

Attachment 5.2

Community Consultation Session Posters

Proposed Keyneton Wind Farm

The proposed wind farm site is located on the Mount Lofty Ranges approximately 8km west of Sedan, 5km north west of Cambrai, 12km south east of Angaston, 4km east of Keyneton and 7km north east of Eden Valley. The site runs approximately 16km north to south. The wind farm will consist of up to 57 wind turbines and a maximum capacity of approximately 130MW.

The total site area is approximately 5,256 hectares, however less than 40 hectares of land would be used in the final development footprint.

The site has been selected by Pacific Hydro due to it's:

- Strong, consistent winds
- Proximity and access to the National Electricity Grid: (Transmission line crosses the site)
- Existing land practices which can co-exist with the turbines
- Site characteristics elevation and suitable terrain
- Good access from the public road network

The wind farm will generate significant environmental, economic and social benefits. At its maximum size of 130MW these would include:

- **Greenhouse abatement** – Avoiding approximately 359,000 tonnes of greenhouse gas emissions every year.
- **Clean energy** – producing enough electricity to power the equivalent of around 51,000 homes every year.
- **Jobs** – generates hundreds of job opportunities during its construction phase, for example our 57MW Clements Gap Wind Farm employed over 400 South Australians during its 12 month construction phase. Pacific Hydro aims to use local content where ever practicable.
- **Limited footprint** – The permanent works will occupy less than 1% of the host property, ensuring current farming practices can continue.
- **Water savings** – A similar amount of electricity produced by a coal-fired power station would use up to 698,000 megalitres of clean drinking water each year (the equivalent requirements of around 3 million households).
- **Community benefits** – Pacific Hydro aims to be an active member of the community, by supporting local activities at all of our wind farm sites. Once a project is operational a portion of its revenue is given to local community organisations through our Sustainable Communities Fund each year as part of our community relations program.



Overall Wind Farm Design

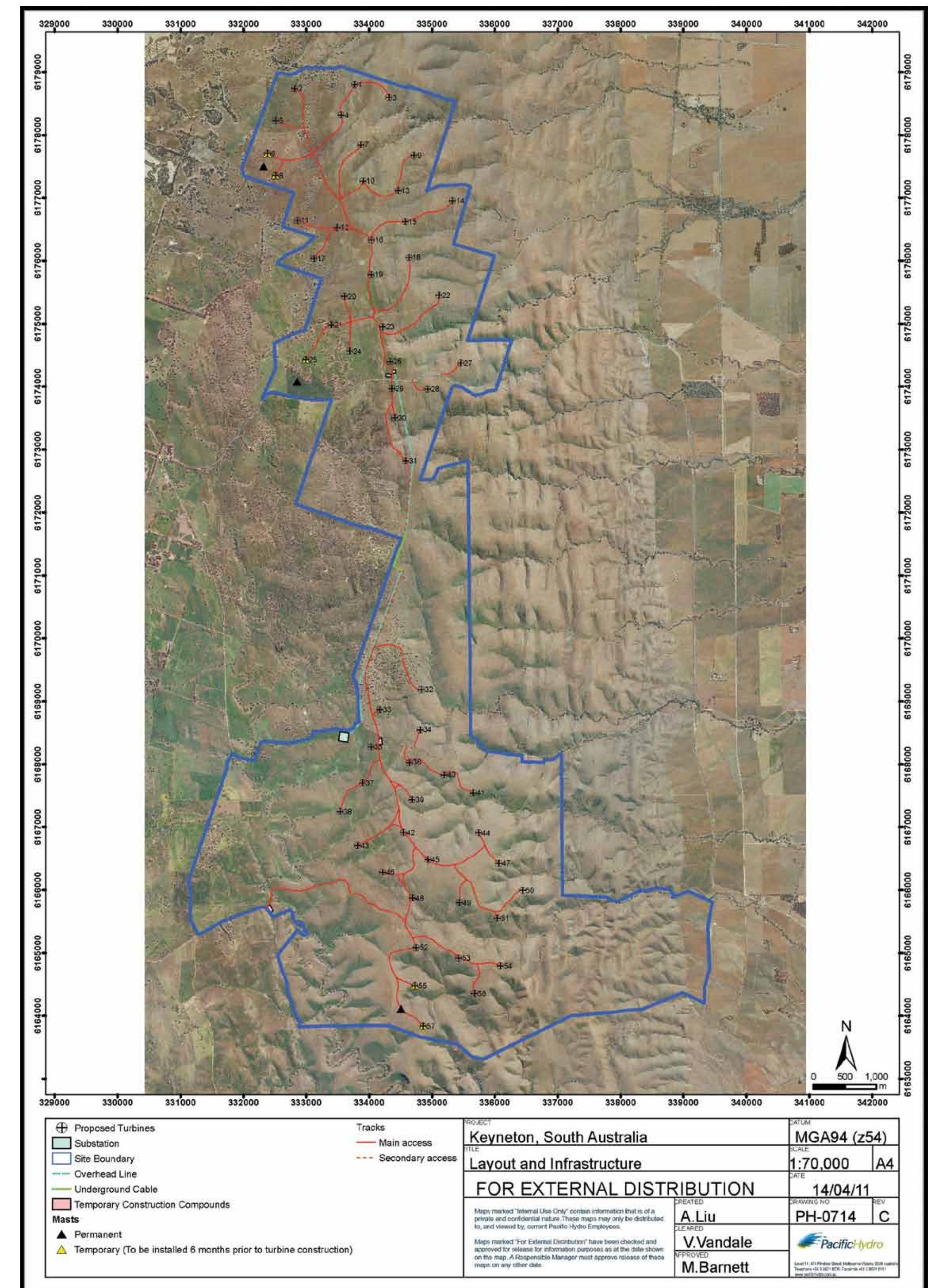
The Development Application will be for a wind farm comprising a maximum of 57 turbines.

The layout shown here is based on the preferred design with respect to the topography, wind speeds, local resident's views and environmental considerations. Some changes to this indicative layout may occur following completion of environmental studies however these changes (if any) are expected to be minor.

The proposal comprises the following key components:

- Up to 57 turbines across two (2) clusters (with 31 in the north and 26 in the south);
- Turbines will have a maximum tip height of 145.5m (i.e. hub height of 95m and blade length of 50.5m);
- Approximately 5.5km of overhead line (either 33kV or 66kV) connecting the two (2) sub-stations;
- One main sub-station, which connects to the existing 275kV transmission line (running through the site) and a secondary sub-station;
- Associated infrastructure including access tracks, turbine hardstands, electrical transformers and underground cabling;
- Up to three (3) permanent meteorological masts situated within the wind farm and up to five (5) temporary meteorological masts; and
- Three (3) temporary construction compounds for use during construction of approximately 50m x 50m (including site office, car parks, concrete batching plant, turbine lay-down and storage).

Right: Indicative wind farm layout and infrastructure



Turbine Layout Evolution

Consultation plays an important role in the development of our projects. The following information provides some information about the evolution of the design to date.

Design changes

Following initial technical assessment a provisional turbine layout was produced in May 2009. Since then on-going consultation with the local community, statutory agencies and other local and regional organisations has resulted in the following modifications to the turbine layout:

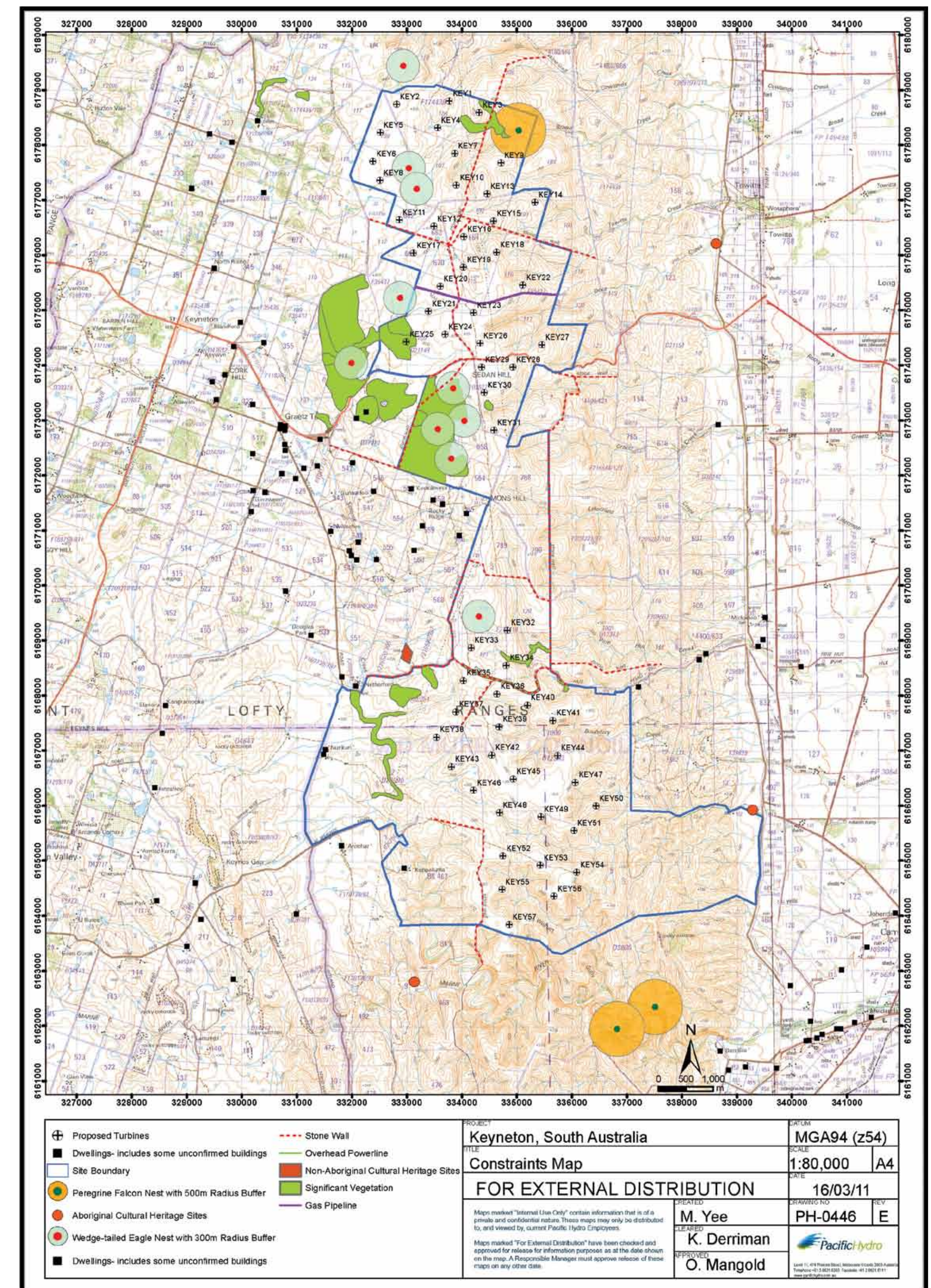
- Deletion of three turbines from the central part of the site
- Relocation of two turbines from the central part of the site
- A separation of over 1.5km between turbines and the nearest non stakeholder residential properties
- A buffer of 150m maintained between turbines and the existing 275kV transmission line
- A buffer of 50m between turbines and the high pressure gas main

Design criteria

The turbine layout has been also designed considering the following criteria:

- Areas of native vegetation of conservation significance have been predominately avoided
- A buffer of 300m between turbine locations and Wedge-tailed Eagle nests
- A buffers of 500m between turbine locations and Peregrine Falcon nests
- The turbine and access track layout designed to minimise impacts on the dry-stone walls that traverse the site
- Natural drainage lines or areas subject to inundation will be avoided wherever possible

Right: Identified areas of constraint



Development Application Process

Pacific Hydro is currently preparing a Development Application for the Keyneton Wind Farm to be submitted to the Development Assessment Commission (DAC). The project has been defined as *public infrastructure* and will be considered under section 49 of the *Development Act 1993*.

DAC is an independent statutory body, who will conduct the assessment of the application, invite submissions, conduct hearings and make recommendations to Minister of Urban Development, Planning and the City of Adelaide. The Minister will determine the application.

During the assessment it is expected that the DAC will consult and seek comment from:

- Mid Murray Council
- Barossa Council
- The Department for Transport, Energy and Infrastructure
- Environmental Protection Agency
- Department For Environment and Natural Resources
- SA Murray-Darling Basin Natural Resources Management Board
- General public

Submissions

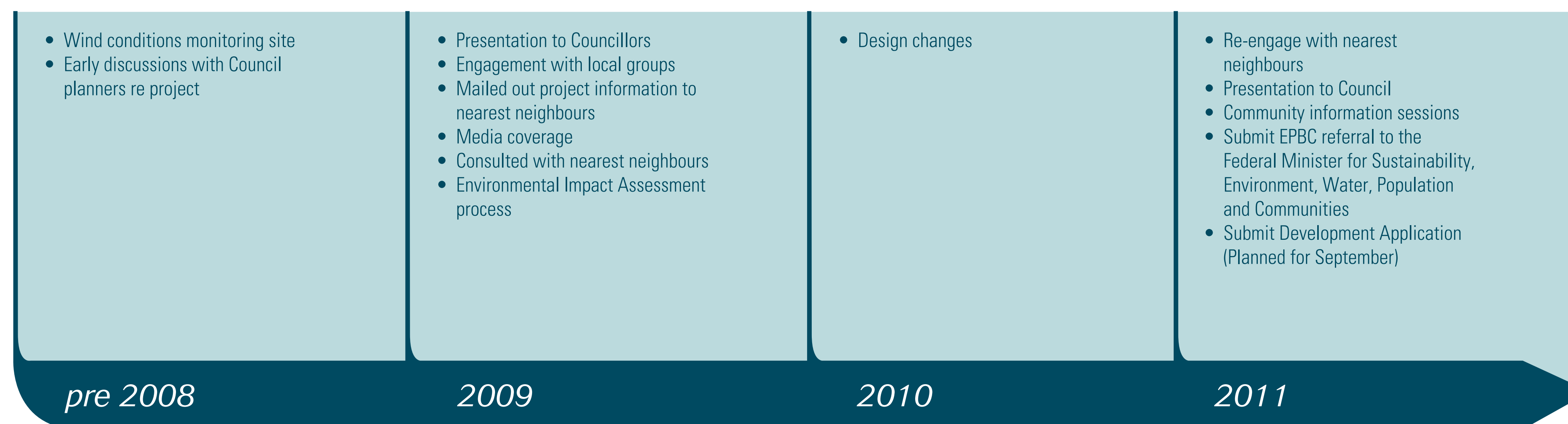
Once the application is submitted, the DAC will place notices in local papers to advise that submissions are sought. A period of fifteen business days is provided for written comments from the date of notification. Written representations must be received by the close date indicated by the DAC and can either be posted, hand-delivered, faxed or emailed to the Development Assessment Commission.

Pacific Hydro is happy to assist community members writing to make a submission.

Consultation

Pacific Hydro has had on-going consultation with a range of agencies, government bodies, community and environmental groups and the local community since 2009. As a result of feedback a number of changes have been made to the proposed development.

Timeline of Activities:

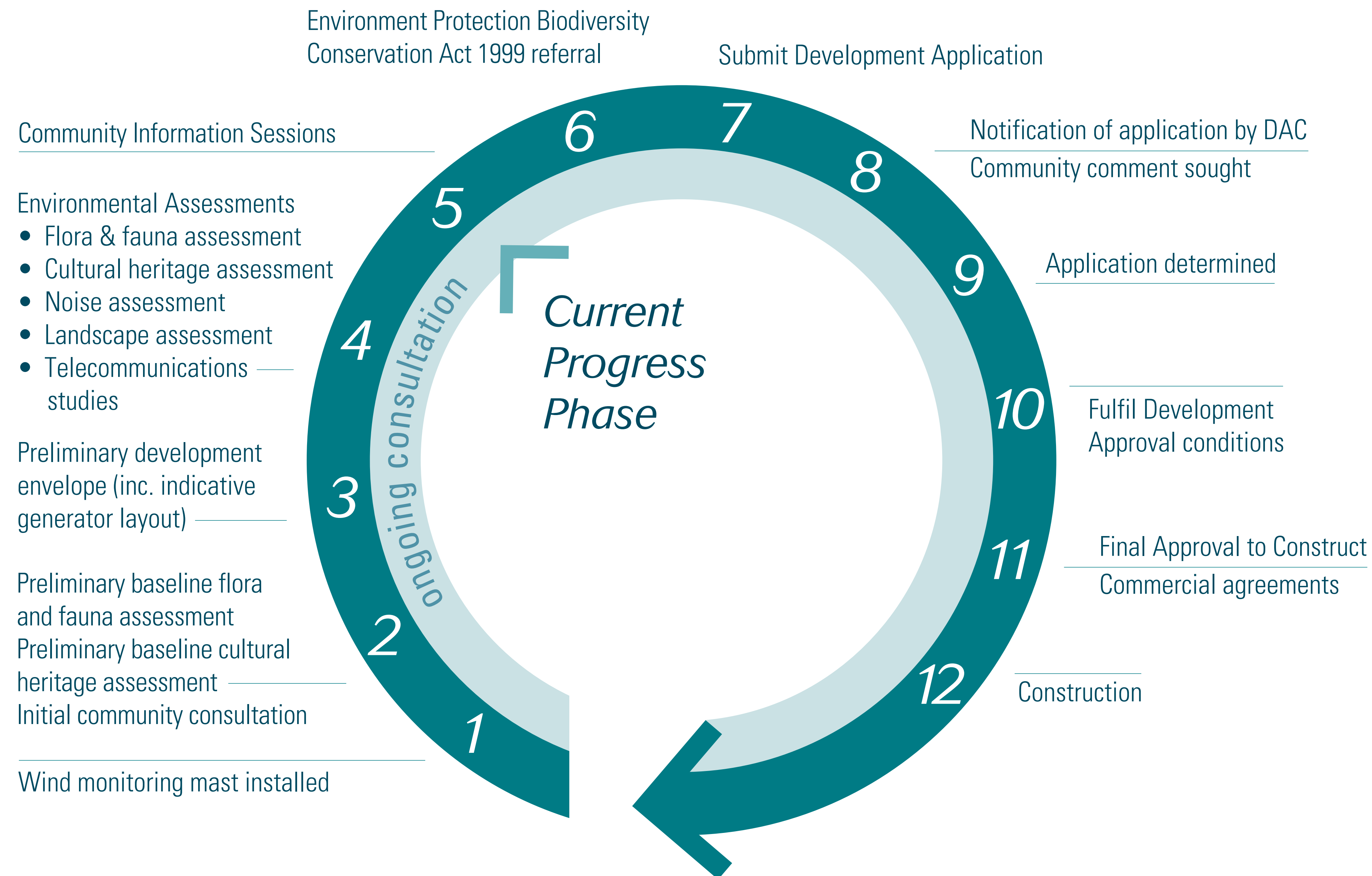


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Keyneton Wind Farm Development Steps

The diagram below demonstrates the typical steps involved in developing a wind farm project:



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Environmental Assessments

The Development Application will include detailed information on the proposed project as well as an assessment of potential environmental impacts associated with the development. Pacific Hydro has engaged a number of expert consultants to carry out studies to identify potential environmental impacts and subsequently mitigation or management options. A list of the assessments carried out and consultants used is provided below:

- Native Vegetation – EBS Ecology
- Birds and bats – EBS Ecology
- Cultural heritage – Australian Cultural Heritage Management Pty Ltd
- Landscape and Visual Assessment – Wax Design
- Noise – VIPAC
- Telecommunications
- Aviation

Further information about the assessments is available on subsequent posters.



View south from Angaston-Sedan Road



View north of the site from Pine Hut Road



View within the site, to north of Angaston-Sedan Road (with existing met mast centre shot)

Native Vegetation

Land use

The site is currently used for agriculture (predominantly grazing areas for sheep). The majority of the site is within cleared agriculture land.

Surveys

EBS Ecology undertook vegetation surveys in November 2008 and November 2009 to:

- Established the extent and quality of existing native vegetation
- Determine the potential for the proposal to impact on any species of “conservation significance”
- Identity and map the extent of all Ecological Vegetation Associations on site.

The baseline data gathered has been used to inform the turbine layout.

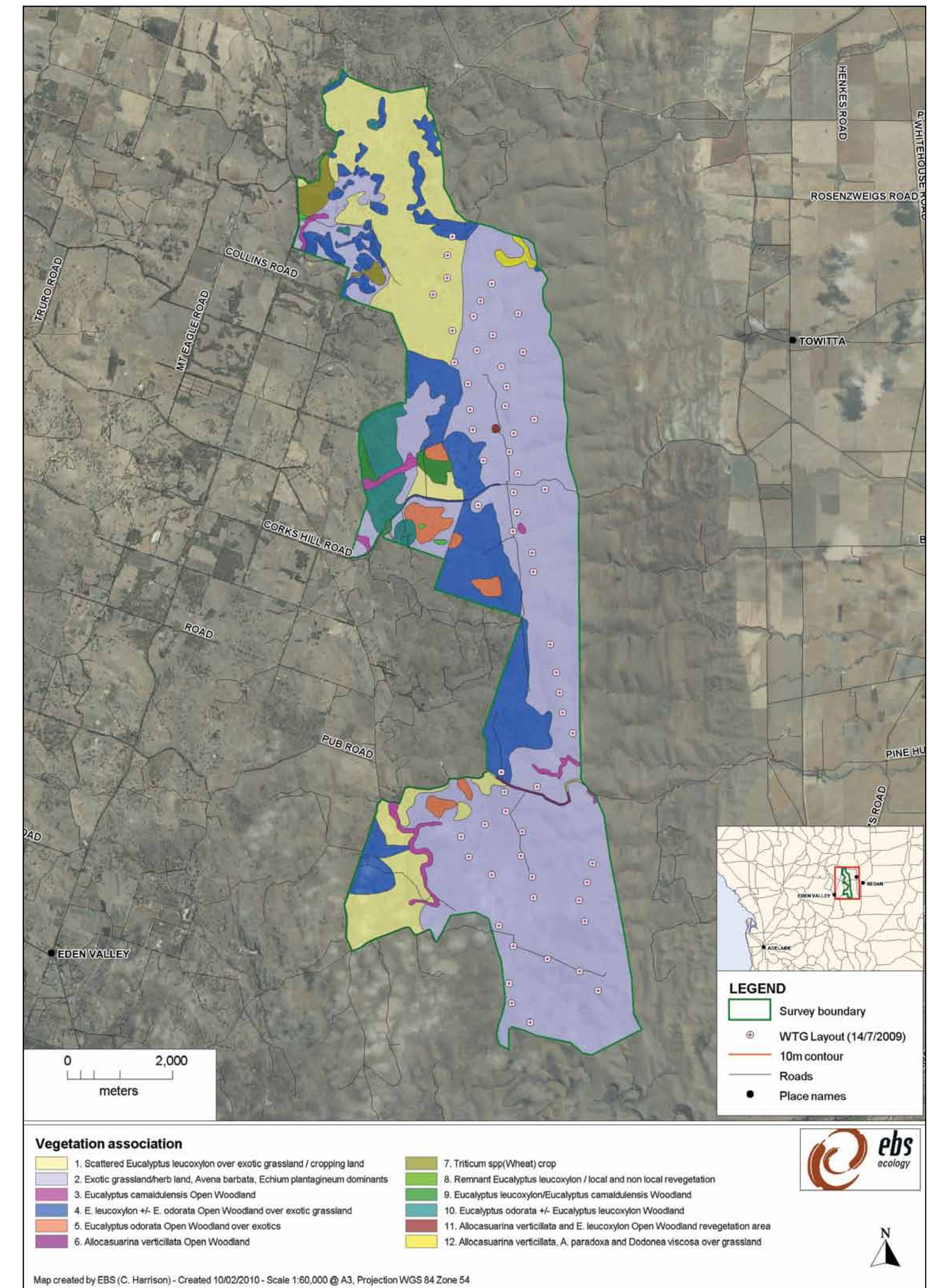
Findings

As a result of the surveys it was established that:

- No vegetation species of National Significance occurred on site
- A State significant listed species *Anogramma leptophylla* (annual fern) occurred within Ecological Vegetation Association 12: Open grassy Woodland with a tree canopy of Drooping Sheoak
- Exotic grasslands / herb lands dominate the site and occur over a greater extent than all the other Ecological Vegetation Associations found on site
- Twelve Ecological Vegetation Associations were found to occur on the site; eight were assessed as very poor in condition and four ranged from very poor to poor in condition due to previous land practices.
- Blue Gum, Drooping Sheoak, River Red Gums and Peppermint Box are the main native trees that remain on site

Mitigation

Significant areas of vegetation having either high remnant value, high fauna habitat value or containing species or communities of conservation significance have been identified (see the Turbine Layout poster). This mapping has in turn allowed the turbine layout to be modified in order to avoid and minimise impacts on these areas of vegetation. The State significant listed species *Anogramma leptophylla* is limited to a gorge in the north east of the site in an area which is isolated and inaccessible for development it will therefore not be impacted.



Right: Extent of ecological flora associations found on the site

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Birds and Bats

Surveys

EBS Ecology conducted a number of Bird Utilisation and Raptor Nest surveys between late 2008 and 2010 to assess the type and numbers of bird species that utilise the site and determine if any raptors actively use the site for breeding purposes. These surveys were carried out in:

- September / October 2008
- June 2009
- September 2009
- December 2010

These surveys were conducted across areas that were readily accessible, provided a good view of the surrounding area, and represented a range of habitats across the study area.

Summer Bat surveys were also conducted in:

- November 2009
- January 2010
- December 2010

Findings

The surveys found:

- No bird species of National Conservation Significance were identified on site
- Three State listed bird species (Peregrine Falcon, Elegant Parrot and White-Winged Chough)
- No bat species of National or State Conservation Significance were identified on site

Mitigation

A number of measures will be adopted to avoid and minimise potential impacts on local bird and bat species, such as:

- Avoiding impacts on native vegetation with conservation significance
- Maintaining buffer distances around Wedge-tailed Eagle nest sites (300m)
- Maintaining a suitable buffer distances around Peregrine Falcon nest sites (500m)
- Avoiding development in areas of highest bat activity (e.g. near open water, woodlands area)



Above: Wedge-tailed Eagle



Above: Gould's Wattled bat Source: B.G. Thomson

Cultural Heritage

Aboriginal Cultural Heritage

Cultural heritage consultants, Australian Cultural Heritage Management Pty Ltd (ACHM), were engaged in 2009 to identify any significant Aboriginal and European archaeological, anthropological or historical values within the site.

The site is located within Peramangk country which can be generally described as the area located in the Mount Lofty Ranges from Myponga north to Gawler and Angaston, east to Wright Hill, Strathalbyn, Kanmantoo and along the range's eastern scarp to Towitta. Peramangk are represented by the Mannum Aboriginal Community Association Incorporated (MACAI).

ACHM carried out a desktop survey of relevant heritage registers and found no Aboriginal sites or non-Aboriginal cultural heritage sites within the wind farm site. However numerous Aboriginal sites have been identified within the greater area and landscape features such as ridgelines, waterways and drainage lines which occur within the site are often culturally sensitive areas. ACHM and MACAI representatives will work together to identify any Aboriginal sites or values that may exist on site in order to protect them during construction.

Pacific Hydro will continue to work with ACHM and MACAI to prepare a Cultural Heritage Management Plan. The Management Plan will ensure any Aboriginal cultural heritage sites found on site will be properly managed and protected.

Non-Aboriginal Heritage

No registered non-Aboriginal/ European heritage sites were found during the desktop investigations; however dry-stone walls are prominent features within the site and wider area. ACHM will provide further advice of the significance of these dry-stone walls. In order to facilitate access to and across the site, some existing entry points to site will require widening, however, the proposed access tracks have been designed to minimise impacts on the dry-stone walls and post construction restoration will be undertaken if required.

Pacific Hydro will be consulting with the Dry Stone Walls Association of Australia (DSWAA) prior to the Development Application to discuss appropriate protection and restoration measures.

If you know of any locally significant heritage or areas of significance please speak with a Pacific Hydro representative.



Dry stone walls- Pine Hut Road

Landscape and Visual Assessment

Significant Component of the Landscape

The proposed wind farm is situated within a highly modified agricultural landscape, along the Mount Lofty Ranges, which form a ridge line rising from the flat agricultural land of the Murray Plains to the east of the site. To the west, the topography of the Eden and Barossa Valleys is more undulating and many mature eucalypts remain, particularly along roadsides. These large mature eucalypts, particularly South Australian Blue Gums, are a significant component of the landscape character to the west of the site.

Survey

A Landscape and Visual Assessment (LVA) is being carried out by Wax Design. The LVA will consider the change in the landscape resulting from the wind farm and the degree of visual change from a range of representative viewpoints. A Zone of Theoretical Visual Influence (ZTVI) and a series of photomontages (computer generated visualisation depicting how the wind farm is likely to look in the landscape) will be prepared for use within the assessment.

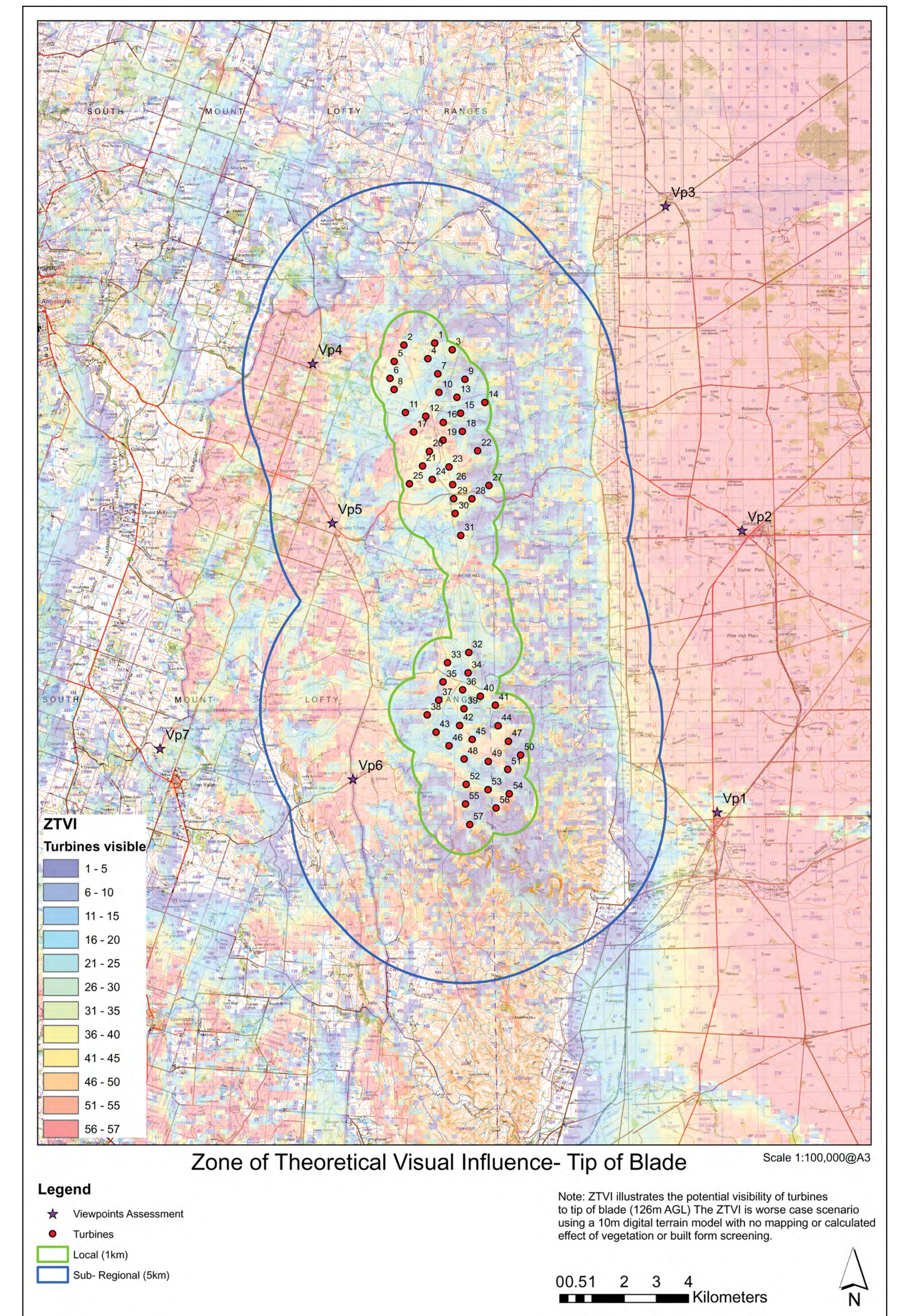
Photomontages

Based on the ZTVI and in consultation with Mid-Murray and Barossa Councils, representative viewpoints were selected from which photomontages have been created.

The photomontages represent a range of anticipated views from public vantage points around the site and the range of different landscape characters which occur around the site

The series of photomontages provided here today aim to give the viewer an understanding of what the development will look like once built.

Please inform the staff present here today if you know of any other areas of local interest or significance near the site which should be included in the assessment.



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Noise

Wind farms do emit some noise, however Australian wind farms are required to meet strict criteria which restrict noise to relatively low levels compared to other sources (see Table). Whether you will be able to hear a wind farm depends on factors such as wind speed, wind direction, the distance from the wind farm and the amount of noise from other sources such as wind generated background noise (rustling leaves and wind moving around buildings) and road traffic. You are more likely to hear a nearby operating wind farm when the wind direction is blowing from the turbines towards you or your dwelling. However it is likely that this would only occur for a limited period of time during certain wind speeds and direction.

Assessment

An assessment of potential noise impacts from the operation of the wind turbines is currently being undertaken by VIPAC Engineers and Scientists in line with the SA EPA guidelines: *Wind Farms Environmental Noise Guidelines* (July 2009).

The assessment includes a measurement of existing “background” noise levels at a number of houses around the site. This data will be used along with the predicted noise levels of the wind farm to determine compliance with EPA Noise Guidelines.

Guidelines

The EPA Guidelines require wind farms to adhere to the following noise level at receivers within a Rural Zone. The noise level should not exceed:

- 40 dB(A) at nearby houses, or
- the background noise by more than 5dB(A)

(whichever is the greater).

Preliminary assessment for the Keyneton Wind Farm demonstrates that the proposed development will comfortably comply with these EPA criteria. The complete assessment will be completed by VIPAC and included within the Development Application.

Please speak with a Pacific Hydro representative if you have any questions about noise.

Comparative noise level guide of various sources or activities

Source/Activity	Approx. Sound Pressure Level (dBA)
Threshold of hearing	0
Rural night-time background	20-40
Quiet bedroom	35
Car at 65 km/h at 100m	55
Air Conditioner Unit at 1m distance	60
Conversation	60
Truck at 50km/h at 100m	65
City traffic	90
Pneumatic drill at 7m	95
Rock/Pop Band at performance venue	100+
Jet aircraft at 250m	105
Threshold of pain	140

Source: Dr Peter Teague, Vipac Engineers & Scientists Ltd. Basic Introduction to Noise

Other Considerations

Fire

The Mid Murray Council Development Plan identifies the site as falling within both General and Medium Bushfire Risk areas. Although wind farms do not pose a significant fire risk, on-site access tracks will help to improve access across the site for firefighting purposes if an event occurs in the area. Pacific Hydro in consultation with the CFS, will develop and implement a Fire/Emergency Management Plan.

Shadow flicker

Shadow flicker occurs when the sun is low in the sky and shines on a building or object from behind a wind turbine rotor. This is a similar effect as driving down a tree lined road on a clear sunny day. As the position of the sun is easily mapped it is possible to calculate the extent of shadow flicker to avoid this effect on neighboring properties. Modeling suggests that no dwellings will be impacted on by shadow flicker.

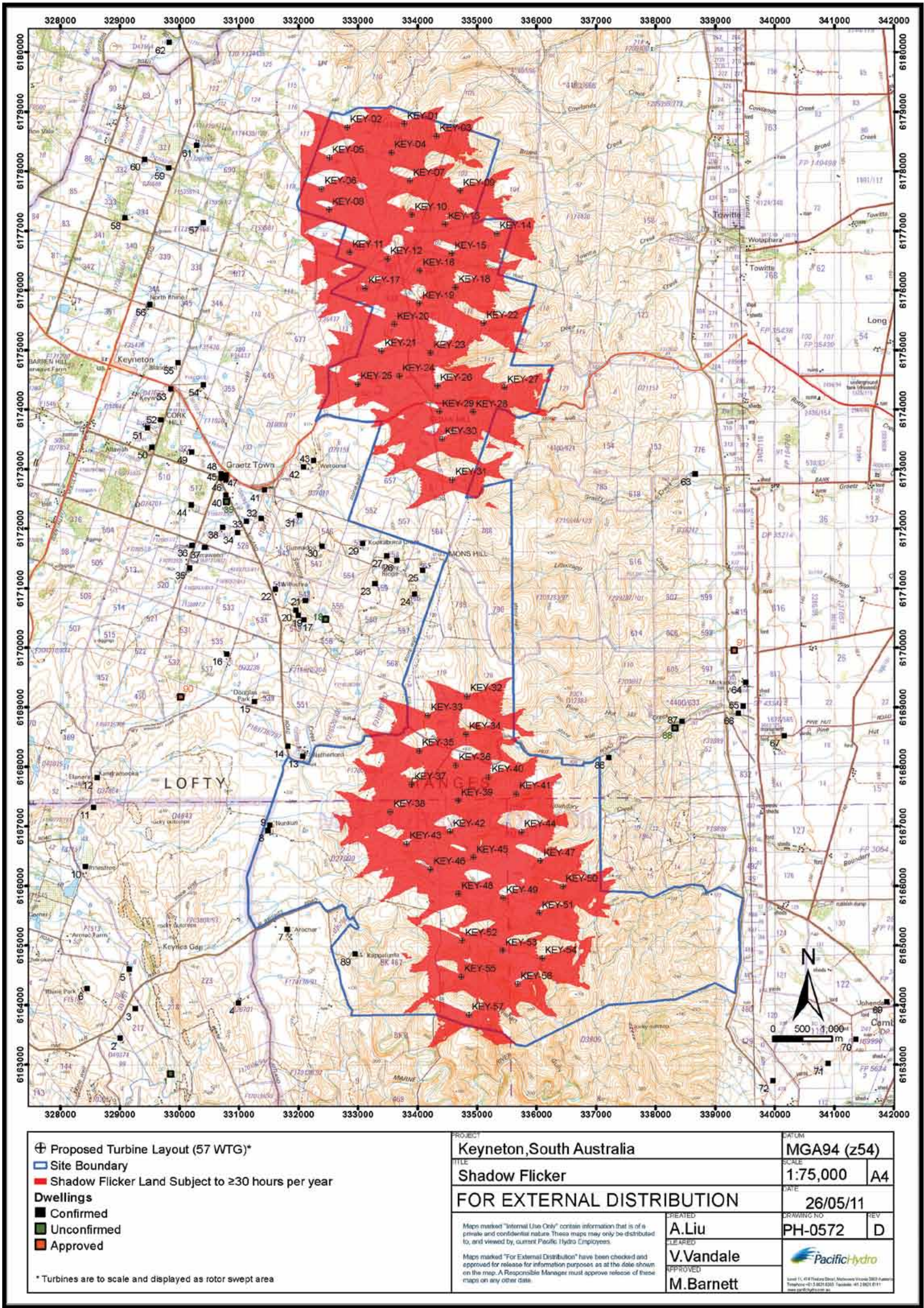
Aviation

While wind farms within 15km of an aerodrome can impact on its operational airspace; no registered Aerodromes or RAAF Base stations exist within a 30km radius of the proposed Keyneton wind farm. Pacific Hydro engaged consultants HART Aviation to assess the risk to aviation operations in the vicinity of the site. Their assessment which included consultation with aviation organisations, concluded that risks to aviation were sufficiently low and that obstacle lights are not warranted.

Telecommunications

As with all tall structures wind turbines have the potential to interfere with analogue television, radar, radio and microwave signals. However the likelihood of interference to these systems can be eliminated or reduced through a number of mitigation measures, such as designing the turbine layout to avoid impacting on the direct line of sight of communications towers, modifying or realigning TV antennas or switching to digital TV reception.

Right: Extent of Shadow flicker



Steps in wind farm development

A typical wind farm at least 4 years to develop from the installation of the wind monitoring mast through to first electricity generation.

The following illustrates the development of Challicum Hills Wind Farm in Victoria.



August 1999 – wind mast installed



August 2001 – community consultation



October 2002 – Turning of The Turf ceremony



October 2002 – track construction commences



January 2003 – embedded cylinder being lifted into windmill foundation



January 2003 – workers fixing reinforcement mesh around embedded cylinder



February 2003 – pouring concrete into completed foundation



February 2003 – fibre optic cable and 22,000 volt underground cable being laid



March 2003 – tower base section being lowered onto foundations



March 2003 – preparation for welding base tower section



April 2003 – windmill components await lifting



April 2003 – preparation for lifting next tower section



April 2003 – final tower section being lifted



April 2003 – nacelle being lifted



April 2003 – rotor blades assembled on site



May 2003 – rotor being lifted onto tower



June 2003 – underground cabling being completed



July 2003 – electricity generation commences



September 2003 – completed windmills

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Traffic and Transport

Traffic route to site

In addition to having consideration for local traffic and bus routes, Pacific Hydro will consult with Roads SA and both the Barossa and Mid Murray Councils to determine a preferred traffic route for Over-Dimensional (OD) construction vehicles to assess the site. Site access routes for the delivery of tower and turbine components on OD vehicles, will be restricted to defined heavy freight routes as far as possible. Pacific Hydro has already received information from local residents which has helped in the initial traffic route consideration.

Construction traffic

Prior to construction a detailed Traffic Management Plan will be developed in consultation with the Barossa and Mid Murray Councils to ensure appropriate control of site traffic and any necessary road or intersection upgrades.

OD construction traffic will, where possible, operate outside identified school bus times in areas where construction traffic is operating on roads with school collection and drop off points. Other short term construction traffic will consist of daily deliveries of materials, water and employees moving to and from site.

Please speak to a Pacific Hydro staff member here today, if you think there are any specific local road or traffic issues we should be aware of.



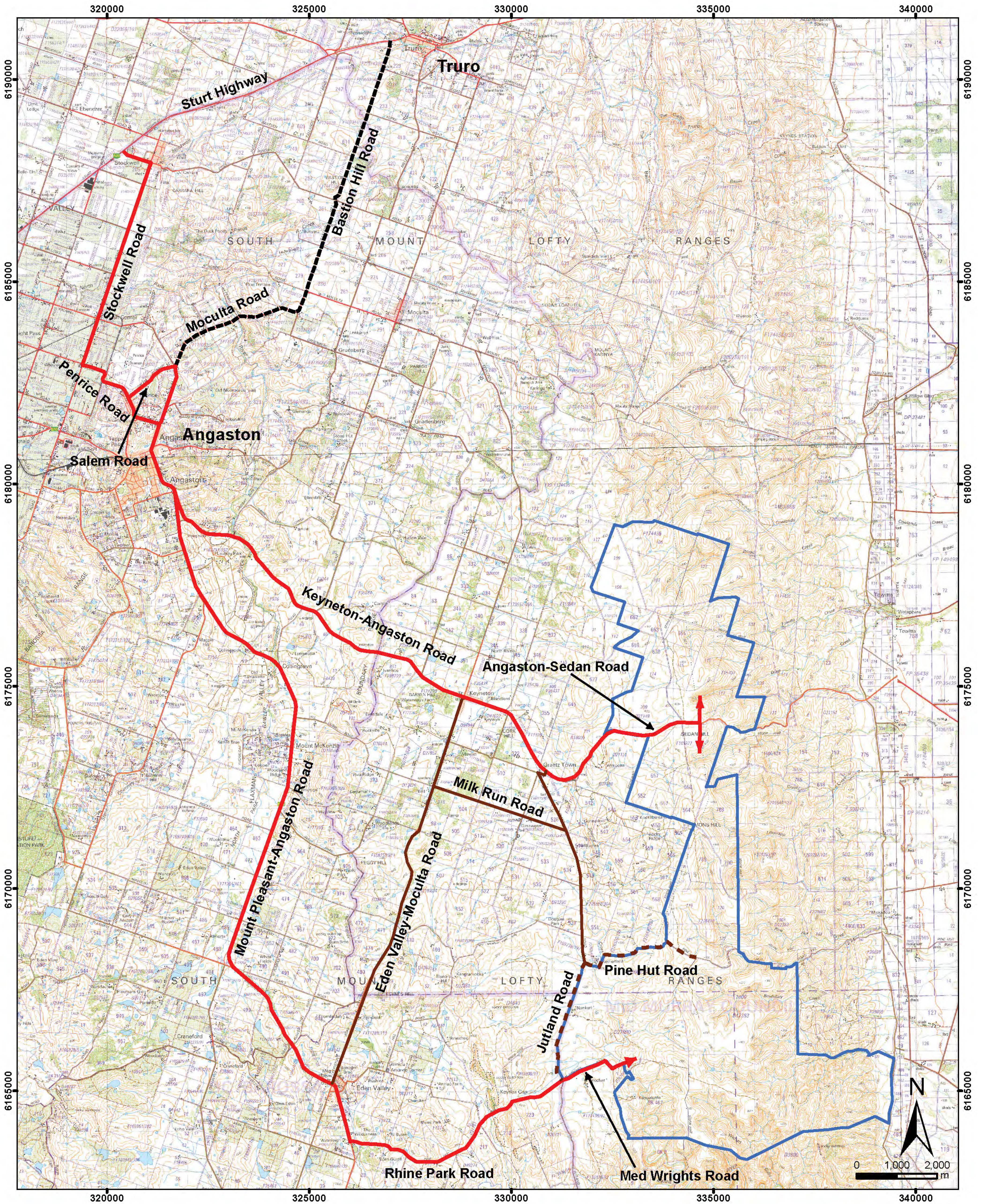
Delivery of mobile crane




Delivery of turbine blade

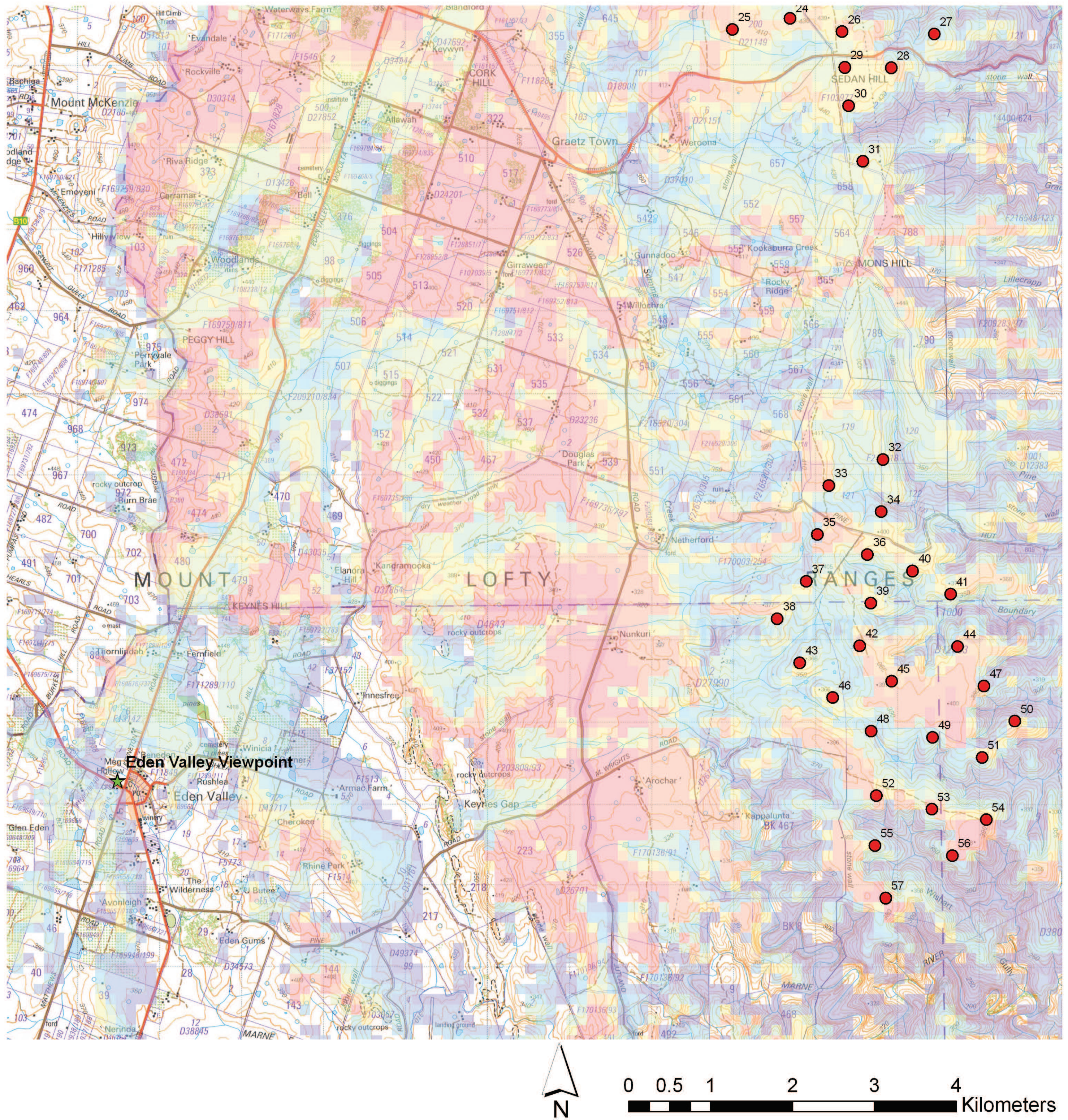
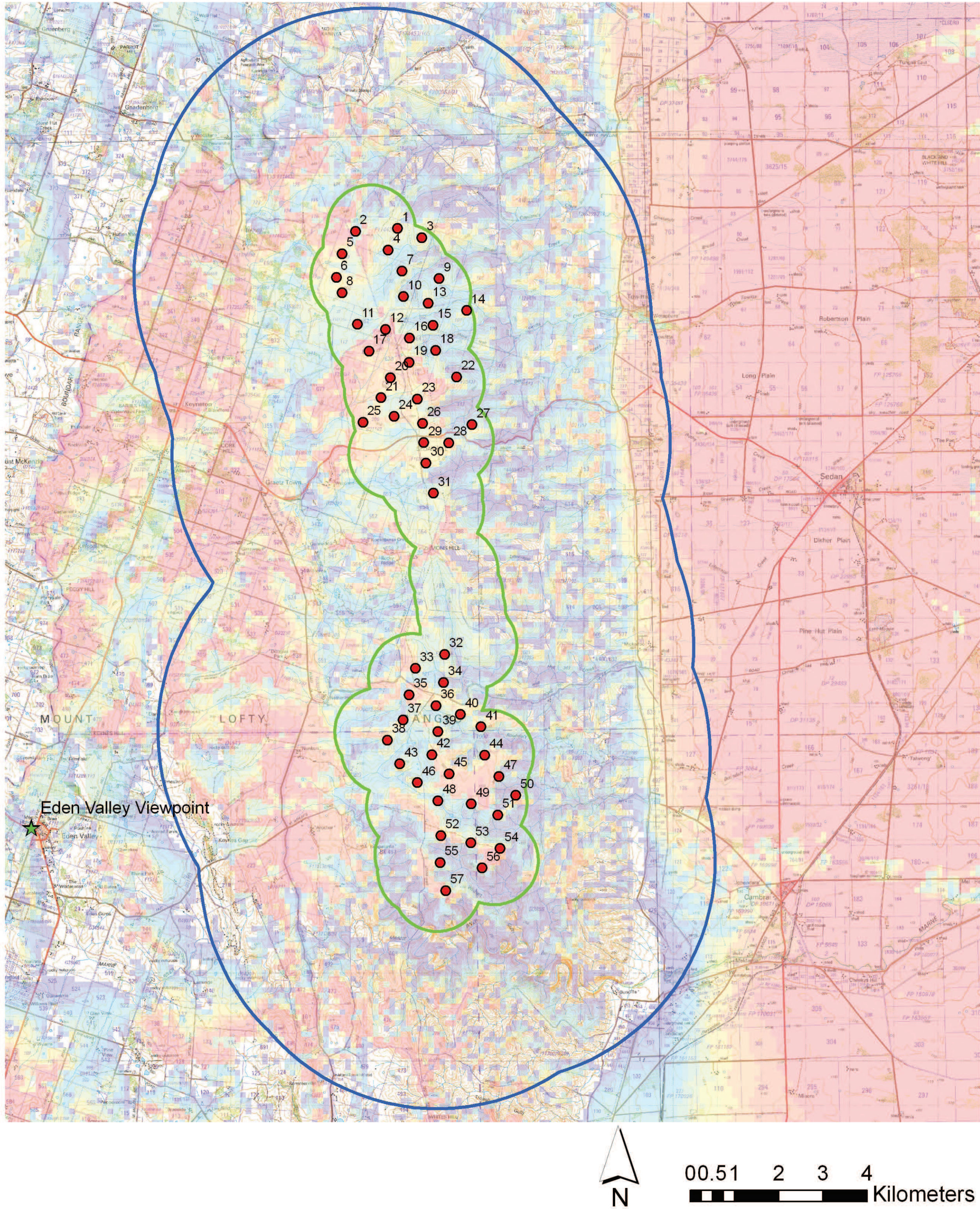
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<div><div></div> Site Boundary</div>	PROJECT Keyneton, South Australia		DATUM MGA94 (z54)	
Routes	TITLE Preferred Access Routes		SCALE 1:120,000	A4
<div><div></div> Preferred Over Dimensional (O/D) Routes (Including tower and turbine components)</div>	FOR EXTERNAL DISTRIBUTION		DATE 16/05/11	
<div><div><div></div><div></div><div></div></div> Over Dimensional Alternative</div>				
Secondary Routes	Maps marked "Internal Use Only" contain information that is of a private and confidential nature. These maps may only be distributed to, and viewed by, current Pacific Hydro Employees. Maps marked "For External Distribution" have been checked and approved for release for information purposes as at the date shown on the map. A Responsible Manager must approve release of these maps on any other date.	CREATED A.Liu	DRAWING NO PH-0721	REV B
<div><div></div> Non Over Dimensional Loads</div>		CLEARED K.Derriman	<div></div> <div>Level 11, 474 Flinders Street, Melbourne Victoria 3000 Australia Telephone +61 3 8621 6300 Facsimile +61 3 8621 6111 www.pacifichydro.com.au</div>	
<div><div><div></div><div></div><div></div></div> Over Dimensional Vehicles*</div>		APPROVED M.Barnett		
* Pine Hut Road between site entrance and North Rhine Road will be used for exiting O/D vehicles				

Zones of Theoretical Visual Influence - Tip of Blade




Legend



- ★ Eden Valley VP
- Turbines
- Local (1km)
- Sub-Regional (5km)

Turbines Visible

1 - 5	21 - 25
6 - 10	26 - 30
11 - 15	31 - 35
16 - 20	36 - 40

41 - 45
46 - 50
51 - 55
56 - 57



Landscape and Visual Impact Assessment consultants:  

Note: ZTVI illustrates the potential visibility of turbines to tip of blade (145.5m AGL). The ZTVI represents a conservative estimate of the number or turbines that are potentially visible using a 10m digital terrain model with no mapping or calculated effect of vegetation or built form screening.

PRINTED ON: 13 September 2011 for Community Consultation purposes only

Maximum Wind Turbine Size :

