
Submission to New South Wales Department of Planning**Preliminary Environmental Assessment**

Crookwell 3 Wind Farm, Crookwell, New South Wales

Prepared by Tract Consultants Pty Ltd

12 February, 2010

1 Introduction

Tract Consultants, on behalf of Crookwell Development Pty Ltd (CDPL), have prepared this Preliminary Environmental Assessment (PEA) to provide initial details of the Crookwell 3 Wind Farm to the NSW Department of Planning.

The proposed wind farm site is located in the NSW Southern Tablelands, approximately 17km south-east of Crookwell township. It is proposed to include approximately 25 to 35 turbines of up to 3.3MW each across two separate development parcels to the east and south of the existing Crookwell 1 and approved Crookwell 2 wind farm (currently under construction). These separate parcels will be referred to from this point on as Crookwell 3 East and Crookwell 3 South, and collectively referred to as 'the site'.

It is understood that this PEA will allow the drafting of *Director Generals Requirements* to be addressed by an Environmental Assessment (EA) to be lodged with the NSW Department of Planning for assessment.

The proposed wind farm supports the NSW Government's renewable energy policies and directly implements the Federal Government's renewable energy target of 20% of Australia's energy sourced by renewable energy by 2020. By supplying a clean and renewable source of energy, the project will help reduce Australia's greenhouse emissions and assist in addressing the dangerous impacts of climate change.

This document represents an overview of the site and surrounds, describes the proposal in its preliminary form, summarises the planning instruments and outlines the key issues and next steps for the project.

2 The Site and Surrounds

2.1 Regional and Local Context

The site is located in the NSW Southern Tablelands, approximately;

- 17km south-east of Crookwell township;
- 25km north-west of Goulburn;
- 90km north – east of Canberra.

Following a recent amalgamation of Local Government boundaries, the site now falls entirely within the Upper Lachlan Shire Council Local Government Area.

Land use in the locality is predominantly rural with agricultural industries including wool, lambs, beef cattle and seed potatoes. Smaller plot vineyards and other boutique rural uses, such as flower farms, have been established more recently in the region.

Please refer to **Figure 1 – Locality Plan**.

The surrounding area is undulating with some steeper slopes around incised valleys. Crookwell 3 South is bordered by Pejar Dam on the eastern side, with Woodhouselee Road providing the western boundary to Crookwell 3 East.

At approximately 2500 people, the Crookwell township is the closest significant population centre to the site, with the regional centre of Goulburn located further south via Crookwell Road. Goulburn is a large town of approximately 22,000 people and is known for its contribution to the Australian wool and agricultural industry.

2.2 The Site

Crookwell 3 includes two separate development parcels to the east and south of the existing Crookwell 1 and approved Crookwell 2 Wind Farm.

These parcels are referred to as Crookwell 3 East and Crookwell 3 South. Please refer to **Figure 2 – Site Analysis Plan** and the accompanying site photos. Crookwell 3 South comprises 400 Hectares of rural land with access via Crookwell Road. Crookwell 3 East comprises 1100 Hectares of land and is accessed from Woodhouselee Road. The site consists of approximately 15 individual titles in total amongst three different landowners.

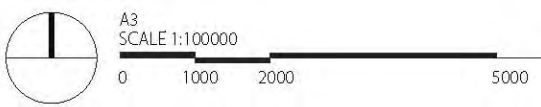
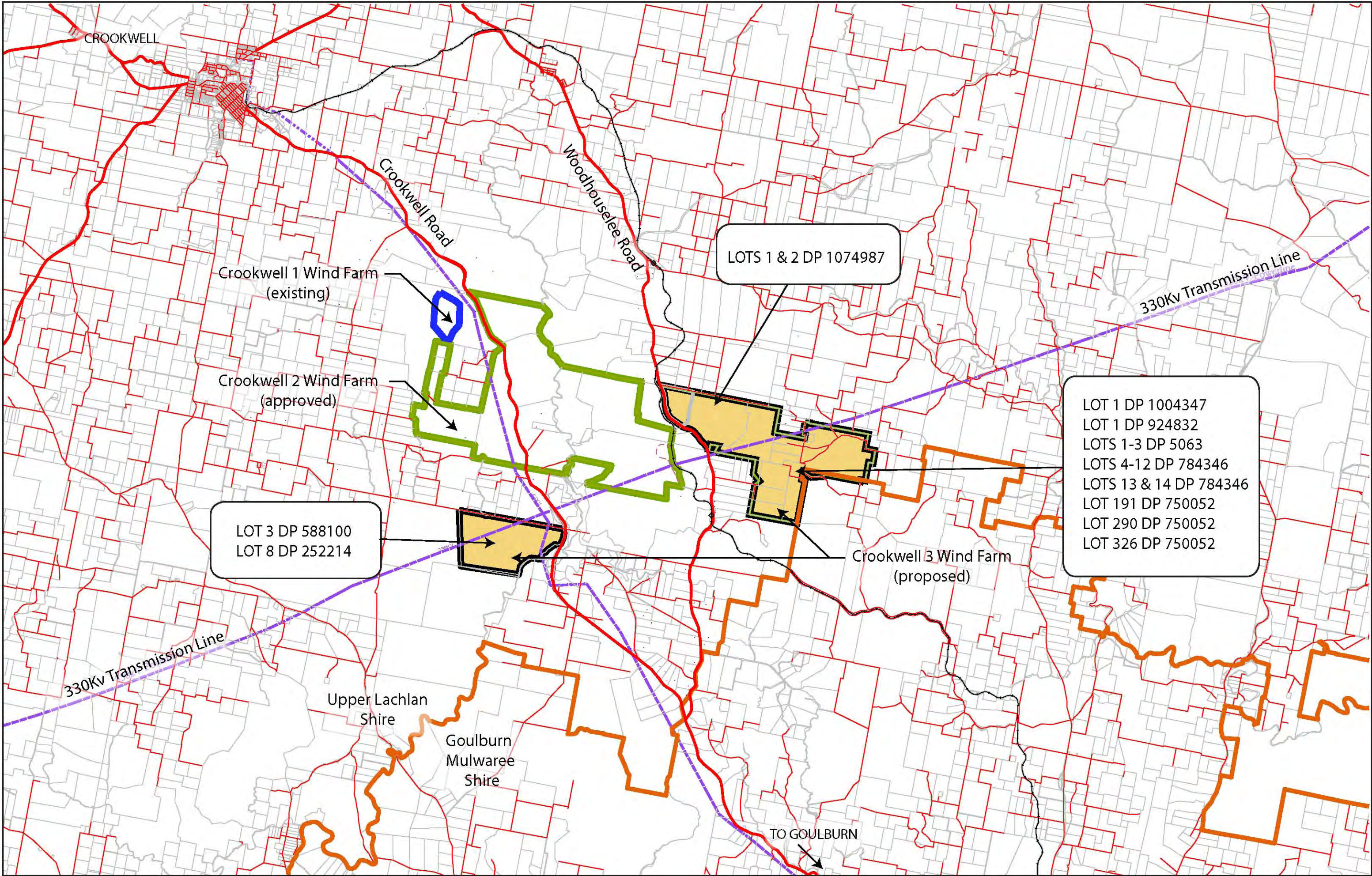
The majority of the Crookwell 3 South has been cleared of native vegetation, but retains isolated remnant patches. The majority of Crookwell 3 East has also been cleared of native vegetation, however there are some larger areas of vegetation, which have been fenced for protection from livestock. One of these is as reserve vested in Upper Lachlan Shire and is referred to as 'Peach Hill'. Some planted windbreaks exist at the site.

The vegetation comprises a mix of types as the result of a long history of grazing activities. Remnant trees occur along some creeklines, road verges and in isolated remnant patches.

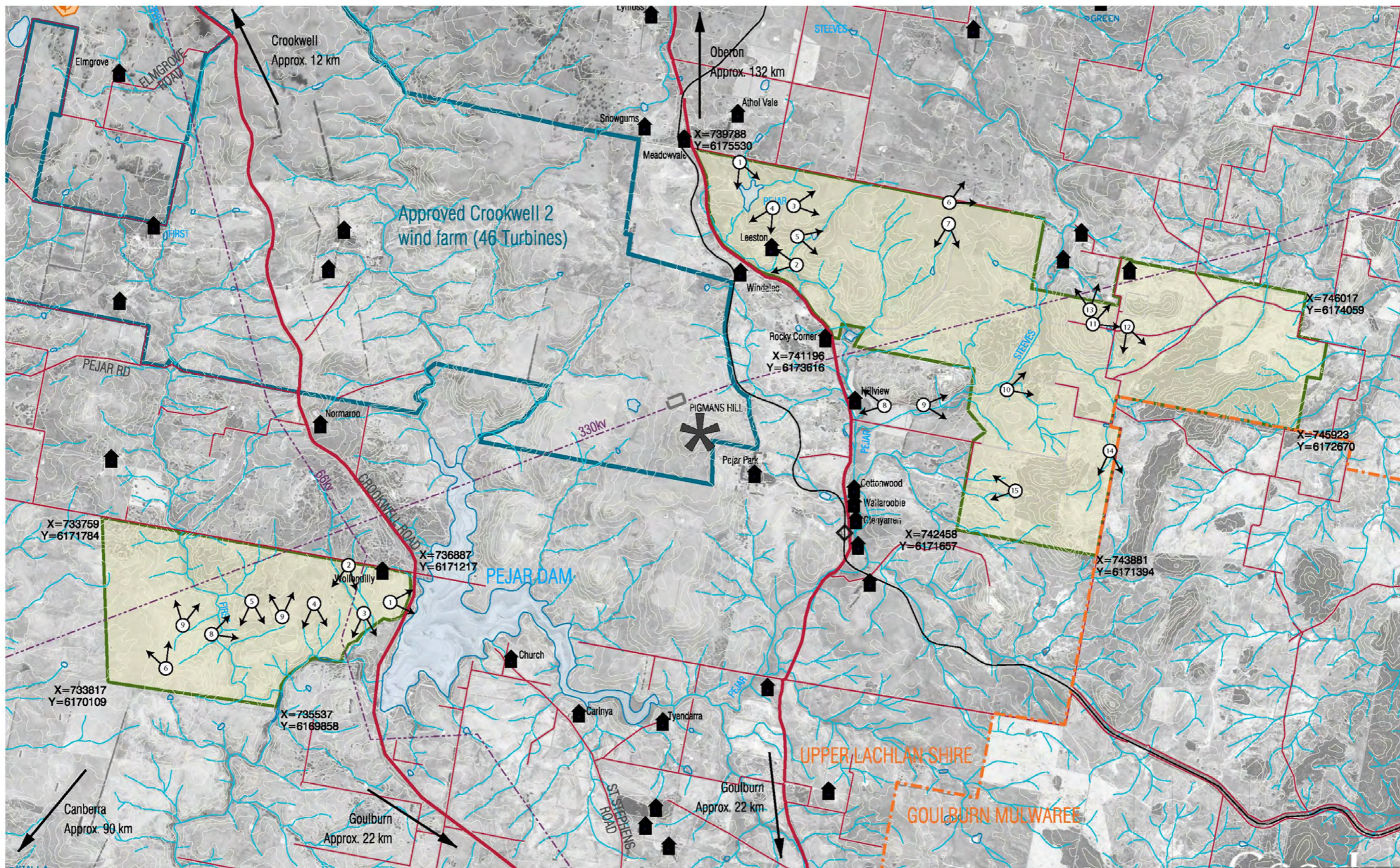
Both parcels are undulating with a number of ridges and waterways. Steeves Creek runs through Crookwell 3 East and First Creek through Crookwell 3 South. There are several additional incised drainage lines which run through the site. The site ranges between approximately 765m and 931m above sea level, with Crookwell 3 South on average 100m lower than Crookwell 3 East.

The landscape within the site and its surrounds is generally rural, across cleared undulating hills with scattered rural dwellings and sheds present. The character of the site is typical of the surrounding area. The landscape consists of the following elements:





- Grassed areas, most commonly introduced pastures;
- Scattered trees and some larger clusters;



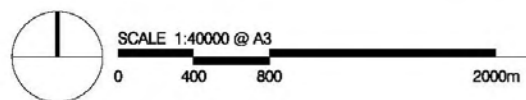
LOCATION PLAN (PROPERTY DETAILS)



LEGEND

- | | | | | | |
|---|----------------|---|-------------------|---|----------------------------|
|  | Activity Area |  | 2WD/4WD Road |  | Rail Station |
|  | Major Road |  | Locality Boundary |  | Dwelling (Indicative Only) |
|  | Secondary Road |  | Rail Line |  | Transmission Line |
| | | | |  | |

SITE ANALYSIS



SITE PHOTOS - Crookwell 3 South



1. View east to Pejar Dam from landowners dwelling



2. Typical landscape of Crookwell 3 South



3. Characteristic drainage line



4. Planted wind break



5. Rocky Hilltop



6. Transmission line from highest point

SITE PHOTOS - Crookwell 3 South



7. Small Dam and other farm infrastructure



8. Wind mill and shed



9. Yellow Box (remnant vegetation)

SITE PHOTOS - Crookwell 3 East



1. View to Dam from Boltons Road



2. Leeston Homestead



3. Typical landscape from hilltop



4. Pigman's Hill from hilltop



5. View east with Dam in foreground

SITE PHOTOS - Crookwell 3 East



6. Intersection of Bolton's Road and property boundary



7. View south along drainage line to Dam



8. Hillview Homestead



9. Site from western access point

SITE PHOTOS - Crookwell 3 East



10. Fenced reserve



11. View south from northern boundary



12. Dam with Willowvale Hill in background

SITE PHOTOS - Crookwell 3 East



13. View to non-participating dwellings from northern boundary



14. Potential access road at eastern boundary



15. View west from central southern portion of site

- Limited Rocky Hilltops;
- Drainage lines and creeks;
- Flats; and
- Some planted wind breaks.

The landscape is punctuated by human infrastructure including:

- Residences, usually associated with a surrounding farm;
- Agricultural structures (silos, sheds etc);
- High voltage powerlines;
- Dams.
- Farm tracks
- Fencing

The existing Crookwell 1 Windfarm is also present on the landscape and is visible from Crookwell Road during the site approach.

3 Project Description

3.1 Purpose

The PEA has been prepared to support a future EA for the proposed Crookwell 3 Wind Farm, located 17km to the south east of Crookwell. It provides a description of the site and surrounds, a preliminary overview of the project details, and a summary of the key planning instruments.

The purpose of this chapter is to provide an overview of the preliminary specifications of the proposal. Whilst the approximate number of turbines that the site can accommodate is expected to be between 25 and 35 turbines, the location of the individual turbines is not resolved at this stage and will be informed by the next phase of investigations.

The next stage of the process will also provide greater clarity of the preliminary details of the project through the engagement of a wider range of specialists. Their work and findings will inform the EA, to be prepared and submitted with the NSW Department of Planning.

3.2 Project Overview

The project will comprise a number of elements, including:

- 25 – 35 individual wind turbines standing up to 152m at top of blade tip with up to 3.3MW capacity each;
- Internal unsealed tracks for turbine access;
- Potential upgrades to local road infrastructure;
- An underground electrical and communication cable network linking turbines to each other and the proposed substation;
- A potential temporary concrete batching plant to supply concrete for the foundations of the turbines and other associated structures;
- The potential for obstacle lighting to selected turbines;
- The potential removal of native vegetation.

Grid connection will be achieved via connection to the 330kv transmission line which bypasses the site. The site will share a single substation, control room and grid connection with the approved Crookwell 2 Wind Farm which will be connected via an underground connection across Woodhouselee Road from Crookwell 3 East and from Crookwell 3 South via underground connection within either the property to the north or within the Crookwell Road reserve.

The project has a capital investment of approximately \$90 - 120 million and will generate between 45 to 116 MW of electricity.

The site consists of three landowners which have entered into an Agreement for Lease with CDFL.

3.3 Turbines

The following table represents the turbines currently under consideration by CDFL for the project. At this early stage in the planning process, flexibility is needed for the turbine selection as the turbine industry changes rapidly and models can become obsolete in a small space of time.

Turbine Option	1	2	3	4	5	6	7	8	9
Turbine Model	V90	MM92	V100	N100	2.5xl	E100	SWT101	3XM	V112
No of Turbines	25 to 35								
Tower Hub Heights (m)	80 95 105	80 100	80 95	80 100	75 85 100	80 90 100	80 90	80 100	84 95
Rotor Blade Length (m)	44	46	49	49	49	49	49	51	55
Rotor Diameter (m)	90	93	100	100	100	100	101	104	112
Total Height To Tip (m)	125 140 150	127 147	130 145	130 150	125 135 150	130 140 150	131 141	132 152	140 150
Turbine Capacity (MW)	2.0	2.0	1.8	2.5	2.5	3.0	2.3	3.3	3.0
Total Wind Farm Capacity (MW)	50 / 70	50 / 70	45 / 63	63 / 88	63 / 88	75 / 105	58 / 81	83 / 116	75 / 105

To maximise energy generation, wind turbines are automated to rotate to face into the wind. The turbines selected for consideration have a cut-in speed of between 3m/s and 4m/s in response to the particular conditions at the site.

There are some slight differences in the electrical construction of the turbines under consideration. Some of these options have a transformer in the nacelle, and a switchgear either in the base of the tower or next to the tower. Other turbines have the transformer and the switchgear on the ground in a kiosk next to the tower.

3.4 Electrical Works

The electrical works proposed comprise;

- Electrical cables linking the turbines to each other;
- Two major underground connections linking Crookwell 3 East and South to the approved substation within Crookwell 2;

All infrastructure associated Grid connection will be achieved by connection to the 330kv transmission line in conjunction with Crookwell 2 wind farm.

3.5 Access

Within the site, unsealed access tracks would be created to connect the turbines to the main roads. Some of these may utilise existing farm tracks modified to fit machinery specifications to minimise the degree of new earthworks. During construction these would be widened to approximately 10m in width to support the extra load of heavy equipment. They would then reduce to 5m during the operation phase of the project.

Access to Crookwell 3 South would be achieved by Crookwell Road directly into the property. In the first instance, access to Crookwell 3 East will be achieved via Woodhouselee Road from one or more access points. In order to limit road interruption however, an alternative is being investigated that will see access achieved off Gray Siding Road (which involves a right turn off Woodhouselee Road and then entrance to the property from the south along the eastern boundary of the southern section of

Crookwell 3 East). This would be able to cater for all access required to Crookwell 3 East.

Access points would be selected taking into account traffic engineering principles, wind farm construction and operation requirements, and the avoidance of native vegetation.

3.6 Vegetation Removal

The majority of the site is cleared and has a long history of grazing uses, and therefore does not contain significant vegetation. The planning process will involve the detailed assessment of vegetation conditions, and the layout of the turbines and other infrastructure will seek to avoid significant areas. However, the project may require some unavoidable vegetation removal to facilitate the development. The exact extent of proposed vegetation removal will be detailed in the EA. Areas of the site which are heavily vegetated, however, in most cases are not considered ideal locations for wind turbines.

Any vegetation removal will likely be a product of providing access to the turbines. Micro-siting of turbines and other infrastructure usually enables vegetation loss to be minimised.

3.7 Construction and Operation Stages

The full construction phase would likely take 12 months subject to delays due to weather and unforeseen circumstances. The construction phase of the project (subject to planning approval) would likely commence in the mid 2011. It is intended that this timeframe will allow construction to continue from Crookwell 2 directly to Crookwell 3.

At the peak of construction, the project is likely to be employing approximately 40 people, across the tasks detailed in the table below.

Construction Program

Activity	Works Involved
Site Establishment	Clearing of work areas, levelling and compaction, installation of portable buildings and installation / connection of utility services. Site Survey.
Internal Road Works	Removal of topsoil, levelling, sub-base compaction, gravel, drainage.
External Road Works	Upgrade existing roads where required. Provide new access roads to the site.
Foundations	Removal of topsoil, excavation, screed concrete, reinforcement steel bottom, installation of foundation ring, reinforcement steel top, concreting, concrete ring and conduits, backfilling.
Crane Pad Establishment	Removal of topsoil, base compaction, rock / gravel compaction.
Trenches and Cable Laying	Excavation, sand infill, cable laying with protective covering, backfilling and compacting, installation of cable route markers.
Electrical Works	Control building switchboards, communications, Supervisory Control And Data Acquisition (SCADA) systems. Installation of cabling, switchgear, turbine control panels.
Turbine Supply	Transport of towers, nacelles, hubs and blades to site.

Activity	Works Involved
Turbine Erection	Erection of towers, nacelle, blades, installation of cabling.
Substation Electrical Works	Connection of Crookwell 3 Wind Farm cables to Crookwell II Substation
Wind Farm Commissioning	Pre-commissioning of turbines, SCADA, cables testing, optical fibre. Testing and commissioning of turbines, switchgear, SCADA.
Construction Closure	Site cleanup, revegetation, landscaping.

3.8 Operation

The operation phase of the project reflects the leasing arrangement with landowners. During the operation all infrastructure associated with the wind farm would remain the responsibility of the proponent. All access tracks used by CDPL would be maintained by CDPL as part of the operation of the wind farm, and are available for host landowner's use.

The wind farm would be controlled by a computerised system. The system would be linked to each turbine by fibre-optic cables laid in the same trench as the electrical cables. The computerised system would log all relevant operating parameters and initiate the most efficient functionality of the turbines according to the atmospheric characteristics. The computerised system would also enable the controller to stop the turbine should the need arise.

The computerised system would ensure that rotational speed and the wind turbine angle operate automatically within the wind speed design envelope. Turbines would be disconnected from the grid at low wind and very high wind speeds. Maintenance will be conducted throughout the operation phase and includes a number of activities over differing time periods.

The operation of the wind farm is estimated to provide full time employment for 6 people, in addition employment generated by the Crookwell 2 wind farm project.

3.9 Project Background

This project was initiated in its current form in 2009 following approval of the modification to the Crookwell 2 Wind Farm in 2009. Crookwell 2 provides a large amount of essential infrastructure required to support a wind farm, and there are synergies gained from co locating the projects.

Because Crookwell 3 will operate in close proximity to the Crookwell 2 wind farm, the two projects can share infrastructure, lending significant benefits to the project and increasing its viability. It also reduces the potential amenity impacts arising from separate substations, controls buildings and switchyards.

Two wind monitoring masts to be located on the property in order to confirm the wind resource, which has been demonstrated to exist in the area through several years of wind monitoring at the Crookwell 2 wind farm site.

The project will now enter its assessment phase to inform a wind turbine layout and Environmental Assessment for the project with various consultancies contributing to the EA.

An EPBC referral will also be lodged with the Department of Environment and Heritage (now DEWHA) once flora and fauna and archaeological investigations have concluded.

A letter has been sent to the Department of Planning requesting that the application be declared a Major Project and therefore be assessed under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

3.10 Project Timeframe

Following receipt of the Director General's requirements the applicant will prepare and lodge an *Environment Assessment* in the third quarter of 2010.

The following timeframe is envisaged.

Phase	Duration	Completion
Preparation of Environmental Assessment	4 months	July 2010
Assessment by DoP	4 months	November 2010
Detailed Design	3 – 5 months	March 2011
Construction Tender Process	3 months	June 2011
Wind Farm Construction and Grid Connection	10 months	April 2012
Commissioning	1-2 months	June 2012

3.11 The Applicant

Crookwell Development Pty Ltd [CDPL] is the owner of the Crookwell II Wind Farm Project in NSW. CDPL is a fully owned subsidiary of Union Fenosa Wind Australia Pty Ltd [UFWA]. Union Fenosa is an international energy group with a presence in 14 countries worldwide and with over 12,000 employees. Union Fenosa has a long history of successful renewable energy projects around the world, building more than 2,000 MW of green energy capacity across wind, solar, hydro, biomass and other renewable energy sources.

Union Fenosa has entered into a partnership with TME Australia Pty Ltd, an Australian company and the original proponent of the wind farm, to develop a portfolio of (currently) 1,000 MW of wind farm projects across Australia including the Crookwell 3 Wind Farm. Union Fenosa is the majority stakeholder in the partnership, holding an 80 percent share in UFWA. UFWA now has eight projects across NSW and Victoria.

This portfolio represents an investment of approximately \$2 billion in renewable wind generation. Once complete, the portfolio will increase Australia's present wind generation capacity of approximately 1,800 MW by nearly 50%. In addition, the portfolio will result in the creation of several hundred jobs in the construction and operational phases.

Union Fenosa Group has now been acquired by Gas Natural and together they have created a leading vertically integrated gas and electricity group that has a presence in 23 countries and employs over 20,000 staff with 17,000 MW of installed electricity generation and has more than 20 million customers worldwide.

4 Planning Instruments

4.1 Introduction

A range of Federal, State, Regional and Local planning and environmental instruments apply to the proposed Crookwell 3 Wind Farm, including State Environmental Planning Policies (SEPPs), Regional Environmental Plans (REPs), and Local Environmental Plans (LEPs).

This chapter outlines the key environmental instruments and planning controls which apply to the project application. The EA, which will be submitted as part of the future stage of the planning process, will contain a comprehensive assessment of the proposed project against all relevant planning and environmental instruments.

4.2 Commonwealth Instruments

Environment Protection and Biodiversity Conservation Act 1999

The EPBC Act regulates actions that impact on matters of national environmental significance.

An action that:

- has, will have or is likely to have a significant impact on a matter of national environmental significance; or
- is a nuclear action;
- may not be undertaken without prior approval from the Commonwealth Minister for the Environment and Heritage. Such approval is provided for under Part 9 of the EPBC Act.

Matters of national environmental significance under the EPBC Act include:

- World Heritage properties and National Heritage places;
- Wetlands of International Significance (i.e. RAMSAR wetlands);
- Listed threatened species and communities;
- Listed Migratory Species protected under international agreements (CAMBA and JAMBA);
- Commonwealth Marine Areas.

The proposed wind farm constitutes an action under section 523 of the EPBC Act.

The specialist assessments proposed to be completed to inform the EA will review the application of the EPBC Act to the proposed wind farm and in particular whether any matters of national environmental significance (as defined under the EPBC) are likely to be affected.

If it is deemed likely that a matter of national environmental significance is impacted upon by the proposed wind farm, a referral under the EPBC Act will be submitted.

Civil Aviation Safety Regulations 1998

The *Civil Aviation Safety Regulations 1998* (made under the *Civil Aviation Act 1988*) require that CASA must be informed of proposals to build a structure greater than 110 metres above Australian Datum. This is required to allow assessment of whether the structure may represent a hazard to aircraft, and to provide any associated mitigation measures including any requirements for markings or lighting.

A circular regarding hazard lighting of wind farms has been released by CASA that is of relevance to this proposal. The AC139-18(0) advises that proponents of wind farms where the turbines exceeds 110m above ground level should expect that CASA will require appropriate obstruction lighting and marking to reduce the hazard to aviation unless the circumstances at a particular wind farm are very unusual. AC139-18(0) has been withdrawn by CASA pending a review of the guideline material. Despite this,

CASA has advised that the circular remains of relevance to proponents wishing to assess aeronautical impacts.

Detailed discussions will be had with CASA during the next stage of the planning process, and consideration given to any revisions to CASA Guidelines, as part of the specialist investigations informing the EA.

4.3 NSW State Instruments

Environmental Planning and Assessment Act 1979 & Environmental Planning and Assessment Regulation 2000

On 23 December 2009, the proponent wrote to the Department of Planning requesting Major Project determination under Part 3A of the Environmental Planning and Assessment Act 1979 and critical infrastructure status for the Crookwell 3 Wind Farm.

A decision on these matters is yet to be made.

Other SEPP's may apply to the proposed wind farm which will be assessed as part of the EA.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) governs the establishment, preservation and management of national parks, historic sites and certain other areas. The NPW Act also provides the basis for the legal protection and management of threatened native flora and fauna and Aboriginal sites within NSW.

Detailed flora and fauna studies along with cultural heritage investigations will be prepared as part of the EA which will inform compliance with this Act.

Threatened Species Conservation Act 1995

The *Threatened Species Conservation Act 1995* provides for the conservation of threatened species, populations and ecological communities of animals and plants. It provides a framework for the assessment of any action that may impact on threatened species.

The flora and fauna investigation carried out as part of the EA will assess the implications of this Act and in particular the need for targeted surveys for particular species.

Water Management Act 2000

The object of the Water Management Act 2000 (WMA) is the sustainable and integrated management of the State's water for the benefit of both present and future generations. A controlled activity approval under the WMA is required for certain types of developments and activities that are carried out in or near a river, lake or estuary.

An assessment of the implications of this act, and in particular whether controlled activity approval is needed, will be carried out as part of the EA.

Native Vegetation Act 2003

In accordance with the principles of ecologically sustainable development, the Native Vegetation Conservation Act 2003 provides for the conservation of native vegetation through the prevention of inappropriate clearing and promotion of rehabilitation practices.

Preliminary siting information for the turbines shows that extensive vegetation clearance will not be required, and there is significant scope to avoid the need to remove vegetation for other infrastructure through careful placement of tracks and control lines. No native vegetation removal is required for the control building and switchyard as these facilities will be shared with Crookwell II.

Detailed mapping of flora and fauna values will be undertaken which will inform the siting process with the aim to avoid the need to remove areas of native vegetation. If vegetation clearing is unavoidable, the implications of this activity under this Act will be investigated, including the need for approval.

Heritage Act 1977

The *Heritage Act 1977* aims to protect and preserve items of non-indigenous Heritage significance. The Act provides for the protection of items of local, regional and State heritage significance. The implications of this act on the proposed wind farm will be assessed as part of the EA.

Roads Act 1993

Section 138 of the *Roads Act 1993* prohibits a number of activities, such as conducting work in, on or over a public road, unless consent has been obtained from the appropriate roads authority.

It is likely that consent will be needed under this act for the temporary closure of roads during construction, which will be further investigated as part of the EA.

Crown Lands Act 1989

Part 4 of the NSW *Crown Lands Act 1989* provides for circumstances where Crown Land may be leased or sold and where licenses over Crown Land may be granted.

There is a network of Crown public roads in the area, and electrical cables may be installed under such roads to connect the turbines to the Crookwell II substation. In the event that the final cable network does require installation of cables under Crown public road(s), the Department of Lands would be consulted in order to determine the best means of gaining consent to install such cables, along with other implications under this Act.

4.4 Additional Approvals

Additional approvals that may be required for the proposed development include:

- a requirement for occupiers to notify NSW Workcover of any dangerous goods stored and handled under the Occupational Health and Safety Act 2000;
- a licence to supply electricity under the Electricity Supply Act 1995 from the Department for Energy, Utilities and Sustainability; and,
- necessary Part 4A certificates under the EP&A Act, including a Construction Certificate and Occupation Certificate under the Act from a relevant certifying authority.

4.5 Regional Instruments

A number of Regional Environmental Plans may apply to the proposed wind farm. Relevant REP's will be assessed as part of the EA.

4.6 Local Instruments

Local Environmental Plans

The subject site is located within the Upper Lachlan Local Government Area, and the site is subject to the Crookwell Local Environmental Plan 1994 (CLEP) and the Mulwaree Local Environmental Plan 1995 (MLEP). Both LEP's set the provisions for land-use planning and development permissibility within subject site.

The site is zoned 1(a) General Rural under the CLEP and MLEP.

As the proposed wind farm is defined as 'generating works', it is permissible within this zone subject to development consent under both LEP's. The overriding objective of both LEP's is to protect, enhance and conserve the areas agricultural land and to sustain agricultural production. The proposed wind farm accords with this objective as more than 99% of the site will remain available for agricultural production, and existing operations will be supported by the additional landowner income and improved access tracks. Studies have shown that wind power generation and farming have a high degree of compatibility.

The compliance of the proposed wind farm against the relevant objectives of zone 1(a) General Rural will be assessed as part of the EA.

Upper Lachlan Shire Council – Development Control Plan – Wind Power Generation 2005

The Wind Power Generation DCP has been prepared and adopted by Upper Lachlan Shire Council to give the community and developers guidelines for future wind farm developments.

The DCP was adopted by Council in September 2005 and amended in November 2008. The DCP will be considered during the next stage of the planning process, and the EA will contain a full assessment of the compliance with this instrument.

Other Guidelines

In addition to the above instruments, the following list of relevant guidelines will be considered as part of the wind farm design and environment assessment:

- *Best Practice Guidelines for Wind Farm Developments (Clean Energy Council, formally AusWind 2003).*
- *National Wind Farm Development Guidelines' (Environment Protection and Heritage Standing Committee, 2009)*

5.1 Key Issues

This report highlights the major issues for consideration in the Environmental Assessment. It is likely that further issues will be raised when specialist consultants commence their investigations, which will be also addressed in the Environmental Assessment. At this stage, the following issues will be addressed as part of the EA;

- Economic and Social Impacts
- Visual and landscape amenity
- Noise
- Flora and Fauna
- Aviation and night obstacle lighting
- Traffic and Transportation
- Telecommunications
- Fire
- Shadow Flicker and Blade Glint
- Heritage
- Geotechnical

Consultants will be engaged to address these issues and prepare detailed reports that will inform the EA. It is envisaged that some issues will be of greater significance than others.

Due to the proximity of Crookwell 3 to the approved Crookwell 2 and existing Crookwell 1 Wind Farm, a key component of the Environmental Assessment will be the cumulative impacts arising from the existing projects. As a result, assessment of the proposed wind farm will consider the cumulative impacts across the range of issues, such as impacts on landscape amenity, noise, and flora and fauna.

New draft guidelines for the assessment of wind farms have been released by the Commonwealth Government (Environment Protection and Heritage Council). Whilst these are not State Policy, they will be considered in the preparation of the Environmental Assessment.

5.1.2 Economic and Social Impacts

A number of positive and negative economic and social impacts are expected arising out of the construction and operation of the wind farm. These include impacts on;

- Employment;
- Tourism;
- Population;
- Investment;
- Community profile.

An assessment of these factors will be undertaken in the preparation of socio-economic impact assessment to support the EA. The key objectives of the assessment will be to:

- Establish a demographic and economic profile of the area.
- Describe local and regional employment and economic impacts and opportunities.
- Identify relevant social policy objectives of the Council and broader region and identify how the proposed development complements these policy objectives.

- Identify how negative impacts can be mitigated, and positive impacts supported and strengthened
- Review and recommend on community consultation activities.

5.1.3 Visual and Landscape amenity

As with any wind farm, the proposal will have an impact on the landscape of the area.

A key part of the investigations of the visual impact of the proposal will be to examine Crookwell 3 in the context of Crookwell 2 Wind Farm, which has been approved and for which construction has commenced, but for which no turbines have been erected.

The effect of wind farms on the viewer can also be largely subjective. Some viewers consider they detract from the landscape and others feel that the wind turbines add to visual interest. The degree of impact is considered in the context of the surrounding landscape and therefore includes an assessment of the inherent qualities and values of that landscape.

A landscape and visual assessment will be undertaken and will analyse any potential impacts that may arise out of the development, in particular;

- To identify any sensitive receivers that may be unacceptably impacted (according to relevant guidelines, policies, regulations and/or legislation) by visual amenity impacts from the operation of the proposed Crookwell 3 Wind Farm.
- To address all Wind Farm visual impact related issues (including existing and approved wind farms}
- To satisfy the requirements of relevant authorities.

The assessment will also outline mitigation measures to reduce any detrimental visual impact.

5.1.4 Noise

When in operation turbines can create a noise impact to the immediately surrounding area. Buffers or setbacks are used to reduce noise levels to nearby houses to acceptable levels. In this instance, the elevated areas of the site (where the majority of the turbines will be located) are significant distances from non-participating dwellings.

A noise impact assessment will be undertaken to analyse the impacts arising out of a proposed layout of turbines at the site. It will assess all turbine models under consideration in accordance with the South Australian EPA's Environmental Noise Guidelines (Interim Guidelines) (2007). If noise levels are found to exceed acceptable standards mitigation measures will be proposed such as relocating turbines or operating in low – noise mode.

A noise management plan will also be developed as a condition on the development permit which will establish standards to be met during the operational phase of the project.

5.1.5 Flora and Fauna

Flora and fauna impacts will be a key component of the EA. The construction phase may include some native vegetation removal to facilitate access to the site or siting of individual turbines and other associated infrastructure. A loss of habitat has the ability to affect fauna species.

The operational phase includes the potential for birds and bats to be affected by turbine blade strike and the deterrent effect of moving turbines.

CDPL is committed to a design process whereby impacts to flora and fauna are avoided and minimised. A flora and fauna assessment will be undertaken to address the potential impacts of the proposal. Particular attention will be given to any state or nationally threatened species. This will include thorough field assessment and discussion of;

- The existing flora and fauna values of the site;
- Further studies required arising out of preliminary investigations;
- Identification of areas and values of required vegetation removal (if any);
- Implications of results; and,
- Mitigation measures.

5.1.6 Aviation and night time obstacle lighting

Due to the height of the proposed turbines consultation with key air agencies will be required to understand any potential impacts to the safety of aircraft in the vicinity of the farm. As the key agency, early discussions will take place with the Civil Aviation Safety Authority (CASA) and inform an overall assessment of air safety in relation to the wind farm, as well as the turbine layout itself.

This will inform whether obstacle lighting will be required for the proposed wind farm and highlight any other technical requirements that would need to be met. Obstacle lighting is an evolving issue and the need for lighting on turbines of various heights is under review by CASA.

5.1.7 Traffic and Transportation

The transportation of wind turbines and associated infrastructure to wind farm sites may have an impact on the surrounding road network.

An assessment will be undertaken to identify and consider the traffic impact both during the construction and operational phase of the project. It will also examine the likely upgrades required to improve conditions of the access routes to the site.

Access points and internal access track layout will be informed by several factors, including the avoidance of native vegetation, engineering specifications and safety aspects.

5.1.8 Telecommunications

In some situations, wind farms have the ability to interrupt telecommunications signals. Interruptions to signals are rare and can be appropriately mitigated using a number of options. As part of the EA an analysis of potential interference will be undertaken and mitigation measures developed to comprehensively address any potential interruption.

5.1.9 Fire

A wind farm in a rural area, as with any large scale development, can increase the potential risk of fire to nearby people and property. This includes fire caused by the generators themselves, and also impacts on the generators caused by fire sparked elsewhere. Importantly however, access tracks required for both construction and operational phases have the dual function of access and a fire / fuel break. Other measures are available to reduce the risk of fire, such as dams, watertanks, and fire breaks

Whilst the fire risk is considered low, the applicant will conduct early consultation with the relevant fire authorities and is committed to maintaining fire fighting capability as part of permanent staffing of the proposed wind farm.

Operational Management Plan procedures related to fire (including prevention) would be prepared as a condition of any development consent and agreed with the relevant fire authority.

5.1.10 Shadow Flicker

The occurrence of shadow flicker is a potential impact of wind farms particularly where dwellings are located to the east or west of individual turbines, thereby causing shadow flicker in the early morning or evening.

Shadow flicker is not likely to be a significant issue in this instance due to significant buffer distances between dwellings and turbine zones in most locations. Nevertheless

specialist consultants will assess the site against relevant standards and will propose mitigation measures where appropriate.

5.1.11 Geotechnical

Investigations by specialist consultants will be undertaken as to the suitability of the soil structure to support wind turbine infrastructure. This work will raise any potential issues that can inform the detail design process.

The presence of some rocky hilltops on the site may mean that innovative construction techniques where turbine footings are attached to underlying granite could be used.

5.1.12 Heritage

Wind Farms can impact on the heritage values of the land, insofar as excavation of land is required to support the turbine construction and access tracks as well as the placement of turbines near recognised heritage buildings.

One of the features of wind farms is the ability to 'micro-site' turbines and access tracks to avoid land and sites deemed to be of historic or cultural significance. impacts.

The EA will include heritage investigation of the proposed wind farm in relation to Aboriginal and historic cultural heritage and the potential impact of the proposed activity on these heritage values. The assessment will also outline recommendations for mitigation of potential impacts to guide development of the site.

The investigations which took place at Crookwell 2 Wind Farm will assist in informing this investigation.

5.1.13 Next steps and Consultation

Following receipt of Director General's Requirements, a consultant team will be engaged to carry out assessments in relation to the above disciplines. This body of work will inform the turbine layout and the EA proposed to be lodged in mid 2010. Chapter 3.11 details the project timeframe.

A key part of the EA will be the finalisation of the turbine layout. This will be completed taking into account;

- Wind speed;
- Flora and fauna values;
- Visual and landscape character;
- Access and infrastructure;
- Noise buffers;
- Other results from the specialist investigations.

A key future step of the project is the preparation and implementation of a consultation strategy. UF is committed to fully informing the local community and gaining feedback from interested stakeholders that will shape the projects design. To that effect, it is likely that the following methods will be used to consult and engage stakeholders:

- Newsletters distributed in the vicinity of the farm
- Establishment of a free call phone number for queries
- Establishment of a project website
- Information day conducted at Crookwell
- Advertisements in local newspapers
- Direct mail outs to nearby residents
- Door-knocking of residents in close proximity to the wind farm site

6 Conclusion

This report provides preliminary details of the Crookwell 3 Wind Farm by Crookwell Development Pty Ltd (CDPL) to the NSW Department of Planning.

The proposed wind farm site is located in the NSW Southern Tablelands, approximately 17km south-east of Crookwell township. It is proposed to include approximately 25 to 35 turbines of up to 3.3MW with two separate development parcels to the east and south of the existing Crookwell 1 and approved Crookwell 2 wind farm (currently under construction).

The proposal comprises a number of elements, including:

- 25 – 35 individual wind turbines standing up to 152m at top of blade tip with up to 3.3MW capacity each;
- Internal unsealed tracks for turbine access;
- Potential upgrades to local road infrastructure;
- An underground electrical and communication cable network linking turbines to each other and the proposed substation;
- A potential temporary concrete batching plant to supply concrete for the foundations of the turbines and other associated structures (this will be determined through cost-benefit analysis and may prove more economical to be trucked from Goulburn);
- The potential for obstacle lighting to selected turbines;
- The potential for removal of native vegetation.

The project will utilise the substation, control room and grid connection proposed to be constructed as part of the neighbouring approved Crookwell 2 Wind Farm.

The proposed wind farm will bring significant environmental, social and economic benefits to the locality, the wider region, and the State of New South Wales.

The proposed wind farm supports the NSW Government's renewable energy policies and directly implements the Federal Government's renewable energy target of 20% of Australia's energy sourced by renewable energy by 2020. By supplying a clean and renewable source of energy, the project will help reduce Australia's greenhouse emissions and assist in addressing the dangerous impacts of climate change.

A full Environment Assessment will be prepared, using the professional advice of specialists, that will detail the potential impacts of the proposal, and methods for mitigation of any undesirable impacts. It will also include an assessment of the proposal against relevant environmental and planning instruments.