Executive Summary

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ES1.1 Introduction

This Environmental Impact Statement (EIS) accompanies the Development Application for the proposed Woodlawn Wind Farm, near Tarago, NSW.

URS has prepared this EIS on behalf of the proponent, the Woodlawn WindEnergy Joint Venture (WWE JV). This EIS addresses the issues identified in the Director General's requirements and issues identified by other regulatory authorities and the community.

ES1.1.1 The Proposal

Woodlawn Wind Farm would be located on a ridgeline that crosses two properties, Pylara and Woodlawn located approximately 7 km east of Tarago and 37 km south of Goulburn. Collex owns Pylara. Denehurst Pty Ltd owns Woodlawn but has agreed to transfer ownership to Collex. Transfer was put into effect on 6 September 2004. Collex operate the Woodlawn Bioreactor at the site of the former Woodlawn Mine, within Woodlawn.

Figure ES.1 and **ES.2** illustrate the regional and local context of the proposed wind farm.

The proposed wind farm would comprise 25 wind turbines each with a 2 Megawatt (MW) installed capacity, creating a total wind farm of 50 MW installed capacity. Ancillary structures proposed are a substation, access tracks, an overhead transmission line, underground cables and a viewing platform.

The wind farm would generate approximately 140,000 Megawatt hours (MWh) of electricity per annum. Generation of electricity from the available wind resource would offset up to 124,040 tonnes of carbon dioxide per annum, based on the 2004 NSW Pool Coefficient for greenhouse gas emissions from electricity generation.

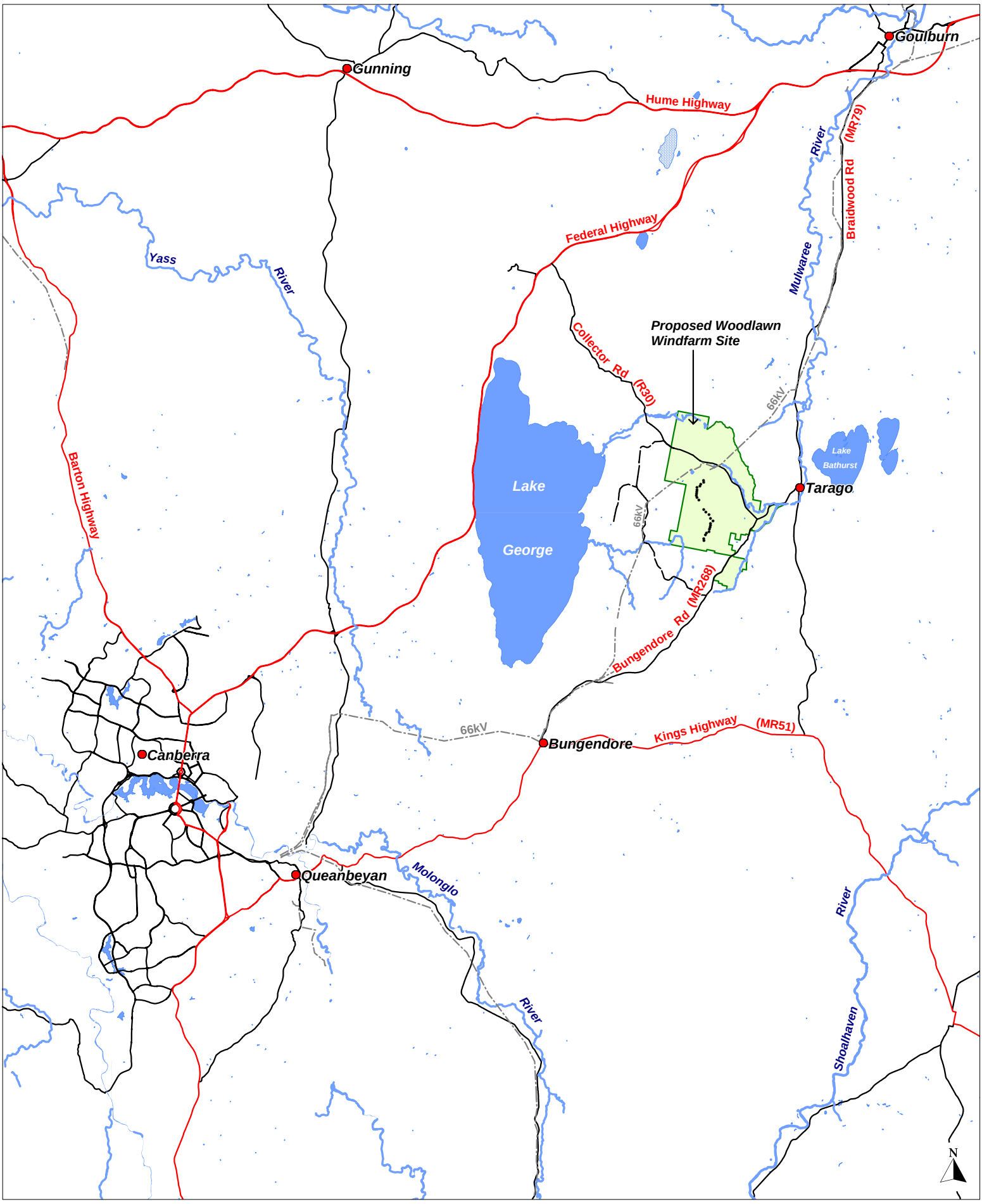
Figure ES.3 illustrates the proposed wind farm components and layout.

ES1.1.2 Proponent

The Woodlawn WindEnergy Joint Venture (WWE JV) is the project proponent and comprises ActewAGL, Collex Pty Ltd, EHN (Oceania) Pty Ltd and ANZ Infrastructure Services Ltd. Each of the four companies contributes an equal equity share to the project. The WWE JV formed specifically to develop, own and operate the proposed wind farm at Woodlawn.

ActewAGL

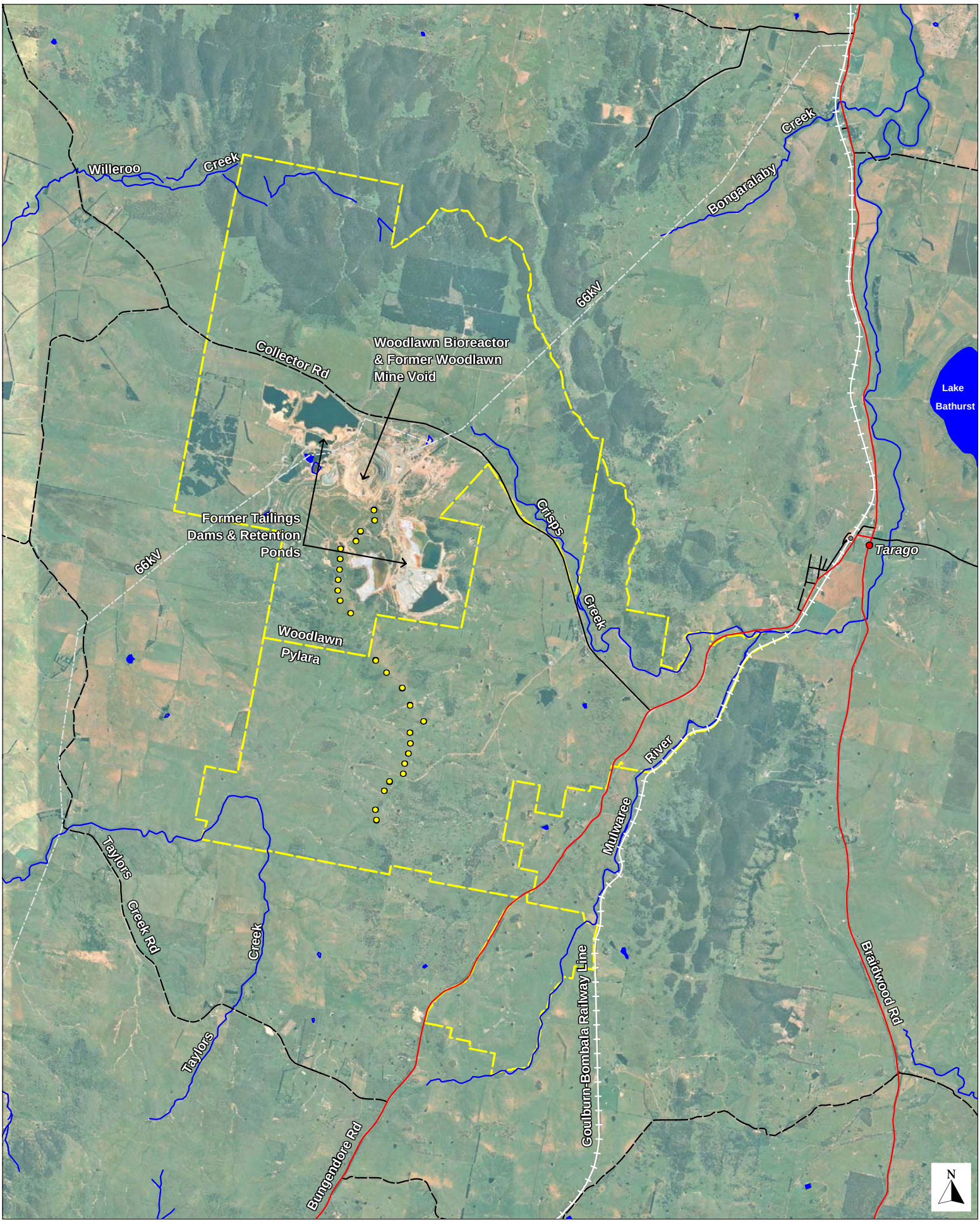
ActewAGL is a services utility providing the Australian Capital Territory (ACT) with electricity, natural gas, water and sewerage services. ActewAGL is also responsible for the management, planning, operation and maintenance of the water and wastewater networks, treatment plants and dams in the ACT.



LEGEND

- Approximate Proposed Wind Turbine Locations
- Town
- Site Boundary
- Rivers, lakes.....
- Highway
- Sealed Road
- Unsealed Road
- Transmission Line (66kV)

URS		**URS Australia Pty Ltd**
Date Printed: 07/09/04	Author: CL	**Regional Context**
	Approved: CDS	
Fig ES.1	Status: FINAL	
Client: Woodlawn WindEnergy Joint Venture		Woodlawn Windfarm EIS - 43177238
File Location: T:\Proj\GIS\53664\003\GIS\Workspaces\Final Workspaces\ES 1.WOR	0 6 12 kilometres	Projection: MGA (GDA94 Zn 55)



LEGEND

- Proposed Wind Turbines
- Town
- Main Road
- Sealed Road
- Unsealed Road
- Site Boundary
- Lakes, Waterholes...
- Rivers, Creeks...
- Railway Line
- Transmission Line

URS Australia Pty Ltd

Date Printed: 07/09/04	Author: CL
	Approved: CDS
Fig ES.2	Status: FINAL

Local Context

Client: Woodlawn WindEnergy Joint Venture

Woodlawn Windfarm EIS - 43177238

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0 1 2 kilometres

Projection: GDA94 (Zn 55)

LEGEND

- 1 Proposed Wind Turbines
- Proposed Substation
- 15 Monitoring Mast
- Overhead 66kV Transmission Line
- Proposed Access Track
- Proposed Upgrade of Existing Access Track
- Sealed Road

URS Australia Pty Ltd

Date Printed: 07/09/04	Author: BH
	Approved: CDS
Fig ES.3	Status: FINAL

Proposed Wind Farm Layout

Client: Woodlawn WindEnergy Joint Venture

Woodlawn Windfarm EIS - 43177238

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0 500 metres

Projection: GDA94 (Zn 55)

Collex Pty Ltd

Collex is an environmental services company providing waste management and industrial services. Collex owns the Pylara property and is currently in the process of transferring the ownership of Woodlawn from Denehurst Pty Ltd to Collex. Collex operate the Woodlawn Bioreactor located within the Woodlawn property. Collex received the first waste at the Bioreactor on 6 September 2004.

EHN (Oceania) Pty Ltd

EHN (Oceania) Pty Ltd (EHNO) is a wholly owned subsidiary of EHN. EHN is the largest installer and operator of wind farms in the world and the fourth group in terms of its own installed capacity. EHNO is responsible for the management of the development of the proposed wind farm. EHNO would also operate, manage and maintain the wind farm once it is operational.

ANZ Infrastructure Services

ANZ Infrastructure Services Ltd (ANZIS), is a division of ANZ Banking Group Ltd. ANZIS is a specialist infrastructure equity investor, investment manager, and financial advisor with a focus on the energy and infrastructure markets.

ES1.1.3 Approvals Process

The Woodlawn Wind Farm proposal would be assessed under Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). In accordance with Section 78A of the EP&A Act a Development Application (DA) for a development classified as 'designated development' must be accompanied by an Environmental Impact Statement. The proposal is designated development in accordance with Clause 18, Schedule 3 of the Environmental Planning and Assessment Regulation 2000.

In August 2004, the Minister Assisting the Minister for Infrastructure and Planning declared the proposed Woodlawn Wind Farm to be State significant development under Section 76A(7)(b) of the EP&A Act. The Minister for Infrastructure and Planning is therefore the consent authority for the proposed wind farm.

ES1.2 Project Objectives and Need

Project Objectives

Woodlawn WindEnergy Joint Venture's objectives for the proposed wind farm are to:

- create an electricity supply from a renewable source by harnessing the energy from a wind resource along the ridges of Woodlawn and Pylara, south eastern NSW;
- contribute to Australia's reduction of greenhouse gas emissions whilst generating electricity;
- work closely with key stakeholders and the local community during the development of the proposed wind farm concept and therefore obtain stakeholder input;

- maximise the potential benefits of the proposed wind farm and minimise the costs (including environmental impacts);
- complement production of green electricity from the Woodlawn Bioreactor; and
- contribute to the establishment of all Joint Venture partners in the wind industry in Australia, allowing all companies to make additional investment in renewable energy development in Australia.

The proposed Woodlawn Wind Farm would meet all of the WWE JV's objectives.

Project Need

The proposed Woodlawn Wind Farm is needed because:

- it would provide up to 50 MW of power from a renewable energy source, providing on average 140,000 MWh of electricity per year, enough to supply up to 22,500 homes;
- it would avoid the production of up to 124,040 tonnes of Greenhouse Gas emissions per annum, therefore contributing to Australia's commitments under the Kyoto Protocol;
- it is consistent with objectives for local land use and other future potential land uses;
- it may bring positive economic benefits to the local economy;
- it would help enable the joint venture partners to continue to invest in both wind energy development and relevant wind farm infrastructure manufacturing industries and to bring international expertise to Australia; and
- it is consistent with the WWE JV's objectives to create a renewable energy supply while minimising environmental impacts.

ES1.3 Alternatives Considered

Site Selection

WWE JV reviewed the wind energy resource at a number of locations throughout NSW including Woodlawn and confirmed the existence of an economically viable wind energy resource at this site. WWE JV supplemented this initial assessment with an estimation of the yearly long-term mean wind speeds from two wind monitoring masts at Woodlawn. This estimation confirmed the viability of the wind resource and associated grid infrastructure to support a commercial wind farm at the site.

The WWE JV completed a rigorous assessment of the suitability of Woodlawn in terms of its wind energy resource, grid connection opportunities, environmental impact, economic viability and community opinions. Based on this assessment WWE JV agreed to proceed with the environmental assessment and application for development approval for a proposed wind farm at Woodlawn.

Wind Farm Capacity

WWE JV determined that the two existing 66 kV transmission lines running north and south from Woodlawn have a combined capacity of up to 75 MW. Collex predict the Woodlawn Bioreactor to have

an output of up to 25 MW. WWE JV considered upgrading one of the existing transmission lines to enable output from a larger wind farm or building a smaller 50 MW wind farm that would be able to be connected to the existing transmission lines without upgrade. WWE JV identified that a 50 MW wind farm created fewer environmental impacts and would still provide an economically viable project.

Site Layout

WWE JV determined that 25, 2 MW turbines with a combination of hub heights of 60 m and 78 m would provide the optimal environmental, social and economic outcomes for the available wind energy resource. WWE JV selected turbine positions based on wind energy optimisation, physical constraints and avoidance of areas of environmental significance including bird and reptile habitat, potential bird flight paths and areas of archaeological significance.

WWE JV selected track routes to optimise the requirements not to exceed a grade of 14% while avoiding areas of environmental sensitivity and visual impacts. WWE JV selected the substation location aimed at optimising the electrical system layout, minimising energy losses and avoiding areas containing items of archaeological heritage significance, areas containing potential bird or reptile habitat and limitation of the substation's potential visual impact.

The selected viewing platform location optimises the view of the turbines, provides safe vehicle entry and exit and avoid impacts on an archaeological site.

Do Nothing Alternative

The consequences of not proceeding include loss of electricity supply, loss of opportunity to offset greenhouse gas emissions, loss of social and economic benefits and loss of an opportunity for the WWE JV to expand their renewable energy development interests in NSW and Australia and therefore continue to offset greenhouse gas emissions.

ES1.4 Project Description

Project Site

The wind farm would comprise 25, 2 MW wind turbines with a total installed capacity of 50 MW. Ancillary infrastructure would include an internal network of access tracks, a substation, underground cables and an overhead transmission line.

The proposed wind farm and all ancillary infrastructure (covering a total land area 4.86 ha) would be located entirely within the properties Woodlawn and Pylara. Collex will own both properties, which together comprise an area of 6,015 ha. The footprint of the wind farm would therefore comprise only 0.08 % of the total land area of Woodlawn and Pylara.

A viewing platform comprising a car park for 20 cars and two coaches, a viewing platform and signs providing information about the wind farm would be located on the property Pylara, with access off Collector Road and adjacent to the Collector Road and Bungendore Road intersection.

Wind Farm Description

Each wind turbine would comprise:

- a reinforced concrete turbine foundation (footing) up to 15.7 m x 15.7 m placed approximately 2 m below the existing ground level;
- a tower constructed of tubular steel and painted dull white approximately 4.1 m in diameter at base and 2.3 m diameter at the top, with a total tower height (including hub) of either 60 m or 78 m.
- a nacelle at the top of the tower housing the gearbox and electrical generator; and
- a rotor comprising hub (attached to the nacelle), three glass fibre reinforced epoxy blades of 40 m length each and a shaft connecting the blades to the generator via the gearbox.

Internal access tracks are required to enable construction and ongoing maintenance of the wind farm. Existing farm tracks within both areas would be utilised wherever possible.

Access to the proposed wind farm would be via Collector Road with entry points at both Pylara Farm and the Woodlawn Bioreactor. Access tracks would be 6 m wide with a top layer of gravel. The grade of tracks would not exceed 14%. The tracks would include drainage trenches to collect rainwater runoff from the compacted surface of the track. All access tracks would be permanently retained to provide ongoing access during operation of the wind farm.

The substation complex would contain a control room containing a centralised computer system, workshop, meeting room, kitchen, toilets, 22 kV switchroom, compound area and 66 kV switchyard containing two 66/22 kV transformers.

The wind farm would be managed and maintained by 3 to 4 staff during normal working hours. The wind farm would be remotely monitored 24 hours a day, with duty staff on call to respond if required.

Construction

Construction is expected to take 12 months between June 2005 and June 2006. Construction would comprise:

- site establishment including establishment of site office, a concrete batching plant and installation of a temporary overhead 11 kV line;
- clearance of small amounts of vegetation prior to construction of the access tracks and turbines;
- upgrade of existing tracks and construction of new access tracks;
- installation of permanent underground cables alongside access tracks;
- construction of turbine foundations and substation;
- installation of overhead transmission line;
- transport of turbine equipment and erection of wind turbines;

- site commissioning; and
- restoration of disturbed areas.

ES1.5 Local Zoning and Land Tenure

The proposed site is located along the boundary between the recently formed Greater Argyle Council and the Eastern Capital City Regional Council. The proposed site is located wholly within the former Mulwaree Shire. In the absence of Local Environmental Plans for Greater Argyle and Eastern Capital City, the provisions of the Mulwaree Shire Local Environmental Plan 1995 (MLEP) are applicable to the site.

The proposed site is located within the 1(a) General Rural Zone under the MLEP. As provided by Clause 9 of the MLEP, wind farms are 'permissible with consent' within the 1(a) General Rural Zone. The wind farm is consistent with the objectives of the 1(a) General Rural Zone.

The wind farm construction and operation would impact on a very small proportion (0.08%) of the land area of Woodlawn and Pylara and would not impact on the operation of either rural enterprise or the operation of the Woodlawn Bioreactor.

The proposed wind farm site is located entirely within one registered native title claim and along the boundary of another claim. The proposed wind farm is located on privately owned land and therefore native title on the site is extinguished. The WWE JV recognises and respects indigenous people's connection with their traditional country. The WWE JV has consulted with the Buru Ngunawal Aboriginal Corporation and the Pejar Local Aboriginal Land Council during the preparation of this EIS.

There are three mineral exploration licences within the general area of the proposed wind farm site.

ES1.6 Statutory Planning

The key NSW legislation applicable to the approval process for the proposed wind farm is:

- Environmental Planning and Assessment Act, 1979;
- Rivers and Foreshores Improvement Act, 1997;
- Protection of the Environment Operations Act 1997;
- National Parks and Wildlife Act 1974; and
- Roads Act 1993.

Table ES-1 summarises the approvals, licences and permits required for the construction and operation of the proposed wind farm.

Table ES-1 Summary of Approvals

Authority	Relevant Legislation	Approval
NSW Minister for Infrastructure and Planning	*Environmental Planning and Assessment Act 1979*	Development consent
Department of Environment and Conservation (NSW Environmental Protection Authority)	*Protection of the Environment Operations Act 1997*	Environmental Protection Licence for scheduled activity
Greater Argyle Council	*Roads Act 1993*	Approval under section 138 as work is to be undertaken on a public road (viewing platform).
Department of Environment and Conservation (National Parks and Wildlife Service)	*National Parks and Wildlife Act 1974*	Permit under Section 90 to disturb or move an aboriginal object.
Department of Infrastructure, Planning and Natural Resources	*Rivers and Foreshores Improvement Act, 1948*	Permit under Part 3A as development would occur within 40 m of a water body (intermittent streams)

ES1.7 Consultation

The WWE JV sought the requirements of the Director General of the Department of Infrastructure, Planning and Natural Resources in accordance with Clause 73 of the EP&A Regulation.

WWE JV consulted all relevant government agencies and authorities to identify issues to be addressed in the EIS and appropriate mitigation measures. Government consultation mechanisms included a Planning Focus Meeting, letters to all relevant agencies, telephone discussions and targeted meetings.

WWE JV completed an extensive community consultation program. Community consultation mechanisms included letters, public responses mechanisms (phone, fax, e-mail, post), media coverage and advertisements, distribution of a brochure, fact sheet and community information updates, community information open days, project website, meetings and a presentation and opportunity to visit the proposed wind farm site.

WWE JV addressed issues raised by both Government and community groups and individuals in this EIS. WWE JV would put in place an ongoing community consultation and communication strategy to consult and provide information during the public exhibition phase, construction phase and operation phase of the proposed wind farm.

ES1.8 Potential Impacts

URS identified and prioritised all potential environmental impacts based on the results of Government and community consultation, the requirements of Schedule 2 of the Environmental Planning and Assessment Regulation 2000, Planning NSW's Wind Energy Facilities Draft EIA Guidelines (June 2002) and issues covered in other relevant EIS documents.

URS assigned a rating to all impacts and prioritised impact assessment accordingly. Impact assessment for all environmental aspects included identification of the existing environment, assessment of impacts during construction and operation and recommendations for appropriate mitigation measures.

ES1.8.1 Landscape and Visual

Visual elements of the proposed wind farm would include turbines, a substation and an overhead transmission line. URS assessed the potential impact of the wind farm in the context of the view catchment, view distance, number of viewers, category of viewer, period of view and view elevation.

Development of the proposed wind farm would create a visually prominent line of turbines along the top of a major ridgeline, which would result in a significant change to the existing landscape character of the area.

The turbines may be perceived positively by the majority of viewers because they represent a source of electricity from a non-polluting renewable source in an existing highly modified rural environment. However some residents may perceive the wind farm as creating a negative impact because of the introduction of an industrial element into a predominantly rural landscape character.

The turbines would be visible from some parts of local roads including Collector Road, Bungendore Road and Taylors Creek Road. Roadside views would be interrupted by vegetation or local landforms.

Turbines would potentially be visible from approximately 33 homesteads located outside of the wind farm site and within the visual catchment of the proposed wind farm. The extent of visibility from individual homesteads would vary greatly depending on local landforms, structures and vegetation.

Access tracks and the substation may also create some visual impacts, but impacts would be minimised by careful siting, minimisation of cut and fill, use of non-reflective materials and revegetation and planting.

WWE JV would mitigate any impacts of the proposed turbines by selecting a colour that provides the least visual contrast with the surrounding sky and by site specific tree planting to screen particular homestead views where required.

ES1.8.2 Noise

Sources of noise from the proposed wind farm operation may include noise from the turbines and noise from equipment in the substation. Sources of noise during construction may include construction equipment and construction traffic.

Specialist noise consultants, Wilkinson Murray Pty Ltd completed a noise assessment in accordance with the South Australian EPA's *Wind Farms: Environmental Noise Guidelines* (2003) as required by the NSW Department of Environment and Conservation.

The predictions of noise from the proposed 25 turbine wind farm show that the noise levels would comply with the SA EPA criteria using software developed and applied internationally for wind farm analysis (WindFarmer®) and the Environmental Noise Model (ENM).

Noise from the substation would result in no predicted or measurable increase in noise levels at sensitive receivers such as homesteads.

Cumulative impacts caused by the wind farm in conjunction with the Woodlawn Bioreactor would remain below the SA EPA criteria.

Construction noise levels would also meet all relevant criteria.

ES1.8.3 Flora and Fauna

URS Australia Pty Ltd completed an assessment of the impact of the proposed wind farm on flora and fauna and commissioned specialists where necessary to carry out specific aspects of the assessment.

The proposed Woodlawn Wind Farm site is characterised by an exposed ridgeline comprising a degraded vegetation structure punctuated by non-endemic plantings. No threatened or endangered flora species or ecological communities listed under the NSW *Threatened Species Conservation Act 1995* or Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* were recorded on site.

Allocasuarina woodland and other isolated trees provide foraging habitat for the Glossy Black Cockatoo. These woodlands have regional conservation significance.

Potential habitat exists for the Pink-tailed Worm Lizard *Aprasia parapulchella* in rocky outcrops across the ridgeline. Further surveys are required to confirm the presence of this species. Eight part tests, in accordance with the EP&A Act, for the Pink-tailed Worm Lizard and Little Whip Snake concluded that the proposal would not be expected to have a significant impact on either species based on the habitats that exist on the site. Avoiding areas of potential habitat during construction would mitigate impacts on *Aprasia parapulchella.*

Potential habitat existed for the Large Bentwing Bat and further studies are required to confirm the absence or presence of the Yellow-bellied Sheathtail Bat. Eight part tests accordance with the EP&A Act concluded no significant impact on either species is predicted.

The study team observed the Glossy Black-Cockatoo and potential habitat on site. The eight part test conducted in accordance with the EP&A Act for the Glossy Black-Cockatoo concludes that no significant impact on this species is predicted.

Although significant impacts are unlikely, further research is required to identify bird mortality, water bird movements between Lake George and Bathurst, and raptor movements in the vicinity of the turbines.

Measures are recommended to mitigate potential impacts on bird species including birds moving between Lake George and Lake Bathurst and Glossy Black Cockatoos.

Providing the mitigation measures are implemented, no threatened or endangered species would be significantly impacted as a result of construction or operation of the proposed development.

It is not necessary to undertake a Species Impact Statement (SIS) under the *Threatened Species Conservation Act 1995* or submit a referral under the *Environment Protection and Biodiversity Conservation Act 1999*.

ES1.8.4 Heritage and Archaeology

Biosis Research Pty Ltd (Biosis), specialist archaeological consultants, completed an investigation of heritage and archaeological impacts of the proposed wind farm and viewing platform. Representatives from Pejar Local Aboriginal Land Council (Pejar LALC) and Buru Ngunawal Aboriginal Corporation accompanied and assisted Biosis on all surveys.

Fifteen previously undocumented Aboriginal archaeological sites were discovered. All sites are stone artefact sites, and all but two have low archaeological significance.

The proposed wind farm would directly impact on eight out of the 15 Aboriginal archaeological sites. All sites that would be impacted are assessed as being of low archaeological significance and possessing low archaeological potential.

WWE JV would seek consent to destroy with salvage from the NSW DEC for the eight Aboriginal archaeological sites that would be directly impacted on by the proposed wind farm. Representatives from PEJAR LALC and Buru Ngunawal Aboriginal Corporation would carry out all salvage accompanied by Biosis. Relocation of items would be agreed with all groups prior to salvage.

Biosis has prepared a draft Cultural Heritage Management Plan on behalf of WWE JV. WWE JV will finalise the plan in conjunction with the local Aboriginal Community and DEC to outline how cultural heritage would be managed during construction (including requirements for archaeological salvage) and to put in place contingency measures in the event of an artefact being uncovered .

WWE JV would fence off the remaining seven archaeological sites as no go areas during construction activities.

ES1.8.5 Social and Economic

URS completed an assessment of the potential social and economic impacts of the proposed wind farm.

The proposed wind farm development would provide a positive contribution to the economy and the local community. Positive impacts would result from the capital investment associated with the proposed development providing direct and flow on economic impacts through permanent and temporary employment and the associated contracting, supplies and services needs of the workforce.

The impact upon greenhouse gas emissions would have positive social and economic outcomes by supporting national and international efforts to reduce the impacts of global warming and climate change.

The proposed development may also provide flow on impacts through increased spending in the local community and through employment and commercial opportunities from the economic investment along with the potential to “up skill” the local workforce.

The proposed wind farm may have some minor impacts on local amenity, particularly via views of the wind farm, depending on an individual viewer’s perception.

ES1.8.6 Transportation and Traffic

URS assessed the options and routes for transporting the wind turbines and transformer equipment to site and the impacts of wind farm generated traffic on the local road network both during construction and operation.

The preferred port of entry for wind farm equipment is Port Kembla. The preferred landside transportation method is by road. The preferred route option from Port Kembla is Wollongong to Picton Road (Main Road 88), Hume Highway, through Goulburn via Hume Street and Cowper Road, from Goulburn via Braidwood Road, Bungendore Road and Collector Road.

The preferred route option from South Australia or Victoria is via the Hume Highway, to Barton and Kings Highways then via Bungendore Road and Collector Road.

Traffic generated during construction or operation of the proposed wind farm would not change the existing level of service (LOS 'A') on Braidwood, Bungendore and Collector Roads and on the intersections of Collector Road and Bungendore Road and the Woodlawn Bioreactor and Collector Road.

Provided the proposed mitigation measures are implemented, the proposed wind farm would have minimal impact on the traffic carrying capacity of the roads used to access the site during construction and operation.

ES1.8.7 Electromagnetic Interference

Wind turbines can potentially disrupt electromagnetic signals used in a range of telecommunication, navigation and radar services. URS completed a desk top assessment to examine the potential impacts of the proposed wind farm on the surrounding environment, due to electromagnetic interference (EMI).

URS identified that no potential significant EMI impacts existed for mobile phones, aircraft navigation and Sally Trigonometrical Station from the proposed wind farm.

An existing fixed radio link was identified as transmitting across the proposed wind farm site. Further investigation would be carried out during the detailed design phase to assess this potential impact. The WWE JV would, in consultation with the operator, manage any potential impacts that may arise through the use of a range of well established mitigation technologies.

Potential impacts on television reception have been identified in areas around the wind farm. The WWE JV would assess any specific impacts on television reception at the operation stage of the wind farm. Any impacts would be easily managed through the implementation of identified mitigation measures, such as alternative aerials or satellite receptors, in consultation with the residents and landowners.

ES1.8.8 Hydrology and Water Quality

URS completed an assessment of potential impacts during construction and operation on hydrology and water quality.

The proposed wind farm would be partially located within Sydney's drinking water catchment, under the control of the Sydney Catchment Authority. The proposed wind farm would have a minor potential to contaminate surface water runoff. WWE JV would install and implement mitigatory measures to ensure the wind farm has a neutral effect on water quality in accordance with the requirements of the Sydney Catchment Authority.

The proposed wind farm is not expected to be subject to flood hazard or to impact on groundwater due to its elevation on the ridgeline.

A water management strategy is proposed to ensure water is conserved and recycled wherever possible during both construction and operation and that water quantity impacts are contained within the site.

WWE JV would carry out monitoring during the operational phase to measure any water quality impacts and would implement adaptive management measures where necessary.

The proposed development is compatible with the requirements of Clause 10 of SEPP No. 58 and the Draft Regional Plan for the drinking water catchments of Sydney and adjacent regional centres.

ES1.8.9 Soils and Geology

URS completed a desk-top study and preliminary geotechnical assessment to assess potential impacts of the proposed wind farm on soils and geology. Potential impacts on soils may occur if erosion occurs at areas where soil or rock is exposed during construction or during operation. Due to the minimal level of disturbance, impacts are not expected to be significant.

WWE JV would include measures in the detailed design of the proposed wind farm to ensure potential erosion is minimised. WWE JV would prepare a detailed soil and water management plan for the construction and operational phases of the proposed development to provide management controls to prevent erosion and sediment loss. If these controls are implemented, impacts on soils and groundwater resulting from the construction and operation of the proposed wind farm are likely to be negligible.

ES1.8.10 Air Quality

The proposed wind farm may create potential minor impacts on air quality as a result of emissions from vehicles and machinery or generation of dust during construction. URS completed a desktop assessment to identify potential air quality impacts during the construction period and potential cumulative impacts from the Woodlawn Bioreactor and proposed wind farm.

Dust and air emissions resulting from construction activities may affect residents in the west and east depending upon prevailing wind direction and speed. The impact on residents is expected to be minor because of the distance to the nearest residences and implementation of environmental management measures to avoid and minimise emissions wherever possible.

ES1.8.11 Greenhouse and Energy

The proposed wind farm would offset creation of greenhouse gases by generating electricity from an energy source that does not burn fossil fuels. The proposed wind farm would also potentially generate a small amount of greenhouse gas emissions during manufacturing of components, transport to and from the site and through construction machinery used on site.

URS estimated the greenhouse gas (GHG) emissions of the proposed wind farm as 2,800 tonnes CO_{2e} and the potential savings (by displacing fossil fuel based energy sources) as 126,840 tonnes CO_{2e} creating overall estimated GHG savings of 124,040 tonnes CO_{2e} per annum. The proposed wind farm is predicted to supply up to 22,500 households with electricity and to meet 1.5% of the 9,500 GWh MRET target.

Energy would be consumed during the construction, operation and decommissioning of the proposed wind farm. The wind farm would supply the equivalent amount of electricity to the National Electricity Market within 2-3 months of operation.

Energy consumption would be minimised throughout the project lifetime through the implementation of mitigation measures including equipment maintenance, limitation of vehicle movements and switching off equipment not being used.

ES1.8.12 Hazards and Risk

URS identified potential hazards and risks associated with the proposed wind farm, none of these were significant.

The proposed wind farm would be beyond the Obstacle Limitation Service (OLS) of any airfields. The Commonwealth Aviation Safety Authority (CASA) advised that there would be no impact on the operations of the closest licenced aerodromes (Goulburn and Canberra), and there is no requirement to mark or light the towers.

Parts of the proposed wind farm site fall within land defined as 'bushfire-prone land' in the Mulwaree Local Environmental Plan. WWE JV would prepare a bushfire risk management plan in consultation with Greater Argyle Council, Taylors Creek Rural Fire Service and Collex to comply with obligations under the Rural Fires Act 1997.

WWE JV would ensure turbine components and design of foundations and infrastructure meet all relevant Australian and/or overseas standards to avoid safety implications of structural or mechanical failure.

Construction works would be carried out in accordance with relevant requirements of the WorkCover Authority and other statutory requirements. The lead contractor would be required to develop a Health and Safety Plan for the site to minimise the risks to personnel from potential hazards associated with construction activities.

Lightning strike protection would be incorporated into the design of the turbines, the substation and electrical equipment.

Shadow flicker is not expected to cause disturbance because of the distance of the proposed wind farm to the nearest road or residence.

All aspects of road safety would be managed through a Traffic Management Plan.

The proposed wind farm would meet all current risk acceptability criteria provided identified risk management and reduction measures are implemented.

ES1.8.13 Cumulative Impacts

Potential cumulative impacts may occur as a result of the operation of the Woodlawn Bioreactor or as a result of any potential additional future wind farms constructed in the local area.

Potential cumulative impacts as a result of the Woodlawn Bioreactor are expected to be low.

There are no known potential future wind farms in the local area. The consent authority for future wind farm developments would be required to assess cumulative impacts in relation to the Woodlawn Wind Farm prior to granting development approval. Preliminary assessment of cumulative impacts from future wind farms suggests that the impact would be low.

ES1.9 Mitigation, Monitoring and Management

This EIS contains mitigation measures to ensure any potential environmental impacts are avoided or minimised wherever possible.

Mitigation measures include responses to potential issues identified for specific environmental impacts such as sites of Aboriginal archaeological significance and potential bird and reptile habitat.

The EIS also contains recommendations to carry out ongoing monitoring and surveying both prior to and during construction and during operation including monitoring of bird and bat movements and impacts and monitoring of water quality during construction.

WWE JV would prepare a Construction Environmental Management Plan (CEMP) and an Operational Environmental Management Plan (OEMP). The CEMP would contain measures to ensure all aspects of construction are managed to avoid impacts on the environment, in particular in relation to potential impacts on water quality via soil erosion and mitigation of dust. The OEMP would contain measures to ensure the ongoing operation of the wind farm avoids impacts wherever possible.

Both documents would be consistent with the requirements of ISO14001 the international standard for Environmental Management and would include requirements to report, audit and manage non-compliances.

WWE JV would also prepare specific sub management plans to manage Traffic, Soil and Water, Bush Fire Hazard, Waste Management and Bird and Bat Monitoring and would prepare and implement a Disaster/Emergency Plan for the proposed wind farm.

ES1.10 Project Justification

Having regard to the EIS findings and the principles of Ecologically Sustainable Development, the reasons justifying the carrying out of the development in the manner proposed are:

- environmental issues associated with the proposed development of the wind farm have been fully considered;
- impact prediction has been carried out on the basis of the worst case scenario, considering cumulative impacts with existing known facilities and utilising conservative assumptions;
- potential impacts identified are capable of being mitigated and the proposed development does not represent a threat of serious or irreversible environmental damage; and
- biological diversity and ecological integrity of the area would not be affected by the proposed development.

The construction and operation of the proposed Woodlawn Wind Farm is justified as it would be environmentally acceptable taking into account biophysical, economic and social considerations and is in accordance with the principles of sustainability.

ES1.11 Conclusion

The proposed Woodlawn Wind Farm would meet the Woodlawn WindEnergy Joint Venture's objectives as it would create a renewable energy supply, while maximising social benefits and minimising environmental impacts.

The proposed wind farm would contribute to the supply of electricity from a renewable source, resulting in the offset of greenhouse gas emissions.

The proposed wind farm would create environmental impacts but no significant environmental impacts are expected. WWE JV would put in place mitigation measures through design, operation and management to ensure potential impacts are avoided or minimised wherever possible.

The proposed project would be justifiable taking into account potential environmental, economic and social impacts and the principles of Ecologically Sustainable Development.