

Appendix A

Appendix A: Planning Report (Nolan Rumsby)

Keyneton Wind Farm

Location:

Keyneton

Prepared for:

Pacific Hydro

19 June 2012

PLANNING REPORT

Contents	Page
1. Introduction.....	3
2. Overview and Purpose	3
3. Legislation and Policy Framework.....	3
3.1 State Strategic Policy.....	3
3.1.1 South Australia’s Strategic Plan, 2011	3
3.1.2 Strategic Infrastructure Plan for South Australia 2004/5 - 2014/15.....	3
3.1.3 Renewable Energy Plan for South Australia, 2011	4
3.2 The Planning Framework.....	4
3.2.1 The Development Act 1993 and Development Regulations 2008	4
3.2.2 The Planning Strategy: Murray and Mallee Region Plan, 2011	4
3.2.3 Statewide Wind Farms Development Plan Amendment (2011).....	5
4. Proposal	6
5. Subject Land and Locality	8
5.1 Subject Land	8
5.2 Locality	9
5.2.1 Eastern Mount Lofty Ranges.....	9
5.2.2 Eastern Mount Lofty Ranges Plateau.....	9
5.2.3 Eastern Mount Lofty Ranges Escarpment.....	10
5.2.4 Murray Plains.....	10
5.2.5 The Wider Locality.....	10
6. Documents Assisting the Assessment of the Proposal.....	10
7. Processing of the Application	11
8. Assessment	12
8.1 Provisions of the Development Plan	12
8.2 Wind Farms and Policy Intent of the Development Plan.....	13
8.3 Zone Intent and Land Use ‘Fit’	15
8.4 Impacts	16
8.4.1 Visual.....	16
8.4.2 Noise.....	19
8.4.3 Flora/Fauna	21
8.4.4 Cultural and Heritage.....	23
8.4.5 Aircraft Safety.....	24
8.4.6 Transportation and Access.....	25
8.4.7 Shadow Flicker and Blade Glint	26
8.4.8 Telecommunications and Electromagnetic Interference	27
8.4.9 Other Relevant Considerations	28
9. Conclusions	29

1. Introduction

Nolan Rumsby Planners has been instructed by Pacific Hydro to assist and advise in the preparation of this development application. The proposal, in summary, comprises the construction of a wind farm comprising 42 wind turbines and ancillary infrastructure in the Eastern Mount Lofty Ranges, east of Keyneton.

This planning report details our assessment of the relevant provisions of the Mid Murray Council Development Plan. We have reviewed the subject site on 24 February 2012 and reviewed the extensive reports prepared on behalf of the proponent which comprise the application.

2. Overview and Purpose

This report accompanies a Development Application prepared by Pacific Hydro to be lodged, pursuant to Section 49 of the *Development Act 1993*, by the Department of Planning Transport and Infrastructure as sponsor for the project.

The report describes the Statewide policy framework within which the application is lodged and assesses the proposal's compliance with the overarching intent of the Government to support renewable energy developments. It is informed by numerous reports prepared by other experts in specific fields having regard to the design, siting and impacts criteria expressed in the Mid Murray Development Plan.

3. Legislation and Policy Framework

3.1 State Strategic Policy

3.1.1 South Australia's Strategic Plan, 2011

South Australia's Strategic Plan is the State's foremost strategic planning document. The Strategic Plan was initially published in 2004 and set a series of targets aimed at driving the State's economy, improving community wellbeing, working toward sustainability and fostering creativity and innovation. The Strategic Plan has since been through two revisions, the most recent in 2011.

The 2011 version of the Strategic Plan states that *"South Australia is well positioned to take positive action to ensure environmental sustainability. South Australia was one of the first places to enact legislation to reduce carbon emissions. In 2011 South Australia has over half of Australia's wind-generation capacity, providing 20% of the state's electricity production"*.

Targets 59, 64 and 66 establish the State's dedication to reducing carbon emissions, the targets seek:

- 59 Greenhouse gas emissions reduction** *Achieve the Kyoto target by limiting the state's greenhouse gas emissions to 108% of 1990 levels during 2008-12, as a first step toward reducing emissions by 60% (to 40% of 1990 levels) by 2050;*
- 64 Renewable energy** *Support the development of renewable energy so that it comprises 33% of the state's electricity production by 2020 (baseline: 2004-05) Milestone of 20% by 2014; and*
- 66 Emissions intensity** *Limit the carbon intensity of total South Australian electricity generation to 0.5 tonnes of CO₂/MWh by 2020 (baseline: 2011).*

The proposed wind farm supports the objectives and targets of South Australia's Strategic Plan.

3.1.2 Strategic Infrastructure Plan for South Australia 2004/5 - 2014/15

The Strategic Infrastructure Plan for South Australia (SIP) sets out both broad and specific infrastructure priorities for the State. The priorities are based on the infrastructure required to

assist in meeting the targets within South Australia's Strategic Plan. The SIP informs both the public and private sector infrastructure investment over a 5-10 year period.

The SIP acts at both the State level and at a regional level. At the State level, the SIP recognises that a significant amount of work has already been undertaken to ensure sufficient energy supplies within South Australia, including expenditure on gas infrastructure and securing investment in renewable energies, including wind power. The SIP acknowledges that energy requirements will increase over the life of the SIP and that, at peak demands, the electricity network can have capacity issues. The SIP aims to improve the reliability of the energy supply and to ensure that South Australia meets the renewable energy targets as established within the SASP.

The overview is quite broad with respect to energy requirements for the Murray and Mallee Region. The SIP establishes key infrastructure projects for the region and, with respect to energy, identifies two projects. The projects include, firstly, the provision of electricity infrastructure to support mineral sand mining and irrigation industries, and secondly, to prepare a business case for gas line extension into large towns within the region. The development of wind farms within the region is not identified, although, when first published in 2005, few wind farms had been established across the State. Notwithstanding the above, the proposal accords with the direction of the SIP in that the development of renewable energy infrastructure is supported.

3.1.3 Renewable Energy Plan for South Australia, 2011

The Renewable Energy Plan (REP) for South Australia was released by the State Government in late 2011. The REP forms the guiding document of the Renewables SA Board, which was established to drive investment in renewable energy. The REP promotes five key initiatives, including, the provision of quality information to inform investment, ensuring efficient regulation and competitive charges, addressing market failures, leading by example and moving early to prepare for national policies.

The REP reaffirms the commitment of the State Government to achieve the renewable energy targets as identifies within the Strategic Plan.

3.2 The Planning Framework

3.2.1 The Development Act 1993 and Development Regulations 2008

The *Development Act 1993* (the Act) provides the legislative framework for the regulation of development within the State. The Development Act guides the establishment of planning policies at both the strategic and local level, by way of the Planning Strategy and local Development Plans. Additionally, the Act sets out the procedures and regulations pertaining to the assessment of development applications. Discussion on State and Local planning policy provision follows.

3.2.2 The Planning Strategy: Murray and Mallee Region Plan, 2011

The Planning Strategy represents the State Government's current planning policy direction for South Australia. Specifically, the Planning Strategy seeks to coordinate the provision of infrastructure and services to benefit the community, the private sector and local government.

The Planning Strategy is a requirement pursuant to Section 22 of the Act and is separated into a series of volumes based on geographic areas. The relevant Planning Strategy, containing the subject land, is the Murray and Mallee Region Plan.

The Murray and Mallee Region Plan (the Region Plan) contains a series of principles and policies centred on the four key themes of environment and culture, economic development, population and settlements, and infrastructure and service provision. The commentary within the 'Overview' of the Region Plan recognises the support given by the State and local governments towards renewable and clean energy technologies. This is reinforced by one of the aims of the Region

Plan which is to “promote the generation and use of renewable energy supplies, such as solar, wind and thermal rock technologies”.

Specific policies supporting renewable energy supplies are as follows:

Environment and Culture

- 2.1** *Promote carbon sequestration and greenhouse gas mitigation activities through sustainable land-use management practices, taking into account climate, land and soil suitability and species characteristics.*
- 2.7** *Provide for the development of alternative and innovative energy generation and water supply, including guidance on environmental assessment requirements.*

Economic Development

- 5.4** *Promote the development of renewable energy in appropriate locations and facilitate the establishment of supply chains in association with renewable energy developments.*
- 5.5** *Manage interfaces between infrastructure and residential areas and other sensitive land uses to ensure adequate protection against noise and air pollution.*
- 6.1** *Prevent loss of productive agricultural land and potential conflict with incompatible uses by:*
- focusing housing (including rural living allotments) and industrial development in and adjacent to towns and industrial estates, unless directly related to primary industry*
 - preventing fragmentation of viable and productive agricultural land*
 - limiting and carefully locating rural living areas*
 - managing interfaces with residential areas and other sensitive activities through the use of buffers*
 - ensuring tourism-based developments are sited away from agricultural land where practicable*
 - designating areas of primary production significance (in particular high-value agricultural and horticultural land) in Development Plans and introducing planning controls to protect their use.*
- 8.4** *Support the growth of renewable energy and green technologies by setting aside employment lands and ensuring flexibility in zoning to allow new industries to establish.*

The proposed development supports these policies.

3.2.3 Statewide Wind Farms Development Plan Amendment (2011)

The Statewide Wind Farms Development Plan Amendment (Wind Farm DPA) provided a review of Development Plan policies with respect to renewable energy facilities, in particular, wind farms. The wind farm policies within Development Plans were first introduced in 2003, and had not since been significantly reviewed.

Given that there have been a number of applications since the introduction of the initial wind farm policy, and that the impacts of wind farms are now better understood, the State Government saw it necessary to review and update Development Plan policies to ensure that the best practice in the siting, design and management of wind farms carried through from initial site identification to their operation.

The Wind Farm DPA covers most of the State, except for inner metropolitan Adelaide. A number of changes have been made at both the Council Wide and Zone level which seek to ensure that wind farm development occurs within suitable zones, appropriate distances from dwellings, and that the visual impact of wind farms is managed.

The Wind Farm DPA is currently an interim operation, which means that the proposed amendments to Development Plans have legislative effect and have been incorporated into those

plans. Any applications will be assessed under the new provisions. The Wind Farm DPA was gazetted, and came into effect, on 19 October 2011.

Specifically, the DPA has made the following changes to Development Plans, including the Mid Murray Development Plan:

- wind farms are anticipated forms of development in zones where wind sources are generally suitable and the number of sensitive land uses, such as dwellings, are limited to rural, farming and primary production type zones;
- wind farms are subject to an 'on merit' assessment in zones in which they are envisaged, which means they are assessed against all of the relevant provisions of the Development Plans, which now include the provisions of the Wind Farm DPA.
- Zone and Council Wide provisions have been amended to recognise that wind farms are an envisaged form of development and that their visual impacts shall be managed, rather than 'avoided' or 'minimised'. Additional policy has been included to guide the management of visual impacts including minimum separation distances, the use of vegetated buffers and the siting of turbines;
- wind farms in more sparsely populated areas (identified generally as non 'living' type zones) are considered as Category 2 for the purposes of public notification, except where turbines are located closer than 2 kilometres from 'living' zones. Owners and occupiers of adjacent land can make representations to Council, though there are no appeal rights for representors; and
- wind farms in more densely populated areas (zones in which residential development comprises a dominant use) remain as Category 3 forms of development for the purposes of public notification, and third party appeal rights remain.

Specific commentary assessing the proposal against these provisions is provided later in the report.

4. Proposal

The proposed development is comprehensively described in the Development Application Report prepared by Pacific Hydro, dated June 2012.

The proposal, in summary, comprises the following works:

- turbines
 - 42 turbines sited in two clusters, a northern cluster of 22 turbines and a southern cluster of 20 turbines;
 - each turbine has a proposed maximum tip height of 145.5m;
 - each turbine requires a foundation with an approximate 6m diameter at ground level and 14m sub-surface diameter;
 - each turbine requires a hardstand area up to a maximum area of 1700m², though the size and shape can vary, dependant on turbine manufacturer;
 - external electrical transformers, adjacent to each turbine base and approximately 4m in length, 2m wide and 2m in height.
- access roads
 - main access tracks of approximately 39km in length, the majority of tracks will be 5m in width, up to 10m on main arterial access tracks within the site to facilitate safe two way vehicle movement. Existing farm tracks will be used where possible;
 - secondary access track, of approximately 6km in length, which is located between the two turbine clusters and is to be used primarily by standard vehicle transport during construction and operation (i.e. no turbine transport or turbine construction vehicles).

- underground cabling
 - 33kV underground cabling of approximately 42km in length;
 - the cabling will be located in a trench of approximately 1m depth and 1m width, the majority of trenches will run adjacent to the access tracks.

- substation/switching yard
 - one permanent 33kV/275kV grid connection within a compound area of 285m by 80m;
 - located within the northern cluster, approximately 600m-700m north of Angaston-Sedan Road, adjacent the access track between turbines 18 and 20 near the existing 275kV transmission line;
 - substation area of approx 75m x 120m including transformers and switchgear, control building, staff amenities, workshop, storage and a small car parking area, etc). The control building dimensions are approximately 36.1m length x 7.9m width x 6.35m height
 - switching station (required by the Electricity Utility) of approx. 75m x 165m.
 - gantries at a height of 22.625m will be required to connect the substation to the existing 275kV transmission line
 -

- overhead line
 - grid connection will occur on-site
 - approximately 6.1km overhead transmission line will connect the two turbine clusters. It is expected the line will consist of 2 circuits (6 conductors) on steel poles approximately 20-25m high, and spaced between 100-250m apart (estimated average spacing of 180m)
 - a short section (approx 690m) of the transmission line connecting the two clusters will be undergrounded (where the transmission line is to cross under the existing 275kV transmission line)

- meteorological masts
 - up to three permanent meteorological masts to hub height
 - up to five temporary meteorological masts; which will be installed approximately 6 months prior to the construction of the turbines, and then removed to allow turbine construction at those locations.
 - two existing meteorological masts will remain for 6-12 months after the construction, at which point they will be dismantled and removed.

- temporary construction compounds
 - three temporary construction compounds of approximately 50m by 50m, including:
 - site office and staff facilities;
 - car park;
 - concrete batching plant (unless undertaken off site); and
 - turbine lay-down and storage area.
 - at this stage, the concrete batching may be undertaken on or off site, this will be subject to the construction contractor's requirements.

As detailed within the application, on-site access tracks will be constructed to enable construction and operational vehicles to access each of the turbines. Wherever possible, access tracks will follow existing farm tracks and the existing contours and features of the landscape thus minimising the need for substantive earthworks and maximising the retention of productive land. Wherever possible, the tracks will also be designed to avoid cultural heritage sites. The access tracks will have minimal impacts on native vegetation. At present the only areas where native vegetation removal is foreseen is in association with the construction of new access/egress points along Pine Hut Road. It is intended that the access tracks between clusters and within the site's north-western section will be designed/micro-sited to avoid impacts on native vegetation, in particular large trees

Several road improvements are required for over-dimensional vehicle access to the site. The preferred vehicle movement routes have been identified following consultation with the Department for Planning, Transport and Infrastructure and the Mid Murray and Barossa Councils.

Access to the northern cluster is by the Sturt Highway, Halfway House Road, Blanchetown Road and the Angaston-Sedan Road, where a new access point to the site is required. Access to the southern half of the site is by the Sturt Highway, Stockwell Road, Duck Ponds Road then via the defined heavy vehicle route around the west and south of the Angaston township, by Stockwell Road, Crennis Mine Road, Long Gully Road, Hurns Road and then to the Angaston-Mt Pleasant Road through the Eden Valley township to North Rhine Road and Med Wrights Road. A new access point to the site is required from Med Wrights Road.

The connection of the site to the grid will occur on-site. Approximately 6km of overhead transmission lines will connect the two clusters of turbines, including a short section which is undergrounded, crossing under the existing 275kV transmission line.

Upon completion, the proposal has an estimated capacity of 105MW and an estimated generation equivalent to powering 68,000 South Australian homes per year and will avoid some 240,000 tonnes of carbon pollution each year.

The location of proposed turbines is indicated on the Layout and Project Infrastructure plans dated June 2012 have been prepared by Pacific Hydro.

5. Subject Land and Locality

5.1 Subject Land

The subject land comprises various allotments (over nine titles) under the ownership of seven separate entities. The specific allotment details are as described within the report prepared by Pacific Hydro.

The subject site is approximately 16 kilometres long by up to 8 kilometres wide. As the proposed wind farm consists of two 'clusters' of turbines, the site is shaped accordingly, with two wider areas at the north and south, and a narrower strip through the centre of the site which is proposed to connect the clusters and facilitate one on-site sub-station/ grid connection. The subject site has an area of approximately 5,256 hectares.

The nearest turbines are located approximately:

- 8.2 kilometres east of Eden Valley;
- 4.4 kilometres east of Keyneton;
- 7.5 kilometres south east of Moculta;
- 8.6 kilometres west of Sedan; and
- 6.5 kilometres west of Cambrai.

The site is located on the eastern extent of the Mount Lofty Ranges at an elevation range between 380m and 450m AHD. The topography within the site varies, though is undulating with some areas of steeper incline. The topography of the site is similar to that extending beyond the site along the eastern extent of the Mount Lofty Ranges.

The ridgeline on which the turbines are proposed is mostly devoid of any significant stands of native vegetation. The site is sparsely vegetated and mostly comprises a grazed, grassed layer. Some shrubs and trees are scattered throughout the site, though they are mostly located along creek lines. The land is used primarily for sheep grazing, although some other forms of dryland farming occur on the fringes of the site.

Two roads traverse the site in an east-west direction; they are Sedan Hill Road (or Angaston-Sedan Road) and Pine Hut Road. Sedan Hill Road is a sealed road which runs between Keyneton and Sedan and carries an estimated 950 vehicles daily. Sedan Hill Road passes through the southern end of the northern cluster, such that two turbines will be located south of

Sedan Hill Road and the remainder (20 turbines), will be located to the north. Pine Hut Road is an unsealed road which runs between Jutland Road in the west to the Mannum-Sedan Road in the east. Pine Hut Road would carry limited traffic on a day to day basis and most likely is used only to service the local community.

The existing 275kV transmission line from Robertstown to Tungkillo passes through the site in a north-south direction. The proposed Wind Farm is able to capitalise on the location of this line with a direct connection from the proposed substation. The existing 275kV transmission line is a visible element in much of the landscape.

There are three dwellings within the subject site. The owners of these dwellings are project stakeholders and their dwellings are between 1,700m and 2,400m from the nearest turbines. The assessment undertaken by Pacific Hydro identified approximately 150 dwellings within 6km of the site. The nearest dwelling (which is not a project stakeholder) is 1.56km from the nearest turbine. There are a further three non project stakeholder dwellings that are less than 2km from the nearest turbine. The remaining 145 dwellings are greater than 2km from the nearest turbines. The dwellings within and near the subject site are identified on Figure 2.4 within the Development Application Report.

5.2 Locality

Given the scale of both the wind farm and the individual turbines, we have considered the locality to extend some distance from the actual site, in the order of 10-15 kilometres. As identified earlier in the report, the subject site extends over a large area on the eastern extent of the Mount Lofty Ranges.

Similar to the Landscape Character and Visual Assessment Report prepared by Mr Warwick Keates and Dr Brett Grimm, we note that there are clear 'sub' localities within the overall locality. Running north-south, we observe four distinct sub localities, each based on the topography of the land, they are the Eastern Mount Lofty Ranges, the Eastern Mount Lofty Ranges Plateau, the Eastern Mount Lofty Ranges Escarpment and the Murray Plains.

There are further 'sub localities' within these defined localities that will comprise unique circumstance such as topography or vegetation, such as the Marne River and Keynes Gap.

5.2.1 Eastern Mount Lofty Ranges

Extending from Keyneton, east toward the site, the landform consists of rolling hills and wide valleys. This landscape includes the towns of Keyneton, Eden Valley and Mount Pleasant as well as other settlements to the south-west of the subject site.

Vegetation within this region varies and includes a mix of native trees, predominantly eucalypts, pine plantations as well as some vineyards. This region is significantly vegetated and, when combined with the land form, views within the region are often limited.

5.2.2 Eastern Mount Lofty Ranges Plateau

The Mount Lofty Ranges Plateau incorporates the site and is situated between the undulating Mount Lofty Ranges and the escarpment. The landform of the Plateau is similar to that of the Mount Lofty Ranges, though provides a transitional edge to the escarpment. The density of vegetation decreases substantially nearer the escarpment.

The Plateau sits atop the escarpment and is viewable from the Murray Plains. Views of the Plateau from the Plains stretch beyond the north and south extent of the site. The Plateau contains scattered eucalypt trees but is generally devoid of vegetation except for a heavily grazed grass layer.

The majority of the proposed turbines are sited within the Plateau.

5.2.3 Eastern Mount Lofty Ranges Escarpment

The Mount Lofty Ranges Escarpment is the ‘face’ of the Eastern Mount Lofty Ranges. The Escarpment runs the length of the Plateau, and provides a backdrop to the Murray Plains. The escarpment is a significant variation to the landforms of both the Mount Lofty Ranges and the Murray Plains.

The Escarpment provides diversity in visual character through the contrasting ridgelines and gullies which create variations in light and shade which are cast across the landscape. It contains little variation in vegetation cover which consists mainly of grasses. Some larger shrubs and trees are located within gullies around water sources such as the Marne River which crosses the Escarpment.

5.2.4 Murray Plains

The Murray Plains is a low lying landscape adjacent the Escarpment. The Plains are vast and expansive, extending from the Escarpment to the River Murray and beyond. Subtle variations in local ridgelines and vegetation provide moderate visual screening and variation in the landscape in localised areas.

Land within the Murray Plains is mostly either grazed or put to cropping use. The regular shaped allotments are interspersed with shrubs and wooded vegetation which create borders and define the Murray Plains.

5.2.5 The Wider Locality

Within the broader locality, a number of small rural towns and settlements exist. The character of these towns varies with their location. Towns such as Sedan and Cambrai, which are situated within the Murray Plains, are small and representative of their surrounding agricultural land uses. They are generally open with little landscaping, or where there is vegetation, it is generally lower in height. Towns such as Keyneton and Eden Valley have a different character which is generally more enclosed by both the natural and the built environment. These towns are located within the Mount Lofty Ranges and contain significantly more vegetation than those on the Murray Plains.

6. Documents Assisting the Assessment of the Proposal

The following additional reports have been prepared to inform the proposal:

- Landscape Character and Visual Assessment Report, prepared by Wax Design and Brett Grimm Landscape Architects (BGLA);
- Flora and Fauna Assessment, prepared by EBS Ecology;
- Avifauna and Raptor Nest Assessment, prepared by EBS Ecology;
- An Assessment of Bats at the Proposed Keyneton Wind Farm, prepared by EBS Ecology;
- Noise Impact Assessment, prepared by Vipac Engineers and Scientists Ltd;
- Cultural Heritage Site Assessment, prepared by Australian Cultural Heritage Management.

Further investigations have been undertaken by Pacific Hydro including:

- assessment of shadow flicker;
- assessment of electromagnetic interference;
- aviation impacts;

In addition, a number of Environmental Management and Monitoring Plans (EMMP’s) will support the construction and operational phase of the development. Outlines for these documents accompany the application.

The additional plans and figures have also informed this assessment:

- 1.1 Site Location
- 1.2 Layout / Project Infrastructure Topography
- 1.3 Layout / Project Infrastructure Aerial
- 1.4 Land Titles Details
- 2.1 Site Elevations
- 2.2 Site Contours / Aerial Photo
- 2.3 SA Wind Resource Map
- 2.4 Layout and Houses
- 2.5 Site Context Map
- 2.6 Project Density and Comparison
- 3.1 Indicative Turbine Dimensions
- 3.2 Indicative Turbine Foundations Cross-section
- 3.3 Indicative Access Track cross-section
- 3.4 Indicative Substation / Switching Yard Layout
- 3.5 Indicative Substation / Switching Yard / Control Room Elevations
- 3.6 Indicative Mast Elevations
- 5.1 Former 60 Turbine Layout
- 5.2 Former 57 Turbine Layout
- 10.1 Preferred Access Routes
- 11.1 Adelaide TV 1 Licence Area Plan
- 11.2 Shadow Flicker Assessment
- 13.1 Zoning Map
- 13.2 Policy Areas Map

7. Processing of the Application

The application is lodged pursuant to Section 49 of the Development Act 1993. In accordance with subsection 49(2), which states:

- 49 *Subject to this section, if—*
- (a) *a State agency proposes to undertake development (other than in partnership or joint venture with a person or body that is not a State agency); or*
 - (b) *a State agency proposes to undertake development for the purposes of the provision of public infrastructure (whether or not in partnership or joint venture with a person or body that is not a State agency); or*
 - (c) *a person proposes to undertake development initiated or supported by a State agency for the purposes of the provision of public infrastructure and specifically endorsed by the State agency for the purposes of this section, the State agency must lodge an application for approval containing prescribed particulars with the Development Assessment Commission.*

The Department of Planning, Transport and Infrastructure has endorsed the proposal, and is to lodge the application to the Development Assessment Commission.

Under the Section 49 application process, the application is referred by the Development Assessment Commission to the relevant local Council, in this case the Mid Murray Council for comment, as well as relevant referral bodies who may have an interest in the application. Comments received from these agencies are considered in the assessment of the application.

The application will be publicly notified. Interested parties who lodge a written submission with DAC during the prescribed period are also given an opportunity to appear personally, or by representative, before the Development Assessment Commission in support of their submission.

The Development Assessment Commission will then prepare a report with recommendations for the Minister who may either approve or refuse the development.

8. Assessment

The subject site is located wholly within the Rural Zone of the Mid Murray Council Development Plan and further contained within two policy areas, being Policy Area Number 13 – Marne Watercourse and Policy Area Number 14 – Hills Policy Area.

The relevant version of Council’s Development Plan is that consolidated on 19 April 2012.

8.1 Provisions of the Development Plan

The following provisions of the Development Plan are considered the most relevant in the assessment of this application.

Council Wide

<i>Objectives</i>	1, 8, 14-16, 18-20, 26, 27, 48, 49, 52, 54, 55, 57-59, and 98-100
<i>Principles</i>	1, 8, 35, 38, 40, 43, 53, 54, 56, 58, 60, 79, 80, 88, 89, 92- 94, 156-164, 166-179, 182, 188 and 401-403

Rural Zone

<i>Desired Character</i>	
<i>Objectives</i>	1, 2, 6, 16, 21, 22, 23 and 25
<i>Principles</i>	1, 4, 12, 18, 19, 20, 21, 22, 24 and 46

Policy Area 13 – Marne Watercourse

<i>Desired Character</i>	
<i>Objectives</i>	1, and 4
<i>Principles</i>	1, 2, 4, 5, 6, 10, and 11

Policy Area 14 – Hills Policy Area

<i>Desired Character</i>	
<i>Objectives</i>	1, 2, and 3
<i>Principles</i>	1, 3, and 4

With varying degrees of relevance and application, these provisions touch on numerous aspects of the proposal. However, in order to properly ‘weigh’ these provisions, so as to distinguish those of key relevance from those of a more peripheral nature, our starting point in assessing the proposal looks firstly at the nature of the land use and the manner in which, in our view, the Development Plan directs assessment of such.

Accordingly, the assessment comprises consideration of:

- wind farms and the policy intent of the Development Plan;
- zoning intent and the land use 'fit'; and
- other impacts and effects.

8.2 Wind Farms and Policy Intent of the Development Plan

As identified earlier within this report, the Mid Murray Council Development Plan has been recently amended to incorporate the Ministerial Statewide Wind Farms Development Plan Amendment (the Wind Farm DPA). The Wind Farm DPA has updated the policy content of 56 Development Plans, including 52 of the 68 affected Councils, and some out-of-Council areas. The Wind Farm DPA has introduced a State wide consistent policy approach to wind farms, such that they are a form of development envisaged within various zones. The common policy has been applied to Development Plans which have been converted to the new 'Better Development Plans' format and to Plans that are yet to be converted.

The approach to consider wind farms as envisaged development within zones is a contrast to previous planning policy which at the zone level, provided little guidance or direction. The new policy framework reinforces the State's view that wind farms are desirable and may be developed where visual impacts are managed and where adverse impacts on the environment and the community are minimised or avoided.

The core provisions relating to wind farms are located within the Council Wide section of the Development Plan under the heading Renewable Energy. We comment on each of the objectives and principles of development control, which establish the standards and direction for wind farm development. The Renewable Energy provisions are as follows:

Council Wide

Objectives

- 98 Location, siting, design and operation of renewable energy facilities as essential infrastructure that benefits the environment, the local community and the State.**
- 99 The development of renewable energy facilities, such as wind farms and ancillary development, in areas that provide the opportunity to harvest natural resources for the efficient generation of electricity, accepting that such facilities will often need to be sited in visually prominent locations.**
- 100 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment.**

Principles of Development Control

- 401 Renewable energy facilities, including wind farms and ancillary developments, should be located in areas that maximise efficient generation and supply of electricity.**
- 402 Wind farms and ancillary development such as substations, maintenance sheds, access roads, wind monitoring masts and connecting power-lines (including to the National Electricity Grid), should be sited, designed and operated to:**
 - (a) manage the visual impact of the development by achieving the following:**
 - (i) a setback of at least 1 kilometre of a wind turbine from a dwelling that is not associated with the development;**
 - (ii) vegetated buffers to mitigate short to medium range visual impacts;**
 - (iii) regular spacing of wind turbines in open/flat landscapes where vegetation is orderly;**
 - (iv) irregular spacing in hilly/rugged landscapes where vegetation is varied;**

- (v) ensure that blades on wind turbines rotate in the same direction;
- (vi) ensure that all wind turbines have uniformity in terms of colour, size and shape;
- (b) avoid or minimise the potential for adverse impact on areas of native vegetation, conservation, the natural environment, geological, tourism or built or natural heritage significance;
- (c) avoid or minimise the following impacts on nearby property owners and/or occupiers, road users and wildlife:
 - (i) shadowing, flickering, reflection or blade glint impacts;
 - (ii) excessive noise;
 - (iii) interference with television and radio signals;
 - (iv) modification of vegetation, soils and habitats;
 - (v) striking of birds or bats.

403 Renewable energy facilities, including wind farms and ancillary development, should be designed and sited so as not to impact on the safety of water or air transport and the operation of ports, airfields and designated landing strips.

The provisions seek that renewable energy facilities, of which wind farms are part, be established in appropriate areas for the efficient generation of electricity, provided that firstly, the visual impacts of wind farms is managed, and secondly, the adverse impacts are avoided or minimised.

We note the use of the terms ‘manage’, ‘avoids’ and ‘minimise’, which are used with respect to the impacts of the proposal. The term ‘manage’ is used with respect to the visual impacts that a wind farm may have. This is in response to the fact that wind farms consist not only of the towers themselves, but also include other infrastructure such substations, maintenance sheds, access roads, monitoring masts and connections to existing infrastructure, which can be sited over large areas. Specific guidance on how to ‘manage’ the visual impact is provided in Principle 402 (a). Further assessment on the visual impact is provided later. The use of the terms ‘avoid’ and ‘minimise’ as per Objective 100 and Principle 402 (b) and (c), suggests some level of weighting, as to the envisaged nature of the impact. Impacts, as a priority, should be avoided but where this cannot be achieved, for whatever reason, those impacts should be minimised to an acceptable level.

In view of the above, and the provisions of the Development Plan, in our opinion, there are three tests which must be applied in the assessment of the application. Firstly, is the wind farm located in an area that maximises the efficient generation and supply of electricity? Secondly, are the visual impacts of the proposal able to be appropriately managed? And thirdly, are the adverse impacts on the natural and built environment, road users, property owners and the community at large, able to be avoided or minimised? These tests are to be considered in their own right and having regard to the overarching intent of the Development Plan in providing for “*essential infrastructure that benefits the environment, the local community and the State*”.

Pacific Hydro has operated two wind 50m meteorological masts on site since 2004. Monitoring indicates that the site has an expected average annual long term speed in the order of 7.7m/s at 80 metres above ground level across the site. Such wind characteristics are considered an above average resource, which has been further reinforced in independent wind assessment. The prevailing westerly wind movement supports development oriented in a north-south arrangement. Wind turbulence is considered to be low to moderate, which further enhances the suitability of this site for wind farm development.

As identified earlier within this report, the existing 275kV line between Tungkillo and Robertstown runs through the site. Pacific Hydro’s assessment indicates that it is feasible to “cut into” the existing transmission line, and that the line has capacity to support a connection of up to 150MW without adversely affecting the network operation.

The proposed Wind Farm has been sited and designed to utilise the existing wind resources of the area. The location of the site, the nature of wind resources and the ability for the proposal to be connected to the national electricity grid from the site, indicates that the proposal is able to generate and supply electricity in an efficient manner in accordance with Council Wide principle of development control 401.

The Development Plan also acknowledges, as an overarching statement of policy, that wind farms per se have a visual impact and that the siting of wind farms may need to occur in visually prominent locations and/or areas of scenic amenity as per the following Council Wide Objectives:

- 51: **Protection of scenically attractive areas, particularly natural, rural and riverine landscapes, accepting that wind farms and ancillary development may need to be located within landscape areas or areas of scenic amenity and that the visual impact of the development will need to be managed.**
- 55: **Conservation, preservation or enhancement of scenically attractive areas, including land adjoining water or scenic routes, accepting that wind farms and ancillary development may need to be located within such areas and that the visual impact of the development will need to be managed.**

It is within this context that the intent of any zone and related policy area must be read when considering wind farm applications.

We address the intent of the Rural Zone and the 'fit' of the wind farm in that zone in the following section.

8.3 Zone Intent and Land Use 'Fit'

The Rural Zone encompasses the majority of the Council area, apart from those areas identified for urban development, rural living, conservation areas or the Murray Valley.

The Development Plan identifies the Zone as being characterised by the agricultural land uses which dominate the zone, with a number of other primary production land uses, such as irrigated orchards, vegetables, vineyards and pastures, where access to water supplies are available. The overarching intent of the Zone is that the primary production activities are retained, with an increased focus on sustainability, economically viable farming activities, large land holdings and protection of the natural landscape, accepting that wind farms and ancillary development may be sited in visually prominent locations.

The Desired Character of the Zone acknowledges that wind farms and ancillary development are an envisaged form of development within the zone, stating:

Such facilities may be of a large scale, comprise a number of components and require an extended and/or dispersed development pattern. These facilities will need to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence, may be located in visually prominent locations.

Additionally, the Desired Character identifies that the Rural Zone's natural character defines the area as important for both tourism and scenic purposes. According to the Desired Character Statement scenic tourism routes traverse the zone and their scenic importance should be conserved. However, the Desired Character, and the Zone policy, is cognisant that wind farms are an envisaged land use, and suggests their visual impacts may need to be managed, including within these scenic areas.

This policy intent is carried through to the more specific Marne Watercourse and Hills Policy Areas within which the subject land also sits. These policy areas represent areas of distinct geographical features within the vast Rural Zone.

The stated intent of each policy area is detailed in their respective Desired Character Statements and objectives and principles of development control. Both policy areas re-affirm and reinforce the appropriateness of wind farms and specifically acknowledge their likely siting in areas of some visual prominence as per the following:

Marne Watercourse (Policy Area 13)

Principles

- 2 Development should preserve and enhance the character and amenity of the River Marne and River Somme and its environs, accepting that wind farms and ancillary development may need to be located within such areas and that the visual impact of the development will need to be managed
- 10 Development should maintain and enhance the natural character and beauty of land within the locality, accepting that wind farms and ancillary development may need to be located within landscape areas or areas of scenic amenity and that the visual impact of the development will need to be managed.
- 11 Buildings should not be sited on prominent ridgelines or in locations that would detract from views obtained from any primary or secondary arterial roads or scenic routes, or in locations requiring unnecessary removal of natural vegetation or excessive amounts of excavation, accepting that wind farms and ancillary development may need to be located within landscape areas or areas of scenic amenity and that the visual impact of the development will need to be managed.

Hills Policy Area 14

Objectives

- 1 Retention of the open rural character as derived from large land holdings used for primary production and dispersed isolated built form, accepting that wind farms and ancillary development may need to be located within such areas and that the visual impact of the development will need to be managed.
- 2 No building development on the eastern face of the Mount Lofty Ranges, unless required to facilitate the development of wind farms and ancillary development.

Principle

- 3 Dwellings and non-rural buildings shall not be located where they are prominently visible from a public road without extensive screening first established, accepting that wind farms and ancillary development may be of a large scale, comprise a number of components and require an extended and/or dispersed development pattern. These facilities will need to be located in areas where they can take advantage of the natural resource upon which they rely and, as a consequence, may be located in visually prominent locations.

Insofar as the siting and design of the proposed development is concerned, we note our own observations and those of Wax Design and BGLA as comprehensively detailed in the Landscape Character and Visual Assessment Report. We concur with the findings of that report which utilises a well accepted methodology in quantifying visual impact.

The proposed wind farm accords with the overarching intent of the zone. The vast majority of the subject site will remain in primary production use. The proposal, though spanning a considerable site area, will only comprise a total 'footprint' of some 48 hectares, equating to less than 1% of the overall site. Furthermore, the turbines are to be sited on ridgelines, which present a relatively lower order of grazing or cropping productivity, compared with areas below ridgelines. In the context of the vast Rural Zone, the loss of land for primary production purposes is negligible.

8.4 Impacts

8.4.1 Visual

Although the primary intent of the Rural Zone is to ensure the long term operation and sustainability of primary production activities and industries, certain forms of development are acceptable within the zone provided they don't jeopardise the core intent of the zone. As identified earlier in this report, wind farms are an envisaged land use in a number of zones,

including the Rural Zone. The Development Plan accommodates wind farm uses where their impacts can be minimised, avoided, or at the least, managed.

Given the scale of wind farm developments, which comprise turbines of significant height and number sited over considerable areas of land, it is acknowledged that there will be some form of visual impact. The policy within the Development Plan, as identified within Council Wide Principle 402, suggests that it impracticable to avoid or minimise the visual impact of wind farms, and that such impacts should, instead, be managed.

402 Wind farms and ancillary development such as substations, maintenance sheds, access roads, wind monitoring masts and connecting power-lines (including to the National Electricity Grid), should be sited, designed and operated to:

- (a) manage the visual impact of the development by achieving the following:**
 - (i) a setback of at least 1 kilometre of a wind turbine from a dwelling that is not associated with the development;**
 - (ii) vegetated buffers to mitigate short to medium range visual impacts;**
 - (iii) regular spacing of wind turbines in open/flat landscapes where vegetation is orderly;**
 - (iv) irregular spacing in hilly/rugged landscapes where vegetation is varied;**
 - (v) ensure that blades on wind turbines rotate in the same direction;**
 - (vi) ensure that all wind turbines have uniformity in terms of colour, size and shape;**

With respect to the above Principle, we confirm visual impact of the proposal has been carefully considered, and the extent of the visual impact managed. The proposed wind farm is situated at least 1 kilometre from the nearest dwelling; the closest dwelling being located greater than 1.5 kilometres from the nearest turbine. The turbines are sited in an irregular pattern as sought for hilly/rugged landscapes. All turbines will have blades that rotate in the same direction, and will be of identical height, size and shape.

We turn to, and adopt, the Landscape Character and Visual Assessment Report for the Keyneton Wind Farm prepared by Mr Warwick Keates and Dr Brett Grimm. The report provides a targeted assessment of the existing landscape character and the extent to which this may change due to the proposed wind farm and its associated infrastructure. The report represents a 'best practice' approach utilising the 'GrimKe Matrix, which assess the landscape character and the visual effect based on:

1. Topographic Relief (the complexity of the land that exists as part of the underlying landscape character);
2. Vegetation Cover (the extent to which vegetation is present and its potential to screen and filter views);
3. Infrastructure and Built Form (the impact of existing development on landscape and visual character);
4. Cultural and Landscape Value (quantification of the percentage of recognised planning overlays within the regional 20km area);
5. Percentage of visual absorption (ability of landscape to absorb and screen the visual change);
6. Horizontal visual effect (spread of the development in the visual landscape);
7. Vertical visual effect (height of the development in proportion to the existing vertical scale of the visual landscape); and
8. Distance of visual effect (distance between viewpoint and closest turbine of the proposed development).

The assessment is undertaken from a number of viewpoints situated between 3 to 10 kilometres from the site. The location of viewpoints was carefully considered and selected with reference to the Zone of Theoretical Influence mapping, site investigations and in consultation with Pacific Hydro and the local community.

The Visual Effect Assessment recognises that each viewpoint has different landscape characteristics, and that the visual effects that will be experienced will vary between locations. In general, the visual effects will be experienced within a highly modified, pastoral landscape. The visual effect of the proposed development will vary from slight to moderate on the eastern side of the Escarpment with higher degrees of visual change generally to the west and a localised area of substantial visual change associated with areas of increased landscape and tourist value.

The Landscape Character and Visual Assessment report provides the following analysis.

The visual assessment demonstrates the relative visual effect of the wind farm within the landscape from a sub-regional and regional context. From locations to the east, the agricultural land use, lack of landscape amenity (absence of natural vegetation cover) and prominent topographic form of the Eastern Mount Lofty Ranges off-sets the potential visual impact of the wind turbines. While the wind farm will be visible, its overall scale is mitigated by the landscape character, underlying topography and panoramic visual qualities of the regional landscape areas to the east. The wind farm is described as producing a slight to moderate degree of visual change within a modified rural landscape.

To the west, the amount of vegetation cover and undulating topography provides significant screening and framing of views throughout the landscape. While the degree of visual change is described as moderate increasing to substantial, the actual visual effect is mitigated by the surrounding landscape context which limits both the number of locations from where the wind farm is visible and the amount of visual effect that will be experienced. By contrast, from the east the visibility of the wind farm increases, due to the elevated position of the wind farm. However, the majority of the proposed wind turbines are located within the transitional and agricultural landscapes of the Eastern Mount Lofty Ranges Plateau and Escarpment. The associated modified agricultural landscape value and increased topographic variations of the escarpment reduce the potential degree of visual change. Through the iterative design process the visual effect has been further reduced by the deletion of certain wind turbines (reducing the wind turbine number from 57 to 42).

The proposed Keyneton Wind Farm will for the majority of the regional landscape be experienced as a moderate visual effect. Although areas of substantial effect were recorded to the west, these more affected locations are contained within a well vegetated and topographically varied landscape where views of the wind farm are often partially or fully screened.

Based on the visual assessment, the Landscape and Visual Impact Assessment concludes that the degree of visual change that will result from the development of a Keyneton Wind Farm will not cause a significant adverse visual impact and that the existing landscape character can accommodate the proposed development. In the opinion of Wax Design and BGLA while the visual effect of the wind farm will be moderate to substantial, the underlying rural and agricultural regional landscape character will be preserved. We accept and agree with these findings.

It is important to note that the landscape character and visual assessment by Mr Keates and Dr Grimm has been ongoing. At the beginning, the wind farm proposal involved the construction of 60 wind turbines, a 43% increase over the current proposal. The number of wind turbines has been decreased on two occasions to reduce the visual impacts by providing visual breaks within the clusters, reducing their prominence on ridgelines and on the character of the Marne River and to reduce the visual prominence of individual turbines.

Our view as to the extent of change of the landscape, or the degree of visual effect, is comparatively subjective in nature to that of Mr Keates and Dr Grimm. It is an assessment of how we perceive the visual qualities and character of the land and locality, and how the proposed wind farm may affect this. We summarise our views as follows:

- the subject land covers a significant area that exhibits a range of topographic and vegetative features;
- some areas within the locality are less visually interesting, while some areas, generally further from the site are more visually interesting and pleasing to the eye;

- at a local level (up to 1km), elements of the wind farm may be dominant features, to the contrary however, there will be instances where the wind farm may not be noticeable even from this distance;
- depending on the complexity or 'beauty' of any view, the presence of a turbine may, depending upon any individuals perspective, detract from the landscape character;
- at distances between 1 to 5 kilometres, the scale of the wind farm decreases, the view or extent of the wind farm changes, the scale of the wind farm reduces, and a larger number of turbines may become visible; and
- at greater distances, i.e. views up to 20 kilometres away, the dominance of individual elements dramatically reduces, although a greater number of elements (i.e. the wind farm as a whole) may be visible.

Pacific Hydro has recognised that there is likely to be some form of visual effect that may occur from certain areas, and to certain degrees. Pacific Hydro will establish a landscape vegetation screening programme which will be eligible to landowners within the locality to mitigate the visual effect on a localised basis.

We accept that, in certain circumstances, the Wind Farm will be visually prominent, however we note the design modification undertaken by Pacific Hydro which has significantly reduced its visual prominence. With respect to Council Wide principle of development control 402(a), the visual effect of the wind farm has been managed by:

- maintaining a minimum setback between dwellings and turbines of 1.5km;
- where there is not sufficient vegetation buffers in place, the proponent will establish a programme to provide localised vegetation screening;
- the turbines are irregularly spaced in the undulating landscape;
- all turbines will rotate in the same direction; and
- all turbines will be uniform in colour size and shape.

8.4.2 Noise

Pacific Hydro commissioned Vipac Engineers and Scientists Ltd to undertake a Noise Impact Assessment for the Keyneton Wind Farm. The assessment involved establishing existing noise levels and the noise modelling of the proposed 42 turbine wind farm, which informed the likely noise impact of the proposed wind farm for a range of operational and wind scenarios using a noise model and accepted noise propagation algorithms.

The predicted noise levels were assessed against the South Australian Environment Protection Authority *Environmental Noise Guidelines: Wind Farms* (2009), the relevant policy in which wind farms would be assessed against, and as directed by Council Wide principle of development control 95.

The following provisions are the most relevant in the assessment of noise generation of the proposed wind farm:

Council Wide

Objectives

- 26 **Development located and designed to prevent adverse impact and conflict between land uses.**
- 26 **Protect community health and amenity and support the operation of all desired land uses.**
- 93 **Development should be designed, constructed and sited to minimise negative impacts of noise and to avoid unreasonable interference.**
- 94 **Development should be consistent with the relevant provisions in the current Environment Protection (Noise) Policy.**

- 98 Location, siting, design and operation of renewable energy facilities as essential infrastructure that benefits the environment, the local community and the State
- 100 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment.

Principles

- 8 Development should not detrimentally affect the amenity of the locality or cause unreasonable interference through any of the following:
 - (b) noise;
- 402 Wind farms and ancillary development such as substations, maintenance sheds, access roads, wind monitoring masts and connecting power-lines (including to the National Electricity Grid), should be sited, designed and operated to:
 - (c) avoid or minimise the following impacts on nearby property owners and/or occupiers, road users and wildlife:
 - (ii) excessive noise;

We defer to, and rely upon, the report prepared by Vipac providing an assessment of the noise generated by the wind farm against the current EPA Environmental Noise Guidelines: Wind Farms (2009).

In accordance with that Policy, Vipac has prepared a report which indicates:

- the site is within the Rural Zone and there are approximately 150 noise sensitive receivers (dwellings) within 6km of the site;
- the relevant noise criteria is (whichever is greater):
 - 40dB(A) at relevant receivers in localities in the Rural Zone, or
 - the background noise level (LA90,10) plus 5dB(a);
- background noise was measured at nine sites around the locality. Wind speed and direction was also recorded by two meteorological masts within the wind farm site;
- the relevant noise criteria, based on the EPA policy 40dB(a) for seven of the sites and 43dB(A) and 48dB(A) for the remaining two sites;
- predicted sound power levels for noise propagation in various meteorological conditions was established;
- the predicted sound pressure levels at each residential receiver was assessed using the background data and the established sound power levels of the wind farm;
- the predicted noise levels, for worst case conditions range 36.1dB(A) at the nearest sensitive receiver, which is a non-financial stakeholder.

Additionally, the following observations were noted by Vipac:

- a slight 'swish' type noise may be audible in the near vicinity of a turbine as a result of the rotor blade passing through the air and past the support tower; a slight 'hum' from the generator may be heard. These minor noises diminish significantly over distance, and mix to form low level background noise;
- modern wind farms do not generate significant levels of low frequency noise (less than 100Hz). Infrasound (inaudible range <20Hz) is most unlikely to be perceptible to humans.

Infrasound is naturally occurring in the environment and was a feature in some older 'downwind' turbines over 20 years ago;

- substation noise has been incorporated into the predicted sound power levels;
- construction and traffic noise will be within the allowable continuous noise criteria of 45dB(A) at the noise-affected premises. Regardless, due to the siting and construction methods, no individual sensitive receiver will be subject to extended or permanent disturbance by construction or traffic noise.

As sought by principle 95, Vipac has indicated that the proposed wind farm is able to comply with the EPA's Environmental Noise Guidelines Wind Farms (2009).

On this basis, we are satisfied that the proposed development will not detrimentally affect the amenity of the locality by excessive noise propagation.

8.4.3 Flora/Fauna

Council Wide

Objective

- 52 Native flora, fauna and ecosystems protected, retained, conserved and restored.
- 53 Restoration, expansion and linking of existing native vegetation to facilitate habitat corridors for ease of movement of fauna.
- 56 Preservation and replanting of roadside vegetation.
- 57 Preservation of natural vegetation of historic, local or particular visual significance.
- 59 Retention of environmentally-significant areas of native vegetation.
- 100 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment.

Principles of Development Control

- 402 Wind farms and ancillary development such as substations, maintenance sheds, access roads, wind monitoring masts and connecting power-lines (including to the National Electricity Grid), should be sited, designed and operated to:
 - (b) avoid or minimise the potential for adverse impact on areas of native vegetation, conservation, the natural environment, geological, tourism or built or natural heritage significance;
 - (c) avoid or minimise the following impacts on nearby property owners and/or occupiers, road users and wildlife:
 - (iv) modification of vegetation, soils and habitats;
 - (v) striking of birds or bats.

EBS Ecology was engaged by Pacific Hydro to undertake an assessment of the impact that the wind farm may have on:

- flora and fauna;
- avifauna and raptors; and
- bats.

Each of the assessments comprised a survey of an area covering some 1,200km². The survey involved reviewing existing databases of flora and fauna within the area as well as extensive field surveys. Based on these surveys, an assessment of likely impacts was undertaken and mitigation measures proposed.

We provide the following summary of each report.

Flora and Terrestrial Fauna

EBS, based on their initial investigations established 12 'vegetation associations' which identified spatial areas and the type of vegetation contained within them. Each association was assessed with respect to the type of floral species contained within them, and included the identification of any national or state conservation rated species. Additionally the condition of each association was assessed. EBS identifies that poor condition areas do not qualify as critically endangered under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) .

No EPBC listed flora species were identified during the survey, however one state conservation significant species, the *Anogremma leptophyllina* (Annual Fern) was identified within a gorge in the north east area of the site that is inaccessible for development.

Few terrestrial fauna species were identified during the field survey, however, two State rated rare species were discovered, being the *Trichosorus Vulpeular* (common brushtail possum) and the *Pseudophryne Bibronii* (Brown Toadlet).

A number of mitigation measures have been either proposed or undertaken to ensure that the siting of turbines does not affect the listed species or areas of significance. Turbine locations have been sited to avoid the removal of any mature South Australian Gums. Additionally, riparian habitats and rocky outcrops have been avoided as they are generally in valleys.

Avifauna and Raptors Nest Assessment

EBS undertook a series of bird surveys at and around the Keyneton Wind Farm site. Surveys were undertaken through different seasons to account for breeding activity patterns. The surveys were aimed at identifying any significant species and to assess the breeding habits of the Wedge-tailed Eagle.

During the surveys no EPBC Act listed bird species were recorded, however an online search did list three EPBC listed species as likely to occur in the area. They were the Rainbow Bee Eater (*Merops ornatus*), Great Egret (*Phalacrocorax carbo*) and the Cattle Egret (*Ardea ibis*).

The site survey recorded no birds of national conservation status, although recorded four species of State conservation status. They were the Peregrine Falcon, Egret Parrot, the Jacky Winter and the White-winged chough.

Further investigation into the locations of the Wedge-tailed Eagle and Peregrine Falcons was undertaken. The survey identified twelve potential Wedge-tailed Eagle nests, of which nine were subsequently confirmed to be Wedge-tailed Eagle nests. The nine Wedge-tailed Eagle nests were considered likely to belong to at least two breeding pairs. One Peregrine Falcon nest was recorded on site.

The assessment of potential impacts included an assessment of the risk of direct collision, barrier to flights, habitat loss and disturbance. Based on this assessment a series of mitigation measures have been introduced into the wind farm design. These measures include:

- 1,000m buffer around the Peregrine Falcon nest site;
- 500m buffers around the nine Wedge-tailed Eagle nests;
- avoiding the removal of any mature gums, and the minimisation of native vegetation removal;

- further survey and monitoring of Wedge-tailed Eagle and Peregrine Falcons breeding activity; and
- regular long-term bird strike monitoring programme.

Bats

Similar to the other assessments, the assessment included both a database search and further on-site survey and recording.

The on-site monitoring recorded eight bat species, none of which are National and State Conservation listed. Additional species may have been recorded, as a proportion of the total calls received, but were not able to be identified at the species level.

Habitat clearance is understood to be the primary threat to bats. As the turbines are sited to avoid native vegetation, the impact on existing bat habitats will be minimised. Bat strikes can occur where turbines are sited in areas where bat activity within the rotor swept area occurs. Additionally, bats may be subject to barotrauma, which affects bats by localised changes in air pressure.

Areas that have high concentrations of bats have been avoided to minimise any impacts. The adoption of habitat buffers will reduce the likelihood of bat impacts (either direct or indirect).

Mitigation measures have included:

- siting turbines in areas that do not provide preferred bat habitat, such as wooded areas;
- adopting turbine exclusion buffers; and
- establishing bat monitoring and activity programmes to monitor long term impacts and ensure the adequacy of mitigations.

Council Wide Principle 402 requires wind farms to be sited, designed and operated to avoid or minimise impacts on the natural environment, including the modification of habitat and the striking of bats or birds.

In our view, the assessment of EBS and the subsequent informing of the wind farm design, indicates that impacts on all flora and fauna will be low. Significant impacts have been avoided by refining the design of the wind farm, the siting of individual turbines and the incorporation of recommended mitigations such as nest and habitat buffers.

We are satisfied that the proposal avoids or minimises impacts on the natural environment and local wildlife.

8.4.4 Cultural and Heritage

Council Wide

Objective

- 58 Conservation of land, buildings, structures and other items of significant historical, social and architectural or other Aboriginal or European heritage significance.**

Principle of Development Control

- 164 Development liable to create significant adverse effects on natural features, areas of significant native vegetation, drainage systems, water catchments and storage areas, the River Murray or any associated water bodies, fragile land, scenic routes or scenically attractive areas, or areas of environmental significance, should not be undertaken, accepting that wind farms and ancillary development may need to be located within landscape areas or**

areas of scenic amenity and that the visual impact of the development will need to be managed.

Australian Cultural Heritage Management (ACHM) were engaged by Pacific Hydro to undertake an anthropological and archaeological assessment of the site. The assessment reviewed items of both Aboriginal and European heritage.

The assessment identified one archaeological site (a scarred tree, registered) and one potential archaeological site (a rock art site, unregistered). Neither of these sites will be impacted by the development. Upon further inspection, a number of areas were mapped according to their archaeological sensitivity. Some areas around the North Rhine River and pockets of native vegetation were designated as high areas of sensitivity. Three minor creeks were considered of medium significance and the remaining area of low significance.

A search of the both the National and South Australian Heritage Database indicated that there were no heritage items within the site. Two State Heritage listed items were located near the site, an engine house for the North Rhine Mine and an historic bridge adjacent to Angaston-Sedan Road.

The work undertaken by ACHM, in conjunction with consultation with the Peramangk Traditional Owners (represented by the Mannum Aboriginal Community Association Inc.) recommended the relocation of one turbine. This turbine was subsequently removed from the design.

A number of mitigation measurements are proposed by ACHM and will be implemented by Pacific Hydro. If any subsequent sites are uncovered, they will be treated in accordance with the requirements of the *South Australian Aboriginal Heritage Act 1998*. On the basis that the recommendations of ACHM are implemented, we are satisfied that the proposed development will conserve and protect items of both Aboriginal and European significance.

8.4.5 Aircraft Safety

Council Wide - Renewable Energy

Objective

98 Location, siting, design and operation of renewable energy facilities as essential infrastructure that benefits the environment, the local community and the State.

Principle of Development Control

403 Renewable energy facilities, including wind farms and ancillary development, should be designed and sited so as not to impact on the safety of water or air transport and the operation of ports, airfields and designated landing strips.

Pacific Hydro has engaged an independent assessment of the impact the proposed wind farm may have on aviation activities. The assessment reviewed the location of existing airfields, local flight movements and the need, or otherwise, for obstacle lighting.

The nearest licensed aerodromes are the Parafield Airport (55 km), the Adelaide Airport (70 km) and the Waikerie Airport (85 km). Additionally, the Wind Farm is approximately 53 km from the Edinburgh military airport. There are further unlicensed aerodromes located within 20 km from the site, being:

- Angaston (7.5 km);
- Mount Lindsay Stud (9 km);
- Sanderson (11 km); and
- Sedan (12.5 km).

Flights from these aerodromes are generally itinerant, private and for agricultural operations. Flights would only be during daylight hours and under Visual Flight Rules (VFRs). The assessment indicates that the wind farm is of sufficient distance from each of these aerodromes so as not to have any adverse impacts on their operation.

On this basis, and given the distance of waterways and ports, the application is considered to comply with Council Wide Principle of Development Control 403.

8.4.6 Transportation and Access

Council Wide

Objectives

- 14 Safe and efficient movement of people and goods by road.
- 15 Provision of a system of scenic routes serving the district and their protection from inappropriate development.
- 16 Free flow of traffic on roads by minimising interference from adjoining development.

Principle of Development Control

- 35 Development liable to generate traffic volumes which cannot safely and conveniently be accommodated on the existing or proposed road system should not be undertaken.
- 38 Development should include an appropriate provision on the site to enable the parking, loading, unloading, turning and fuelling of vehicles and pedestrian or cycle movement in a safe and convenient manner. Shared parking areas or sites located elsewhere other than on site should only be provided where such an arrangement is to be benefit of the community.
- 40 Driveways, access tracks and parking areas should:
 - (a) follow the natural contours of the land;
 - (b) follow the geometric pattern of plantings;
 - (d) be designed and constructed with a minimum amount of excavation and/or fill;
 - (e) be designed and constructed to minimise the potential for erosion from run-off; and
 - (e) not involve the removal of existing vegetation.

Matters of transportation and access, as they relate to Wind Farm developments, fall into two distinct and discrete groupings, namely construction and ongoing operation and management. We address these as follows.

Construction

Typically, off-site impacts borne from constructing a development do not fall within the ambit of the planning assessment of that development unless the activities are such as to likely prevent the development proceeding. For example, the construction of any large development is likely to impact surrounding road and/or road networks to some extent and, in certain circumstances, to a significant extent. The construction of the New Royal Adelaide Hospital, for example, necessitates long-term road closures whereas the new South Road Superway has required the actual construction of long-term bypass roads.

To this end, it is an accepted planning premise that these temporary and one-off works do not generally bear significantly upon the merits of any development proposal. Nonetheless, as is typical with Wind Farm developments, detailed consideration has been given by the proponent to the practicality and impacts of bringing large component parts to the development site.

Although the application of Council Wide Principle 35 is considered to be limited to 'day-to-day' operations, as opposed to the construction process, Pacific Hydro has undertaken a detailed analysis of the proposed approach routes to the site making maximum use, as able, of prescribed higher mass limit (HML) and B-Double roads. In determining vehicular approach to the site,

consideration has been had to road capacity, road width, proximity to townships and roadside vegetation.

Having regard to the information detailed within the application, appropriate regard has been had to access for construction purposes to the subject land. Construction is envisaged to take some 24 months, following which the use of the broader network is limited to day-to-day operational requirements, save any infrequent requirements to move replacement components to the site.

Day-to-Day Operations

Following construction, on/off-site movements will occur to a minimal extent, comprising essentially maintenance and monitoring staff using standard vehicles, utilities or four wheel drive vehicles. Such attendance would ordinarily be in the order, on average, of no more than once or twice daily including marking allowance for maintenance and repairs (if and as required). Such movement would have no consequence or impact upon the surrounding road network or its other users.

Provision for irregular major maintenance (e.g. – such as major gearbox oil changes required approximately every five years) and any unforeseen events (such as failure of a gearbox) will be accommodated for within the project's Traffic Management Plan (TMP). DPTI, Mid Murray and Barossa Councils' will be consulted during the development and implementation of this detailed TMP.

There are no elements of the proposal in terms of off-site traffic movement which conflict with the intent of the Development Plan.

With respect to other referenced and applicable provisions regarding the construction of on-site access tracks, the following is noted:

- tracks are constructed leading to and between turbines to facilitate, in the first instance, construction and thereafter access via utility or similar vehicle for maintenance and/or repair;
- the majority of tracks are located on the Plateau such that they will not be prominently visible (if visible at all in many circumstances) from the lower elevations surrounding the land;
- tracks are formed to meet required gradients for heavy vehicle movements and, as such, generally follow the contours of the land; and
- track width will typically be 5m access on most of the site, excepting those areas where two-way movement of heavy vehicles or turning areas are required.

All tracks are constructed so as to minimise scouring and erosion utilising, as required, vegetated swales and cross flow paths (the route taken by run-off down a slope or over a road). In the majority of cases, track design and gradients are such that the likelihood of erosion caused by run-off is very low. In any event, all access tracks will be constructed so as to minimise erosion and will be monitored through the life of the development.

Having regard to the above, the proposal is considered to accord with the relevant provision of the development plan with respect to matters of access and on-site construction and movement.

8.4.7 Shadow Flicker and Blade Glint

Council Wide

Objective

- 100 **Location, siting, design and operation of renewable energy facilities to avoid to minimise adverse impacts on the natural environment.**

Principle of Development Control

402 Wind farms and ancillary development such as substations, maintenance sheds, access roads, wind monitoring masts and connecting power-lines (including to the National Electricity Grid), should be sited, designed and operated to:

(c) avoid or minimise the following impacts on nearby property owners and/or occupiers, road users and wildlife:

(i) shadowing, flickering, reflection or blade glint impacts;

Shadow flicker results from the position of the sun in relation to the blades of the wind turbines as they rotate. It is most common under certain geographical position and time of day circumstances, and particularly prevalent when the sun is low in the sky, where the shadow of the turbine is projected on the face of a building or wall. When this flicking occurs through a narrow opening, such as a window, it is known as shadow flicker.

There are no South Australian planning guidelines that regulate a maximum amount of shadow flicker. Victorian planning policy sets a maximum amount of shadow flicker occurring at residences as 30 hours per year.

Pacific Hydro has modelled the extent of shadow flicker that will occur around turbines. Shadow flicker is most prominent at distances within 500 metres of a turbine. The modelling undertaken by Pacific Hydro indicates that no dwelling is to receive more than 30 of hours of blade flicker per year.

To eliminate blade glint, it is now common practice to finish turbines, including the towers, blades and the nacelle, in a matt non-reflective coating. This method has been used in practice by Pacific Hydro whom have not received any complaints regarding blade glint in their 10 years of operating wind farms.

We consider the effects of shadow flicker and blade glint are likely to be minimal, and unlikely to adversely affect the amenity of the locality.

8.4.8 Telecommunications and Electromagnetic Interference

Council Wide - Renewable Energy

Objective

100 Location, siting, design and operation of renewable energy facilities to avoid or minimise adverse impacts on the natural environment.

Principle of Development Control

402 Wind farms and ancillary development such as substations, maintenance sheds, access roads, wind monitoring masts and connecting power-lines (including to the National Electricity Grid), should be sited, designed and operated to:

(c) avoid or minimise the following impacts on nearby property owners and/or occupiers, road users and wildlife:

(iii) interference with television and radio signals;

Pacific Hydro has undertaken investigations into the likely impacts the turbines may have on:

- television reception;
- radio;
- microwave links;
- differential geographical positioning systems; and
- radar interference.

The investigations indicate that in some instances some disruptions to analogue television reception may occur. These are likely to be in certain locations depending on the direction of the transmitted signal in relation to the turbines. There are not anticipated to be any additional reception problems to digital signals by the introduction of the turbines.

Pacific Hydro will implement a programme that ensures that the turbines do not affect television reception and have identified a series of measures that can be undertaken to ensure adequate reception. Measures include minor adjustments of TV antennas through to the installation of cable or satellite TV.

Given the distances between turbines and dwellings, the proposed Wind Farm is unlikely to impact on the existing AM or FM radio signal quality or strength. Such issues would only occur where distances between turbines and dwellings are extremely close, in the order of 50 metres apart.

There are 16 microwave transmitters within 25km of the site. None of the transmitting towers provide point to point links. A point to multipoint link registered to the Bureau of Meteorology used for transmitting rain gauge data is located within the site boundary. Consultation with the Bureau indicates that it will not be affected by the proposal.

The Wind Farm has potential to interfere with the differential geographical positioning systems which are used by local farmers. Further investigations are to be undertaken in the pre-construction phase to determine the areas at risk, the quality of existing reception and remediation options (e.g. provision of repeater stations).

Pacific Hydro has identified one radar within 20km of the site. The radar is licensed to Airservices Australia and is a non-directional beacon at Stonefield Airfield. Airservices Australia does not anticipate any interference as a result of the proposed Wind Farm.

We are satisfied that the above investigations indicate that the proposal will not adversely affect radio or television signals. In the event that the Wind Farm does interfere with these signals, Pacific Hydro will implement measures to resolve such problems.

8.4.9 Other Relevant Considerations

Bushfire

The majority of the subject land falls within an area of General Bushfire Risk, with only a very small element (situated at the south-western corner of the site approaching Med Wrights Road and Jutland Road) located within an area of Medium Bushfire Risk. None of the Mid Murray Council area (and, accordingly, none of the subject land) falls within an area of High Bushfire Risk.

The bushfire provisions of the Development Plan are directed primarily to habitable buildings, structures which can trap burning debris (ie under floor areas of transportable buildings) and land division. None are of particular assistance, or relevance, in considering Wind Farm developments. However, the proponent has consulted the Country Fire Service (CFS) which will likely comprise a formal referral authority in any application. The CFS is in the process of preparing detailed guidelines applicable to Wind Farm developments. In the absence of any more formalised guidelines, and in accordance with Council Wide Principle 400, the proposal will satisfy all code criteria set out in the relevant Minister's Code and have designed the proposal accordingly.

Wind Farms per se have no inherent built form or operational characteristics which introduce an increased risk of fire, nor do their presence inhibit firefighting practices (either aerial or on ground). Nonetheless, a detailed Fire and Emergency Management Plan will be prepared in consultation with the CFS and the Mid Murray Council.

Stormwater Management

The management of stormwater is related to the construction of access tracks and hardstand areas. Appropriate management mechanisms and techniques implemented throughout the design, construction and operational phase of the project will address matters of erosion and sedimentation.

Such mechanisms and techniques include:

- at the design phase ensuring wherever practicable: gradients for access tracks are kept to a minimum and follow contour lines; minimal disturbance of vegetation; avoidance of friable soils and existing areas of erosion;
- at the construction phase ensuring wherever practicable: cross-flows temporarily are diverted and, later, accommodated via formed flow paths and use of crushed rock (or vegetate?) swales; if required, sediment traps and stabilisation devices are used to address scouring; and exposed earth is stabilised via revegetation or other temporary measures;
- during the operation phase: carrying out routine inspections of tracks, hardstand areas and pits/traps; specific inspections of watercourses undertaken following heavy rain events.

Measures to address stormwater during the construction and operational phases of the project will be detailed within an Environmental Management and Monitoring Plan.

Management and Monitoring Plans

The construction and operation of the wind farm to be undertaken within a detailed framework of documented management and monitoring practices. These practices will be detailed within a series of Environmental Management and Monitoring Plans (EMMP). Pacific Hydro has outlined the type of measures and mitigations that are to be incorporated within the EMMPs that are prepared at detailed design.

The EMMPs will cover construction, operations and decommissioning whilst other documented procedures address complaints, training and induction, and auditing.

The EMMPs provide a mechanism whereby the stated intentions of the proponent can be documented and outcomes monitored. EMMP's are typically finalised following any planning approval, once further information relating to planning conditions, suppliers, building rules requirements, the site's geotechnical conditions and lead contractor's preferred methodologies . They are usually required, by condition attached to any approval, to be approved prior to issuance of full Development Approval. Such arrangement is considered appropriate in this instance with subsequent EMMPs conforming generally with the outlines provided within the application proper.

9. Conclusions

The proposed Keyneton Wind Farm is considered to be fully in accord with the State Government policy regarding the provision of renewable energy facilities as detailed in the States highest level strategic document, South Australia's Strategic Plan 2011. Further, it is supported by the subservient documents detailing the State's infrastructure and Renewable Energy targets in the short and medium term.

At the 'development' level, the Planning Strategy, the Statewide Wind Farms DPA (and its supporting investigations), and the Mid Murray Development Plan set, at increasing levels of specificity, the intention to facilitate wind farms across the State and to set criteria against which such developments are to be assessed. At the most specific on-site level, the Development Plan acknowledges that the very nature of wind farms is such that they will likely be sited in visually prominent locations and that one of the key tests is to manage any visual impact.

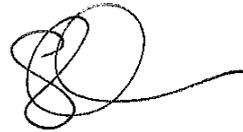
The Development Plan also sets assessment criteria addressing impacts associated with the ongoing operation of wind farms which, in turn, informs the initial site selection and the subsequent design of the development. Ongoing operational matters are further managed by a series of Management and Monitoring Plans.

Having regard to all of the above, to the detail provided within the application proper and to the various expert reports provided, it is our opinion that the proposed development satisfies the Development Plan and incorporates elements in its design and ongoing management which appropriately manages, avoids or minimises impacts upon owners and occupiers of land within the vicinity of the development and upon the natural environment (including flora and fauna).

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