PROPOSED DANDARAGAN WIND FARMS

DANDARAGAN

WESTERN AUSTRALIA

FOR

WIND PROSPECT WA PTY LTD

PLANNING REPORT

Prepared by
Geraldton Independent Planners
P.O. Box 7177
GERALDTON
W.A. 6531
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1.0 INTRODUCTION

Wind Prospect WA Pty Ltd proposes to establish two separate wind farms containing up to 151 turbines in total as well as associated infrastructure that will be required during the construction phase and also the ongoing operational stage of the projects.

The wind farms will consist of up to 57 turbines located at the Waddi Wind Farm location and 94 turbines at the Yandin Wind Farm location.

This planning chapter presents the comments and opinions of Geraldton Independent Planners, Town Planning Consultants. The comments and opinions follow a preliminary assessment of the proposed land use and developments against the relevant legislative requirements as appropriate to wind farm developments within Western Australia and more particularly within the Shire of Dandaragan.

This assessment was undertaken to determine the appropriateness of the proposed use of the subject land, and to identify any likely social, economic and/or environmental impacts. The report is intended to be used as the supportive documentation in conjunction with specific technical study reports to enable a development application to be processed by the relevant authorities.

2.0 THE DEVELOPMENT PROPOSAL

Wind Prospect WA Pty Ltd proposes to establish and operate two individual wind farms comprising collectively up to one hundred and fifty one (151) wind turbines.

Approval is sought for the turbines and associated infrastructure to be located within the indicative site works area as indicated upon the submitted plans.

The proposal will consist of the following:

- Construction and operation of a combined number of up to 151 turbines – with up to 57 located at Waddi Wind Farm and up to 94 located at Yandin Wind Farm;
- Construction of up to six (6) on-site permanent wind monitoring masts within the indicative site works area;
- Construction of access tracks, hardstand areas and other associated on-site infrastructure as indicated;
- On-site electrical connections and infrastructure; approval is sought for this infrastructure to be located within the site works area as indicated on the submitted plans;
- On-site sub stations; approval is sought for this infrastructure to be located within the site works area as indicated on the submitted plans;
- Overhead interconnection power line from the on-site substations to the off-site substation connecting to the Western Power Transmission line.
- Temporary Site Infrastructure: The site works associated with the construction of the turbines will require the erection of temporary infrastructure such as portable field offices, toilet facilities, material storage

areas and parking bays. This infrastructure will be typical of that used at construction sites however it is unlikely to include full accommodation facilities;

- On-site Concrete Batching Plant – A concrete batching plant may be established on-site to supply concrete for the foundations of wind turbines. It is anticipated that the site for this plant would be located in an area of relative flatness and away from severe slopes and variations. The plant would be established during the preliminary stages of site preparation civil works for the development. Aggregate, sand and cement would be stored within the concrete batching plant area for use as required. Cement would be delivered on site in enclosed container trucks as needed and stored in enclosed silos. Aggregates and sand would be delivered in standard bulk material delivery trucks and stockpiled for use as required. Concrete manufactured on-site would be loaded into concrete agitators for transport to the turbine locations on-site. The concrete batching plant including material stockpile area would be located in an area on-site approximately 30m by 30m and it is anticipated that the plant would have a capacity of 25m^3 (60tonnes) per hour. It is recognised that should the proponent decide to establish this concrete batching plant on-site then liaison will be undertaken with EPA to assess the need for Works Approval for its operation under the Environment Protection Regulations 1987 – Part V, Concrete Batching Works as such a facility is listed as a prescribed premises;
- Temporary storage of fuels and oils as well as other machinery lubricants and liquids – a storage area as shown on the submitted plans has been allocated for each of the wind farm developments and will be fenced and secured during all operations. This is required in order that bulk fuels etc can be stored on-site for all machinery to access as a matter of convenience for operations. The delivery of such fuels etc will be in conventional fuel trucks as required.

The proposed Dandaragan Wind Farms are comprised of two individual sites in Waddi Wind Farm and Yandin Wind Farm. The potential exists for each site to be built independently from each other. Wind Prospect therefore seeks development approval for each site separately, whereby the construction of one is not dependent on conditions allocated to the other site. It should be noted that given the proximity of the sites all technical assessments within the Environmental Impact Statement reports have been undertaken to address the cumulative impacts of both sites.

3.0 THE SITE

The proposed wind farms are located on land to the east of the Brand Highway between the townships of Cataby and Dandaragan. The sites total approximately 25,423Ha (being 10,235Ha for Waddi Wind Farm and 15,188Ha for the Yandin Wind Farm.

The land proposed for the project area is freehold land falling within the Shire of Dandaragan and will utilise some 250.8Ha (0.8% of project area) of the abovementioned total land area.

A total of 26 titles are included within the project area and these titles belong to thirteen (13) individual landowners.

Land tenure details within the project area are as follows:

WADDI WIND FARM

Certificate of Title (Volume/Folio)	Size (Ha – approx)
1604/69	809
1604/70	1564
1747/835	809
1780/891	1220
1780/892	1228
1834/391	1162
1859/822	1772
1888/114	1670
TOTAL	10235

YANDIN WIND FARM

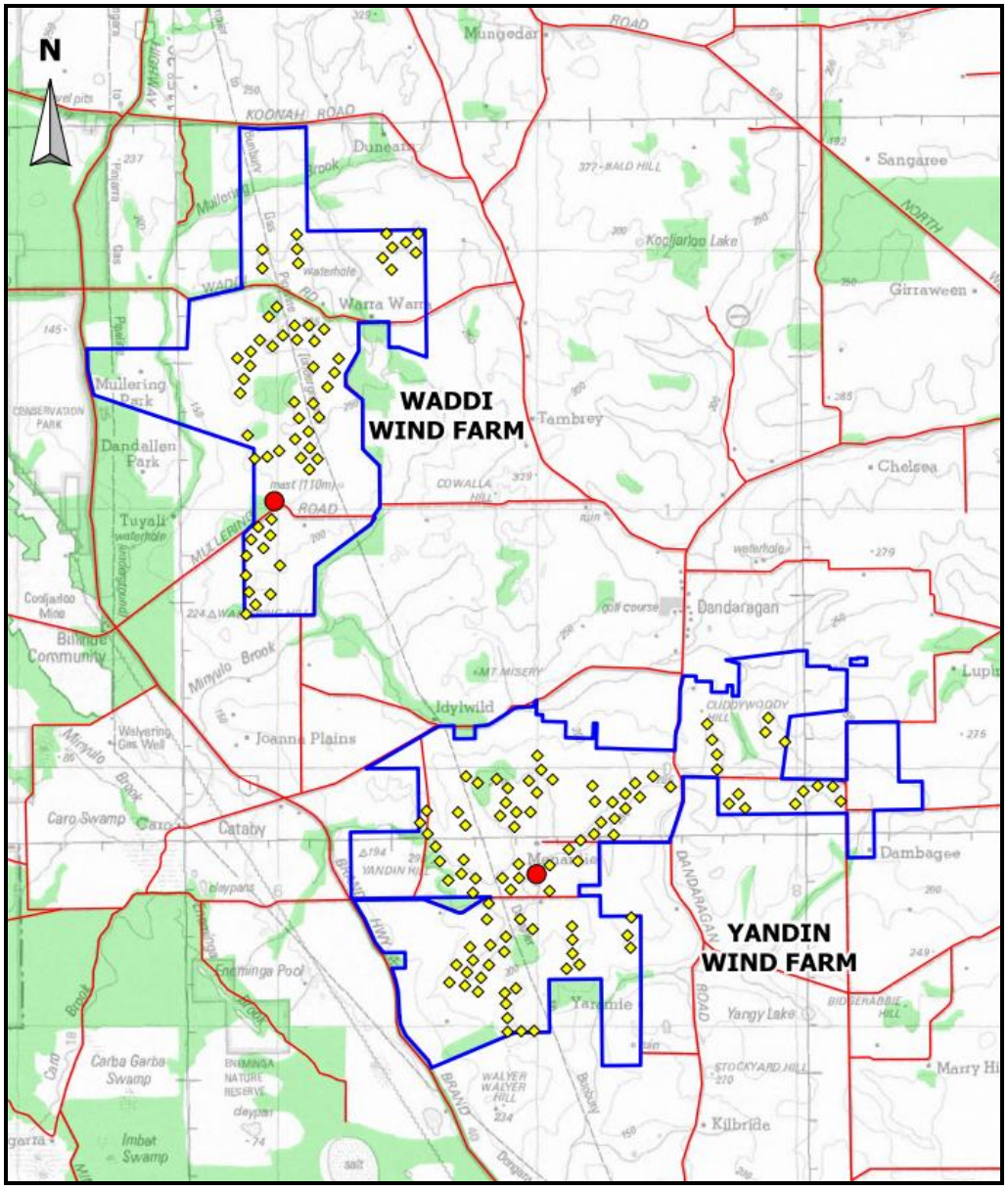
Certificate of Title (Volume/Folio)	Size (Ha – approx)
845/66	939
961/68	184
1073/222	40
1116/336	386
1136/871	678
1156/372	875
1204/991	41
1204/993	480
1245/252	724

Certificate of Title (Volume/Folio)	Size (Ha – approx)
1254/773	2544
1309/291	622
1309/292	616
1550/74	1287
1745/724	1334
1789/272	1415
1880/649	1336
2106/463	297
2186/89	1357
TOTAL	15155

GRID CONNECTION ROUTE

Certificate of Title (Volume / Folio)	Size (Ha – approx)
1611 / 474	942
2125 / 64	251
2125/65	150
2198/2	1,240
2751/794	1,328
TOTAL:	3,911

The following map indicates the location and extent of the proposed wind farms the subject of this development application.



Map showing the location of the proposed Dandaragan Wind Farm Project site

The current land the subject of this development application is currently used as predominantly farming land by the various owners and contains some areas of remnant vegetation. The accompanying Environmental Impact Statement report outlines in detail the management of the remnant vegetation and the continued farming activities once the turbines are located upon the land.

Some dwellings are located within the project area and again the Environmental Impact Statement report outlines the impact of the turbines on these dwellings in detail in regard to noise and visual amenity.

Access to the site for both construction and ongoing maintenance will be gained using existing local road network as well as internal private property tracks. Signage will be incorporated along all local roads and within the properties in accordance with both Main Roads WA and local government requirements to cater for construction traffic and future maintenance traffic servicing the turbines as well as tourist and local traffic through the area.

4.0 THE LOCALITY

The land within the immediate and more general localities comprises large rural properties that are primarily utilised for farming purposes such as grazing and cropping. These agricultural land uses are long established, and past land management practices have generally resulted in the majority of these properties being cleared of any significant native vegetation. Full details of locations and treatment of remnant vegetation areas are outlined within the Environmental Impact Statement report that accompanies this Development Application.

Other prominent features within the general locality include:

- Emu Downs Wind Turbine Farm;
- Badgingarra Wind Farm (proposed);
- Yandin Hill
- Badgingarra National Park

In view of the above, we consider the immediate and general localities to exhibit an open rural character.

5.0 PLANNING ASSESSMENT

5.1 Information for Planning Approval

This part of the planning assessment has been written in a format similar to that used by the Shire of Dandaragan in its reporting to Council in order that the local planning issues can be seen to be addressed in accordance with the Shire of Dandaragan's Local Planning Scheme No.7. Hence the headings used will be in the same format as those found on Council's planning reports to Council.

PROPOSAL:
Planning approval is sought for up to 151 wind turbines and ancillary structures for the purpose of generating electricity from wind energy to be located upon lots as defined in section 3.0 of this report to establish the Waddi Wind Farm and the Yandin Wind Farm.

BACKGROUND:
The proponents for the Waddi Wind Farm and the Yandin Wind Farm are Wind Prospect WA Pty Ltd.

The Waddi and Yandin sites lie between the townships of Cataby and Dandaragan within the Shire of Dandaragan, located in the Central Midlands Region of Western Australia.

An Environmental Statement has been prepared by Wind Prospect WA Pty Ltd to accompany and support the two planning applications submitted for the Dandaragan Wind Farms. Approval is sought for up to 151 turbines to be located within indicative works area as indicated in **Figure 2** (Waddi) and **Figure 3** (Yandin) within the Environmental Statement Report. This layout is based on a number of technical, environmental and social factors and results of site assessments. The layout ensures optimum, undisturbed use of the measured and predicted wind resources after consideration of site constraints. This will consist of the following matters:

- Construction and operation of a combined number of up to 151 turbines (Waddi Wind Farm 57 Turbines and Yandin Wind Farm 94 Turbines); approval is sought for the turbines to be located within the indicative site works area as indicated upon the submitted plans;
- Construction of up to five on-site permanent wind monitoring masts within the indicative site works area;
- Construction of access tracks, hardstand areas and other associated on-site infrastructure as indicated on the submitted plans;
- On-site electrical connections and infrastructure; approval is sought for this infrastructure to be located within the site works area as indicated on the submitted plans;
- On-site sub stations; approval is sought for this infrastructure to be located within the site works area as indicated on the submitted plans;
- Operation and maintenance of the Waddi and Yandin Farm infrastructure;
- Overhead interconnection power line from the on-site substations to the off-site substation connecting to the Western Power Transmission Line;
- Concrete batching plant and material storage areas; approval is sought for the location and operation of this plant as well as material storage areas for sands, cement etc during the construction phase of the wind farms development;
- Construction and location of temporary offices and fuel storage areas; approval is sought for the location and use of these ancillary facilities during the construction phase of the wind farm development.

The proposed Dandaragan Wind Farms are comprised of two individual sites in Waddi Wind Farm and Yandin Wind Farm. The potential exists for each site to be built independently from each other. Wind Prospect therefore seeks Development Approval for each site separately, whereby the construction of one site is not dependent on conditions allocated to the other site. However it should be noted that given the proximity of the sites all assessments made in the accompanying Environmental Impact Statement have been undertaken to address the cumulative impacts of both sites.

As the wind farm developments depend on the upgrade of Western Power's transmission line in the near future Wind Prospect is in consultation with Western Power to ensure the grid connection route can be finalised in line with their timelines. The on-site 33 kV electrical reticulation system will comprise a network of underground cables transporting the generated electrical energy from each circuit to the proposed on-site Waddi substation located approximately 400 metres north of Mullering Road and the onsite Yandin substation approximately 1 km north of Yandin Road (see **Figure 4**). All circuits will be marshalled together at the sub-stations and fed into a step-up 33/330 kV transformer. The proposed route for the 330 kV overhead line for the Waddi Wind Farm can be seen in **Figure 4**. The proposed route for the 330 kV overhead line for the Yandin Wind Farm can be seen in **Figure 4.**

Western Power and Karara Mining Limited (KML) are currently proposing the Mid West Development Project which is an upgrade to the existing transmission line which runs from Eneabba to Koolanooka and extends to the Karara mine site (Western Power, 2010). The upgrade project involves the potential construction of a new 330kV 180-kilometre transmission line, mostly in the same corridor as the existing 132kV line, which it is intended to replace. The existing line would be removed once the new line is in operation.

It is intended that the line and associated infrastructure will be available for use by other customers in the area, and will improve and strengthen the transmission network in the Mid-West region. The proposed line will run parallel to the Brand Highway and within close proximity to the proposed Dandaragan Wind Farms project, significantly increasing grid capacity throughout the region. Wind Prospect intends to connect power generated from the wind farms directly into this line.

At the off-site substation located adjacent to Mimegarra Rd, approximately 2 km west of the Brand Highway (**Figure 4**), the export power lines will be connected to the new Western Power transmission network (once built).

Detailed sub-station layouts will be finalised during the design and detailed engineering phases to ensure the most efficient and environmentally appropriate installation for the site, and will be subject to any engineering assessments required by the Shire.

Given the scale of the project and expected lead times for transmission line upgrades required to connect the wind farms Wind Prospect is seeking a Development Approval with a timeframe that would be 48 months minimum instead of the normal 24 months approval period and with options to extend this timeframe should it be necessary due to delays in commencement for technical reasons.

The proposed Dandaragan Wind Farms contains up to 151 turbines, with an estimated generation of 1,841,440MWh per year. The electricity produced by the wind farms would be enough to meet the needs of around 306,000 Western Australian households. This amount of energy would contribute approximately 4% to the "20%

by 2020" target established by the Australian Federal Government under the expanded RET system.

The turbines will be located upon previously cleared farm land and have minimal environmental impact during and after the construction phase. Some minor vegetation clearing may be required however this will be avoided where possible. Full details of environmental impacts are outlined in the Environmental Impact Statement that accompanies this Planning Application.

The clearing of native vegetation requires a permit to be issued under Part V of the Environmental Protection Act 1986. A permit is applied for to either the Department of Environment and Conservation or the Department of Mines and Petroleum or otherwise an exemption must apply. Wind Prospect WA Pty Ltd will apply for such permits as clearing is required.

Substantial project construction is expected to commence within 48 months of the date of Development Approval – however it may be that given the scale of this project and lead times expected for transmission upgrades that further extensions of the development approval may be required to allow the entire project to be completed. Any extensions of the development approval will be requested prior to the initial development approval timeframe expiring should this be required due to technical delays.

COMMENT:
The project consists of 26 parcels of land containing in total some 25,423Ha of land. The land is presently used predominantly for grazing sheep and cattle and some cropping with small areas of remnant vegetation with varying quality as outlined within the Environmental Impact Statement report attached to this planning application. The Badgingarra National Park is located to the North and West of the proposed site.

The size of the project has been determined based on the future upgrade by Western Power to the transmission lines in this locality. The number and location of the combined 151 turbines has taken this upgrade into account as well as ensuring that compliance with regulatory noise levels at external residences can be achieved.

The electricity produced by the wind turbines will be transmitted to a substation located within the wind farm location which transforms the power to the required kilovolts for connection to the existing and planned Western Power transmission lines running through the site. The electricity will then be sold to the electricity market as a "Green Power" product.

The proponents are seeking approval for the two wind farms as shown on the submitted plans that has taken into account the relevant wind flow characteristics, the topography and the desire to locate turbines away from vegetation, sensitive habitats, roads, occupied dwellings and other infrastructure as well as being conscious of views both to and from the wind farms.

Whilst the attached site plans show indicative locations for the proposed wind turbines it must be recognised that due to various technical reasons such as final turbine design, engineering and environmental factors these exact locations may vary at the time of construction. Hence when approval is granted for the development some leeway should be granted to allow variations to occur as long as the intent and philosophy of the current design be made in accordance with the constraints identified in this application.

The extent of works undertaken to date which are contained within the Environmental Impact Statement that accompanies this planning application has included the following:

- **Planning Assessment** conducted by Geraldton Independent Planners;
- **Ecology Assessment** including Bird Survey, Fauna Assessment and Vegetation Assessment conducted by Outback Ecology Services;
- **Cultural Heritage Assessment** conducted by Australian Interaction Consultants;
- **Noise Assessment** conducted by Vipac Engineers and Scientists Ltd;
- **Television Signal Effects** conducted by Lawrence Derrick and Associates;
- **Traffic Management** conducted by ARRB Group Ltd;
- **Aeronautical Impact Assessment** conducted by The Ambidji Group Pty Ltd;
- **Electro Magnetic Interference** conducted by Lawrence Derrick and Associates;
- **Landscape and Visual Impact** conducted by GHD Pty Ltd.

The project is being designed for an approximate 20 year operational life with the future possibility to upgrade and repower the turbines and extend its life at that stage or decommission the turbines and the site at the end of that 20 year or so period.

The Wind Farms are located within the 'Rural' Zone under the provisions of the Shire of Dandaragan's Local Planning Scheme No.7. The Planning Scheme designates the future use and development of the land as being for rural purposes.

Pursuant to the Local Planning Scheme No.7 the Wind Farms is a 'Land Use' that is not listed under the Scheme and therefore does not appear in the Zoning Table.

Under Clause 4.4.2 of the Scheme " If a person proposes to carry out on land any use that is not specifically mentioned in the Zoning Table and cannot reasonably be determined as falling within the type, class or genus of activity of any other use category the local government may:

(a) determine that the use is consistent with the objectives of the particular zone and is therefore permitted;
(b) determine that the use may be consistent with the objectives of the particular zone and thereafter follow the advertising procedures of Clause 9.4 in considering an application for planning approval; or
(c) determine that the use is not consistent with the objectives of the particular zone and therefore is not permitted."

The objectives of the Rural Zone are "To provide for a range of rural activities such as broadacre and diversified farming so as to retain the rural character and amenity of the locality, in such a way as to prevent the land degradation and further loss of biodiversity.

It can reasonably be determined that the proposed use of Wind Farms could be considered in accordance with clause 4.4.2(b) thereby requiring formal advertising under Clause 9.4 of the Local Planning Scheme.

Clause 9.4 stipulates that the "local government is not to grant planning approval to that application unless notice is given in accordance with Clause 9.4.3."
Clause 9.4.3 states: "The local government may give notice or require the applicant to give notice of an application for planning approval in one or more of the following ways:

(a) notice of the proposed use or development served on nearby owners and occupiers who, in the opinion of the local government, are likely to be affected by the granting of planning approval, stating that submissions may be made to the local government by a specified date being not less than 14 days from the day the notice is served;
(b) notice of the proposed use or development published in a newspaper circulating in the Scheme area stating that submissions may be made to the local government by a specified date being not less that 14 days from the day the notice is published; or
(c) a sign or signs displaying notice of the proposed use or development to be erected in a conspicuous position on the land for a period of not less than 14 days from the day the notice is erected."

In terms of the period of public advertising in which submissions may be lodged with the local government, for a project of this nature, and in keeping with the length of advertising for other wind farm developments in this locality, the period would be for 42 days, to allow sufficient time for information displays, community meetings, and input from key stakeholders. This 42 day period is a straight day count from the commencement of the advertising.

The current land uses on the landholdings involved within this project area generally comprise freehold agricultural pursuits such as sheep and cattle grazing and cropping. These uses will remain after the Turbines are established on site and the Wind Farms are fully operational.

The proponents will enter into Land Leases with the landowners, to lease the portions of the site required for the turbines, internal roads and associated infrastructure and place easements over the overhead interconnection grid route. As the Wind Farms will operate for a period of twenty five years with an option for an additional twenty five year period the Western Australian Planning Commission's approval to the Lease Agreement will be required under Section 140 of the Planning and Development Act 2005. Such lease arrangements are being made subject to WAPC approval.

This project, with up to 151 turbines which will rise up to 152m from the ground to the tip of the blade, with typical tower heights of 80-100m and blades 45-60m in length and with each turbine capable of producing in the order of 1.5MW to 3.4MW of power (or higher, depending on the turbine models available at the time of contract tendering), could well be the largest wind farm in W.A.

The on-site electrical reticulation consists of underground cables connecting all turbines to the site substation. All cables, trenches and conduits shall be installed in accordance with the relevant Australian Standards and local authority requirements. Where cable routes cross under public roads the appropriate Works Permit (Underground Road Crossing) will be obtained, from the Shire. On-site cabling routes will avoid disturbing vegetation wherever possible.

Overhead transmission lines will link the substation to the Western Power transmission lines traversing the site.

On-site service roads linking all turbines and associated infrastructure will be required. All roads will be gravel and utilised for construction, operation and maintenance activities.

At each turbine location, an area around the base will be prepared to provide suitable space for the assembly of the turbines. Some other small areas may be required for crane tables and hardstands for use during construction and the majority of these areas will be revegetated upon completion of construction if vegetation has been disturbed. Details of vegetation removal and protection is contained within the Environmental Impact Statement report that accompanies this planning assessment.

A site compound will be established in the general vicinity of the substation. This will provide a base for the construction and operations personnel and support services. This site compound will contain the following – an administration building, workshop, fluid store, maintenance store, storage compound and car parking facilities. The site compound will be utilised by the operations personnel and support services for the lifetime of the project. The required building approvals for these structures will also be sought by the proponents once planning approval is granted.

Construction and operation of the Wind Farms will involve the following activities:

- Construction of on-site service roads linking all wind turbines and associated infrastructure to the existing external roads. These will be utilised for construction, operation and maintenance activities.
- Construction of a permanent Site Compound containing an Administration Building, Workshop, Fluid Store, Maintenance workshop, storage compound and car parking facilities.
- Construction of temporary construction infrastructure including site offices parking, hardstand areas and amenities to accommodate the construction workforce. These facilities will be removed and the areas rehabilitated after construction.
- Excavation of foundations for each wind turbine footing followed by reinforcement and concrete pouring.

- Erection of wind turbine towers of up to 100 metres in height and the installation of the nacelle and rotor blades.
- Excavation, laying and backfilling of underground electrical cabling linking all turbines and the substation.
- All wind turbines within each Wind Farm will be connected to the substation constructed on the site, which incorporated a control building.
- The substation/s will be connected to the planned Western Power transmission lines spanning the site.
- Water for construction needs will be sourced locally.
- Where possible, the construction workforce will be sourced from the local area.
- Installation of a temporary concrete batching plant
- Restoration of areas used for construction, which are not required for operational activities.

A temporary concrete batching plant facility may be required on-site to facilitate the continuous pouring of concrete for the turbine footings. Raw materials will be trucked to the site and stockpiled adjacent to the batching facility. The siting of the batching facility will be responsive to the distances to be travelled for concrete pours.

General temporary facilities required for construction will include site sheds and offices, ablution facilities, crib rooms, covered external area and laydown areas etc. These facilities will be located close to the permanent site compound. They will be removed following construction and all areas disturbed will be rehabilitated.

The Wind Farms turbines do not affect the Obstacle Height Limitation Surface existing around the closest airfield being the Gin Gin Military Airfield. Other airfields are located beyond 20km from the turbines and hence would not be affected.

Air Route W14(Between Rottnest and Jurien Navigation Aids) with a lowest safety elevation height as stipulated by CASA of 2100 feet would be infringed by the Waddi Wind Farm by 350 feet and to safeguard this air route the lowest safety altitude would need to be raised to 2500 feet. No other air routes are affected by the proposed wind farms.

The Environmental Protection Act 1986 is the principal environmental legislation in Western Australia outlining the environment assessment procedure applying to the evaluation of the proposed Wind Farms. Under this Act – Section 40, the Environmental Protection Authority is required to notify the Shire within 28 days whether the proposal is to be assessed (environmental impact assessment) or give advice and make recommendation to the Shire on the environmental aspects of the proposal. The Environmental Impact Statement report that accompanies this planning report outlines in detail all of the environmental impacts and management procedures for these. A summary of these are included within this planning report.

Mining Exploration Licences are granted to enable exploration for minerals under the Mining Act. It authorises entry to the land to explore for minerals with such vehicles,

machinery and equipment as may be necessary and permits digging pits, trenches and holes, sinking bores and tunnelling.

Exploration licences are granted for an initial term of five years and may be extended in prescribed circumstances for further periods of one or two years.

The exploration licence holder under the Mining Act has the statutory right to apply for, and have granted, mining leases over the land covered by the exploration licence. This means that if Exploration Licence holders wish to conduct more substantial mining operations on the land (or even if it wishes to conduct further exploration) it is entitled as of right to the grant of a mining lease which gives it the right to mine, unless the Minister is satisfied on reasonable grounds in the public interest that the mining lease should not be granted. This is only tempered to the extent of any private agreement that the tenement holder may have reached with the underlying landowner.

The project area covers a number of current mineral exploration licences. Consultation with the holders of the licences has revealed that no significant detrimental impacts on potential exploration activities within the proposed project area would occur as a result of the Wind Farms project. Such activities would include surface rock sampling and possibly core drilling, depending on the results of preliminary exploration work. Ongoing consultation and negotiations with the stakeholders will continue as the development progresses.

Construction of the Wind Farms will require transportation of both imported and locally produced components. The number and type of loads required are dependent on a number of factors and will only be confirmed once the manufacturer and model of turbines have been selected. The proponents proposed to utilise existing roads and create on-site access roads. All on-site access roads will be constructed to a suitable standard catering for the requirements of all delivery and construction vehicles.

Transportation of large equipment to the site will involve traffic escorts. Imported equipment will arrive at either of the ports of Geraldton or Fremantle and transported by truck to the site.

A traffic management plan will be prepared in conjunction with the Shire and MRWA prior to construction covering the specific traffic and transport details for the project.

CONSULTATION

Whilst a number of community consultation sessions have been conducted by the proponents as well as a number of negotiations with departments and agencies there will be a requirement for the local government to undertake advertising under the Local Planning Scheme No.7 Clause 9.4.3.

This advertising will include formal submission to the following agencies seeking their formal comments:

- Department for Planning and Infrastructure
- Department of Environment and Conservation
- Environmental Protection Authority

- Main Roads WA
- Wheatbelt Development Commission
- Civil Aviation Safety Authority
- Air Services Australia
- Department of Defence
- Electricity Network Provider
- Department of Land Information
- Department of Industry and Resources
- Tourism Western Australia
- Department of Agriculture and Food
- Public via advertising and Landowners in vicinity of the project.

5.2 Site Works Summary

Prior to the main construction commencing a number of enabling works and further site planning would be undertaken including:

- Detailed site investigation including geotechnical investigations involving a series of trial pits and/or boreholes.
- Upgrading the surfaces of local roads and access tracks where required.
- Widening the junctions or corners of local roads, entrance/access points where required.
- Widening the existing gateways or inserting new gateways in between paddocks where required.
- Stripping and careful storage of existing soil from the areas which would be affected by construction activities, including the tower bases, switchgear house and yard, access track areas, crane hardstand areas and temporary laydown/carpark areas.
- The construction of a secure works facility with project owner and subcontractors field offices (portables), carpark hardstand areas and toilet facilities (temporary).
- Erection of signage on roads.
- Enabling works for the locating of a mobile concrete batching plant (temporary if required).
- Enabling works for the locating of a rock crushing plant (temporary if required).
- Environmental survey and refinement of the Environmental Management Plan, Health and Safety Plan, Traffic Management Plan and any other documentation as required under the planning authorisation.
- Survey of critical boundaries and pegging of infrastructure locations.
- Preparation of works procedures.
- Engineering design works and submission for Building Licence consent.

The principal components of the construction activity on site are to be as follows:

- Overhead power lines - these will be required to transport the electrical energy from the proposed Waddi and Yandin on-site substations to the proposed off-site substation. The power line support poles will be supported by reinforced

concrete piers to a depth determined by an engineer, taking into account the local geotechnical conditions. The poles will be either 'stobie' poles or spun concrete poles, 20-25m in height. Three conductor wires (single phase) and an earthing wire would be strung from the head frame on the poles.

- Site access tracks and hardstand areas requiring surfacing in order to cater for construction traffic and machinery. This would involve the excavation of the tracks and hardstand areas to a suitable depth, prior to the laying of a compactable interlocking stone base and top dressing. The soil and rock that is removed will be stored on-site at convenient locations for re-use within the development area where appropriate. Site access points would be gated and secured and appropriate warning signs erected. Site access tracks will be constructed to 12 metres to allow for passing construction traffic, large mobile cranes and other long and wide loads. Once operational these tracks will be reduced to a maximum of 6 metres width to allow access for primarily commercial vehicles only. The crane hardstand area and turbine footprint would be sized at approximately 50 metres by 80 metres.
- If slab turbine foundations are required, the construction of the foundation for each machine would involve the excavation of approximately 450m³ of ground material (of which 200m³ would be used as back fill around the turbine bases to a depth of 2metres. Steel reinforcement would be put in place and concrete poured to form the base in-situ. The upper surface of the base would finish approximately 1 metre below the ground level with either a central column with bolts to support the tower or the base section of the tower set into the concrete.
- If slab plus rock anchor turbine foundations are required the construction of the foundation for each machine would involve the excavation of approximately 300m³ of ground material to a depth of approximately 2metres. Shuttering and steel reinforcement would then be put in place and concrete poured to form the base in-situ. The upper surface of the base would finish at ground level with either a central column with bolts to support the tower or the base section of the tower set into the concrete. The rock anchor piles are drilled prior to concrete pour and are up to a depth of approximately 20 metres.
- If mono pile turbine foundations are required the construction of the foundation would involve the excavation of approximately 50 m³ (of which 30m³ would be used as back fill) of ground material to a depth of approximately 10m using a rock drill. A tubular section with tower connection flanges would then be inserted in the hole and concrete then poured in-situ. The flange would finish slightly above the ground surface to allow connection of the tower.
- Either prior to or during turbine base construction the underground site electrical system would be installed. This would involve the cutting or excavation of trenches to a depth of between .08 – 1.0m for the laying of the underground cabling that links the turbines to the on-site substation. All trenches would be backfilled and marked with warning tape once the cables were laid. The majority of the underground cabling would be located adjacent to the access tracks where practicable and the route would be marked with small marker posts and the surrounding vegetation will be allowed to regrow.

- The turbine components would be delivered to the site on extended and regular semi-trailers. The method of construction would involve the use of a small mobile crane for the ground assembly operation. A larger 600-1000tonne mobile crane together with the smaller tailing crane would be required to erect the turbines once ground assembly is complete. Erection is likely to take approximately 2-3 days per turbine.
- On site Sub Station Compounds- Waddi Wind Farm – A location for the on-site substation has been selected approximately 400 metres north of Mullering Road. The total compound area will be in the order of 100 x 80 metres and the yard will be surfaced with compacted quarry rubble to form a hardstand area. Reinforced concrete footings will then be constructed to support the electrical infrastructure and buildings. Infrastructure required within the yard includes a 33kV/330kV transformer, switchgear, power conditioning equipment and operations office. Yandin Wind Farm – A location for the on-site substation has been selected approximately 1Km north of the Yandin Road. The total compound area will be in the order of 200 x 200 metres and the yard will be surfaced with compacted quarry rubble to form a hardstand area. Reinforced concrete footings will then be constructed to support the electrical infrastructure and buildings. Infrastructure required within the yard includes a 33kV/330kV transformer, switchgear, power conditioning equipment and operations office.
- Site works will also require the erection of temporary infrastructure such as portable field offices, toilet facilities, materials storage areas and parking bays. This infrastructure is typical of that found at construction sites.
- A concrete batching plant may be established on-site to supply concrete for the foundations of wind turbines. The details surrounding the batching plant are not yet finalised as they will depend on a number of factors including type of footings used, proximity of alternate supply and identification of suitable locations. The concrete batching plant including material stockpile area would be located in an area on site approximately 30 metres x 30 metres and the plant would have a capacity to produce 25m^3 (60 tones) per hour. Aggregate, sand and cement would be stored within the concrete batching plant area for use as required. Cement would be delivered on-site in enclosed container trucks as needed and stored in enclosed silos. Concrete manufactured on-site would be loaded into concrete agitators for transport to the turbine locations on-site.
- Construction activities will require the storage of minor amounts of certain hazardous chemicals and wastes, such as fuels, oils and other machinery lubricants and liquids. Bulk storage of cement and other construction materials may also be required. All hazardous materials will be stored in specific laydown /storage areas and will be handled and stored according to regulatory requirements and Australian Standards AS 1940 – The Storage and Handling of Flammable and Combustible Liquids and other relevant standards. Any wastes will be removed for off-site disposal at an appropriate, licensed disposal facility.

5.3 Environmental Assessment

Wind Prospect has engaged a number of consultants to determine the baseline environmental conditions at the site, identify potential impacts and develop management strategies to mitigate those impacts where possible.

The assessment process has involved stakeholder consultations, site-specific survey work and observation of relevant literature. These assessments along with stakeholder input have been consolidated into the Dandaragan Wind Farms Environmental Statement Report. All external assessments and consultations have been extensively drawn upon to develop an optimal wind farm design that balances environmental, social, economic and cultural needs.

A number of specialist studies have been undertaken in order to determine and assess potential environmental and social effects of the project and their management. They are:

- Ecological Studies
- Noise Assessments
- Electromagnetic Interference Studies
- Cultural Heritage Studies
- Aviation Studies
- Traffic Studies
- Visual Simulation Studies

Site management of the Dandaragan Wind Farms project will be in accordance with this Environmental Statement report and recommendations and the baseline Environmental Management Plan. The EMP includes a soil and water management strategy and a scope for the production of various other site management plans to be implemented by the on-site contractors.

5.4 Management of Physical Environment

Soils – Potential Impacts –: The potential for soil erosion exists during the construction of wind farm infrastructure such as access roads, turbine bases and cable trenches – that is where earthworks and soil disturbance takes place. Inadequate protection of exposed surfaces during construction can lead to erosion from rainfall and high wind events. Erosion events can lead to siltration and consequential habitat disturbance both on and off site, decreased productivity from loss of top soil, disturbance to soil structure and general instability of soil.
The use of chemicals and hazardous materials on-site also attracts the potential for soil contamination through misuse or spillage.

Soil – Management -: A number of management actions will be implemented to manage surface runoff and exposed soil surfaces to ensure that erosion events do not occur. These will be detailed in a Soil and Water Management Plan to be developed prior to construction. Such actions will include siting access tracks and cable trenches both along ridge tops and along contours as far as practicable, appropriately covering and stabilising exposed soil surfaces subject to an erosion risk where earthworks are carried out, and filtering silted runoff before it leaves the site. Refuelling procedures

and the management of hazardous materials and wastes will also avoid soil contamination.

Hydrogeology – Potential Impacts -: The proposed development does not include any associated groundwater use, and as such there would be no increased stress on groundwater resources in the area due to the development. Possible contamination paths to groundwater due to construction activities could occur during the construction phase. Earthworks will be needed to excavate areas for the ground works for the turbines. These earthworks can open up new paths for contaminants to enter ground water systems.

Hydrogeology – Management -: Whilst impact on groundwater resources within proximity to the Wind Farm Development is expected to be negligible construction management plans will be prepared to minimise possible risks, which include proper and safe storage of fuels, for construction equipment and contingency and emergency response plans for accidental spills. These procedures will be detailed in an Environmental Management Plan.

Air – Potential Impacts -: Some air emissions are expected from on-site construction activities in the form of exhaust emissions from construction vehicles and generation of dust. However emissions will be minimal, localised and short term and have an overall negligible impact. There will be no air emissions produced during operation. Dust emissions may occur during construction activities from the use of machinery including, for example, earthwork machinery operating at turbine locations and access tracks. Dust may also be generated by other construction traffic travelling along the local road network and on-site access tracks and roads. The operation of the Wind Farms will contribute significantly to the reduction of CO2 emissions.

Air – Management -: Vehicle emission will be minimised by ensuring that all machinery used on-site is kept in good working order. Site earthworks for turbines will be located on ridge tops and away from residential areas. As such any dust emissions from earthworks are expected to have a negligible and localised impact. Further, dust suppression practices such as watering down in adverse conditions, can reduce dust emissions from construction traffic both on-site and more significantly along local road network used during construction. All access roads will be of appropriate standard with most surfaced with compacted gravel. Full details of environmental management actions relating to air quality control are listed in the Environmental Management Plan.

Surface Water and Drainage – Potential Impacts -: Construction of the wind farms will not require the modification or redirection of any surface water features. It is also unlikely that any direct impact on groundwater resources from earthwork activities will occur given the depth of the aquifers at locations where trenching and excavation works will be required.

Surface Water Drainage – Management -: Management actions will include such actions as siting access tracks and cable trenches along ridge tops and following contours as far as practicable, covering stabilising appropriately exposed soil surfaces

subject to an erosion risk where earthworks are carried out, and filtered silted runoff before it leaves the site to prevent downslope siltration of habitats and watercourses. Where it is found that construction activity may impact in shallow groundwater resources – in use for stock or domestic purposes – construction of these sites will be effectively engineered to prevent any detrimental effects.

5.5 Management of Ecological Environment

Fauna – Potential Impacts -: There are a number of potential hazards associated with the construction and operation of the wind farms that could result in effects on terrestrial fauna receptors. These include: loss of native vegetation habitat, fragmentation of native vegetation habitat, degradation of native vegetation habitat through clearance and increased fire occurrence, degradation of native vegetation due to increased drainage of the soil as a result of nearby excavations for turbine bases, collision risk of aerial fauna with turbine blades, risk of aerial fauna colliding with new overhead cables, risk of injury or death from maintenance vehicles.

Fauna – Management -: The following management measures have been recommended for the construction and operation of the wind farm sites and will be considered by the proponent:

- Wherever possible, native vegetation that needs removing should be cleared to ground level initially by hand tools to allow ground fauna time to move away from the cleared area before destructive ground works begin.
- If any trees need to be felled, they should be inspected for potential bat roosts by ecologists prior to felling. Any trees with potential roost locations should be removed in stages to permit bats to leave prior to final felling.
- All services be placed underground as far as practicable, but if they must be placed above ground, design the placement so animals can pass under them.
- New overhead cables to be marked with high-visibility markers until such times that bats and birds are familiar with the cables. This should be for a minimum of three seasons.
- Where access routes or cables are to pass across road reserves, they are to pass through existing gaps wherever possible. At these locations undisturbed reserve vegetation is to be temporarily fenced off with high visibility fencing for protection.
- Wind farm service vehicle speeds to be kept low, to avoid road kills of native fauna.
- Investigate and produce a Construction Management Plan to the satisfaction of DEC which will detail among other things:
    - General site awareness of site staff and restrictions e.g vehicle speed and areas that are out of bounds to site vehicles and plant.
    - Provision of temporary high visibility fencing around strands of native habitat that may be at risk of damage from site vehicles and plant during construction.
    - Ecological checks of construction locations prior to soil stripping to ensure no features of significance are present.
    - Investigate limiting site lighting especially during spring and autumn migration periods.

- Wherever possible, investigate and implement seasonal preferences for removal of native vegetation (where permission is provided) to avoid sensitive periods for nesting birds and hibernating reptiles.

Avifauna – Potential Impacts -: Potential impacts to avifauna from the wind farms primarily relate to turbine operation, i.e. collision risk and indirect effects from avoidance, habitat disruption and displacement.

Avifauna – Management -: The following recommendations have been outlined to ensure that the ecological impacts of the proposed wind farms are minimised as far as possible:

- Powerlines between turbines should be constructed underground where possible and along road infrastructure to minimise number of easements through the area and further incidents of potential avian collisions (including the creation of perching locations in the vicinity of turbines).
- A post-construction bird monitoring program, such as that described by Auswind (2005) should be established to determine the impacts of the project on bird populations. Such data may prove invaluable for assessing the impacts of future wind farms within the region and elsewhere within Australia.
- Constructional and operational phases of the development should be in line with the Best Practice Guidelines for Wind Energy Projects (Auswind 2005), including the implementation of an Environmental Management Plan (EMP) and a Construction Management Plan (CMP).
- Vegetation and associated habitat loss is kept at a minimum through careful planning of cable and access road alignments.

Flora & Vegetation – Potential Impacts -: Potential impacts of the proposal to flora and vegetation over the Dandaragan Project Area include:

- Direct clearance or disturbance of vegetation and flora.
- Disturbance to Priority Flora species, including the eight identified in the project area; *Hypocalymma sp.Cataby*, *Acacia plicata, Banksia fraseri* subsp.*crebra, Tetrateca angulata, Conostephium magnum, Eucalyptus macrocarpa* subsp. *elachantha. Grevillea saccata* and *Regelia megacephala.*
- Disturbance to Heath in very good, or better condition that are considered to be important remnants of pre-existing vegetation, and may potentially hold Rare, Threatened or Priority Flora even if not detected by field surveys.
- Potential disturbance to flora and vegetation within the Badgingarra National Park
- Potential disturbance to PEC's or TEC's (i.e. *Banksia attenuate woodland over rich dense shrublands).*
- Potential impacts to riparian vegetation associated with modifications to site hydrology.
- Effects of dust from vehicle movements and clearing.
- Potential to introduce or facilitate the establishment of weeds and exotic species.
- Potential to spread dieback; and
- Secondary impacts, such as off-road vehicles and increased fire.

Flora & Vegetation – Management -: The following management measures will be implemented to reduce potential impacts on flora and vegetation from the proposed Wind Farm Development:

- Clearing of remnant vegetation will be kept to a minimum necessary for safe construction and operation of the project, with only 0.74% of the overall footprint for the Waddi Project located in areas requiring clearing and only 0.12% of the overall footprint for the Yandin Project located in areas requiring clearing. The remainder of the footprint has been positioned on cleared pasture land or pine plantation.
- The majority of turbines and substations have been placed a minimum distance of 30m from remnant vegetation patches.
- The infrastructure placement has been designed to avoid nature reserves.
- The proposed layout of the wind farms have been designed to minimise impacts to Heath vegetation where possible. Only an area of 0.17% of the Heath (that may potentially hold Rare, Threatened or Priority Flora) mapped within the Project Area will be directly disturbed by the project, and where required, the wind farm design layout will be modified to avoid direct disturbance to conservation significant species.
- Approximately 0.11Ha to possible TEC, *Banksia attenuate* woodland (SH2) may be impacted by the proposed infrastructure (only 1.37% of the total SH2 mapped in the area). However, disturbance to this community will be avoided where possible during construction and operational works of this development. The measures implemented to minimise disturbance will include
    - The cable route will be positioned with a minimum vertical clearance of 5m above the tallest vegetation in this area (~10m) to minimise impacts to the vegetation community.
    - Laying the cables using fabric placed over the top of the vegetation to minimise clearing.
    - Installing the power line poles at either end of the vegetation community in previously cleared areas.
    - Wind Prospect will choose the cable route through SH2 that will result in the minimal amount of disturbance.

- A level 2 survey will be undertaken prior to any ground disturbance to confirm that no conservation significant communities will be significantly impacted by the project. Following the completion of the Level 2 Flora Survey, if required, the wind farm design layout will be modified to avoid direct disturbance to any other identified conservation significant communities.
- Clearing of riparian vegetation will be avoided where possible, only a minor area (0.17Ha) of Sedgeland will be impacted by the proposed Yandin Wind Farm.
- For all remaining areas of required vegetation clearance, a vegetation clearance permit will be sought post consent, to ensure any final clearance proposed is acceptable and mitigated with appropriate offsets.
- Wind Prospect has designed the wind farm layout to avoid drainage lines where possible. However, a few access tracks will cross minor drainage lines (at existing crossings), where alternative routes are not feasible. No drainage

lines will be blocked or modified by the project. Therefore the project is unlikely to result in any significant impact to riparian vegetation from altered flow regimes.

- Both topsoil and cleared vegetation will be stockpiled and returned to disturbed areas during rehabilitation earthworks. On decommissioning of the project, rehabilitation will be undertaken to minimise the potential impact of clearing vegetation.
- During the construction phase dust management practices will be adopted to ensure that excessive amounts of dust are not generated along access tracks and cable routes and during clearing activities.
- Fire prevention procedures will be implemented during the construction and operation phase to attempt to exclude fire from the Project Area.
- Implement weed control during construction and operation including:
    - Minimising the creation of disturbed areas to minimise colonisation by weed species.
    - Off-road vehicle use will be strictly controlled over the project area with no driving permitted off designated routes.
    - An induction and ongoing education program for staff will reinforce awareness of procedures to prevent and control the spread of weeds.
    - If earthworks are required to take place in areas with existing weed populations, precautions will be taken to prevent weed contaminated material being transported to uncontaminated areas.
    - Material containing weeds will not be used for rehabilitation, and machinery operating in areas of known weed contamination will be cleaned before leaving the area.
    - If significant populations of weeds are identified during operations spot spraying with Glyphosate (herbicide) will be undertaken with a backpack spray device. The services of a contractor for weed spraying may be employed if weed populations become too large to effectively manage and/or they threaten vegetation success on rehabilitated areas. This weed control program will be maintained throughout the life of the operation.

5.6 Management of Cultural Heritage

Indigenous Heritage – Potential Impacts -: Potential impacts to known or unknown aboriginal sites or objects include disturbance or destruction during construction activities. The current infrastructure layout proposed for the proposed Dandaragan Wind Farms has been designed to avoid the 12 known sites, and as such these sites

will be avoided by all construction activities. Potential impacts to waterways and water resources may result from direct or indirect construction activities, through the establishment of on-site tracks and underground cable routes or other civil works, and through the effects of off-site erosion.

Indigenous Heritage – Management -: The 12 known sites will be recorded on site plans as exclusion zones to ensure they are not encroached during construction or operation activities.

In addition to the desktop study and preliminary site visit undertaken, a further heritage study prior to construction will be conducted in consultation with the Department of Indigenous Affairs (WA) to identify any further Aboriginal sites or objects that require protection under the Act. Such a process will include close consultation with relevant Aboriginal groups and a walkover survey of the areas that will be disturbed during construction of the wind farms by a qualified archaeologist/anthropologist, as well as recognised representatives from the South West Aboriginal Land & Sea Council (SWALSC) and Yued Aboriginal groups.

Care will be also be taken to ensure the avoidance of disturbance to waterways and water resources as far as practicable. This will include final site design works to avoid significant waterways and appropriate management of earthworks to prevent sedimentation and erosion.

Appropriate management actions for responding to accidental/incidental Aboriginal heritage site discovery during construction, will be included in the environmental management plan for the project in line with legislative requirements.

Non–Indigenous Heritage – Potential Impacts -: Two listed sites of non-indigenous heritage exist within the immediate vicinity of the Yandin Wind Farm site. It is unlikely that either site will be detrimentally affected by the construction or operation of the proposed wind farms.

Non-Indigenous Heritage – Management -: All turbine locations and construction activity will occur away from sites of non-indigenous heritage significance identified within the desktop study. The archeological survey to be carried out on-site will include a search for potential non-indigenous heritage sites. If such sites are found they will be flagged (pegged) and all site personnel will be informed of such areas and instructed that they are ‘no-go’ zones. Appropriate management actions for responding to accidental/incidental heritage site discovery during construction, will be included in the EMP for the project in line with legislative requirements.

5.7 Management of Visual Amenity

Potentially there are a number of issues that arise from wind farms in relation to visual amenity such as -:

- The View shed of the development and sensitive viewing locations.
- The landscape character and quality of the setting.

- Community perceptions to wind farms that may influence the sensitivity level of viewers.
- Visual character of the main components of the development.
- Visual impact of the development.
- Shadow flicker from the turbines.

The Consultant's assessment report concluded that there may in reality be very little negative visual effect on the regional or local landscape quality, and that such impact as does occur is either marginal or is such that it cannot be managed in any practical way.

The report concludes that the nature of the study area landscape is such that it has an inherently large capacity to absorb a land use with pronounced structures, such as a wind farm, The turbines can be regarded as an 'additional' man made element within a broad landscape that contains many other structures including power lines, transmission towers, farm buildings, roads, fence lines etc. Individual turbines will be experienced at close quarters as significant and dominating structures, but close quarter access is not widely possible.

Secondly it should be emphasised that the proposed wind farm will be relatively temporary and will eventually be decommissioned with all turbines and ancillary facilities and structures removed. In the meantime it would have brought benefit and revenue to the community which will impact positively upon local perception of its visible presence during its operational life.

Thirdly the scale of the proposed Waddi and Yandin Wind Farms is such that if the development goes ahead it will undoubtedly result in a significant change to the landscape of the locality; it will become a 'rural wind farm landscape'. This will be an undeniably regional landscape outcome.

Fourth at the local and specific site level an issue of unacceptable landscape and visual impact affecting specific individual landowners or residents might arise following construction. However no advice has been received in the course of this study alerting to this possibility. Nor has this study identified a particular problem site.

With respect to all these points Wind Prospect has undertaken ongoing communications with all relevant local landowners (i.e. properties on which the proposed wind farm would be developed) and has conducted wider community consultation in the form of a Public Exhibition in 2009 and other media. GHD (the consultants undertaking this study) consider that this ongoing consultation supports the overall conclusions of their assessment report.

5.8 Management of Electromagnetic Signals

Within both the Waddi and Yandin Wind Farm there is a total of nine point to point link paths that traverse the project area and two radio communication masts located within the project boundaries. There are also a number of radio communication link

paths and masts within the vicinity of the proposed Wind Farms, which have all been taken into consideration. Details of the radio communication links, masts and buffer zones are detailed in the Environmental Impact Statement report that accompanies this planning report.

The turbine layout has been designed to avoid any potential impacts to radio communications services by ensuring recommended buffers from point to point links and transmission towers located within the vicinity of the project area, resulting in negligible predicted impact.

Television interference from the Dandaragan Wind Farms may occur particularly for residences where the Wind Farms are between the receiver and transmitter. If any effects are noted Wind Prospect is committed to ensuring that suitable mitigation measures are implemented.

The Department of Defence have indicated the possibility that the project may result in interference to radar used by Air Traffic Control for Military flying training. Wind Prospect has received the support from the Department of Defence for the construction of the wind farms subject to further discussions and conditions.

The Dandaragan Wind Farms will have minimal impact on mobile phone coverage within surrounding areas.

5.9 Management of Traffic

Access roads for the wind farm will consist of both main and secondary roads with some sections of secondary roads requiring upgrading to cater for construction traffic. The planning of such works will be carried out in consultation with the Shire of Dandaragan and MRWA.

Upgrade work on roads will avoid the disturbance of significant flora and fauna through the implementation of pre-construction surveys and the project EMP. Regular inspections of road condition and ongoing maintenance will ensure road conditions are maintained for the life of the wind farm.

Traffic issues including public safety and increased visitation will be addressed in consultation with the Shire of Dandaragan and MRWA to ensure increased traffic does not significantly impact on road safety in the region.

A formal TMP will be prepared in the next phases of the project development and will provide detailed information on the transportation issues based on more defined parameters. This will be done in consultation with the Shire of Dandaragan and the MRWA to ensure strategies which minimise traffic impact, risks and disruption to the affected communities.

5.10 Management of Aviation

Wind farms have the potential to impact civil aviation safety in three main ways:

- Intruding OLS of aerodromes or Lowest Safe Altitudes along particular air routes.
- Presenting an obstacle hazard in civil airspace.
- Interfering with aviation navigational aids and Visual Flight Rules (VRF) Routes.

The OLS is essentially a defined area (around 15km) of airspace above and around a licensed aerodrome. The nearest licensed aerodrome, the Gin Gin Military Airfield is located 67km from the nearest of the Dandaragan Wind Farms. Other airfields are located at least 20km from the nearest wind farm. Due to the distance of these airfields from the wind farms, aviation activities at these two airfields will not be affected by the wind farms.

CASA administers regulations for the intrusion of structures into aerodrome OLS and tall structures in other airspace. Part of these regulations include lighting requirements for tall structures, although such guidance for Wind Farms is currently withdrawn and under review. The proposed turbine height for the Dandaragan Wind Farms is up to 152metres which is above the Tall Structures threshold and so calls for an Aeronautical Impact Assessment. The region also holds a number of military, agricultural and other aeronautical activities which also warrant an impact assessment.

There are no licensed aerodromes within, or in the vicinity of, the Dandaragan Wind Farms project area, so there are no concerns with regards to aerodromes or OLS'. The Lowest Safe Elevation height for air routes W14 will need to be raised to accommodate the turbines.

Prior to construction Wind Prospect commits to either conducting a full risk assessment to determine the need for turbine lighting or where new CASA regulations are released submit the proposed or consented project to CASA for assessment against those regulations.

The proposed wind farms will not affect any of the Military or RAAF activities or navigational aids. Further support from the RAAF will be sought for turbines up to 152 metres in height.

Agricultural aerial spraying activities will be largely unaffected by the wind farm.

Private airstrips and landing grounds located near the proposed wind farms however pilots operating at such airstrips are responsible for ensuring that they are aware of the conditions on and surrounding these landing sites.

5.11 Management of Noise

There are two main sources of noise emissions from wind turbines – the first is aerodynamic noise from the rotation of the blades and the second is mechanical noise from the operating components of the turbine located in the nacelle, however

mechanical noise has virtually disappeared from modern wind turbines due to improved engineering.

The EPA guidelines were developed to provide guidelines for acceptable levels of noise generated from wind turbines on those residents that do not have an agreement with the wind farm developer, i.e. neighbouring landowners which are not part of the wind farm development.

Dwellings further than 2000 metres from the nearest turbine are unlikely to experience sound emissions from any turbines. In order to satisfy EPA noise criteria, the Dandaragan Wind Farms have been designed to ensure that all dwellings on neighbouring land are situated a minimum of 1500 metres to the nearest turbine, while the nearest dwellings on land involved in the project is a minimum of 1000 metres of the nearest turbine.

Of the 24 residences included within the noise modelling for Waddi Wind Farm, 8 are wind farm landowner residences and 16 are neighbouring residences. Results of the noise level predictions carried out using the CONCAWE noise propagation model to predict the noise from the wind farm show that no neighbouring or landowner residences will experience noise levels above the EPA criterion based on the REpower 3.XM turbine.

Similarly, of the 43 residences included within the noise modelling for Yandin Wind Farm, 12 are wind farm landowner residences and 31 are neighbouring residences. Results of the noise level predictions, again using the CONCAWE noise propagation model, show that no neighbouring residences will experience noise levels above the EPA criterion for the REpower 3.XM turbine. However, the noise level predictions for Yandin Wind Farm landowner residences marginally exceed the EPA criterion at one residence (0.5 dB(A)) based on the REpower 3.XM turbine for wind speeds between 8-12m/s.

The proposed wind farm is not anticipated to lead to any significant increase in noise levels for the residences around the proposed wind farm. However, further monitoring and modelling work will be carried out once a final turbine model has been chosen to confirm this.

5.12 Management of Socio-Economic Impacts

The economy of the Shire of Dandaragan relies on the combined effect of its population, agriculture and tourism. It is considered that the Dandaragan Wind Farms will help to encourage diversification and growth of the local economy, and may also lead to considerable local and regional employment opportunities.

In summary, the socio-economic spin-offs from the proposed Dandaragan wind Farms can potentially include:

- Enhanced agricultural viability of the farms involved through rental income from the wind farm.

- Local and regional employment (in both construction of the wind farms and in its subsequent maintenance).
- Income to local small business due to potential increases in tourism numbers through the region.
- Local project funding through a Community Trust Fund.
- An educational resource for local schools, community organisations, and other interested groups.
- An upgraded and well maintained fire track for the ranges.
- A safe, environmentally friendly and diverse electricity supply for the Mid-North.
- Clean, green energy production, making a significant contribution to the solution of national and global pollution/global warming problems.
- Increased council rates and significant Development Application Fees.

6.0 STRATEGIC ENVIRONMENT

Increasingly, governments around the world are turning to renewable energy to end our dependence on fossil fuels due to the recognised need to mitigate the environmental effects associated with fossil fuel energy generation. Such thought has manifested into international, national and statewide commitments supporting the development of clean and sustainable energy projects.

In 2001, the Australian Government introduced a Mandatory Renewable Energy Target (MRET) program with the goal of increasing uptake of renewable energy in Australia's electricity supply.

By ratifying the 1997 Kyoto Protocol in 2007, Australia made a commitment to limit greenhouse gas emissions growth to an 8% increase on a 1990 base level by 2008-2012. The Australian Government has also developed a strategy to further reduce national emissions. Key elements include:

- A commitment to reduce Australia’s greenhouse gas emissions by 60% on 2000 levels by 2050.
- Setting a 20% target for renewable energy by 2020 to expand the use of renewable energy.
- Investing in research and development of low emissions technologies.

These initiatives demonstrate that the Federal Government attaches great importance to both greenhouse gas abatement programs as well as measures that support renewable energy projects. The initiatives also further emphasise the valuable contribution that renewable energy projects can provide to national and international greenhouse reduction targets.

In December 2008, the Australian Government and the Council of Australian Governments (COAG) released for public consultation draft legislation for an expanded Renewable Energy Target (RET) that will bring the MRET and existing and

proposed state and territory targets into a single national RET scheme. This target will need 45,000 gigawatt hours (GWh) of renewable energy further to the approximately 15,000 GWh of existing renewable energy capacity.

In February 2010, the Rudd government proposed that from 1 January 2011, the RET will include two parts - the Small-scale Renewable Energy Scheme (SRES) and the Large-scale Renewable Energy Target (LRET).

The SRES will apply small-scale technologies such as residential solar power and solar hot water systems and will provide a fixed price of $40 per Renewable Energy Certificate (REC).

The LRET will cover large-scale renewable energy projects like wind and solar farms and should boost investor confidence in those projects, which has also been negatively affected by low REC prices.

After last minute amendments, legislation for the enhanced Renewable Energy Target (eRET) was passed on 24th June 2010.

In 2004 the Western Australian Government released the Western Australian Greenhouse Strategy (2004) to ensure the State's industry and community reduce greenhouse emissions and effectively respond to any opportunities and challenges generated by climate change.

The Strategy establishes research programs to enable the State to better adapt to the changing climate, delivers the Western Australian Government's greenhouse related policy commitments and establishes a Greenhouse Unit in the Department of the Premier and Cabinet to enable Western Australian interests to be represented nationally and internationally. The greenhouse Unit will coordinate implementation of the Strategy and enable the State to more effectively develop and advocate State greenhouse and climate change policy initiatives.

W.A's Greenhouse Strategy defines several objectives for its strategic response to climate change which include:

- Maximising opportunities for a sustainable future for Western Australians.
- Create voluntary market based measures to enable all emitters to access least cost greenhouse emissions abatement initiatives.
- Establish a realistic and effective long term commitment to addressing climate change.
- Ensure all sectors contribute to solutions; and
- Enable Western Australia to contribute to national and international solutions on a cost effective and equitable basis.

In May 2007 the Western Australian Government released Making Decisions for the Future: Climate Change (2007). This report highlights the Government's commitment to reducing Western Australia's total greenhouse gas emissions by 60% of 2000 levels by 2050, which is consistent with the National target.

The report contains a range of initiatives to be adopted in order to meet this target one of which is encourage the development of the renewable energy sector, to deliver long term reductions in emissions.

It is evident that renewable technologies such as wind energy play a vital role in meeting reduced greenhouse emission targets within Western Australia in the future.

7.0 STATUTORY ENVIRONMENT

STATE:

Within the State of Western Australia the Planning and Development Act 2005 is the overarching piece of legislation that covers planning. The purpose of this Act as listed within section 3 of the Act is in part to provide for an efficient and effective land use planning system in the State and promote the sustainable use and development of land in the State.

Sustainable development has been defined in many ways, but the most frequently quoted definition is from *Our Common Future*, also known as the Brundtland Report:

> *"Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs"*

The Planning and Development Act 2005 also establishes the Western Australian Planning Commission. Some of the functions of the Commission are – the coordination and promotion of land use, transport planning and land development in the State in a sustainable manner; to prepare and keep under review a planning strategy for the State and planning polices.

A Planning Strategy for the State was prepared in 1997 which contained a number of relevant principles and actions (Strategies) in relation to planning for the State viz:

- To protect and enhance the key natural and cultural assets of the State and deliver to all Western Australians a high quality of life which is based on sound environmentally sustainable principles.

  Under this broad principle sit the following strategies:
  - Increasingly use energy sources which have minimal impact on the environment.
  - Prevent further loss of biodiversity.
  - Ensure that air quality is protected.
  - Ensure that land and soil is safeguarded and that degradation does not occur.
  - Enhance the quality of life for all Western Australians.
  - Protect the State's cultural heritage.
- To actively assist in the creation of regional wealth, support the development of new industries and encourage economic activity in accordance with sustainable development principles.

  Under this broad principle sit the following strategies:

- Facilitate land use planning for the growth of the tourism industry which is sensitive to environmental constraints.
- Make allowances for the needs of new industries and technologies.

The WA Planning Commission prepared a Planning Bulletin (No.67) in 2004 entitled "Guidelines for Wind Farm Development" and the bulletin is intended to provide local government, other relevant approval authorities and wind farm developers with a guide to the planning framework for the balanced assessment of land based wind farm developments throughout the State of Western Australia.

The Western Australian Government's "State Sustainability Strategy" reflects on the imperative of ensuring land use and development are consistent with the efficient use of energy and minimisation of greenhouse gas emissions. Wind energy is a renewable energy technology, which fits closely with the ideals of this strategy.

The WAPC's Guidelines indicate that wind farm developments have the following advantages:

- Contributes to national and international efforts to reduce emissions of greenhouse gases and other air pollutants through the potential displacement of those created by fossil fuel power sources.
- Improves sustainable production of electricity in Western Australia.
- Assists Western Australia in meeting its MRET obligations.
- Increases energy supply, diversity and security.
- Provides greater electricity distribution network efficiency, through reduced transmission losses.
- Reduces cost of electricity supply in certain circumstances such as remote, off grid rural communities.
- Provides a source of income and employment in regional areas.
- Encourages redevelopment and niche ancillary industries that manufacture energy technologies.
- Reduces regional community and government dependence on fossil fuesl.

These guidelines also recognise the following items as matters of concern that need to be dealt with in the planning process:

- Visual impact on landscape.
- Other amenity issues such as noise, shadow flicker, blade glint, overshadowing and minor electromagnetic interference.
- Potential impacts on fauna such as birds, vegetation, soil drainage, erosion and water quality.
- Construction issues including provisions of infrastructure and utilities to these facilities.
- Public health and safety, including airfield and aircraft safety.
- Socio-economic considerations.
- Impact on items of Aboriginal significance.

The guidelines also provide a checklist for applicants and decision making authorities considering wind farm proposals which cover broadly the matters of site analysis, impact assessment and mitigation measures, and consultation.

In our assessment of the Dandaragan Wind Farms project it is evident that Wind Prospect WA Pty Ltd have adequately addressed all of these criteria and have also met the broad obligations under the State Strategy mentioned above.

LOCAL:

The Shire of Dandaragan in accordance with the provisions of the Planning and Development Act 2005 has prepared and adopted its Local Planning Scheme No.7 which controls land use and development within the Shire.

Applications for any development must be made to the Shire in accordance with the provisions of the Local Planning Scheme.

In the case of Wind Farm Developments the use is to be located within the Rural Zone under the provisions of the Local Planning Scheme No.7. The Scheme designates the future use and development of the land as being for rural purposes. Under Clause 4.2 – Objectives of the Zones within the Scheme it states for the Rural Zone that the objective is "To provide for a range of rural activities such as broadacre and diversified farming so as to retain the character and amenity of the locality, in such a way as to prevent land degradation and further loss of biodiversity".

Pursuant to Local Planning Scheme No.7, the Wind Farms are a land use that is not listed under the Scheme and therefore does not appear in the Zoning and Development Table contained within the Scheme.

Under Clause 4.4.2 of the Scheme "If a person proposes to carry out on land any use that is not specifically mentioned in the Zoning and Development Table and cannot reasonably be determined as falling within the type, class or genus of activity of any other use category the local government may:

(a) determine that the use is consistent with the objectives of the particular zone and is therefore permitted;
(b) determine that the use may be consistent with the objectives of the particular zone and thereafter follow the advertising procedures of Clause 9.4 in considering an application for planning approval; or
(c) determine that the use is not consistent with the objectives of the particular zone and therefore is not permitted."

Given that the Shire of Dandaragan has previously determined that applications for Planning Approval for Wind Farm developments (particularly Emu Downs Wind Farm and the Badgingarra Wind Farm) fall within category (b) above there is no reason to think that this application would be treated in any different way given that previous applications were also within the Rural Zone and also within the vicinity of the proposed Dandaragan Wind Farms project.

Clause 9.4 stipulates that the "local government is not to grant planning approval to that application unless notice is given in accordance with Clause 9.4.3."
Clause 9.4.3 states: "The local government may give notice or require the applicant to give notice of an application for planning approval in one or more of the following ways:

(a) notice of the proposed use or development served on nearby owners and occupiers who, in the opinion of the local government, are likely to be affected by the granting of planning approval, stating that submissions may be made to the local government by a specified date being not less than 14 days from the day the notice is served.
(b) notice of the proposed use or development published in a newspaper circulating in the Scheme area stating that submissions may be made to the local government by a specified date being not less than 14 days from the day the notice is published; or
(c) a sign or signs displaying notice of the proposed use or development to be erected in a conspicuous position on the land for a period of not less than 14 days from the day the notice is erected."

Previous development applications for Wind Farm projects within the Shire of Dandaragan have undergone an advertising process however for a project of this nature the period for advertising has been 42 days to allow sufficient time for any input from stakeholders, departments and community etc.

Whilst it is recognised that the Dandaragan Wind Farms project is of considerable size and will to a large degree rely on both negotiations with and the timing of the upgrading and installation of a new transmission line by Western Power it is quite possible that the development approval period of two years may be exceeded before the development is substantially commenced. Hence it is a request within this request for planning approval that consideration be given by the Shire of Dandaragan in granting any approval that a time frame of 4 years be granted.

Clause 10.5.1(a) of the Local Planning Scheme No.7 states:
"10.5.1 Where the local government grants planning approval for the development of land-

(a) the development approval is to be substantially commenced within 2 years, or such other period as specified in the approval, after the date of determination;"

Clause 10.5.2 allows applications for extensions to the term of the planning approval at any time prior to the expiry of the approval period granted under Clause 10.5.1. However as previously stated it is foreshadowed that given the scale of this project in total a two year time frame would need to be extended as it is considered that the development would not be substantially commenced within that period and therefore to give both security of approval and sufficient time to finalise arrangements with Western Power and any other Department or Agency the 4 year period would be more realistic.

8.0 CONCLUSION

Wind Prospect WA Pty Ltd proposes to develop the Dandaragan Wind Farms consisting of 151 Turbines (Waddi Wind Farm 57 Turbines & Yandin Wind Farm 94 Turbines) and ancillary structures on land located between Cataby and Dandaragan in the Shire of Dandaragan. The subject land is located in the Rural Zone wherein the retention of farming is the primary objective.

The subject development proposal has been assessed against provisions of -:

- A number of Federal and State Government Policies relating to Greenhouse Gas emissions;
- Planning and Development Act 2005;
- The State Planning Strategy;
- The State Sustainability Strategy;
- The WA Planning Commission's Planning Bulletin No.67 - Guidelines for Wind Farm Development;
- The Shire of Dandaragan's Local Planning Scheme No.7.

so as to determine the appropriateness of the proposed use and the subject land and to identify any likely social, economic and/or environmental impacts.

We have formed the opinion that the subject land development proposal represents an appropriate, rational and practical form of development for the subject sites and locality.

In forming this opinion we were mindful that:

- A wind farm is more appropriately located in the open rural landscape rather than in a built or urban environment.
- Despite the establishment of the proposed wind farm, more than 99% of the subject land will continue to be made available for agricultural/farming land uses, in keeping with the primary objectives of the Rural Zone.
- An ecological survey has been undertaken of the subject land, the findings of which have enabled the proponent company to make specific planning decisions so as to protect the local flora and fauna.
- The various sites of the proposed turbines and ancillary buildings are located within open grazed paddocks which generally comprise pasture and/or grassland of low conservation value.
- There are no impacts on either Aboriginal or Cultural heritage sites within the locality.
- The proposed wind turbines are to be dispersed over two sites totalling 25,424Ha (10,235Ha for Waddi Wind Farm and 15,188Ha for Yandin Wind Farm) and will be erected within 1500metres of any neighbouring dwellings, thereby reducing the potential for any detrimental impacts.
- There are no activities associated with the day-to-day operation of the proposed wind farms which should hinder the continued use of the subject land for agricultural purposes, or detrimentally impact upon the environment or natural landscape within the locality.

- Physical and visual impacts during the construction of the proposed wind farms can be minimised utilising appropriate site management practices.
- The proposed Wind Farms are a passive form of development which does not place any significant demands upon public utility services, nor does it produce any greenhouse gas emissions, waste water or waste products.
- The subject development proposal neither purports, nor requires, the removal of any significant native vegetation.
- Very few traffic movements will be generated as a consequence of the day-to-day operation and management of the subject development proposal.
- The subject development is in accord with a number of Federal and State Strategies as well as the objectives of the Shire of Dandaragan's Local Planning Scheme No.7 in particular the provisions which relate to reducing greenhouse gas emissions, improving infrastructure, environment and resources (through the use of wind power), economic activity, and tourism.
- The subject development proposal may improve the economy of the region through the creation of additional employment opportunities (construction and maintenance) and the attraction of tourists, whilst the provision of a safe, reliable and clean electricity supply may assist in the attraction of additional investment and development.
- The proposed Dandaragan Wind Farms will result in the generation of some 1,841,440MWh per year (which also equates to 1,546,000 tonnes of saved emissions per year) which will provide sufficient power to meet the needs of around 306,000 Western Australian households.
- The proposed Dandaragan Wind Farms will also produce enough energy to contribute approximately 4% to the "20% by 2020" target established by the Australian Federal Government under the expanded RET system.
- The subject development proposal complies with the provisions of the Australian Renewable Energy Policy; The Renewable Energy (Electricity) Act 2000; The Federal Government's Greenhouse Gas Abatement Program and the Western Australian State Sustainability Strategy.
- The subject development proposal complies with the relevant objectives and principles as contained within the Shire of Dandaragan's Local Planning Scheme No.7. Further the subject development proposal should have minimal effect upon the amenity and/or character of the locality.

Accordingly we have formed the opinion that the subject development proposal exhibits considerable merit; is on balance an orderly and proper development; is unlikely to be subject to reasonable objection; and will not create any significant environmental impacts.

A.P. (Tony) TURNER Ad Dip Bus Mgt; MPIA; MLGMA; CPP
Director
GERALDTON INDEPENDENT PLANNERS
P.O.Box 7177
Geraldton
W.A. 6531
Mobile: 0418941934
Email: tony@gip.net.au
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