BEFORE THE HEARINGS COMMISSIONERS
AT PALMERSTON NORTH

IN THE MATTER	of the Resource Management Act 1991
AND	
IN THE MATTER	of an application by NZ Windfarms Limited for landuse, stormwater discharge and contaminants discharge consents required to establish the proposed Te Rere Hau Eastern Extension
BETWEEN	**NZ Windfarms Limited**
	Applicant
AND	**Horizon Regional Council**
AND	**Tararua District Council**
	Consent Authorities
AND	**Submitters on the application**
	Submitters

Statement of Evidence of Emma Claire Pollard

Introduction

Qualifications and experience

1. My name is Emma Claire Pollard. I am the Managing Director and 3D Modeller of the firm Morgan & Pollard Visual Limited (**Morgan & Pollard Visual**). The company specialises in computer simulation.

2. The following statement of evidence summarises my qualifications, and experience in the production of survey accurate photo simulations and outlines the techniques that are used to produce them.

3. I have been engaged in the field of 3D visualisation for a total of 8 years. I hold a diploma in Computer Aided Design from Christchurch Polytechnic in 2000. After finishing my diploma; I then went on to work for Truescape Limited for 3 years, as a 3D modeller. I then left their employ to form my own company Morgan & Pollard Visual at the beginning of 2004. Many of the simulations we have generated have been used as evidence for resource consent and Environment Court purposes.

4. Whilst I have worked on and overseen the production of the photo simulations, at Morgan & Pollard Visual we have a team approach; our staff are all formally qualified and have extensively trained in 3D modelling and the production of photo simulations.

5. Our experience includes working with Planners, Engineers, Surveyors, Architects, Landscape Architects and Interior Designers. We use photo simulations through to full computer generated 3D video simulations to illustrate the concept of any proposed development. All of which are to virtual scale and location as would be viewed in the real world.

Scope of work

6. My company was commissioned by NZ Windfarms Ltd to provide a 3D virtual model of the proposed Te Rere Hau Windfarm eastern extension (**TRHE**). Photo simulations have been produced from the 3D model for the purpose of assisting in the assessment of the visual impacts of the proposal.

Methods

7. The methods used to illustrate the proposed development are:

- 12 x Photo Simulations - with 50mm lens from the selected viewpoints. (1-10 have been surveyed by Kevin O'Connor & Associates Ltd, 1a and 4a were surveyed with handheld GPS).

- 12 x Digital Terrain Model (**DTM**) Simulations - A3 from the same positions as the photo simulations; and

- 4 x Digital Terrain Model Simulations – A3 from additional positions.

Source of information

8. Survey data including 20, 10 and 2 metre landform data, road design, turbine design and colour, turbine locations and levels were supplied by NZ Windfarms Ltd and their various consultants.

9. The Windflow turbine model was supplied in 3D by NZ Windfarms Ltd.

10. The turbines blade direction for each photo point was set at 275 degrees as per NZ Windfarms Ltd instructions.

11. All the position and reference co-ordinates for the photo simulations 1-10 were located by using survey data collected by Kevin O'Connor & Associates Ltd.

12. Positions of 1a, 4a, 2a, 2b, 4b, 4c were obtained from hand held GPS positions.

13. All photographs for the photo simulations were taken by Mr Jason Blair. A digital 5D full frame 35mm Cannon SLR camera with a stock 50mm lens was used to take all the photographs. A 50mm lens is the current standard accepted by the Court.

Photo simulations and Digital terrain model simulations

14. The ten photo simulations and digital terrain model simulations as surveyed by Kevin O'Connor & Associates Ltd are as follows:

- Photo simulation 1: Troup Road on outskirts of Woodville, at 3:07pm on 20th November 2007;
- Photo simulation 2: Entrance to 43 Kaitawa - Tiraumea Rd, Pahiatua at 4:03pm on 20th November 2007;
- Photo simulation 3: Pahiatua - Mangahao Road beneath cliffs on zig-zag portion of road at 4:48pm on 20th November 2007;
- Photo simulation 4: Northern edge of the village of Balance at 2:12pm on 20th November 2007;
- Photo simulation 5: Junction of North Range Road and Pahiatua Road at 1:36pm on 20th November 2007;
- Photo simulation 6: 24-26 Ridgeview Road at 1:06pm on 20th November 2007;
- Photo simulation 7: Verge outside 57 Pahiatua - Aokautere Road at 12:37pm on 20th November 2007;
- Photo simulation 8: Verge outside 18 Branksome Place off Polson Hill Drive at 12:08pm on 20th November 2007;
- Photo simulation 9: Pacific Drive, Pacific Heights Subdivision off Aokautere Drive at 11:46am on 20th November 2007; and
- Photo simulation 10: Junction of James Line and Napier Road (SH3) at 10:58am on 20th November 2007.

15. The two photo simulations and digital terrain model simulations as surveyed by hand held GPS are as follows:

- Photo simulation 1a: Ngawapurua Bridge, State Highway 2 at 12:50pm on 21st September 2009; and

- Photo simulation 4a: Ballance Valley Road at 11:23am on 21st September 2009.

16. The four additional digital terrain model simulations surveyed by hand held GPS are as follows:

- Digital terrain model simulations 2a: Pahiatua - Dawson Street;

- Digital terrain model simulations 2b: Pahiatua - Tararua College Sports Oval;

- Digital terrain model simulations 4b: Ballance Valley Road; and

- Digital terrain model simulations 4c: Ballance Valley Road.

17. All of the above simulations (photo and DTM) are included in the Graphic Attachment to Mr Rough's evidence.

Methodology for Preparation of Photo Simulations

18. The main objective of a photo simulation is to provide an image that, as realistically as possible, conveys the modification or change of a proposed activity. The most appropriate technical methodology has been applied to ensure the accuracy of what is depicted, in terms of its relative position, elevation, scale, and appearance. Photo simulations can never replace the real experience of being at a location, but they are a useful tool to assist in the decision making process.

19. To achieve a photo simulation, a 3D model is rendered into a series of 2-dimensional photographs.

20. Mr Peter Rough from Peter Rough Landscape Architects Limited chose the photo point positions and Mr Jason Blair from Morgan & Pollard Visual took

the relevant panoramic photos from the designated positions as described above.

21. A surveyor from Kevin O'Connor & Associates Ltd then survey marked the positions of the camera and reference points for photo points 1-10.

22. The photos were then colour matched to ensure consistency throughout the image and manually stitched together to form a photo panoramic.

23. To create the 3D model my firm firstly imported the digital landform data that was supplied by NZ Windfarms Ltd. Within the 3D software – 3D Studio Max, my firm then created a digital terrain model with the contour data supplied.

24. The turbine model supplied (see Figure 1 below) was then imported into the scene and populated to the exact specifications including positions and elevations. The specified colour "Jungle Mist" and texture were included to add realism.

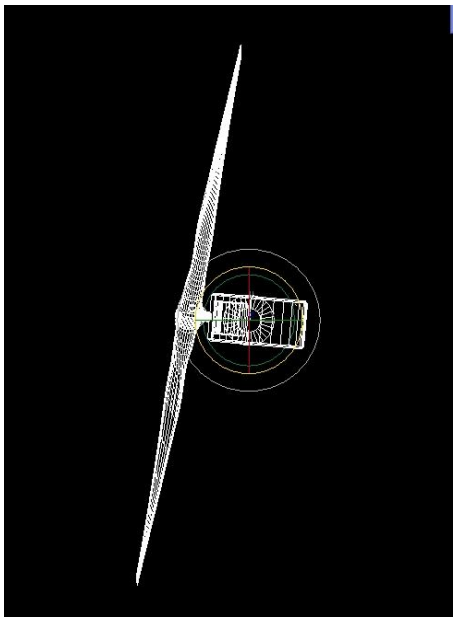

Figure 1: Turbine Model Data

25. Access roads were then formed and cut into the digital terrain model from the data supplied and a texture was applied to add realism.

26. A series of 3D computer cameras within the simulation software were then created. They were positioned accurately to the corresponding survey

marked photo position from which the photos where taken. The camera used depicts a real world camera, including matching the focal length of the 50mm lens.

27. Markers were then positioned at the reference point co-ordinates. To duplicate the view through the real world camera, it was necessary to match the reference markers and landform data to their respective physical objects in the photo - thus ensuring an accurate horizontal and vertical alignment. In general the reference points may consist of existing ground features in the environment such as power poles, light stands, signs, fence posts and/or prominent trees. The reference points were also required to be of varying heights and varying distances to the camera.

28. A sunlight system was then created which uses light in a system that follows the geographically correct angle and movement of the sun over the earth at a given location. Location, date, time, and compass orientation are also able to be chosen. This system is suitable for shadow studies of proposed and existing structures. The simulations my firm prepared, depict the proposed THRE at the same, time and date as specified in point 15, and are simulated to resemble the natural lighting.

29. Within the 3D software, the new image was then rendered containing the accurately positioned 3D model over top of the original photograph.

30. Vegetation in the foreground was overlaid using photo-editing software and was then checked against aerial photography from the site to ensure correct placement.

31. Viewing scale for the photo simulations is 50cm from the eye when printed at large scale by Morgan & Pollard Visual (refer to Figure 2 below).

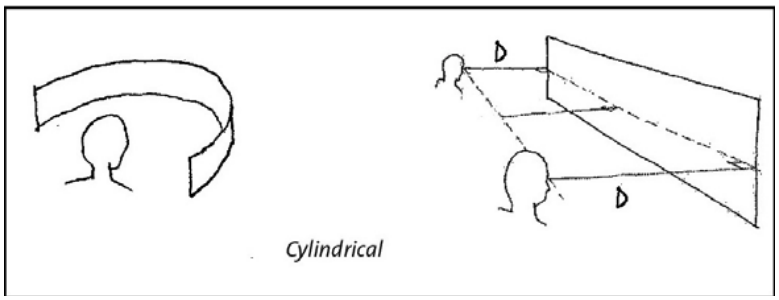

Figure 2: Viewing Scale for Photo Simulations

Methodology for Preparation of Digital Terrain Model Simulations

32. DTM simulations are generated from using the same terrain model as for the photo simulations. The simulations are an indicative representation based on land form only. The do not include real life objects such as dwellings and existing vegetation.

33. DTM simulations 1-10, 1a and 4a are a cropped portion of the photo simulations.

34. DTM simulations 2a, 2b, 4b, 4c are additional positions. For ease of location identification the original photo has been included at the top of the simulation as a reference, and below the simulation is the enlarged DTM simulation.

35. All DTM simulations are at A3 size and are cropped to only include the subject site. They are not to any particular scale or viewing distance.

Conclusions

36. I, Emma Claire Pollard, consider the photo simulations to be an accurate impression of the proposed TRHE created from the data provided.

37. I consider the DTM simulations to be an indicative representation of the subject site on bare landform.

Emma Claire Pollard

2 October 2009