Tree and shrub planting for the operation Year 1 scenario has not been modelled. This is to reflect a worst case scenario whereby the smallest plants within the range of proposed planting heights at Year 1 (300mm to 600mm (hedges) and 600mm to 800mm (woodland)) would not be visilble above the shelters.
- Proposed woodland planting growth has been assumed to have reached a maximum of 7m above ground after 15 years as a precautionary estimate based on the exposed conditions prevailing on Anglesey.
- Operation Year 15 planting scenarios in winter for viewpoint 7 and summer for viewpoint 8 have been represented as translucent green blocks to represent mass of planting only.

2.4 Additional modelling work

2.4.1 A list of core design information can be found in section 4.2, Construction of the 3D design models, which sets out the drawing models used in the development of the photomontages.

2.4.2 Additional modelling work undertaken to refine the core design information.

- Buildings: the design freeze 3D model output from the architect's working model was justified against the building footprints shown on the MEEG / AECC / ESL (LLANFAETHLU) Site Masterplan Figure (ref. WN0906-JAC-OS-DRG-00018). This required moving the models to suit and repositioning to match site levels. The following list details the building heights and base height Above Ordnance Datum (AOD) :

- Combined Mobile Emergency Equipment Garage (MEEG) / Alternative Emergency Control Centre (AECC) building: 14m tall at base level approximately 52m AOD.
- Environmental Survey Laboratory (ESL) building: 8m at base level approximately 53m AOD.

2.4.3 The parameter height for the combined MEEG/AECC building is 14m, 1m higher than the modelled height. The ESL is 0.5m lower than the modelled height. These tolerances of up to 1m from the parameter heights are not considered to materially affect the purpose for which the photomontage illustrations have been provided.

- Highways & earthworks: AutoCAD (CAD) polylines taken from the core data drawings and also traced from the MEEG / AECC / ESL (LLANFAETHLU) Site Masterplan Figure, were used to create site boundary, footpaths and road edges and then modelled in to reflect 1 in 3 slope earthworks, tying into the architects' MEEG 3D model data and toposurvey modelled terrain, as well as (where possible), respecting levels identified in the EIA design package.
- Fencing: A 2.4m perimeter fence was modelled based on the fence alignment shown on the MEEG / AECC / ESL (LLANFAETHLU) Site Masterplan Figure overlaid on the existing and proposed terrain model.
- Lighting: Lighting columns were modelled based on the approved specification and located on the model in accordance with positions shown on the lighting Revision 0.5 design drawing. Where a clash was identified between the model and approved design locations, lighting columns were repositioned to logical locations nearby.
- Road markings: none provided therefore none modelled.
- Drainage design: no 3D information was provided for the drainage design apart from an indicative location of a swale on MEEG / AECC / ESL (LLANFAETHLU) Site Masterplan Figure. This was not modelled due to lack of visibility in the photomontage viewpoints.

3 Viewpoint photographic survey

3.1.1 The locations of viewpoints have been selected by the landscape architect to identify the most suitable and representative views of the schemes' structures and/or features as explained in chapter E1 (Application Reference Number: 6.5.01). These locations have been formally agreed with Natural Resources Wales and Isle of Anglesey County Council.

3.1.2 The photographs have been taken to represent the scheme in either winter or summer depending on when access was obtained to the viewpoint locationWinter photographs were taken in March 2016 at a time when weather conditions provided suitable light levels. Summer photography was undertaken in July 2016.

3.1.3 The viewpoint locations were recorded using a handheld GPS and the height of the camera above ground level was also noted. The locations were recorded in Ordnance Survey National Grid co-ordinates to enable viewpoints to be reproduced in AutoCAD relative to the subject of the photomontage, which was also located using Ordnance Survey National Grid co-ordinates in line with *Landscape Institute Advice Note 01-11 photography and photomontage in landscape and visual impact assessment* [RD1].

3.1.4 The baseline photographs have been taken using a Canon EOS 5D Mark II Digital Single Lens Reflex camera with a fixed 50mm lens. All photographs were taken on a tripod levelled to the vertical and horizontal axes, as well as using a high resolution setting for the images.

3.1.5 The panoramic photography was undertaken using a series of photographs taken with a panoramic tripod head set to provide a 60% overlap (15° increments) between frames to reduce barrel distortion. The photographs were captured in landscape mode due to the rural settings of most viewpoints in line with *Landscape Institute Advice Note 01-11 Photography and photomontage in landscape and visual impact assessment* [RD1].

3.1.6 These photographs were then manually stitched together in Adobe Photoshop software to produce a single panoramic image. During this process only minor improvements have been made to the photographs to balance brightness, contrast etc. where necessary. None of the base photographs have been distorted. All survey information as well as other important information has been provided on the viewpoint figures.

3.1.7 Final images were then cropped to a 80° field of view to ensure a suitable image size for a comfortable viewing distance (approximately 27cm from eye) using A3 printed figures.

3.2 Site photography survey data

3.2.1 At each viewpoint location, the following survey data has been collected:

- GPS reference noting the location of the camera;
- date and time photograph was taken;
- the height of the camera above ground level (approximately 1.6m); and

- weather conditions at the time of photograph.

4 Photomontage creation

4.1 Construction of the 3D base model and camera matching

4.1.1 To assist the process of matching the baseline photograph with the 3D base model, reference points were identified at each viewpoint location. Reference points are features within a photograph that can be identified from a topographical survey, Ordnance Survey map and/or aerial photographs. Examples of features include telegraph poles, field boundaries and pylons.

4.1.2 From the baseline panoramic images, single background frames for use in the camera matching process were cropped to match the 4:3 ratio of a 50mm lens image. These frames were then used as backdrops to the equivalent 50mm 3D camera within Autodesk 3DS Max Design software, which is the main 3D modelling software.

4.1.3 The base 3D model (i.e. existing environment and site context) was modelled at a local grid with a common global shift from Ordnance Survey National Grid identified. This was produced using information from topographical surveys and 2D and 3D Ordnance Survey contour information to vertically place reference objects.

4.1.4 In 3DS Max Design software, the locations of the viewpoints were added to the model using the survey data (see section 2 above). The viewpoints were then used as a starting point for fixing the location of the 3D camera by matching terrain, reference points and other information in the model to the corresponding features in the background image (i.e. the 3D camera backdrop).

4.2 Construction of the 3D design models

4.2.1 3D models of the proposals were produced in 3DS Max Design software using the 3D models provided by the engineers, and added to the 3D base model. Environmental lighting in the combined model was configured to match the date, time and lighting conditions as surveyed on site at the time of the photography.

Core design information

Existing site / toposurvey

- 60PO8049-JAC-MD-MOD-00015.dwg
- 60PO8049-JAC-MD-MOD-00016.dwg

Architect's 3D model

- MEEG MODEL 14-04-2017.fbx

Lighting

- 60PO8077-JAC-INF-01001 Revision 0.5.dwg

Masterplan

- MEEG / AECC / ESL (LLANFAETHLU) SITE MASTERPLAN FIGURE (ref. WN0906-JAC-OS-DRG-00018)
- 60PO8049-JAC-LSC-MOD-00005.dwg

Mitigation planting details

4.2.2 All mitigation planting has been modelled in accordance with chapter E1 (Application Reference Number: 6.5.01), section 1.6, Embedded and tertiary mitigation and section 10.4, Design basis and activities, and the Design and Access Statement (Volume 3 - Associated Developments and Off-Site Power Station Facilities) (Application Reference Number: 8.2.3). The planting stock height, growth rates and plant protection elements assumed for modelling purposes are described below:

Operation Year 1

- Native woodland planting: 1.2m tall tree and 600mm tall shrub shelters (both 100mm diameter). No planting has been modelled within these as it is assumed as worst case that the size of plants (between 600 and 800mm) would be at the lower end of the range and therefore not be visible above the shelters). Occasional feathered trees have been modelled as vertical planes 0.8m wide x 1.2m tall;
- Native hedgerow planting – double staggered row of 450mm tall x 40mm diameter spiral guards at 300mm centres (again no plants have been modelled within these to reflect a worst case scenario of lowest of the planting range only (between 300mm and 600mm).

Operation Year 15

- Woodland planting: illustrated by a 7m tall transparent dark green block;
- Native hedgerow planting: illustrated by a 2m wide x 1.5m to 2m tall mid green block (clipped / flailed hedge).

5 Final output

5.1.1 Rendered images were generated from 3DS Max Design software for the final production stage in Adobe Photoshop where they were stitched back together across the panoramic base image.

5.1.2 Background base images were adjusted to reflect any elements and/or vegetation lost due to the scheme proposals, and then any retained foreground elements were layered over the top of the rendered layers.

5.1.3 The final images were then framed in AutoCAD as a sequence of A3 figures, including the existing photograph for direct comparison. For each photomontage viewpoint the following sheets have been provided:

- sheet 1: showing the existing ('baseline') view and an 'after' view for the operation Year 1 scenario, with proposed buildings highways and landscape mitigation at the beginning of the operational stage; and
- sheet 2: showing the existing ('baseline') view and an 'after' view for the operation Year 15 scenario, with proposed buildings, highways and landscape mitigation after fifteen years of establishment.

5.1.4 The figures also include information on the following in accordance with *PINS Advice Note 6: Preparation and submission of application Version 7* [RD4]:

- date and time;
- site conditions when the photography was taken;
- OS National Grid Reference and elevation;
- camera specifications;
- location plan;
- core design data used for production of proposals; and
- key notes on use such as details on a comfortable viewing distance from the eye.

5.1.5 The locations for the photomontage viewpoints are shown on insert plans as well as figure 60PO8077_DCO_VOL_E_10_05 (Viewpoint locations and visual receptors) as well as figure E10-5, viewpoint locations and visual receptors (Application Reference Number: 6.5.27), which accompanies chapter E10 (Application Reference Number: 6.5.10).

5.1.6 .

6 References

Table 6-1 Schedule of references

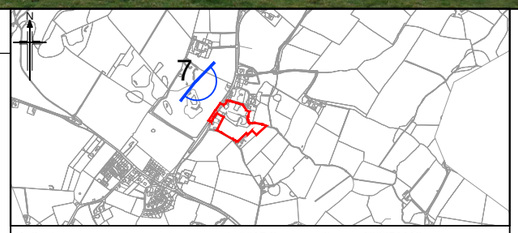
ID	Reference
RD1	Landscape Institute. 2011. *Photography and photomontage in landscape and visual impact assessment (Landscape Institute Advice Note 01/11)* [Online]. [Accessed: November 2016] Available from: https://www.landscapeinstitute.org/PDF/Contribute/LIPhotographyAdviceNote01-11.pdf.
RD2	Landscape Institute and Institute of Environmental Management and Assessment. 2013. *Guidelines for Landscape and Visual Impact Assessment.* Third Edition. Oxon: Routledge.
RD3	Ordnance Survey. *Beginner's guide to GPS*. [Online]. [Accessed: 28 March 2017]. Available from: https://www.ordnancesurvey.co.uk/business-and-government/help-and-support/navigation-technology/gps-beginners-guide.html.
RD4	The Planning Inspectorate. 2016. Advice Note 6: Preparation and submission of application documents [Accessed: July 2017]. Available from https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2015/05/Advice-note-6-version-71.pdf.

EXISTING VIEW - WINTER

PHOTOMONTAGE - OPERATION YEAR 1 (WINTER)

VIEWPOINT NO 7: View from footpath south of the MEEG in AONB

Date of photograph: 22.3.16
Time of photograph: 10:20
Lighting conditions: Clear, cloudy
OS grid reference: 231541, 387360
Viewpoint ground elevation: 64m
Camera height above ground level: 1.6m
Camera type: Canon EOS 5D MARK II
Camera lens size: 50mm
Aperture: f.9
ISO: 200
Shutter speed: 1/250
Included angle of photograph: 80°



Notes
1. Photomontage is to be used for illustrative purposes only.
2. Refer to the photomontage methodology within this appendix.
3. Viewpoints surveyed using handheld GPS unit.
4. Images (as printed on A3 sheet) are to be viewed at approximately 27cm from the eye.
5. Existing vegetation growth has not been represented due to uncertainty of both species, growth rates / age and also land owners maintenance regimes.

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing title: OFF-SITE POWER STATION FACILITIES
PHOTOMONTAGE VIEWPOINT NO.7 (OPENING YEAR)

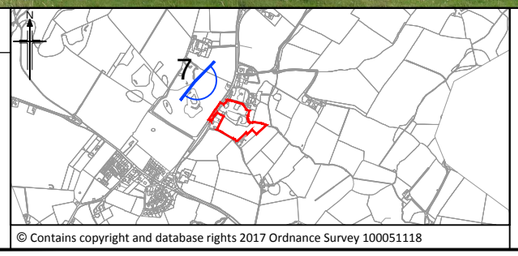
Scale @ A3	AS SHOWN	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.	-	
Drawing No.	60PO8077_DCO_VOL_E_APP_10_05_01	

EXISTING VIEW - SUMMER

PHOTOMONTAGE - OPERATION YEAR 15 (SUMMER)

VIEWPOINT NO 7: View from footpath south of the MEEG in AONB

Date of photograph: 26.7.16
Time of photograph: 16:35
Lighting conditions: Clear, cloudy
OS grid reference: 231542, 387357
Viewpoint ground elevation: 64m
Camera height above ground level: 1.6m
Camera type: Canon EOS 5D MARK II
Camera lens size: 50mm
Aperture: f.9
ISO: 200
Shutter speed: 1/400
Included angle of photograph: 80°



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2. Refer to the photomontage methodology within this appendix.
3. Viewpoints surveyed using handheld GPS unit.
4. Images (as printed on A3 sheet) are to be viewed at approximately 27cm from the eye.
5. Existing vegetation growth has not been represented due to uncertainty of both species, growth rates / age and also land owners maintenance regimes.
6. Graphical representations of year 1 and year 15 scenarios have been undertaken using transparent green blocks to represent mitigation / landscape planting.

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing title: OFF-SITE POWER STATION FACILITIES
PHOTOMONTAGE VIEWPOINT NO.7 (YEAR 15)

Scale @ A3	AS SHOWN	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.	-	

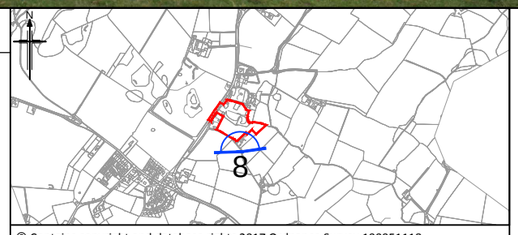
Drawing No.: 60PO8077_DCO_VOL_E_APP_10_05_02

EXISTING VIEW - WINTER

PHOTOMONTAGE - OPERATION YEAR 1 (WINTER)

VIEWPOINT NO 8: View from footpath south of the MEEG

Date of photograph: 22.3.16
Time of photograph: 10:04
Lighting conditions: Clear, cloudy
OS grid reference: 231760, 386994
Viewpoint ground elevation: 58m
Camera height above ground level: 1.6m
Camera type: Canon EOS 5D MARK II
Camera lens size: 50mm
Aperture: f.9
ISO: 200
Shutter speed: 1/250
Included angle of photograph: 80°



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3. Viewpoints surveyed using handheld GPS unit.
4. Images (as printed on A3 sheet) are to be viewed at approximately 27cm from the eye.
5. Existing vegetation growth has not been represented due to uncertainty of both species, growth rates / age and also land owners maintenance regimes.

Rev.	Date	Purpose of revision	Drawn	Check'd	Rev'd	Appr'd
1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing title: OFF-SITE POWER STATION FACILITIES
PHOTOMONTAGE VIEWPOINT NO.8 (OPENING YEAR)

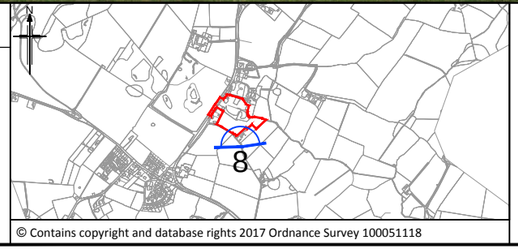
Scale @ A3	AS SHOWN	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.	-	
Drawing No.	60PO8077_DCO_VOL_E_APP_10_05_03	

EXISTING VIEW - WINTER

PHOTOMONTAGE - OPERATION YEAR 15 (WINTER)

VIEWPOINT NO 8: View from footpath south of the MEEG

Date of photograph: 22.3.16
Time of photograph: 10:04
Lighting conditions: Clear, cloudy
OS grid reference: 231760, 386994
Viewpoint ground elevation: 58m
Camera height above ground level: 1.6m
Camera type: Canon EOS 5D MARK II
Camera lens size: 50mm
Aperture: f.9
ISO: 200
Shutter speed: 1/250
Included angle of photograph: 80°



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6. Graphical representations of year 1 and year 15 scenarios have been undertaken using transparent green blocks to represent mitigation / landscape planting.

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1.0	MAR 18	DCO submission	HNPWL	HNPWL	HNPWL	HNPWL

Client: HORIZON NUCLEAR POWER

Project: WYLFA NEWYDD PROJECT
ENVIRONMENTAL STATEMENT

Drawing title: OFF-SITE POWER STATION FACILITIES
PHOTOMONTAGE VIEWPOINT NO.8 (YEAR 15)

Scale @ A3	AS SHOWN	DO NOT SCALE
Jacobs No.	60PO8077	
Client No.	-	

Drawing No.: 60PO8077_DCO_VOL_E_APP_10_05_04