



Trustpower

Palmer Wind Farm
Development Application Report

Volume 1
Project Description & Approach

August 2014

Executive Summary

This is an executive summary of the Project Description and Approach (Volume 1 of the Development Application Package). A separate summary of findings of impact assessment studies is included in Volume 3.

Introduction

Trustpower Australia Holdings Pty Ltd (Trustpower) have lodged a Development Application with the Mid Murray Council seeking approval for the Palmer Wind Farm project. The Palmer Wind Farm is generally located on the eastern side of the Mount Lofty Ranges near the areas of Palmer and Sanderston.

The application will be assessed by the Mid Murray Council Development Assessment Panel (CDAP) in accord with the *Development Act, 1993* and the policies contained in the Mid Murray Development Plan.

More specifically Trustpower are seeking approval for the use of the nominated land for the installation of up to 114 wind turbines and other buildings and related structures needed for the purposes of generating electricity from wind and then transmitting this electricity to the national grid (including above ground and underground transmission cabling and a substation). This includes supporting infrastructure, buildings and structures (including access tracks, wind monitoring masts and management and monitoring facilities) that are necessary for the ongoing operation and maintenance of the development.

Documentation Structure

The Development Application Package comprises a number of Volumes containing the relevant information for the assessment of this project under the Development Act, 1993 as well as background information.

- Volume 1 – Project Description and Approach – Provides a background to the project and describes the project elements (both permanent and for construction purposes). It also contains a statement of project commitments and includes application plans and indicative layouts.
- Volume 2 – Community and Stakeholder Engagement – Describes the engagement activities that have been undertaken and a summary of the issues and questions raised.
- Volume 3 – Impact Assessment – Contains an account of the Impact Assessments, including a Development Plan assessment, undertaken in relation to key impact topics. In most cases the specialist reports are contained in this Volume (the rest are contained in Volume 4).
- Volume 4 – Appendices – Contains four of the larger specialist impact reports. These have been provided separately due to their size and to enable cross referencing with other parts of the Application Package.

Background

Trustpower owns and operates the Snowtown Stage 1 and 2 Wind Farms which were assessed and approved by the Wakefield Regional Council's Development Assessment Panel in 2004. Stage 1 of the Snowtown Wind Farm comprises 48 turbines and has been operating since 2008. Stage 2, comprising a further 90 turbines is currently under construction. Trustpower are highly familiar with a range of assessment, construction and operational issues associated with wind farms in South Australia.

For the Palmer wind farm project, this application is seeking approval for the following project elements and approach as set out in the plans included in Appendix A of this Volume:

- Development Plan consent for a wind farm land use on the sites identified in this report and the associated mapping.
- The wind turbines and associated infrastructure described in this report.
- Up to 114 WTGs (with a maximum height to blade tip of 165m) and associated infrastructure to be generally in accordance with the indicative locations within the turbine corridors shown on the layout plans accompanying this development application. Before the development starts, final layout plans showing exact locations of all infrastructure within the surveyed area will be prepared to the satisfaction of the Mid Murray Council with supporting material to demonstrate that the alteration or modification will not give rise to a significant adverse change to the assessed landscape, flora and fauna, cultural heritage, visual amenity, shadow flicker, noise, electromagnetic interference, fire risk or aviation effects.
- An approval validity timeframe of five (5) years to substantially commence and then three (3) years to complete construction.
- Staging of full Development Approval for different construction elements, subject to building rules certification and satisfaction of development consent conditions as relevant for the respective construction element.

A dwelling, located near WTG B10, will not be used for residential purposes by agreement with the land owner, unless the wind farm noise level at the dwelling is less than 45dB(A) and shadow flicker limits are within the prescribed guidelines unless a reasonable limit for increased shadow flicker is agreed with the landowner. This dwelling is labeled "R139" on the plans.

It should be noted that, while a maximum number of turbines and maximum height is stated, a range of wind turbine models could be considered for the Project. New turbine models, with different technical standards are regularly developed. For example, blade technology is constantly improving which helps to both reduce noise impact as well as improve efficiency. This application does not specify a particular turbine model so that improved models can be considered closer to the time of construction. However, the application does identify performance criteria that must be met, regardless of the model selected.

The indicative capacity of the wind farm will be in the order of 375 MW (based on a typical 3.3 MW turbine). The life of the wind farm will be in the order of 25-30 years. Once the design life of the turbines comes to an end the site is most likely to be re-powered or WTGs will be removed and the land rehabilitated.

Trustpower developed a comprehensive Communication and Stakeholder Engagement Plan to ensure the community had access to full and accurate information and that all neighboring landholders have been directly consulted to get stakeholders' input into the actual design and shape of the project before lodgment of the Development Application.

There are 26 landowners hosting infrastructure associated with this project and Trustpower have been working with these landowners to address issues, concerns and management impacts.

Trustpower has been committed to developing this project in a manner that maximizes the benefits to the local, regional and national community. At the same time, Trustpower has also been committed to eliminating or minimizing the impacts on the local community.

Project Siting

The selection of a site for a wind farm is dependent on a number of factors, the most significant being the nature of the wind resource and the ability to feed power into the electricity grid.

Trustpower have been monitoring the wind resource in this region since 2009/10. Over this time they have developed various high level project concepts that have been tested to varying degrees as site and impact information has become available.

The ElectraNet Tungkillo substation is located just to the south-west of the proposed wind farm. This is a relatively new substation that forms a key node in the national electricity grid. This substation is considered to be one of the strongest parts of the SA network and a sound 'connection point' for the wind farm.

Project Evolution

Trustpower have approached this project in a planned manner, developing the project concept in a number of stages that align closely with the stages identified in the "Best Practice Guidelines" prepared by the Clean Energy Council to guide the implementation of wind energy projects in Australia.

The Project concept presented in this development application report is the result of over 12 months of detailed work to develop a concept that avoids or minimises impacts. The project concept is now at a stage where the applicant is confident that it can be constructed subject to a detailed design that can comply with reasonable specific siting criteria (e.g. noise, heritage, native vegetation).

To get to this point an iterative assessment and concept refinement process has been undertaken having regard to a combination of community and stakeholder feedback as well as the findings and recommendations of the specialist studies.

A range of investigations and specialist studies were undertaken to inform the site selection process, assess potential impacts and support the Development Application. Consideration was given to both the construction phase impacts as well as the on-going operational impacts. The results of the specialist investigations have influenced the design and layout of the project and have provided important information contributing to the draft Construction and Environmental Management Plan (CEMP) (contained in Appendix B of this Volume). Additional management plans are proposed to cover on-going operational issues.

In addition to these studies, investigations have been undertaken to address a number of other potential impacts which have led to recommended management or operational responses and commitments. As a result of the community feedback and further investigations by Trustpower, a number of turbine locations have been shifted and the number of turbines now proposed has been reduced from an initial 130 to 114 turbines.

Commitment to Managing Impacts

A consolidated statement of commitments summarising all impact mitigation measure commitments agreed to by Trustpower is contained in Chapter 6 of Volume 1. These have been developed based on the recommendations of the various specialist assessment reports and in consultation with the community and government agencies.

To minimise impacts, the project will be constructed in accordance with specific Construction and Environmental Management Plans (CEMP). CEMPs are an accepted approach to documenting management arrangements.

These Plans cover issues such as:

- Hours of operation;
- Traffic and transport safety;
- Erosion and sediment management;
- Dust and noise management; and
- Bush Fire Management.

A draft CEMP is included in Appendix B of this Volume. A final CEMP(s) will be prepared by the construction contractors and submitted to the relevant authorities, prior to the commencement of any construction activity.

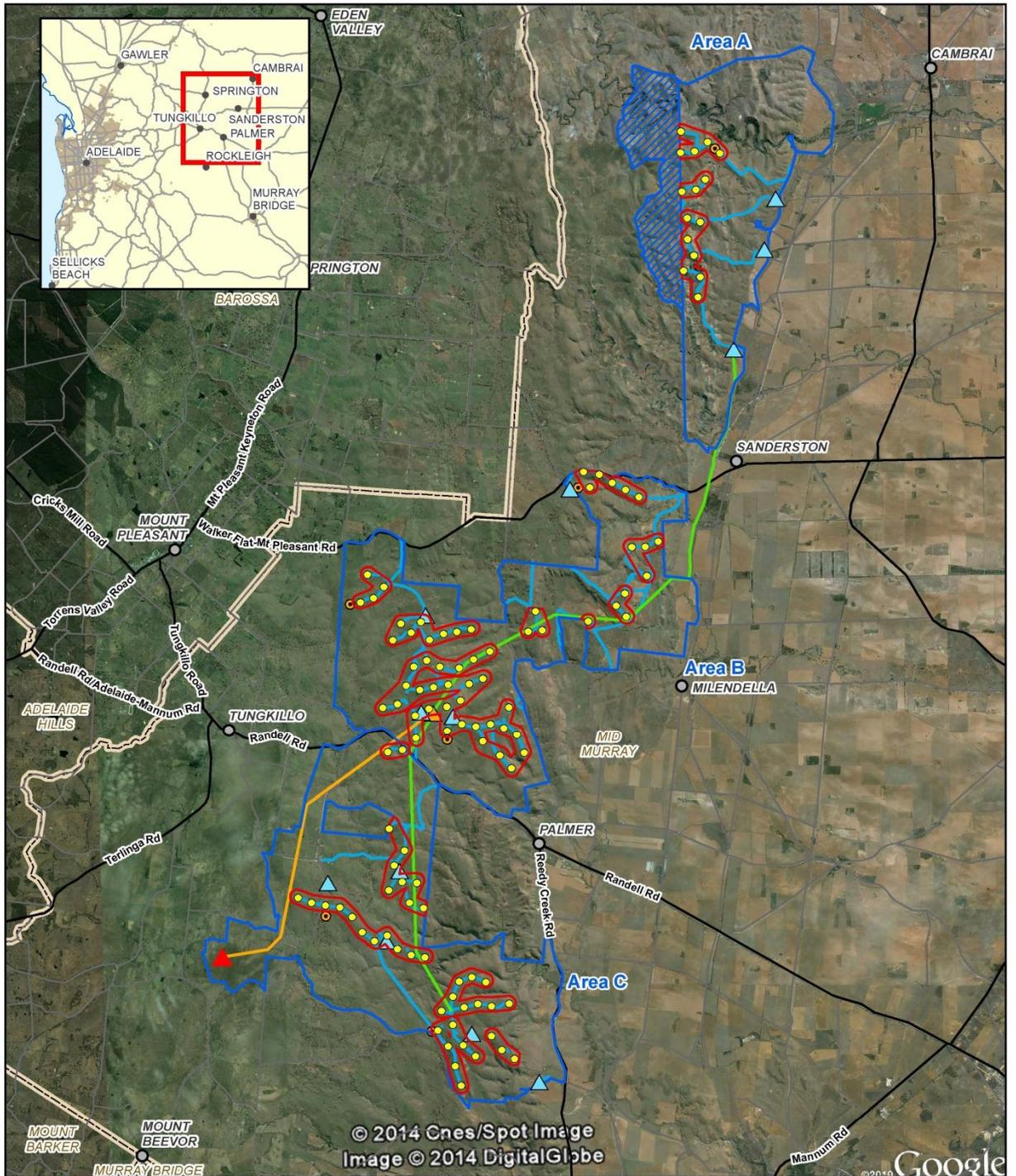
An Operational Management Plan (OMP) will also be prepared to cover on-going issues relevant to the operation, maintenance and decommissioning of the wind farm. These management plan elements will be defined as the project further develops and will be drafted prior to the construction phase. An example of a similar type of Plan is contained in Appendix C of this Volume.

The management plans will provide a framework for the management and control of activities in regards to construction, communication and environmental aspects and the key risks identified. The final Plans will include timeframes, implementation and reporting responsibilities, communication protocols, monitoring, auditing and review arrangements, emergency responses, induction and training and complaint/dispute resolution procedures. Adaptive management would ensure that improvements were consolidated in updated plans.

The CEMP and OMP will cover the following matters relevant to their respective stages;

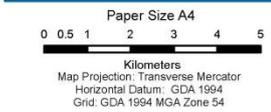
- Community information management;
- Compounds and ancillary facilities management;
- Construction noise and vibration;
- Operational noise management;
- Traffic management;
- Soil and water quality management (including erosion control);
- Air quality and dust management;
- Aboriginal and European heritage management;
- Soil contamination, hazardous material and waste management;
- Hazard and risk management.
- Site rehabilitation;
- Bird and bat management;
- Weed and pest management;
- Health and Safety;
- Fire and bushfire risk management
- Telecommunication and Digital TV interference; and
- Decommissioning.

The management plans will be formally reviewed periodically after the commencement of construction and operation respectively to ensure it is up to date and that changes to procedures and practices have been implemented according to the plan.



Legend

- Not within site of development
- Project Boundary
- Indicative Turbine Location
- Turbine Corridor
- Proposed Access Tracks
- Temporary Construction Facilities
- Substation/Operation & Maintenance Facility
- 33kV Transmission Lines
- 275kV Transmission Line
- Tungkillo Substation
- Meteorological Mast
- Minor Roads
- Council Boundary



TrustPower Australia Holdings Pty Ltd
Palmer Wind Farm Technical Studies

Job Number 33-17234
Revision A
Date 15 Aug 2014

**Palmer Wind Farm
Project Location**

Figure 1

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Appendix A – Indicative Project Layout Plans

Appendix B – Draft CEMP

Appendix C – Example Operational Management Plan

1. Introduction

This report has been prepared as part of a package of information that describes the Palmer Wind Farm project proposal. This information is provided as part of a Development Application, lodged with Mid Murray Council by Trustpower Australia Holdings Pty Ltd (Trustpower). The application will be assessed by the Mid Murray Council Development Assessment Panel (CDAP) in accordance with the *Development Act, 1993*.

This Section provides a summary of the overall project, its key components, how the project has evolved and the assessment pathway. It 'sets the scene' for the more detailed information contained in the other parts of the report.

1.1 Project Overview

Trustpower is seeking approval for the establishment of a wind farm and associated infrastructure. More specifically this includes the elements as described below.

The use of the nominated land for the installation of up to 114 wind turbines and other buildings and related structures needed for the purposes of generating electricity from wind and then transmitting this electricity to the national grid (including above ground and underground transmission cabling and a substation). This also includes supporting infrastructure, buildings and structures (including access tracks, wind monitoring masts, operations and maintenance facility) that are necessary for the ongoing operation and maintenance of the development.

1.1.1 Project Location

The Palmer Wind Farm is generally located on the eastern side of the Mount Lofty Ranges near the areas of Palmer and Sanderston. The wind farm aims to take advantage of the elevation that enables the capture of both climatic winds and thermally generated winds.

Figure 1.1 provides an overview of the project location and project boundary. The overall project has been divided into three key areas: A, B and C, to assist with referencing.

Figure 1.2 provides additional detail of the location of wind turbine areas and relevant infrastructure which is summarised below and described in more detail in Section 3. Indicative layout plans are contained in Appendix A of this Volume.

1.1.2 Project Components

The project components comprise two main types: those permanent components that are required for the life of the wind farm and those that are only required for a temporary period during the construction phase.

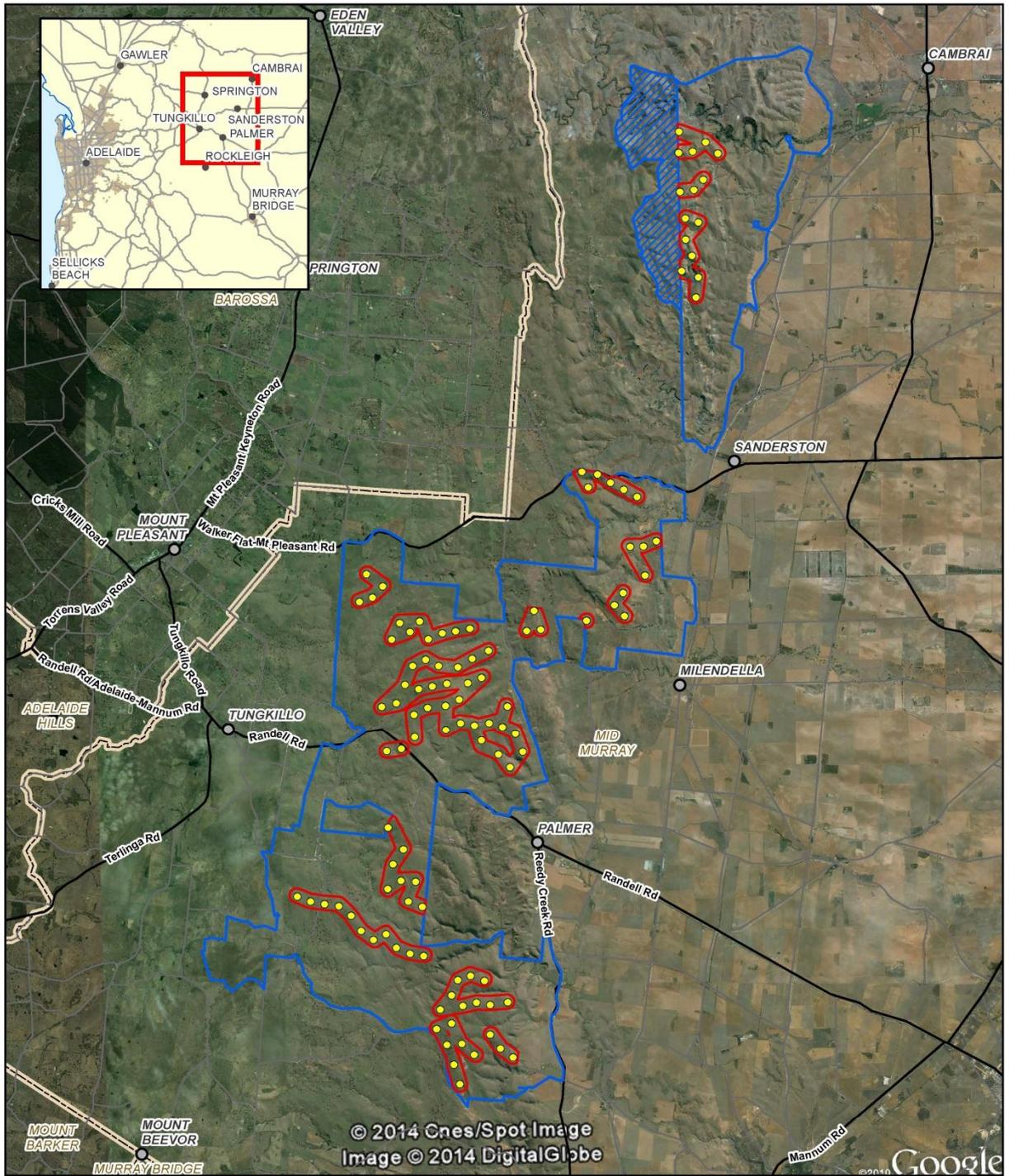
The main permanent components of the proposed wind farm included in this application are:

- up to 114 wind turbine generators (WTG), each with:
 - three blades mounted on a tubular steel tower, with a combined height of blade and tower limited to a maximum tip height of 165 metres;
 - an adjacent hard stand area; and
 - an adjacent pad mounted wind turbine transformer (if required).
- a new 33/275kV wind farm substation located inside the project area;
- a permanent operation and maintenance facility co-located with the new substation, incorporating office, workshop and equipment storage;

- a new overhead power line approximately 10 km in length, rated at up to 275 kV (nominal) capacity, running from the new 33/275kV substation to the transmission connection at the existing ElectraNet Tungkillo substation. It is expected that this new power line would be mounted on either a single pole type structure or lattice towers (similar to the existing high voltage power lines in the area), subject to detailed design;
- underground and overhead 33 kV electrical cabling linking the wind turbines to each other and the on-site substation with an approximate total length of 25km;
- access tracks required for each wind turbine and the related facilities above;
- minor upgrades to local roads, as required for the delivery, installation and maintenance of wind turbines and the related facilities above; and
- up to seven (7) permanent monitoring masts for wind speed verification, weather and general monitoring purposes. The permanent monitoring masts may be either static guyed or un-guyed structures and will be to a maximum height of the wind turbine hubs.

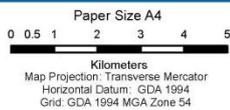
In addition to this, the following temporary elements will be required for the construction phase:

- a related turbine lay down area at each wind turbine site.
- temporary construction facilities including the following:
 - site office and staff amenities;
 - 3-5 laydown areas;
 - mobile concrete batching plants (if required); and
 - other services and facilities as required by the relevant Management Plans (e.g. wash down areas).



Legend

- Not within site of development
- Project Boundary
- Indicative Turbine Location
- Turbine Corridor
- Secondary Roads
- Minor Roads
- Council Boundary



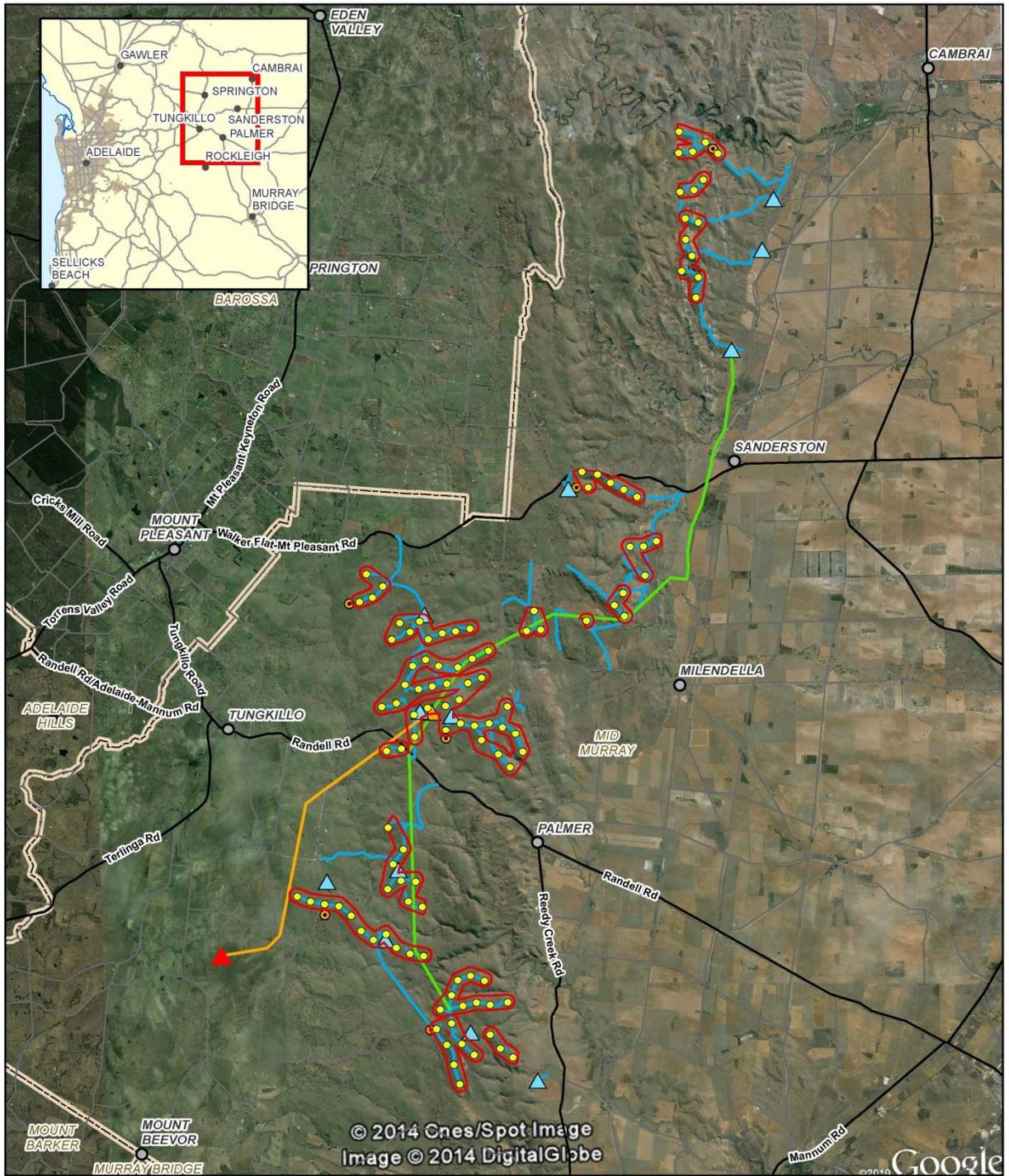
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Palmer Wind Farm Technical Studies

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Date | 15 Aug 2014

**Palmer Wind Farm
Project Location**

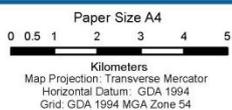
Figure 1.1

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Legend

- Indicative Turbine Location
- ▭ Turbine Corridor
- Proposed Access Tracks
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- ▲ Substation/Operation & Maintenance Facility
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- Secondary Roads
- Minor Roads
- ▭ Council Boundary



TrustPower Australia Holdings Pty Ltd
Palmer Wind Farm Technical Studies

Job Number | 33-17234
Revision | A
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**Palmer Wind Farm
Key Project Elements**

Figure 1.2

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1.2 Approvals Sought

This application is seeking approval for the following project elements and approach:

- Development Plan consent for a wind farm land use on the sites identified in this report and the associated mapping.
- The wind turbines and associated infrastructure described in this section, Section 3 and the supporting sections of this report.
- Up to 114 WTGs (with a maximum height to blade tip of 165m) and associated infrastructure to be generally in accordance with the indicative locations within the turbine corridors shown on the layout plans accompanying this development application. Before the development starts, final layout plans showing exact locations of all infrastructure within the surveyed area will be prepared to the satisfaction of the Mid Murray Council with supporting material to demonstrate that the alteration or modification will not give rise to a significant adverse change to the assessed landscape, flora and fauna, cultural heritage, visual amenity, shadow flicker, noise, electromagnetic interference, fire risk or aviation effects.
- An approval validity timeframe of five (5) years to substantially commence and then three (3) years to complete.
- Temporary construction facilities to be dismantled and sites rehabilitated post construction.
- Staging of full Development Approval for different construction elements, subject to building rules certification and satisfaction of development consent conditions as relevant for the respective construction element.

It should be noted that a dwelling, located near WTG B10, will not be used for residential purposes by agreement with the land owner unless the wind farm noise level at the dwelling is less than 45dB(A) and shadow flicker limits are within prescribed guidelines unless a reasonable limit for increased shadow flicker is agreed with the landowner. This will depend on the final layout of the wind farm . This dwelling is labeled “R139” on the plans.

This application does not specify a particular turbine model so that improved models can be considered closer to the time of construction. However, the application does identify maximum dimensions and performance criteria that must be met, regardless of the model selected.

1.3 Approvals Pathway

This application is lodged with Mid Murray Council in accordance with Part 4 of the *Development Act, 1993*. The Act requires that this application be assessed and decided by the Mid Murray Council Development Assessment Panel (or delegate) as the relevant planning authority. The *Development Act* requires the Panel to make its decision based on the policies contained within the Mid Murray Development Plan (consolidated 24 Oct 2013).

Figure 1.3 provides an overview of the process.

The Development Application Process



Figure 1.3 The Development Application Process

1.3.1 Other Approvals

In addition to approval under the *Development Act, 1993* this project will also need to obtain other approvals in relation to licenses and permits prior to construction. It is normal practice for larger projects to seek Development Plan Consent under the Development Act first and then deal with the detail associated with subsequent specific consents, licenses and permits. This is because the Development Act assessment process can result in changes to the project that then affects the detailed matters.

Overview of Related Approvals

The following provides an indication of the range of approvals/permits/licenses that will be required in addition to a planning consent under the Development Act:

- Building Rules consent, Development Act, 1993 – some elements of the project will require Building Rules Consent (e.g. the Operations and Maintenance building). These will be sought in stages as the detailed design is finalised.
- Land division approvals, Development Act, 1993 – long term leases over portions of allotments for corridors and other infrastructure will require development consent as they are deemed to be land divisions. These will be sought separately when leasing arrangements are finalised.
- Environment Protection Act, 1993 – depending on the approach to the construction phase, some temporary elements may require EPA licensing (e.g. a concrete batching plant). This will be sought and obtained by the construction contractor, as a condition of their contract with the proponent, when the need for such facilities are confirmed and detailed layout designs have been completed.

- Natural Resource Management Act, 2004 – approvals may be required for actions/activities that have an impact on water resources (e.g. up-grades of watercourse crossings, water extraction) management of declared pest plants and animals and prevent land and water degradation. These will be obtained by the construction contractor as a condition of their contract with the proponent.
- Transport and Access – agreement and approvals will need to be obtained from both Council and the Department of Planning, Transport and Infrastructure (DPTI) in relation to matters such as any roads works, oversized vehicle access routes, and access points. Initial discussions have commenced with Council regarding the findings of the Traffic Impact Assessment. It is expected that elements of this report (contained in Volume 3) may change as a result of any specific agreements reached with DPTI or Council following a Development Assessment process.
- Electricity Industry – there are a range of industry standards and requirements regarding the design of electricity infrastructure that apply at national and state levels (e.g. Electricity Act, 1996). ElectraNet will also have specific design requirements that will need to be met. These matters will be addressed as part of the detailed design process and covered under the separate Transmission Connection Agreement with ElectraNet, Generation License with the Essential Services Commission of SA and generator registration with the Australian Energy Market Operator.
- Native Vegetation Act, 1991 – any clearance of Native Vegetation will need to be approved under this Act. The Act includes the ability for the Native Vegetation Council to approve clearance for the purpose of infrastructure provided suitable agreements can be reached on off-sites. The process for this negotiation has commenced but cannot be finalised until the detailed siting has been confirmed. This is addressed in more detail in the Flora and Fauna Assessment by EBS (Volume 4).
- Aboriginal Heritage Act, 1998 – Like the Environment Protection Act, the Aboriginal Heritage Act places a duty of care on the proponent to address the likelihood of any impact on heritage. The proponents have already undertaken extensive survey work in association with the local aboriginal community. However, this is a process that will continue through detailed design and into the construction phases.

Environment Protection and Biodiversity Conservation Act, 1999

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is a Commonwealth Act that can apply to projects that have the potential to have an impact on species or communities that are protected by the Act.

Under this Act, a project that results in an action that may have a significant impact on a matter of national environmental significance, or occurring on Commonwealth land, must prepare a referral under the EPBC Act. This assists the Commonwealth to decide whether the proposal is a controlled action and requires assessment and approval.

During the course of the investigations for this project the Commonwealth Government removed the EPBC referral requirement for the River Murray and associated wetlands (11 December 2013). Notwithstanding this, referrals may be required depending on the specific impacts identified when the detailed design is confirmed.

A separate referral will be lodged under the EPBC Act and, if required, approval sought if deemed a controlled activity.

1.4 Specialist Studies

A range of investigations and specialist studies were undertaken to inform the site selection process, assess potential impacts and support the Development Application. Consideration was given to both the construction phase impacts as well as the on-going operational impacts. The studies undertaken are located in Volume 3 of the Application package and include the following (Larger reports are contained within Volume 4 of the Development Application Package):

- Development Plan Assessment (Masterplan) – Volume 3
- Landscape Character & Visual Assessment Report (WAX) – Volume 3 and 4
- Flora and Fauna Assessment (EBS) – Volume 3 and 4
- Noise Impact Assessment (Sonus) – Volume 3 and 4
- Cultural Heritage Site Assessment Report (ACHM) – Volume 3 and 4
- Traffic Impact Assessment (GHD) – Volume 3
- Civil, Geology, Geotechnical and Hydrology Assessment (GHD) – Volume 3
- Electromagnetic Interference Assessment (GHD) – Volume 3
- Aeronautical, Aviation and Qualitative Risk Assessment and Obstacle Lighting Review (Ambidji) – Volume 3
- Shadow Flicker and Blade Glint Assessment (Garrad Hassan) – Volume 3
- Economic Impact Assessment (Hudson Howells) – Volume 3
- Fire and Bushfire Assessment – Volume 3

The results of the specialist investigations have influenced the design and layout of the project and have provided important information contributing to the draft Construction and Environmental Management Plan (CEMP) (contained in Appendix B of this Volume). The Civil, Geology, Geotechnical and Hydrology Assessment included the preparation of a base Construction Management Plan. The findings of the other community, environmental and cultural studies were then added to this base document to create the CEMP. The CEMP provides guidance on how the construction phase of the project should seek to minimise impacts.

In addition to these studies, additional investigations have been undertaken to address a number of other potential impacts and which have led to recommended management or operational responses and commitments. Additional managements plans are proposed to cover on-going operational issues.

Specific, agreed impact mitigation measures are provided in each specialist assessment which are provided in a combined Statement of Commitments by Trustpower in Chapter 6 of this Volume.

1.4.1 Variations

It is acknowledged that there may be some slight variations between the specialist reports and the content of this Development Application. There are two key reasons for these differences: the first relates to the turbine model used to estimate impact and the second relates to the timing of the impact assessment and subsequent minor refinements to the layout.

Wind Turbine Model Types

There are a number of turbine manufacturers that each produce various turbine models with different technical specifications. New models ,incorporating new technology, are also regularly

developed. For example blade technology is constantly improving which helps to both reduce noise impact as well as improve aerodynamic efficiency. This project has not pre-selected a preferred model so as to enable consideration and selection of the most appropriate and efficient model for this site. This will occur as part of the turbine supply tender process following planning consent .

For the purposes of impact assessment, consideration has been given to the likely impact characteristics of turbines (size, footprint, noise) in the context of different assessment issues (transport, access, noise, visual etc...). In order to 'model' these impacts a turbine model has been selected to represent the realistic possible extent of impact. In this case, the range of turbines selected represents an option that is currently commercially available from a reputable supplier and where detailed documentation was readily available as a basis for impact considerations.

Having regard to the impact issue to be assessed, a suitable model has been selected to provide a realistic assessment of impact and design requirements. For instance:

- The landscape and visual impact assessment assumes a model type that has the maximum tip height.
- The transport assessment utilises an existing model that represents a best fit to the project dimensions (size and weight) for the maximum tip height.
- The noise impact assessment utilises an existing model that is a realistic balance between noise generation and layout footprint.

This has enabled Trustpower to establish design standards and project corridors, based on these model characteristics, within which the project will be confined. The assessments have considered the maximum extent of impact for the proposed layout. Following planning approval, the project will commence the construction tender and detailed design period. At this point, turbine models will be assessed to ensure that they fit within the design standards and corridors including:

- Does not exceed the maximum tip height;
- Does not exceed the noise compliance limits under the EPA guidelines;
- Does not exceed the EPHC Draft National Wind Farm Development Guideline limits for shadow flicker;
- Does not affect existing communication facilities;
- Is compliant with set aviation limits; and
- Can be transported to the project area and turbine sites within the defined transport corridors.

Before the development starts, the turbine model will be confirmed and final layout plans showing exact locations of all infrastructure within the surveyed area will be prepared to the satisfaction of the Mid Murray Council. This will include supporting material to demonstrate that the approach will not give rise to a significant adverse change to the assessed landscape, flora and fauna, cultural heritage, visual amenity, shadow flicker, noise, electromagnetic interference, fire risk or aviation effects.

Project Evolution

The design and layout of a wind farm is primarily driven by the wind conditions and other technical considerations. Further, consultation feedback and the impact assessment process has provided additional information about constraints, which then led to a modification of the

layout and design. This iterative process has occurred repeatedly until a viable project was developed and then minor refinements have been made to address specific impact issues.

It is important to note that the majority of the specialist reports were initially based on a project concept consisting of 130 WTGs. As a result of the investigations the project has been modified to address the potential impact highlighted by the initial findings of the reports. Chapter 2 provides an account of how the project has been developed and modified over the time in order to address impact issues.

1.5 Stakeholder Consultation

From the commencement of this project, Trustpower have been very aware of the need to provide accurate information about the project to the community and all stakeholders.

As a consequence, Trustpower developed a comprehensive Communication and Stakeholder Engagement Plan to ensure the community had access to full and accurate information and that all neighboring landholders have been directly consulted to get stakeholders' input into the actual design and shape of the project before lodgment of the Development Application.

Trustpower have since conducted an extensive program of stakeholder and wider community consultation and engagement, including three public information days, each attracting up to 80 people, two series of detailed workshops attended by the Trustpower team of consultants, and over a hundred 1-on-1 meetings with immediately adjoining property owners and residences within 2km of the project. As a result of the community feedback and further investigations by Trustpower, a number of turbine locations have been shifted and the number of turbines now proposed has been reduced from an initial 130 to 114 turbines.

There are 26 landowners hosting infrastructure associated with this project and Trustpower have been working with these landowners to address issues, concerns and management impacts. Confirmation of agreements with all the host landholders to the proposed locations of infrastructure on their properties will be provided to Council.

In addition, Trustpower has also offered around 65-70 immediate neighbours to the project a direct economic benefit from the wind farm by offering ongoing payments to landowners with property boundaries within 1km or a residence within 2km of a turbine should the project go ahead.

Should this Development Application receive approval, the project will move to the next stage of detailed design and siting and host landowner sign-off on the final layouts and designs.



The Communication and Stakeholder Engagement Plan, including feedback and responses is detailed in Volume 2 of the Development Application package.

1.6 The Proponent

Trustpower Australia Holdings Pty Ltd is a wholly owned subsidiary of Trustpower Limited, a publicly listed company in New Zealand, with the majority of ownership held by public investment groups, individuals and charitable trusts. The company started in 1925 and became publicly listed in 1994. Trustpower Limited is New Zealand's fifth-largest electricity retailer and

electricity generator. It owns and operates primarily renewable energy assets, including 39 hydro stations (3 in Australia) and 6 wind farms, including the largest wind farms in New Zealand and South Australia.

Trustpower began investigating wind farm sites in Australia in 2001. Initial efforts were focused on the South Australian region due to its strong wind resource and proximity to transmission and load centers. Trustpower owns and operates the Snowtown Stage 1 and 2 Wind Farms which were assessed and approved by the Wakefield Regional Council's Development Assessment Panel in 2004. Stage 1 of the Snowtown Wind Farm comprises 48 turbines and has been operating since 2008. Stage 2, comprising a further 90 turbines is currently under construction.

Trustpower prides itself in fostering strong landholder and community relationships at all its projects, with an impressive commitment to the communities where its projects are based. In New Zealand it has developed the 'Lend A Hand' foundation, which supports community groups and causes through funding, mentoring and the provision of goods and services. Trustpower has implemented the same community support structure at its Snowtown Wind Farm in South Australia – which continues to be well received by the community.

1.7 Project Timing

It is anticipated that, should the project receive Development Plan Consent, construction will commence within 2 to 5 years following tender, detailed design, and connection agreement processes - depending on favourable market conditions. Following this, the construction phase is likely to take approximately 2 years.

It is anticipated that the life of the wind farm will be in the order of 25-30 years. Once the design life of the turbines comes to an end the site is most likely to be re-powered with the latest technology turbines or WTGs will be removed and the land rehabilitated. Any re-powering that result in changes to layout or approval parameters will be subject to a separate development application at that time.

1.8 Structure and Content of this Application Package

The Development Application Package comprises a number of Volumes containing the relevant information for the assessment of this project under the *Development Act, 1993*.

- Volume 1 – Project Description and Approach – Provides a background to the project and describes the project elements (both permanent and for construction purposes). It also contains a statement of project commitments and includes application plans and indicative layouts.
- Volume 2 – Community and Stakeholder Engagement – Describes the engagement activities that have been undertaken and a summary of the issues and questions raised.
- Volume 3 – Impact Assessment – Contains an account of the Impact Assessments, including a Development Plan assessment, undertaken in relation to key impact topics. In most cases the specialist reports are contained in this Volume (the rest are contained in Volume 4).
- Volume 4 – Appendices – Contains four of the larger specialist impact reports. These have been provided separately due to their size and to enable cross referencing with other parts of the Application Package.

2. Site Selection and Design

2.1 Site Selection

The selection of a site for a wind farm is dependent on a number of factors, the most significant being the nature of the wind resource, the ability to feed power into the electricity grid and supportive host landowners. In addition to this, topography, access, environmental and cultural issues are also major considerations.

Economic and business considerations have a major impact on whether a wind farm project warrants investment. Wind farms need to be of a sufficient size (i.e. number of turbines) relative to the nature of the wind resource and the cost of establishing the project and connection to the national electricity grid.

2.1.1 Existing Infrastructure

Figure 2.1 provides an overview of the existing major infrastructure located in the general vicinity of the proposed wind farm. Existing infrastructure is important to underpinning the success of a wind farm project to enable access for construction and connection to the national electricity grid. Figure 2.1 also indicates the location of the approved Keyneton Wind Farm project.

Proximity to a suitable electricity transmission network is critical. It is also important to minimize the distance of transmission to maximise the efficiency of the project. As energy is transmitted, a small proportion is lost to the atmosphere. Thus the shorter the distance, the less the loss and the more efficiently a wind farm can be designed.

The ElectraNet Tungkillo substation is located just to the south-west of the proposed wind farm. This is a relatively new substation that forms a key node in the national electricity grid. This substation is considered to be one of the strongest parts of the SA network and a sound 'connection point' for the wind farm.

An overhead 275kV transmission line will be constructed as part of this project to connect the wind farm to the national grid via the Tungkillo substation.

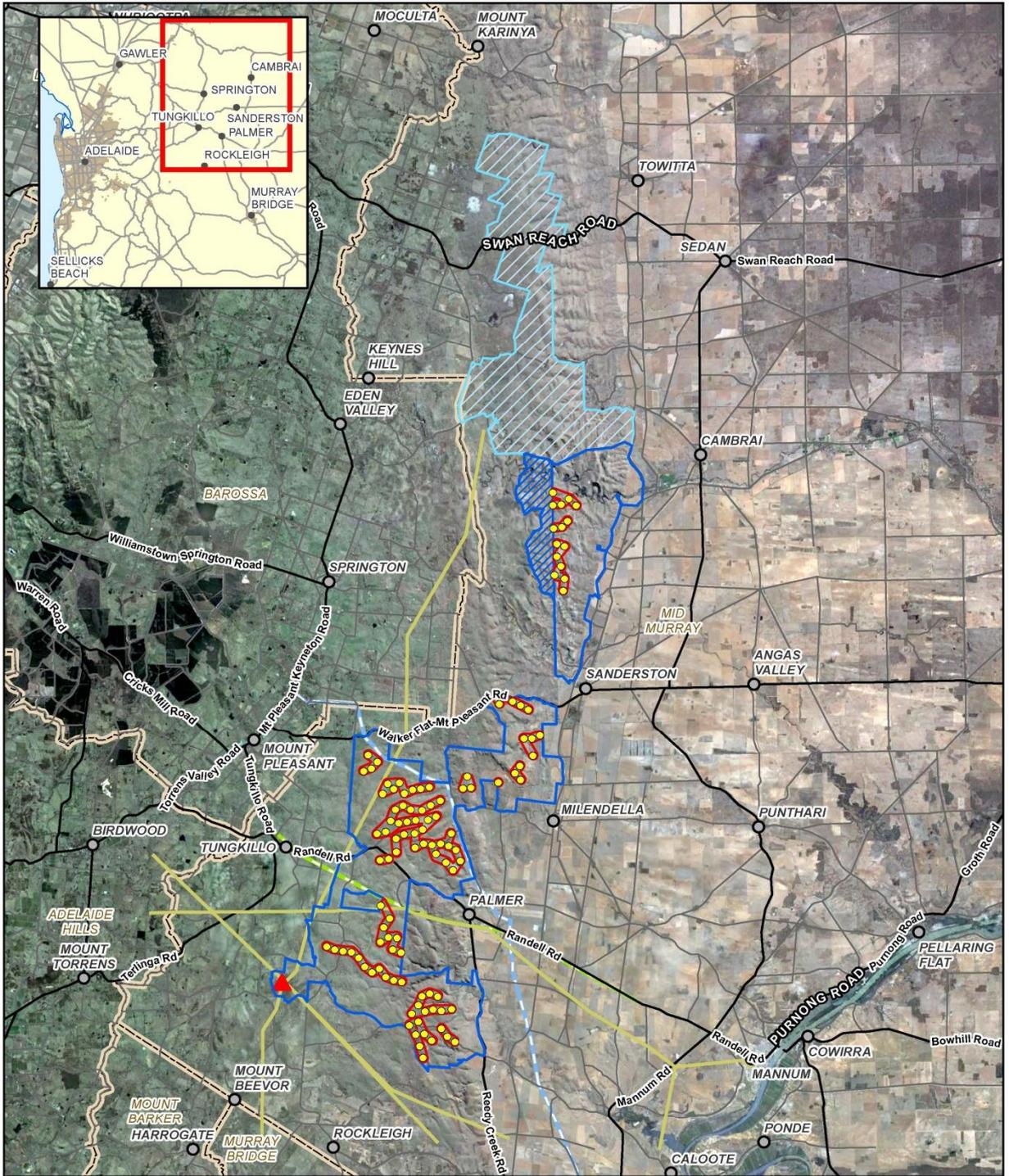
Where possible the project aims to utilise existing infrastructure to minimise new development needs, for example the use of existing roads and connecting into the existing Tungkillo substation. Utilizing the existing ElectraNet transmission line infrastructure is however not feasible due to insufficient capacity to transmit the output from the wind farm. The existing transmission line pole structures will have been specifically designed for the existing power lines only and have different design requirements, ownership and regulatory return arrangements which eliminates the option to share poles.

2.2 Project Evolution

Trustpower have been monitoring the wind resource in the region since 2009/10. Over this time they have developed various high level project concepts that have been tested to varying degrees as information has become available.

Trustpower have approached this project in a planned manner, developing the project concept in a number of stages that align closely with the stages identified in the "Best Practice Guidelines" prepared by the Clean Energy Council to guide the implementation of wind energy projects in Australia.

Figure 2.2 provides an overview of the Palmer project stages and the suggested Guideline stages. The Trustpower process has also included extensive community and stakeholder consultation.



Legend

- Not within site of development
- Project Boundary
- Keyneton Wind Farm Project Boundary
- Indicative Turbine Location
- Turbine Corridor
- Tungkillo Substation
- Adelaide Water Pipeline
- Secondary Roads
- Minor Roads
- Existing Transmission Lines
- SEAGAS Pipeline
- Council Boundary

Paper Size A4
 0 0.751.5 3 4.5 6 7.5
 Kilometers
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 54



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 Palmer Wind Farm Technical Studies

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 Date 15 Aug 2014

**Palmer Wind Farm
 Existing Infrastructure**

Figure 2.1

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Clean Energy Council

Best Practice Guidelines for the Australian Wind Industry

Palmer Wind Farm

Project Process

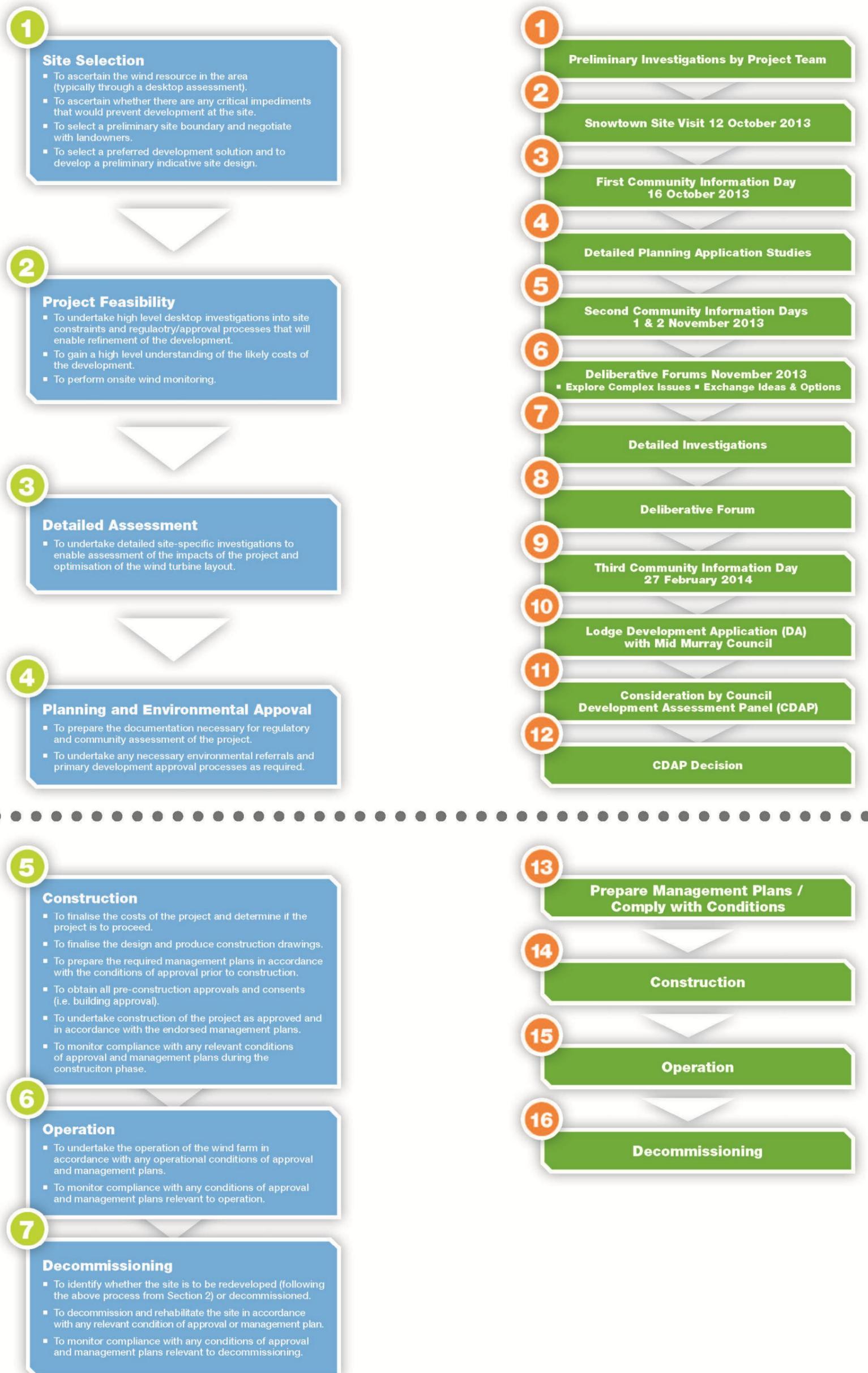


Figure 2.2 Project Evolution

2.2.1 Summary of Concept Evolution

The project concept presented in this development application report is the result of over 12 months of detailed work to develop a concept that avoids or contains impacts within accepted limits or state criteria. The project concept is now at a stage where the applicant is confident that it can be constructed subject to a detailed design that can comply with reasonable specific siting criteria (e.g. noise, heritage, flora and fauna).

To get to this point an iterative assessment and concept refinement process has been undertaken.

2.2.2 Impact Assessment Approach

The evolution of this project has been based on a balance between achieving a commercially viable project and avoiding or minimising impacts.

Initially, high level effects were considered and subsequently addressed by confining the project to a suitable regional location. For example, potential sites within the Barossa Character Preservation District were excluded and those areas with a greater density of residences were also avoided.

Following this, the specialist consultants were requested to consider an initial layout of 130 wind turbines that was released publically in the second half of 2013 and published in the December 2013 newsletter. The process of assessment and refinement that followed is explained below. Figure 2.3 shows the layout which formed the initial basis of assessment.

In order to maximise the potential and efficiency for electricity generation, and retain flexibility over the design of the Palmer Wind Farm, Trustpower is seeking approval to construct the Palmer Wind Farm within specified turbine and infrastructure corridors. The corridors cover the total extent of the potential project impact areas. The full extent of the corridors was assessed from various perspectives. The 'corridor' approach means that a greater area than that actually needed for the development has been evaluated for impact. Where the potential for impact was considered high, these locations have been highlighted as exclusion zones within which no infrastructure will be located. Where the potential for impact is low or manageable (through appropriate detailed siting, construction management or other mitigation measures) these areas remain as areas available for development within the corridors.

In general terms the following was applied:

- Turbine corridors – 200m surrounding (400m wide);
- 275kV line corridor – 100m either side of line;
- 33kV line corridor (overhead and underground) – 100m either side of line;
- Internal access roads – 100m either side; and
- Any other infrastructure outside the turbine, road or transmission corridors – 200m surrounding.

The corridor dimensions are within the dimensions identified above but, due to the physical terrain conditions, the actual corridors within which infrastructure locations are sought are provided in the maps (refer Appendix A of this Volume).

The impact assessment included consideration of various types of impact:

- In some cases the turbines needed to be "excluded" from some locations (e.g. EMI or sensitive nesting sites);

- In other cases impacts have been investigated for the extent of the corridor areas identified above (e.g. flora and fauna);
- Some assessments considered set maximum guidelines to determine impact. This is the case of the noise and shadow flicker impact assessment. In these cases the corridor is accounted for in conditioning these fixed performance guidelines;
- The adoption of a minimum turbine spacing further limits the impact of the corridor on the visual effect; and
- In the case of Aboriginal Heritage, the approach to impact assessment has been agreed with the Aboriginal community representatives as this matter is addressed under different legislation.

Where impact issues have been identified, consideration has been given to whether the detailed design stage can adequately deal with matters or whether the impact is more fundamental. Figure 2.4 shows constraint issues for turbines. This means that, regardless of the extent of the corridors for other elements of the wind farm (e.g. roads, underground cables etc...), turbines will not be located in these exclusion areas. Where it is not practical to consider the full extent of the corridor (noise, shadow flicker) suggested conditions requiring confirmation of the final turbine layout against specific performance criteria have been included.

The extent of the corridors included in this application indicate where turbines, access tracks and other infrastructure can be located subject to detailed design. The impact assessment has confirmed that there are either no impacts within these areas or the impacts can be adequately managed. It is critical to note that the corridor approach has resulted in impact assessments of a land area that is much greater than that needed for the actual development. The corridors are not an indication of the total footprint of the development but a reflection of the area surveyed and the potential impact areas available for detailed siting.

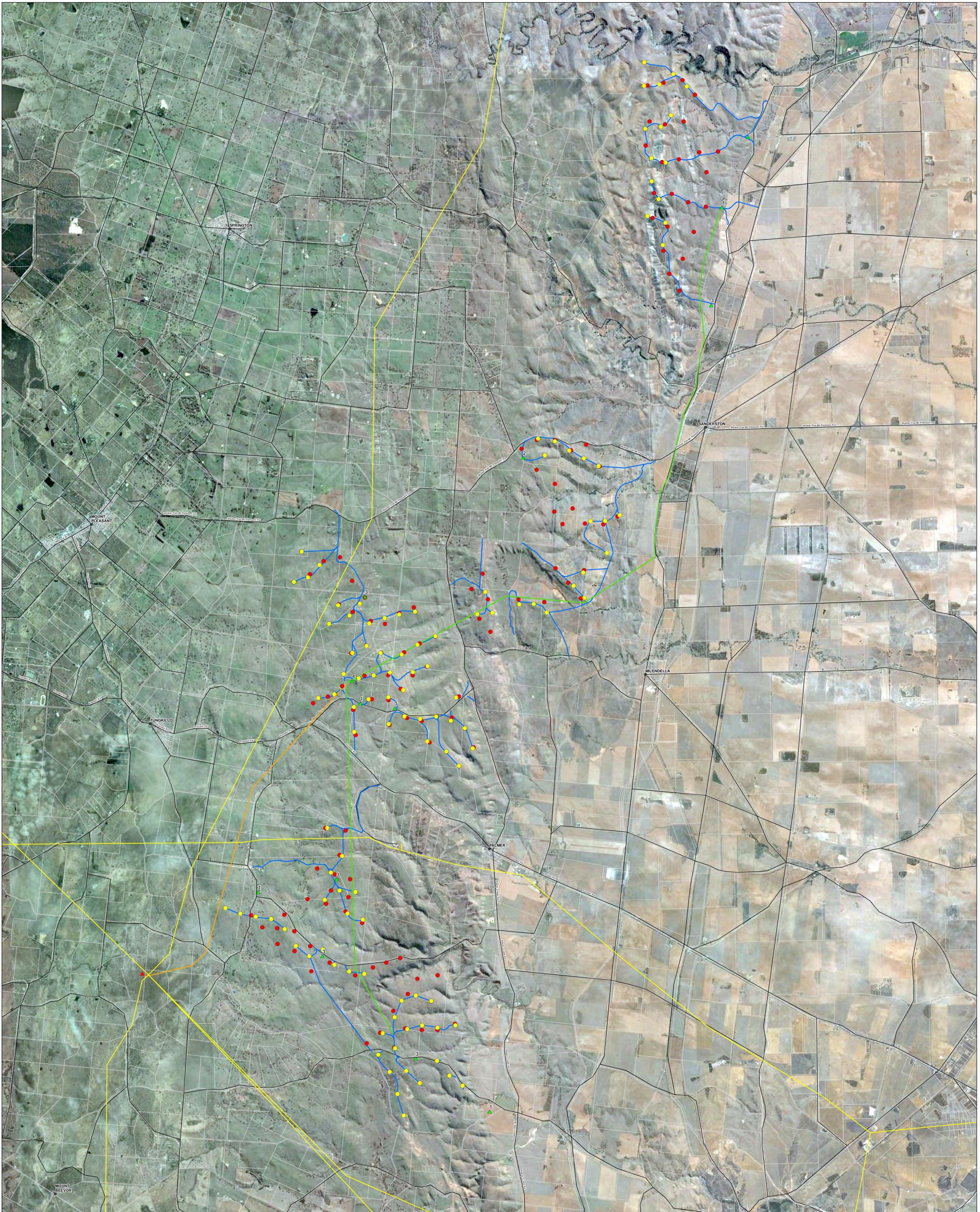
Each of the specialist impact assessment teams assessed the potential for impacts within these corridor areas having regard to the initial turbine locations. The corridors were then reviewed in light of the design principle of avoiding or minimising impacts. In some cases this resulted in the deletion of areas and turbine sites and in others it resulted in adjustments to locations.

It is important to note that the areas initially surveyed include corridors much larger than indicated in the figures in this Development Application.

Aboriginal Heritage impact has also been assessed. The Aboriginal Heritage Act makes provision for the protection of sites and artefacts. Trustpower have worked closely with the representatives of the local indigenous community to ensure that they have taken the necessary steps to avoid damage to sites and artefacts in accordance with the requirements of the Aboriginal Heritage Act. There are some aspects of this process that are sensitive and require a confidential approach. This application package provides some information on Aboriginal heritage issues, as agreed with the local indigenous representatives and in accordance with agreed confidentiality. However, it is noted that some information cannot be released. Trustpower will continue to address Aboriginal heritage issues and work with the local representatives, in accordance with the requirements of the Aboriginal Heritage Act.

2.2.3 Continued Evolution

A project of this size and scale evolves in a continued iterative process of refinement as more detailed information comes to light. However, there is a point at which a development assessment process needs to occur before the detailed project work can proceed any further. Essentially the development assessment process considers whether this land use in the proposed location is acceptable (based on the policies contained in the Development Plan) and that impacts can be effectively avoided or managed.



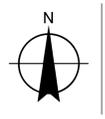
Legend

- Proposed Turbine Location
- Original Proposed Turbine Location (Oct. 2013)
- ▲ Amenities Location (See table for details)
- Proposed Access Tracks
- Existing Transmission Lines
- 275kV Transmission Line
- 33kV Transmission Line
- Roads
- Cadastre

Amenities:

- 1 Construction Amenities / Batch Plant
- 2 Construction Amenities / Laydown Area
- 3 Laydown Area
- 4 O&M Compound / Substation

Paper Size A0
 0 0.5 1 2 3 4
 Kilometres
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 54

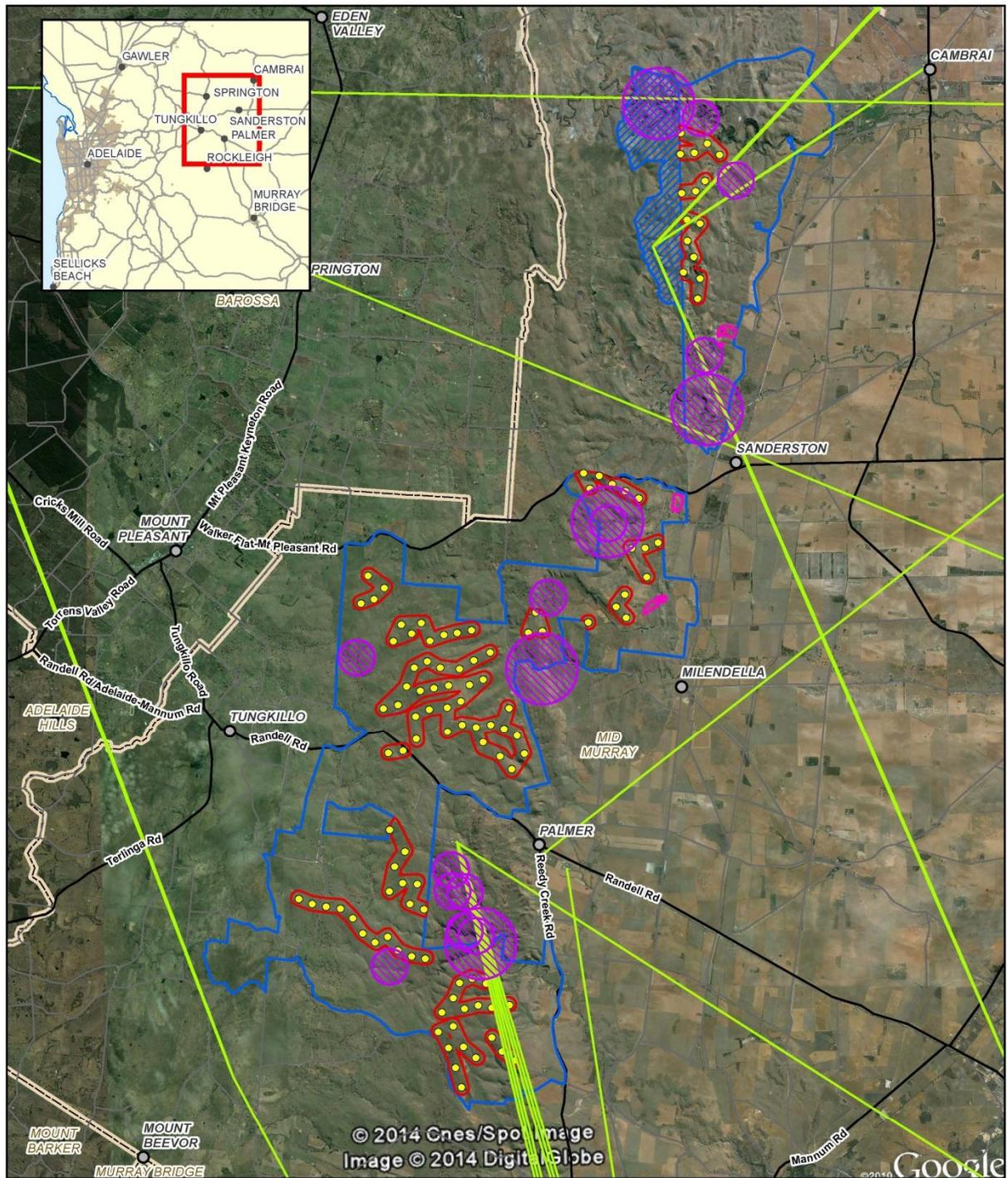


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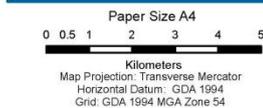
**Palmer Wind Farm
 Consultation Master Layout Map**

Figure 2.3





- Legend** NOTE: Due to scale turbines may appear in the exclusion zones
- | | | |
|---|----------------------------|--|
| Project Boundary | Secondary Roads | Recommended Exclusion Zones (EPBC Referral Required) |
| Barossa Character Preservation District | Minor Roads | Flora & Fauna Turbine Exclusion Zone |
| Indicative Turbine Location | Council Boundary | |
| Turbine Corridor | EMI Turbine Exclusion Zone | |



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**Palmer Wind Farm
Constraints Map**

Figure 2.4

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Volume 3 of this Application Package contains more detailed information about the findings of the impact assessments and the manner in which the project design has been modified to respond to the issues identified.

It should be noted that the final location of turbines is still subject to a more detailed refinement and assessment process.

The following table highlights the key stages and concept evolution over the last 4-5 years. This process of evolution on refinement is typical of most large projects. At each stage an evaluation of the economic viability of the project has been essential to ensure the long term stability of the project.

Should the Council Development Assessment Panel (CDAP) see fit to grant Development Plan Consent, then this project will be able to move to the detailed tendering, design and construction phases.

This will involve detailed design of the project in collaboration with the final selected construction contractor, ElectraNet, DPTI and Council.

This application envisages that this detailed work will be undertaken subject to meeting a number of design criteria or standards to avoid or minimise impacts such as noise, disturbance of cultural heritage and vegetation clearance. The nature of the criteria or standards are reflected in the Statement of Commitments which could form the basis of 'conditions' set by the CDAP.

2.2.4 Construction Impacts

Although construction impacts are essentially temporary, due to the size of wind farm projects, they can occur over an extended period of time.

To minimise these impacts, the project will be constructed in accordance with specific Construction and Environmental Management Plans (CEMP). CEMPs are an accepted approach to documenting management arrangements. These Plans cover issues such as:

- Hours of operation;
- Traffic and transport safety;
- Erosion and sediment management;
- Dust and noise management; and
- Bush Fire Management.

A draft CEMP is included in Appendix C. A final CEMP will be prepared by the construction contractor and submitted to the relevant authorities, prior to the commencement of any construction activity.

Date (duration)	Key Tasks and Changes
1 st half 2009	Trustpower's (TP) experienced wind engineering team identified the potential Palmer wind farm site due to its consistently high wind resource (identified through computer modelling), its proximity to the transmission network and its low population density.
2 nd half 2009	Landowners were approached and, where interested, signed up to the wind farm. Wind monitoring mast locations were identified. Development Applications were lodged and approved for 2 wind monitoring masts.
1 st half 2010	Wind Monitoring programme commenced in early 2010 and is ongoing.
2 nd half 2011	Preliminary Desktop Review was completed addressing issues including Planning, Environment, Heritage, Noise, Electromagnetic, Aviation, Visual, Hydrology, Heritage and grid connection.
1 st half 2012	Combined with 2 years of wind monitoring and the Desktop Review, Layout 1, containing 150 x 3 MW wind turbine was created by TP's wind engineering team. Feasibility studies were completed.
2 nd half 2012	Commencement of onsite surveying work. Up to 40 wind turbines were removed from Wind Farm layout following Wind Farms being categorized as a non-complying form of development within the Barossa Valley Character Preservation District. Option for expanding the wind farm further south investigated, addition turbine sites considered.
1 st half 2013	Additional landowners approached and signed up to the wind farm. Further revisions of layout and onsite surveying work continued.
2 nd half 2013	Public release of an initial layout of 130 wind turbines (refer Figure 2.3). Detailed investigations and voluntary community consultation programme was undertaken.
1 st quarter 2014	Layout of 114 Wind Turbines and all associated infrastructure completed as a result of detailed investigations and community consultation.
February 2014	Development Application lodged with the Mid Murray Council.
May 2014	Council review and request for additional information.
August 2014	Submit updated Development Application to address Council request for additional information and minor layout refinements.

3. Project Description

3.1 Site Context and Existing Environment

The proposed Palmer Wind Farm is located in the northern sector of the Mount Lofty Ranges, toward the eastern edge of the ranges. The wind farm is located in the vicinity of the Palmer township and an area known as Sanderston. The project site areas and key elements are defined in general in Figure 3.1 and in more detail in the plans contained in Appendix A.

The project comprises up to 114 wind turbine generators, in three clusters spanning properties that cover an area of approximately 11,550 hectares of privately owned land within the project area.

While the project boundary includes the full extent of the allotments that contain some element of the wind farm project, the site of the development does not include the portions of allotments in Area A that are located within the Barossa Valley Character Preservation District, as these areas will not contain any aspect of the wind farm project. This is highlighted on Figure 3.2.

The land proposed for the wind farm has been substantially cleared, primarily for grazing but, in some areas, also cropping.

3.1.1 Land Tenure

The majority of the land within the project is privately owned with the remainder consisting of public roads predominantly under Council management.

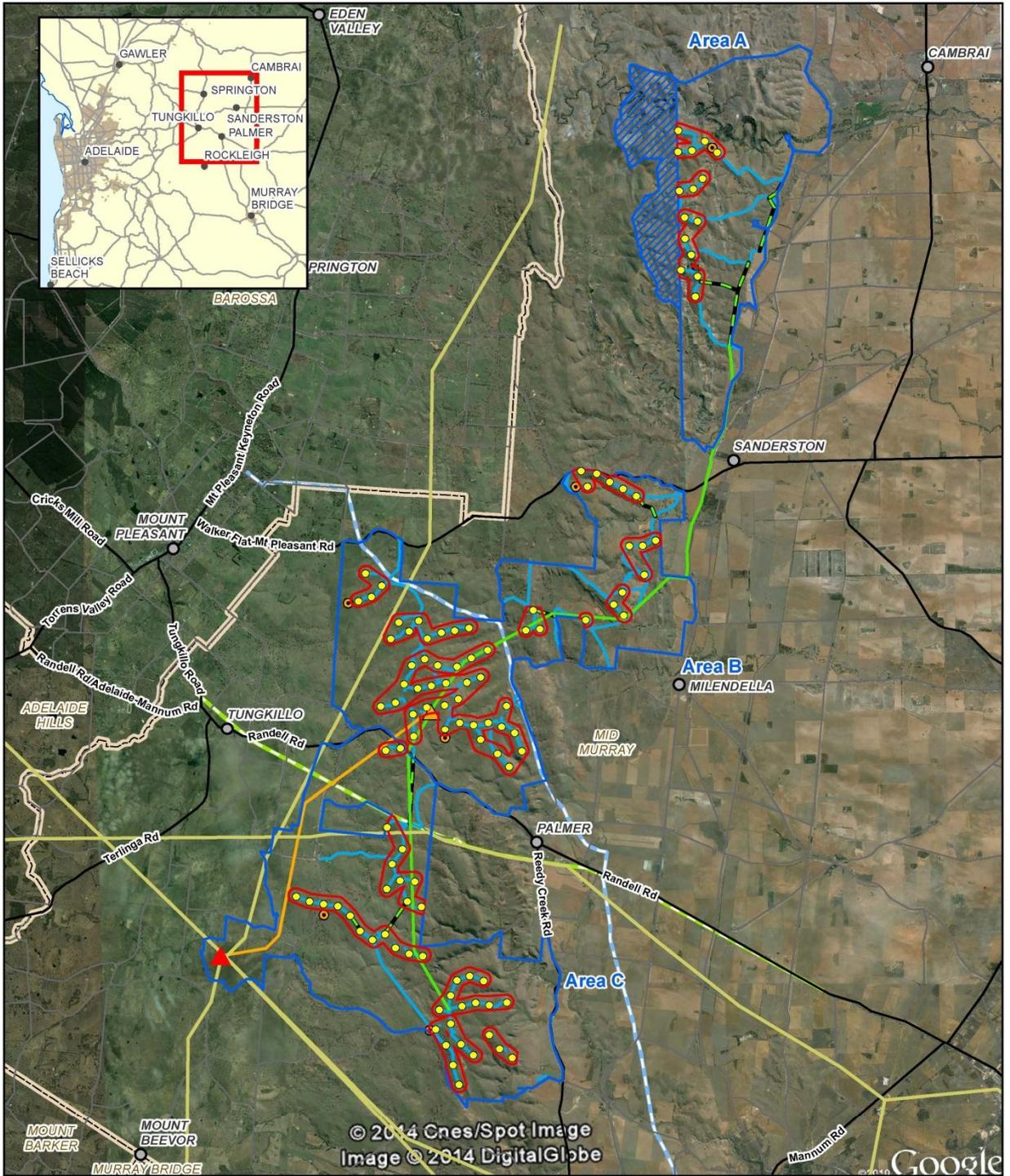
There are 26 landowners hosting turbines, access roads, transmission lines and other related facilities. Table 1, on the following pages, provides a list of the titles involved in the project. Figure 3.2 depicts this in a graphical format. Agreements with host landholders will allow for the use of specific portions of these titles for the wind farm infrastructure.

The approach to siting the wind farm infrastructure has been on the basis that the wind farm operate as an additional activity. The balance of the land surrounding the turbines and other elements will continue to be used for its current purpose.

Table 1 also provides details on the location of the key elements of the proposed wind farm project. These locations are also reflected on the mapping throughout this application package.

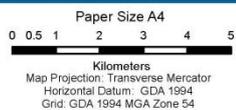
In addition, Trustpower recognises the following ElectraNet position:

Where easements or access is required, that overlaps an existing easement held by ElectraNet, the landowner (who would be granting the easement or access to Trustpower) is free to provide such a grant provided that in doing so the new grant does not prevent or frustrate ElectraNet's use of the ElectraNet easement.



Legend

- Not within site of development
- Project Boundary
- Indicative Turbine Location
- Turbine Corridor
- Proposed Access Tracks
- Underground Cable not within Proposed Access Track
- Substation/Operation & Maintenance Facility
- 33kV Transmission Lines
- 275kV Transmission Line
- Tungkillo Substation
- Existing Transmission Lines
- SEAGAS Pipeline
- Adelaide Water Pipeline
- Meteorological Mast
- Secondary Roads
- Minor Roads
- Council Boundary



TrustPower Australia Holdings Pty Ltd
Palmer Wind Farm Technical Studies

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Date 15 Aug 2014

Palmer Wind Farm
Project Site Area and Key Elements

Figure 3.1

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Data source: Google, Aerial - 20140203, TrustPower Australia Holdings Pty Ltd, Design - 201400123, GA: Geodata Topo 250K Series 3 - 2006, Roads - 2006 Created by: cillingworth

Table 1 Location References

The following provides a summary of land that is involved with the project.

Area A

Title Reference	Parcel ID
CT5615/892 (part of)	D3806 A8
CT6031/198 (part of)	F170020 Q272
CR5760/543	H170100 S55
CT5350/879	F170016 A267
CT5381/422	F170025 A276
CT6087/92	F170029 A280
CT5868/563 (part of)	F170028 Q279
CR5757/383	H170100 S530
CT5726/165	H170100 S529
CT6052/91	D81735 A101

Those parts of the parcels that extend within the Barossa Valley Character Preservation District are not included in the project.

Area B

Title Reference	Parcel ID
CT5517/115	H170300 S52
CT5854/170	H170500 S397
CT5854/170	H170500 S396
CT5705/899	F169859 A110
CT5854/170	H170500 S390
CT5854/170	H170500 S655
CT5854/170	H170500 S395
CT5854/170	H170500 S393
CR5762/33	H171000 S513
CR5761/336	H170500 S344
CT5516/661	F170179 A91
CT5895/323	F169884 A135
CT5854/170	H170500 S394
CT5989/715	F169892 A143
CT5153/319	D20944 A74
CT5546/926	F169887 A138
CT5702/227	F169894 A145
CT5405/94	F204303 A92
CT5844/707	F218333 A21
CT5844/707	F218333 A17
CT5756/280	F217815 A205
CT5756/278	F217815 A203
CT5732/435	F169873 A124
CT5899/987	F169886 A137
CT5897/769	F170180 A92

Title Reference	Parcel ID
CT5348/175	F169893 A144
CT5651/396	F206935 A95
CT5897/853	D20944 A75
CT5756/279	F217815 A204
CT5546/925	F169888 A139
CT5405/94	F204303 A93
CT5404/721	F169891 A142
CT5844/707	F218333 A19
CT5405/94	F204303 Q96
CT5756/276	F217815 A201
CT5756/275	F217815 A200
CT5405/94	F204303 Q95
CT5756/277	F217815 A202
CT5958/134	D68586 A36
CT5657/268	F169896 A147
CT5895/897	D1648 A9
CT5144/864	D26866 A1
CT5854/170	H170500 S391
CT5854/170	H170500 S322
CT5844/707	F218333 A20
CT5405/94	F204303 A91
CT5425/652	H170500 S452
CT5538/443	F170181 Q97
CT5844/707	F218333 A18
CT5897/770	H170500 S437
CT5854/170	H170500 S392
CT5405/94	F204303 A94
CT5424/596	F204033 Q92
CT5844/707	F218333 A22
CT5689/533	D1648 A5
CT5538/443	F170181 Q98
CT5854/170	H170500 S330
CT5854/170	H170500 S2
CT5897/771	H170500 S438
CR5761/336	H170500 S344
CR5762/33	H171000 S513
CT5425/648	H171000 S173
CT5425/648	H171000 S173
CT5538/443	F170181 Q93
CT5538/443	F170181 Q96
CT5538/443	F170181 Q95
CT5854/170	H170500 S394
CT5866/948	R4658 AA

Area C

Title Reference	Parcel ID
CT5864/527	H171000 S73
CT6055/389	H171000 S483
CT5906/64	F43319 A26
CT5385/990	H171000 S482
CT5906/61	F43319 A21
CT5861/704	F169981 A232
CT5876/758	F169983 A234
CT6088/441	H171000 S488
CT5433/702	H171000 S243
CT5906/60	F43319 A20
CT5385/990	H171000 S481
CT5433/293	H171000 S241
CT5297/468	F157755 A31
CT5426/871	H171000 S357
CT6055/390	H171000 S485
CT5416/67	D16500 A307
CT5297/468	F157755 A32
CT5906/63	F43319 Q24
CT5906/63	F43319 Q25
CT5479/260	H171000 S72
CT6120/424	F169983 A234
CT 5806/10	H213527 A91
CT5578/297	H171000 S358
CR5874/60	F43319 A23
CT5906/62	F43319 A22
CT5408/141	D47145 A62
CT5297/468	F157755 A33
CT5433/294	H171000 S242
CT5297/468	F157755 A30
CT5421/815	H171000 B480
CT5409/144	H171000 S214
CT5421/814	F157574 A39
CT5421/812	F157583 A48
CT5473/924	H171000 S211
CT5421/813	F157582 A47
CT5833/39	R1430 AE
CT6081/943	F157552 A17
CT5424/484	H171000 S477

Paper Road References

Position	Title Reference	Parcel ID
Northern Boundary	CT6087/92	F170029 A280
Northern Boundary	CT5868/563	F170028 Q279 Part of this title, up to the point of the Barossa Protection District
Northern Boundary	CT5726/165	H170100 S529
Southern Boundary	CT5657/268	F169896 A147
Southern Boundary	CT5830/562	F169897 A148
Southern Boundary	CT5854/170	H170500 S322
Southern Boundary	CT5854/170	H170500 S330
Eastern Boundary	CT5651/396	F206935 A95
Eastern Boundary	CT5689/533	D1648 A5
Southern Boundary	CT5897/769	F170180 A92
Southern Boundary	CT5405/94	F204303 Q96
Southern Boundary	CT5958/134	D68586 A36
Eastern Boundary	CT5958/134	D68586 A36
Western Boundary	CT5899/987	F169886 A137
Eastern Boundary	CT5144/864	D26866 A1
Northern & Western Boundary	CT5756/275	F217815 A200
Western & Southern Boundary	CT5756/276	F217815 A201
Western Boundary	CT5761/336	H170500 S344
Western, Southern & Eastern Boundary	CT5762/33	H171000 S513
Northwest Boundary	CT5756/277	F217815 A202
Western Boundary	CT5756/278	F217815 A203
Western Boundary	CT5756/279	F217815 A204
Western Boundary	CT5473/924	H171000 S211
Western Boundary	CT5409/144	H171000 S214
Northwest Boundary	CT5385/990	H171000 S481
Western Boundary	CT5906/61	F43319 A21
Southwest Boundary	CT5906/61	F43319 A21
Southwest Boundary	CT5906/62	F43319 A22

Indicative Location of WTGs

WTG Ref Number	Easting (MGA Z54)	Northing (MGA Z54)
A03	336698	6161375
A06	336293	6160637
A01	336353	6161693
A02	335994	6161427
A04	335605	6161391
A07	336033	6160345
A05	335638	6160292
A08	335792	6159545
A12	336154	6159431
A14	335796	6158950
A15	335974	6158492
A18	335687	6158065
A19	336147	6157893
A17	336083	6157324

WTG Ref Number	Easting (MGA Z54)	Northing (MGA Z54)
B01	332895	6152379
B02	333325	6152313
B05	333690	6152072
B06	334442	6151678
B07	333068	6151948
B08	334067	6151876
B09	334658	6149460
B10	328319	6146254
B11	334980	6150426
B12	334238	6150270
B14	334610	6150274
B15	326856	6149493
B17	327311	6149154
B18	332784	6148159
B19	334049	6148960
B20	327021	6148833
B23	326663	6148717
B24	333807	6148617
B26	328346	6148166
B27	334081	6148311
B28	331551	6148465
B29	332416.	6148148
B30	327787	6148121
B31	333123	6147940
B32	329755	6147962
B33	328079	6147863
B34	329350	6147887
B35	331343	6147896
B36	328585	6147661
B37	327563	6147649
B38	328978	6147796
B39	331732	6147930
B40	330274	6147331
B41	329816	6147113
B42	328515	6147087
B43	329413	6146867
B44	328875	6146905
B45	328153	6146906
B46	330074	6146572
B47	329114	6146406
B48	329700	6146418
B49	328700	6146329
B50	327931	6146370
B52	329451	6145957
B53	330806	6145764
B54	327692	6145850
B55	328568	6145725
B56	329074	6145776
B57	327285	6145752
B58	328191	6145525.
B59	330294	6145281
B60	330666	6145173
B61	329488	6145286
B62	329885	6145221

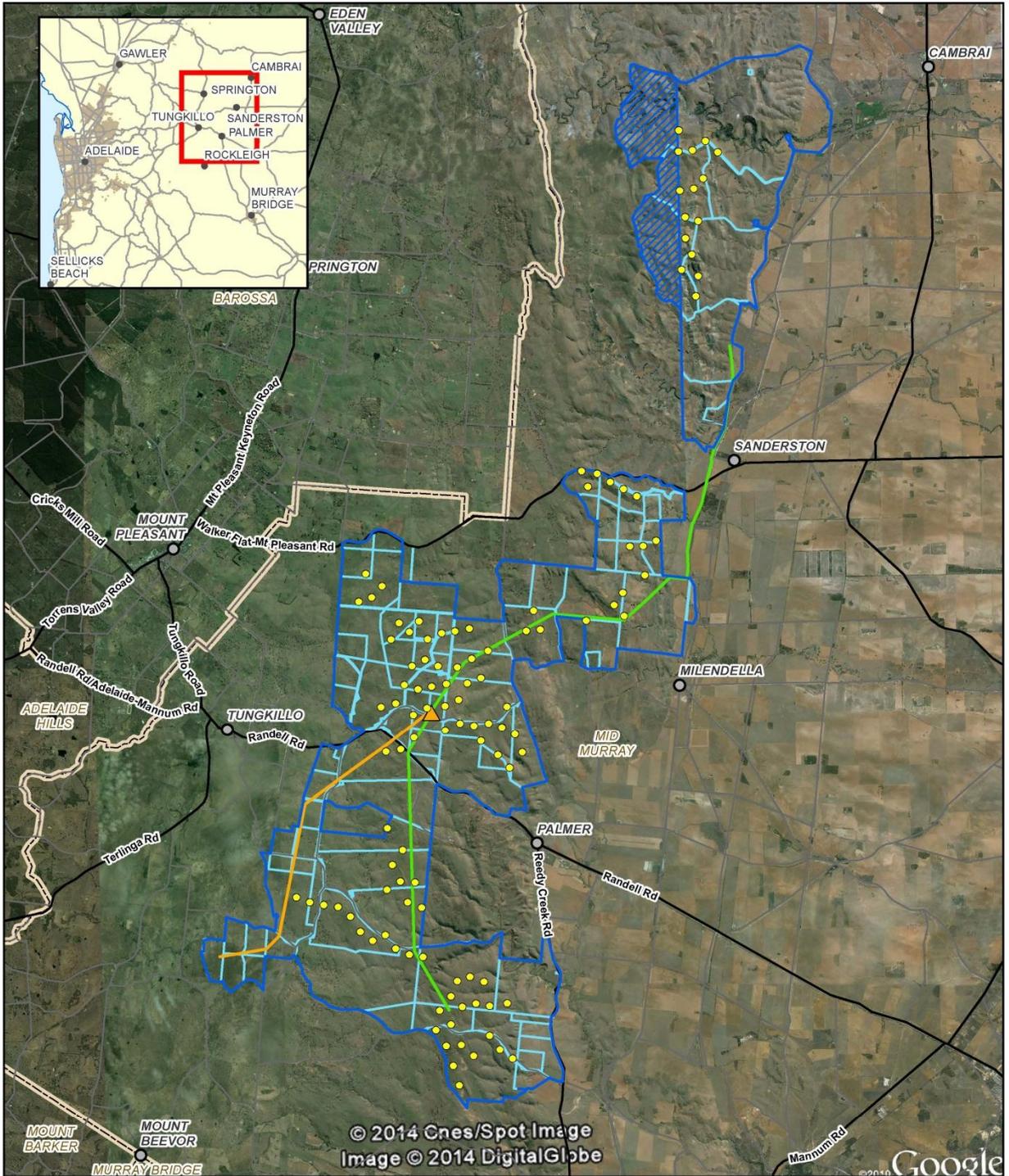
WTG Ref Number	Easting (MGA Z54)	Northing (MGA Z54)
B13	329080	6145090
B51	331025	6144980
B25	328203	6144889
B22	330071	6144645
B21	331231	6144468
B16	330555	6144387
B04	330875	6144025
C01	327512	6142437
C03	327891	6141719
C04	327604	6141295
C05	328230	6140799
C06	327453	6140599
C07	328029	6140248
C09	324913	6140387
C10	326082	6140111
C08	328422	6140094
C11	325291	6140241
C13	326709	6139419
C14	326426	6139848.
C15	325685	6140167
C16	327696	6138940
C12	327400	6139327
C18	327055	6139162
C19	328458	6138706
C17	328074	6138775
C20	329773	6138153
C22	329414	6138023
C23	330169	6138015
C24	329236	6137599
C25	330785	6137396
C26	329554	6137298
C27	330330	6137332
C28	329935	6137392
C29	328927	6137194
C30	329243	6136808
C31	328816	6136645
C32	330633	6136105
C33	329109	6136201
C34	329877	6135919
C35	329306	6135639
C38	329468	6135090
A09	335608	6161989
C39	330319	6136487
C02	329529	6136230
C21	330970	6135853
C40	327823	6140832

Location of Key Sites

Site Type	Title Reference
Substation and Operations & Maintenance Facility (refer Fig 3.6)	Pt CT5756/279 & Pt CT5756/278
Construction Facility (refer Fig 3.8-1)	CT5906/62
Construction Facility (refer Fig 3.8-2)	CT5906/61
Construction Facility (refer Fig 3.8-3)	CT5385/990
Construction Facility (refer Fig 3.8-4)	CT5421/815
Construction Facility (refer Fig 3.8-5)	CT5421/815
Construction Facility (refer Fig 3.8-6)	CT5404/721
Construction Facility (refer Fig 3.8-7)	CT5824/170
Construction Facility (refer Fig 3.8-8)	CT5906/879
Construction Facility (refer Fig 3.8-8)	CT5381/422
Construction Facility (refer Fig 3.8-10)	CT6087/92

Description of 33kV Route

33kV Transmission Line	Description of Location
Portion of 33kV line located in road reserve.	<p>Enters the road reserve of Three Chain Road from the south-east corner of CT5350/879 (at a point located approximately 1.2km north of the intersection of this road and Glenroy Road).</p> <p>Extends south along the western side of Three Chain Road to the intersection with the Angas Valley Road, then continues south along Milendella Road. Exits the road reserve at the north-eastern boundary of CT5651/396 opposite the intersection with an unnamed road (approximately 1.4km south of Fromm Road).</p>



Legend

- Not within site of development
- Project Boundary
- Indicative Turbine Location
- Substation/Operation & Maintenance Facility
- 33kV Transmission Lines
- 275kV Transmission Line
- Secondary Roads
- Minor Roads
- Titles inside Project Boundary
- Council Boundary

<p>Paper Size A4</p> <p>0 0.5 1 2 3 4 5</p> <p>Kilometers</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 54</p>			<p>TrustPower Australia Holdings Pty Ltd Palmer Wind Farm Technical Studies</p> <p>Palmer Wind Farm Land Titles involved in Project</p>	<p>Job Number 33-17234 Revision A Date 15 Aug 2014</p>
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Figure 3.2

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 Data source: Google, Aerial - 2014/02/03, TrustPower Australia Holdings Pty Ltd, Design - 2014/01/23, GA, Geodata Topo 250K Series 3 - 2006, Roads - 2007 Created by: cillingworth (KBM: 20)

3.1.2 Adjacent Land Uses

Figure 3.3 shows the project layout relative to the location of adjacent or nearby dwellings.

The majority of the land adjacent to the wind farm sites is grazing or primary production, including cropping. Consequently the main features on adjacent land include homesteads, sheds, access tracks and open paddocks.

Some areas of remnant native vegetation has survived the cropping and grazing activity, usually along steep slopes and gullies.

Palmer is a small hamlet comprising a small main street and some associated housing. It has an estimated residential population of 75.

Areas A and B abut a linear low density, rural living area which comprises a mix of developed and vacant allotments.

All dwellings within the project area are occupied by landowners with whom agreements will be in place to be involved in the project.

Impact on residential uses

Table 2 provides a list of residences owned by 'host' landowners.

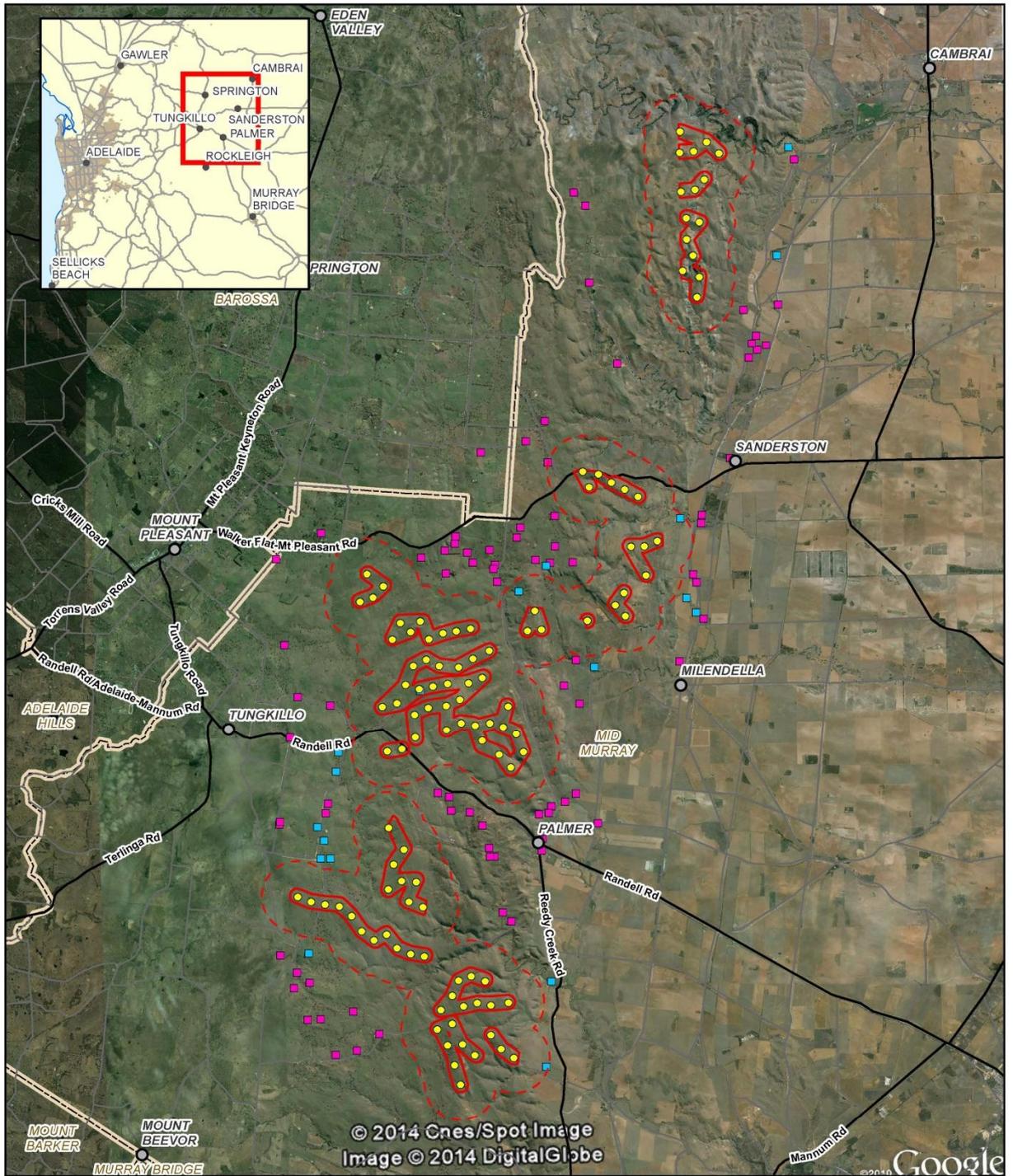
With respect to dwellings on 'non-host' land, the project has been designed to:

- Maintain a 1km separation between turbines and dwellings in accordance with Council Wide PDC 397(a)(i) of the Mid Murray Development Plan; and
- Site turbines so that noise levels from the wind farm comply with the SA EPA Wind Farms Environmental Noise Guidelines.

With respect to dwellings on "host" land, the project approach includes:

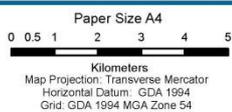
- Agreements with landowners with regard to managing visual impact;
- Site turbines so that noise levels from the wind farm comply with the requirements of the SA EPA Wind Farms Environmental Noise Guidelines for host land owners; and
- Agreements as to acceptable limits of shadow flicker, should this become an issue.

In addition, R139, the dwelling located near Turbine B10 will not be inhabited should the noise levels exceed 45dB or the shadow flicker levels exceed the prescribed guidelines unless a reasonable limit for increased shadow flicker is agreed with the landowner. In this case there will be an agreement between Trustpower and the landowner that covers the undertaking not to occupy and also includes agreement by the landowner for the undertaking to be memorialised on the life of the title to the land that binds subsequent landowners.



Legend NOTE: Turbines located to comply with noise policy for all dwellings

- WTGBuffer1km
- Turbine Corridor
- Host Landowner
- Secondary Roads
- Non Host Landowner
- Minor Roads
- Indicative Turbine Location
- Council Boundary



TrustPower Australia Holdings Pty Ltd
Palmer Wind Farm Technical Studies

Job Number | 33-17234
Revision | A
Date | 15 Aug 2014

Palmer Wind Farm
Proximity of Residential Dwellings

Figure 3.3

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There are a number of dwellings or buildings that are located in the vicinity of the project areas. Every effort has been made to identify all buildings that appear to be private residences. However, it is acknowledged that the topography and limited access in this region generally has made confirmation difficult.

An early layout plan and information about the project was released in September 2013 following which Trustpower invited landowners and residents to highlight issues and concerns. At this point, no additional residences were identified. Nevertheless, should an additional dwelling be identified during the assessment process, Trustpower will address the potential impacts in a manner consistent to the approach undertaken to date.

Table 2 provides a summary of these residential properties and buildings within roughly 3km of the nearest turbine. The final design for the project layout will ensure that at least 1km will be maintained to non-host dwellings as confirmed to be present during the assessment process. Of the 102 dwellings identified within approximately 3km of a WTG, 19 are associated with host landowners as listed in the table below. There are also 3 residences outside the project boundary that are owned by individuals who are also host landowners. These residences and their associated allotments do not contain any element of the project as indicated in the table below:

Table 2 Summary of host dwellings

Area	Dwelling Reference	Title Reference	Distance to Nearest WTG
A	001	5615/892	1.96
Not in project boundary	003	5381/406	2.3
Not in project boundary	004	5381/412	2.3
B	007	5854/170	0.9
Not in project boundary	011	5522/869	1.4
B	012	5651/396	1.3
B	014	5546/925	1.3
B	040	5989/715	0.7
C	046	5421/813	1.4
C	047	5421/813	1.6
C	049	5421/815	1.3
C	050	5421/815	1.3
C	051	6055/389	1.4
C	056	5906/64	0.9
B	087	5517/115	1.8
B	095	5348/175	1.3
Not in project boundary	108	5425/654	1.7
C	117	5075/795	1.7
C	118	5416/67	1.3
C	136	5473/924	1.99
B	139	5756/278	0.06

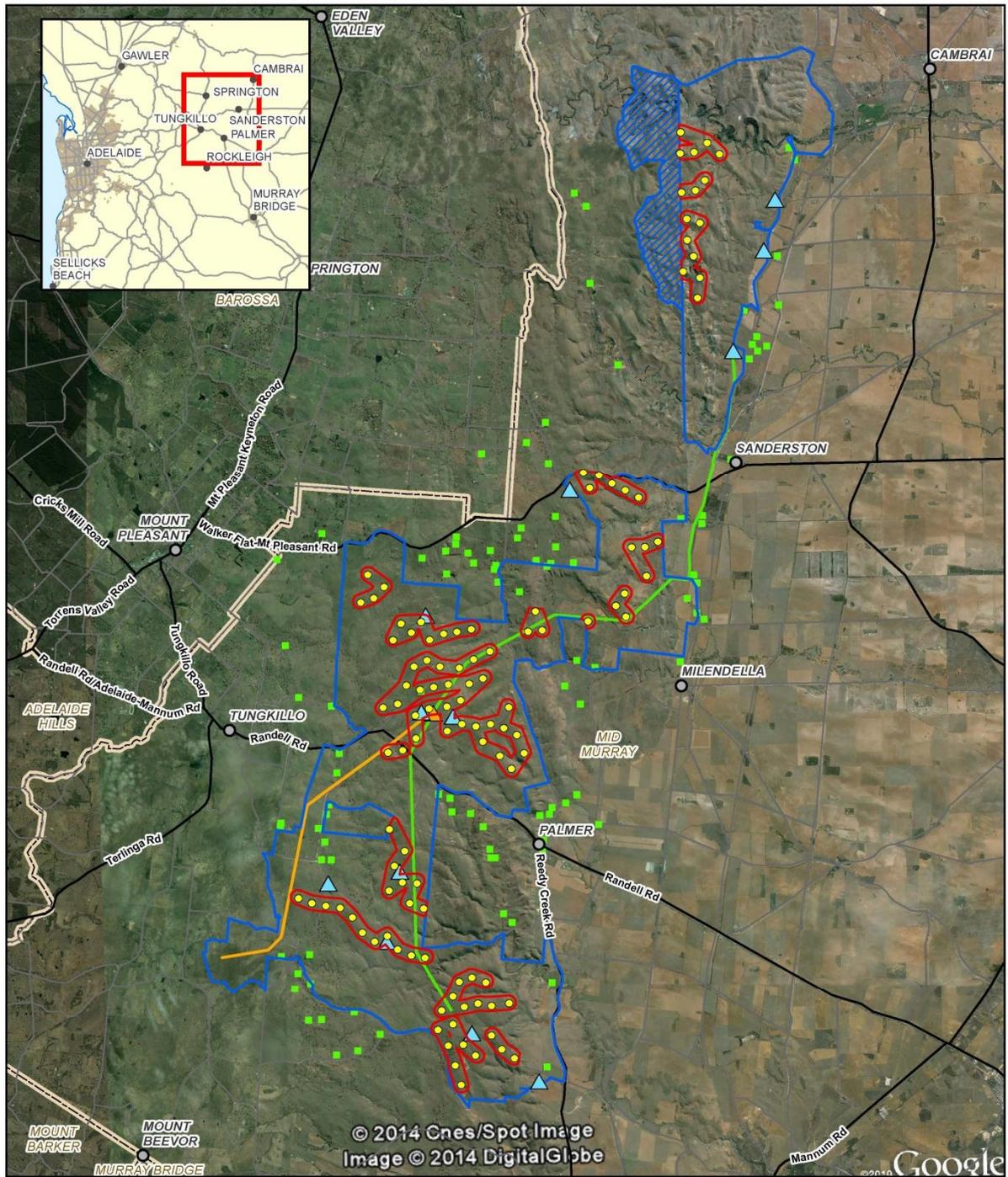
3.2 Project Definition

The following Table 3 sets out the project definition and should be read in conjunction with the plans identified in Table 4. This Development Application is for up to 114 Wind Turbine Generators (WTGs) and associated infrastructure as shown in Figure 3.4. The site is approximately 30km long (generally located on ridgelines) comprising an area of approximately 11,550 hectares.

Approval is sought for the WTGs and associated infrastructure to be generally in accordance with the indicative locations but confined within the representative corridors indicated on Figure 3.3. Before the development starts, the exact turbine model will be specified and final project layout plans, showing exact locations of all infrastructure within the surveyed area, will be prepared to the satisfaction of the Mid Murray Council DAP. This will include supporting reports and analysis, where necessary, to demonstrate that the alteration or modification will not give rise to a significant adverse change to the assessed effects.

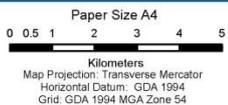
Should it be necessary to make changes to the final layout of the wind farm (within the approved corridors) during construction, these changes will be reviewed for a change of impact and agreed with Mid Murray Council prior to implantation.

Table 3 provides a description of project elements including the approximate dimensions and relevant notes.



Legend

- Not within site of development
- Project Boundary
- Indicative Turbine Location
- Turbine Corridor
- Temporary Construction Facilities
- Substation/Operation & Maintenance Facility
- 33kV Transmission Lines
- 275kV Transmission Line
- Dwellings
- Secondary Roads
- Minor Roads
- Council Boundary



TrustPower Australia Holdings Pty Ltd
Palmer Wind Farm Technical Studies

Job Number 33-17234
Revision A
Date 15 Aug 2014

**Palmer Wind Farm
Project Layout**

Figure 3.4

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Table 3 Project Definition

Element	Description	Notes
Project Layout	<p>Up to 114 WTGs and associated infrastructure across three clusters.</p> <p>Approximate generation capacity of up to 375MW (depending on the final turbine selected)</p>	<p>Total project area is approximately 11,550 ha. Of the approximately 20 ha will comprise the footprint of the WTGs and the Substation/Operations and Maintenance compound.</p>
Wind Turbines	<p>Maximum Height (to blade tip) – 165m.</p> <p>Blade Length – approx 65m.</p> <p>Tower/Hub Height – approx. 100m.</p> <p>Foundations may be either a mass concrete foundation (raft style), piled type rock anchors or a combination of both. Depending on final design the foundations will be 21 - 22m (mass concrete) or 8 - 12m diameter for a rock anchor type.</p>	<p>For the purposes of the impact assessments, a representative turbine was used. The following indicative dimensions have been adopted:</p> <ul style="list-style-type: none"> • Noise Assessment – based on a V117 model • Traffic, Shadow Flicker and Flora/Fauna Assessment – based on V126. • Aviation based on a tip height of 165m • EMI based on 100m tower and rotor diameter of 130m • Visual Landscape assessment based on a V126 on a 102m hub height (i.e a rotor diameter of 126m on a 102m tower) <p>Where necessary the assessments have assumed the largest specifications where appropriate so as to ensure the assessment is as accurate as possible and assesses the largest impact footprint.</p> <p>The exact dimensions and output of the turbines will be confirmed post planning consent when the final contractors and suppliers are selected.</p>

Element	Description	Notes
WTG laydown & Hardstand area	<p>An average area of approximately 50m x 30m around each turbine for foundation and crane hardstand areas and an additional 20m x 20m adjacent the turbine foundations for laydown area.</p> <p>The foundation and hardstand area will be a permanent feature with the laydown area revegetated following construction.</p>	<p>Hardstand areas will be required adjacent to the base of each WTG to enable the assembly and erection of the WTG components.</p> <p>The shape and area will vary depending on the construction approach and the site conditions at each WTG location.</p>
External Electrical Transformers	<p>A pad mounted enclosed transformer (kiosk) located at the base of each turbine.</p> <p>Approximate dimensions (4m long x 2m wide x 2 m high).</p>	<p>The requirement for external transformers depends on the final WTG model selected. Some models do not require this element.</p>
Site Access	<p>On-site access tracks will be up to 10m wide to accommodate construction activities and cranes.</p>	<p>The main access tracks will provide access to the WTG sites and will be designed to take the weight of WTG transport and construction vehicles and the crane used to erect the turbines.</p> <p>These will be located to align with existing property access tracks where possible.</p> <p>Some sections of the access roads may be wider to accommodate overtaking areas and turning circles.</p>
Underground 33kV and fibre optic cabling	<p>Approximate total length 70km.</p> <p>Trench width approximately 500mm per circuit and depth –approximately 1.2m (minimum of 900mm coverage over top of cable).</p> <p>Trench impact area of 5m width for a single cable alignment + 1 m for each additional cable.</p>	<p>To be generally located adjacent the access tracks where possible (within approximately 10m of the shoulder of the track).</p> <p>This will connect the WTGs within in each cluster.</p> <p>The exact location and dimensions will depend on the installation method used by the contractor.</p> <p>Where relevant, vegetation impacts will be negotiated directly as part of an application under the Native Vegetation Act.</p>

Element	Description	Notes
<p>Overhead 33kV transmission lines</p>	<p>Approximate total length of 25km (north section 16m and south section 9km). To be located within the identified corridors.</p> <p>Comprise up to 2 circuits (6 conductors) on a single pole line with steel poles of up to 30m in height and spaced approximately 250 – 300 metres apart.</p> <p>There will be an underground / overhead terminal station at the poles where the underground 33kV cables terminate and transition to the overhead line.</p> <p>Associated minor connection equipment and structures as may be required to transition between underground and overhead lines.</p>	<p>The overhead 33kV transmission lines will connect clusters of turbines to the substation shown in Area B. The exact locations of the poles will be determined at the detailed design stage following planning consent and will depend on the ultimate contractor and pole designs selected. The alignment corridors have been surveyed to identify sensitive areas and ensure pole locations will have minimal impact on:</p> <ul style="list-style-type: none"> • Proximity to dwellings • Vegetation clearance • Cultural heritage <p>The overhead 33kV transmission lines will be very similar to standard local electricity lines (which are not subject to approval under the Development Act).</p>
<p>Overhead 275kV transmission</p>	<p>Approximate total length of 10km. To be located within the identified corridor.</p> <p>It will comprise of either lattice towers up to 46m high (similar to existing high voltage towers in the area) or steel or spun concrete monopoles and spaced approximately 275 – 375 metres apart. The impact areas will be up to 10m x 10m for the lattice towers and 5m x 5m for the monopole locations.</p>	<p>The exact locations of the power line poles will be determined at the detailed design stage following planning consent and will depend on the ultimate contractor and pole designs selected. The alignment corridors have been surveyed to identify sensitive areas and ensure pole locations will have minimal impact on:</p> <ul style="list-style-type: none"> • Proximity to dwellings • Vegetation clearance • Cultural heritage <p>The final detailed siting will also need to comply with all industry safety standards.</p>

Element	Description	Notes
Substation and Operations and Maintenance Facilities	<p>One permanent 33kV / 275kV substation with approximate dimensions of 150m X 150m co-located with a permanent Operations and Maintenance Facility of approximately 100m X 100m</p> <p>The Operations and Maintenance Facility will include:</p> <ul style="list-style-type: none"> • Buildings (including office, control room, staff facilities) • Car park area for staff and visitors • Workshop 	<p>The sub-station and Operations and Maintenance Facility have been co-located to minimise impact on surrounding areas.</p> <p>The layout and fencing of the Substation will meet industry standards and specifications.</p> <p>Vegetation screening, compliant with industry standards, will be planted and maintained around the perimeter of the combined substation and Operations and Maintenance Facility.</p>
Meteorological masts	<ul style="list-style-type: none"> • Up to seven permanent masts • These will be approximately 100m in height and at the same height as the constructed WTG hub height. 	<p>The exact location of the permanent masts will be determined during the final turbine supplier design process.</p> <p>All masts will be permanent structures supported by a small concrete foundations and guy wires.</p>
Temporary Construction Compounds	<p>One main temporary construction compound of up to 300m x 300m in area. The size will depend on the facilities required which may include:</p> <ul style="list-style-type: none"> • Site office and staff facilities • Amenities • workshops • Car park • Laydown area (20m x20m) <p>Up to three additional smaller, satellite temporary construction areas mainly used for laydown areas and staff offices / amenities.</p>	<p>The size and use of construction compounds will depend on the ultimate construction approach.</p>

Element	Description	Notes
Concrete Batching Plants	Up to three temporary concrete batching plants of around 100m x 100m may be required (if not sourced offsite).	<p>The requirement for a temporary concrete batching facility may be located on or off site (subject to construction contractor's requirements). (The indicative potential locations have been agreed with landowners).</p> <p>A separate EPA licence approval will be sought for any on-site concrete batching plants should they be required.</p>
Public Road Improvements	<p>Access routes for all over-dimensional vehicles will be limited to those specified in the Traffic Management Plan.</p> <p>Roads and intersections will be up-graded to meet load and safety standards as required and agreed in the management plan.</p> <p>Public road access will require road upgrades to a width of 6m and a 1m shoulder either side where needed. Localised widening in excess of 6m may be required to support transport and construction activity such as passing bays.</p> <p>All public roads will be left in good repair following construction as agreed in the management plan.</p> <p>All access routes will be subject to DPTI and Council agreement.</p>	<p>Traffic, transport and safety issues are important considerations for the construction phases (especially for heavy and over-size vehicles).</p> <p>Where possible access points to site will utilise and/or improve existing access points to site.</p> <p>The Traffic Management Plan will be specific to all agreements with DPTI and Council.</p>

The following Table identifies the plans that detail the physical components of the project. This is supplemented by the detailed description in the following section. It should be noted that the indicative layout plans are subject to additional refinement and detailed siting (subject to meeting key criteria) and achieving standard infrastructure separation distances.

Table 4 Indicative Layout Plans

Pocket Number	Title (components)
1	Plan 1: Overall indicative Project Layout
2	Map of Area A: Area A Indicative Project Layout
3	Map of Area B: Area B Indicative Project Layout
4	Map of Area C: Area C Indicative Project Layout
5	<p>Substation and Operations & Maintenance Facility:</p> <p>A101: Site Layout</p> <p>A102: Site Section</p> <p>A103: Stormwater and Landscape Concept</p> <p>A104: OM Office Floor Plan</p> <p>A105: OM Office Elevations</p> <p>A106: Workshop Floor Plan</p> <p>A107: Workshop Elevations</p>
6	<p>Construction Elements:</p> <p>A108: Main Construction Site – Indicative Layout</p> <p>A109: Laydown Area – Indicative Layout</p> <p>A110: Tower Site – Indicative Layout</p> <p>A111: Office Floor Plan</p> <p>A112: Office Elevations</p> <p>A113: Lunchroom Floor Plan</p> <p>A114: Lunchroom Elevations</p> <p>A115: Toilet Floor Plan</p> <p>A116: Toilet Elevations</p> <p>Other Structures:</p> <p>A117: Meteorological Mast Elevation</p> <p>A118: Meteorological Mast Footprint</p> <p>A119: 275kV Typical Elevation & Footprint</p> <p>A120: 33kV Typical Elevation & Footprint</p>

3.3 Project Description

The project will comprise up to a total of 114 wind turbine generators (WTGs) which will be loosely clustered in three main groups in the vicinity of Palmer and Sanderston. At this stage the indicative layout comprises the following distribution, although the specific numbers could change slightly following the detailed design process:

- Area A (northern) – 15 WTGs;

- Area B (central) – 61 WTGs; and
- Area C (southern) – 38 WTGs.

A range of infrastructure will be needed to support the operation of the wind turbines, including:

- Access tracks on private land;
- Underground and overhead electricity connections;
- A substation linking the turbines to the national grid;
- An operations and maintenance facility; and
- Wind monitoring masts.

In addition to this, some extra facilities/works will be required to support the construction phase, including:

- Hard stand areas near each turbine location (to support construction equipment);
- Modified road and track access routes (to support and accommodate delivery of equipment and WTG parts);
- Laydown areas for parts and supplies;
- A site office and associated construction facilities, including staff amenities; and
- Up to three temporary concrete batching facilities (if required).

The total project area is approximately 11,550 hectares with each WTG occupying approximately 1,500m² of land (total of 17 hectares) and approximately 3.25 hectares for the Substation and Operation & Maintenance Compound.

3.3.1 Overall Operation

The wind farm as a whole is controlled by a central computer system that manages the power output and operating characteristics of the wind farm. Each turbine is also individually controlled by its own computer and controller system. These systems manage the operating characteristics of that particular turbine based on external factors (wind speed, direction, temperature, pressure) and internal factors (pressure, temperature, etc. of components). Each turbine has its own set of instrumentation measuring these external and internal factors and adapts the operating characteristics of the turbine accordingly.

Every model of turbine (make, MW capacity, etc.) has its own operating characteristics. From the wind speed instrumentation that is mounted on top of each turbine the turbine controller system will individually pitch each blade to optimise the power output from the turbine. This instrumentation will rotate the turbine (nacelle and blades), into the prevailing wind direction. This is known as yawing. These two systems optimise power generation and also act to shut the turbines down in high wind situations (above 90kph).

Generally at wind speeds of 25 m/s (90kph), depending on the turbine specification, the WTG will shut down by feathering or pitching the blades so that there is no lift (or rotation of the rotor – aerodynamic brake) and turning the nacelle with the blades out of the wind (90 degrees to the wind). Most turbines are also equipped with mechanical brakes, e.g. hydraulic disk brakes that will be engaged after the aerodynamic brake and nacelle rotation has taken the wind power off the blades. In this situation the WTG goes into idle mode until wind conditions are once again suitable to generate. A modern wind turbine can shut down from full speed to a complete stop in about 10 – 20 seconds. Most modern wind turbines begin generating electricity when the wind speeds reaches 3- 5 m/s (10 – 18 kph) and reach full power output at 12 – 14 m/s (42-50 kph).

3.3.2 Turbines

The turbines will have a maximum height of 165m from ground to top most point of the blade. The flexibility required in turbine dimensions is to enable the use of latest technology as this becomes available over the next 5 years. The final turbine layout and dimensions will depend on the final turbine supplier. The model selected will be evaluated to demonstrate compliance with any conditions of approval and requirements under any other applicable legislation.

All WTGs consist of several key components: a rotor with blades, a tower and a nacelle (refer Figure 3.5). The rotor comprises three individually attached blades which are attached to the nacelle, all of which is mounted on top of a tower.

The function of a WTG is to generate electricity by harvesting energy from the wind to turn the blades which then turns the generator (by spinning the generator shaft) to generate the electricity. The energy captured by the rotating blades is transferred to the generator housed in the nacelle of the turbine.

Generally turbines are hollow and made of fiberglass (or similar epoxy resin) and steel. They are made to a specific design that maximizes aerodynamic performance.

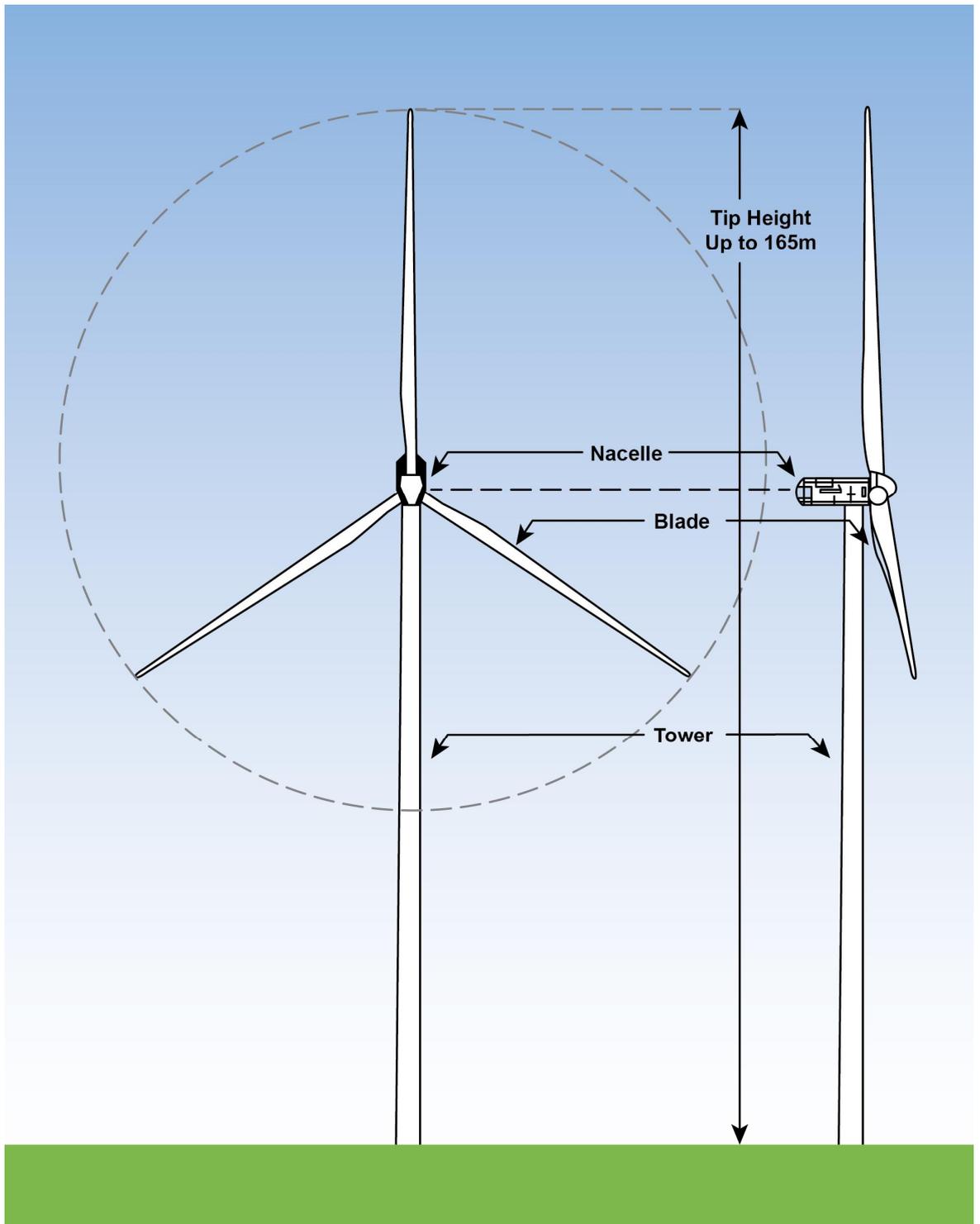


Figure 3.5 Indicative Turbine Design and Height

The wind turbines will have a maximum total height of 165m, accommodating a blade length of approximately 65m placed on a tower of approximately 100m. The final design measurements of the blade and tower are likely to differ slightly to the assessed measurements but will not exceed the maximum tip height of 165m. This is to ensure the most efficient layout and turbine model can be chosen while staying within the maximum turbine height and numbers envelope.

The tower will comprise a tubular steel structure approximately 5m in diameter at the base and tapering to 3m diameter at the top. Within the tower is an access ladder (and/or lift), power and control cables.

The turbines will be constructed on a concrete pad located within a hardstand area of 50m x 30m. It is anticipated that this will be a roughly circular concrete foundation of approximately 6m radius on the surface and 21m radius sub surface, approximately 3m deep. Alternative foundation types could include a rock-anchor design with much smaller concrete footprint and steel reinforced anchors drilled into the rock. The detailed foundation design will depend on the sub soil characteristics of each individual site.

Blades

Each tower will have three blades of approximately 65m which will connect to the turbine hub.

Nacelle

The nacelle sits on top of the tower and houses the generator, gearbox, and control gear including hydraulics, pumps, brakes and electrical components. The nacelle will also include acoustic dampening and protection to the mechanical components of the turbine.

Turbine Hub

The turbine hub is made of cast iron and is the connecting point for the 3 rotor blades and the main shaft. The hub is attached to the nacelle.



Turbine Protection

Modern turbines have lightning protection built into each individual blade and the turbines are earthed to dissipate any energy induced by a lightning strike.

Typically wind turbines are on private land (as is the case at Palmer) so public access to individual turbines is not permitted. Even if public access was permitted the turbine consists of a large steel tower structure with a fully sealed and locked door into the turbine. The outside of the wind turbine does not have any exposed components other than a set of stairs leading up to the turbine door. In some instances the turbine transformer may be placed in a kiosk adjacent to the turbine on the ground (and in other cases the transformer is housed inside the turbine – this depends on the individual turbine characteristics). If a transformer is placed in a kiosk adjacent to the turbine the cables leading to it are buried underground and the transformer is fully enclosed in a locked kiosk to prevent any damage or unauthorised access (much like transformers you see in subdivisions, neighbourhoods, etc.).

Construction

The wind turbine will be transported in separate parts and assembled on site using a specialised crane. The parts will include:

- Three blades;
- 1 nacelle;
- Approximately 4 tower sections; and
- 1 turbine hub.

A hardstand area of approximately 50m x 30m is required for the construction phase including the turbine foundation area. This will need to be a relatively flat surface (1% grade) with sufficient load bearing capacity for the safe operation of cranes. A temporary laydown area of 20m x 20m will be located adjacent to the turbine foundation and hardstand area.

3.3.3 Supporting Infrastructure

In addition to the core elements of the wind farm being, the turbines, additional, but less prominent infrastructure, will be required.

Access Roads

- For construction (10m wide) and then for on-going maintenance (5m wide).
- When constructed, top soil to be stored and then reinstated when the track width is reduced post construction.
- Follow existing tracks and fire breaks where possible to minimise land disturbance.
- Compacted rubble surface (granular material sourced locally where possible).



Examples of turbine parts being transported on site

Electricity Connections

There will be a number of types of electricity connections associated with the project:

- Within the Wind Turbine cluster areas – electricity connections will be all underground in trenches and where practicable will be located under access roads, generally to a depth of 1.2m;
- Two 33kV overhead lines will link areas A & C to the substation in Area B. Area B turbines will be linked to the substation via a combination of underground and overhead connections; and
- A 275kV connection will be provided over a distance of approximately 15km from the wind farm substation to the Tungkillo substation.

At this stage the overhead transmission line routes are shown as a centre “line” located within the surveyed corridors. The location of poles and therefore the actual power line route will vary within this corridor in order to avoid other structures and sensitive areas including native vegetation (where possible). Indicative examples of the 33kV and the 275kV poles and support structures are contained in Appendix A. These plans show the maximum dimensions.



Examples of overhead lines and poles/support structures

Substation

Figure 3.6 shows the approximate location of the substation and an indicative layout is provided in Plan 5 contained in Appendix A. The substations will comprise:

- A fenced compound of approximately 150m x 150m;
- A hardstand area, a switch room, security fencing, transformer located within a bunded concrete pad, lightning protection masts, other electrical transmission equipment and ancillary infrastructure;
- Designed to relevant Australian Standards as required to meet all industry and safety requirements; and
- The tallest structure in the substation will be the gantry which provides support to the overhead power lines feeding into and out of the substation.



Example of a substation with the gantry in the foreground

Operations and Maintenance Facility

The approximate location of the Operations and Maintenance Facility is shown on Figure 3.6 and associated plans are contained in Appendix A. This facility will include:

- A fenced compound, adjacent to the substation, of approximately 100m x 100m;
- Office space, meeting room, lunch & bathroom, workshop and store;
- Car park for approximately 15-20 cars;
- Service vehicle delivery and materials laydown area (loading and unloading);
- Building materials will be generally colourbond and of a colour sensitive to the surrounding landscape; and
- Vegetation screening will be planted and maintained around the perimeter of the combined Substation and Operations and Maintenance compounds.

The layout and arrangements take into account a number of factors and considerations, including:

- This facility has been designed to accommodate the heavy vehicles involved in delivery of parts and equipment;
- A maximum of 12 personnel at the substation site on any particular day (the development is likely to employ 8 FTEs over a 24hr/7 day per week roster);
- The hours of operation will be 8.00am to 6.00pm Monday to Friday except where emergency or repair works are required; and
- As the facility will accommodate heavy vehicles, the internal roads will be an engineered and weatherproof.

Signage will be limited to directional signage from the nearest main road and health and safety related signage only. Tours will not be conducted from the Operations and Maintenance Facility.

High level advice has been sought with respect to the provision of a suitable wastewater treatment facility. Based on the anticipated low levels of use with occasional high use, there appears to be no evident limitations to the provision of a suitable treatment plant such as an aerated septic system which is mechanically aerated. This is a proprietary system enclosed in fibreglass or pre-cast concrete tanks, located in the ground, providing biological treatment and disinfection, treating the effluent to a standard suitable for irrigation (Class B). Consideration has been given to locating sub-surface irrigation within the landscaped swale area along the frontage of the site including species selection for this area.



Example Operations (closest) and Maintenance Buildings (substation located on the right hand edge of photo)

Meteorological Masts

The project will need up to 7 permanent masts approximately 100m high with instrumentation to make meteorological measurements. The elevations provided in Appendix A show the typical dimensions and arrangements for these masts. The heights will be the same as the hub heights of the turbines installed. The masts are an important part of an operating wind farm as the data collected is much more accurate than the equipment installed in the tops of the WTGs. The measurements from these towers are critical to ensuring that the turbines are operating efficiently under different conditions. Measurements and data will also be used to allow more accurate predictions of power output from the wind farm and assist in generation scheduling and is a requirement of the system operation to provide this data.

Two temporary masts have already been installed on the site and a third is currently being installed. Once the wind farm is built the existing temporary masts may be relocated to more optimal positions or removed. The total number of permanent masts will not exceed 7 and the indicative locations are shown on Plans 2, 3 and 4.



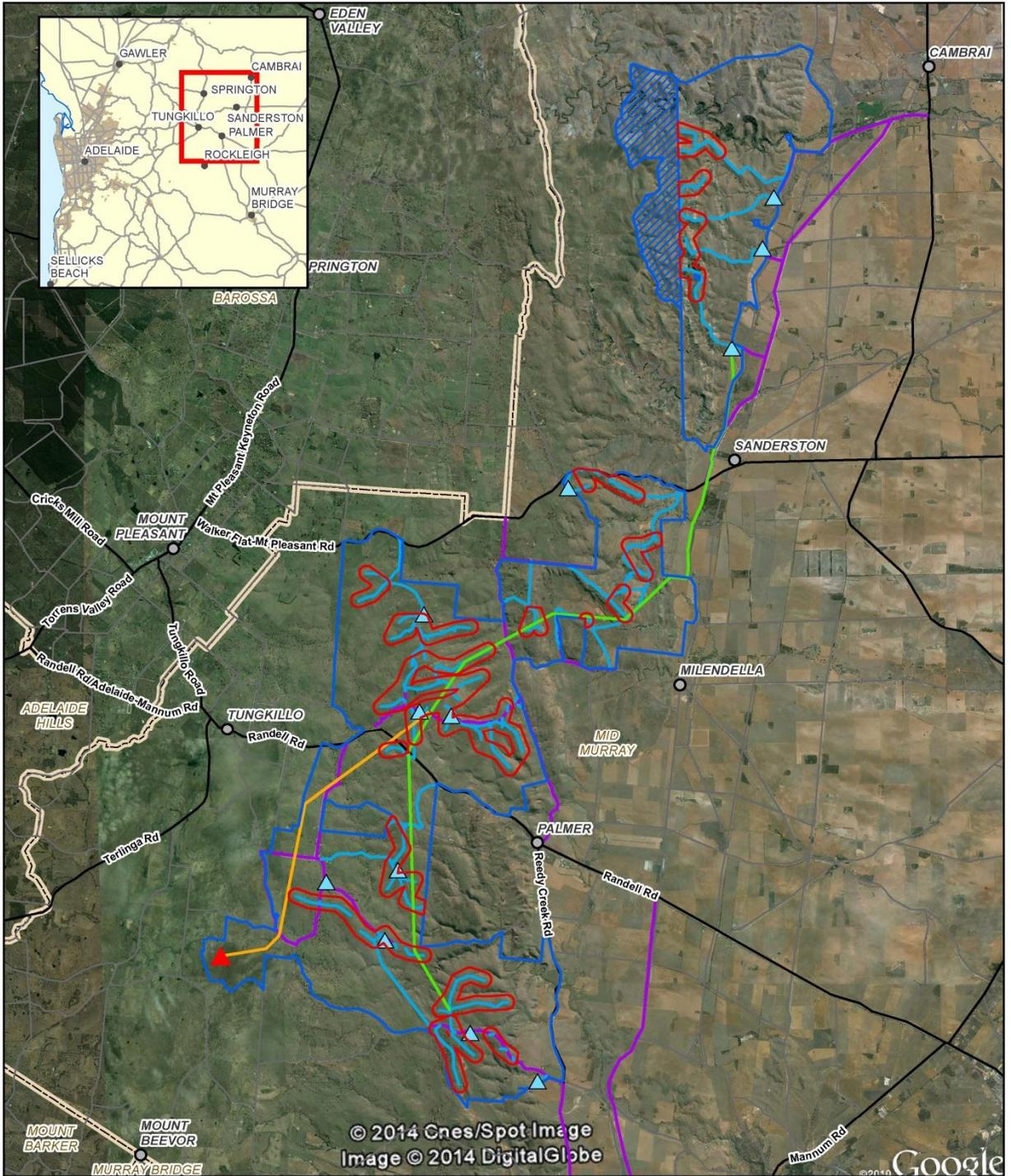
Example of a Meteorological Mast

3.3.4 Construction Phase Elements

The construction phase of the project is a critical logistical aspect of the overall project. Various actions and activities will be needed to ensure a smooth construction phase. Figure 3.7 provide an overview of the key elements of the construction phase and their location. This includes:

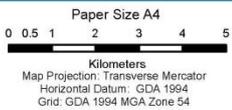
- Roads and other transport infrastructure up-graded to support the weight and scale of the turbine parts;
- A site office (for coordination of the construction phase);
- Amenities for the construction staff; and
- Construction facility areas (which may include materials storage, laydown areas for equipment and parts, concrete batching facilities).

During construction, top soil will need to be removed and stored so that it can be replaced post the construction phase. The locations selected for the storage of top soil will avoid damaging sensitive areas interrupting drainage lines and be protected from being eroded. The CEMP provides guidance for the selection of suitable sites.



Legend

- Not within site of development
- Project Boundary
- Turbine Corridor
- Proposed Access Tracks
- Proposed Council Roads Layout
- Temporary Construction Facilities
- 33kV Transmission Lines
- 275kV Transmission Line
- Tungkillo Substation
- Secondary Roads
- Minor Roads
- Council Boundary



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**Palmer Wind Farm
Construction Phase Elements**

Figure 3.7

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Construction Phase Access

The existing public road network will require modification and up-grading in a range of locations in order to accommodate this project (primarily for the construction phase). A detailed Traffic Management Plan will be prepared (in close consultation with DPTI and Council) to ensure that:

- The road network can support the type and volume of additional traffic expected during construction;
- The road network can support the type and volume of traffic expected post construction;
- Safety standards are maintained for the community (during construction and post construction);
- An appropriate maintenance program is in place during the construction period to keep the roads to a suitable standard for the project; and
- The roads are maintained at an appropriate standard following construction.

Minimal traffic impacts are anticipated post construction as access to the WTGs will be by normal 4WD vehicles, for the most part, and the occasional heavier vehicle for maintenance purposes.

The internal access tracks will be constructed to approximately 10m width and to a standard that is appropriate for the very heavy vehicles and parts that will be transported to the individual site.

Construction Phase Facilities

In addition to the above, there will also be a need for some temporary ancillary supporting infrastructure to be provided during the construction phase. The locations of these facilities are indicated on Figure 3.8 (set of Figures located at the end of this Chapter). A number of sites, distributed across the project area will be required. Some of these sites may be simple laydown areas for materials and equipment but others may require additional facilities. This could include:

- A main site office and construction compound, including employee amenities, parking, storage and laydown areas;
- Up to 3 satellite materials laydown and amenities / office areas;
- Up to 3 potential temporary concrete batching plants;
- On-site rock crushing locations – relocated in line with civil works progression; and
- Supporting activities as required.(e.g. wash-down areas).



Construction Phase - Example of a laydown area

Two indicative construction site layout plans are provided in Appendix A. These plans show an indicative layout comprising all elements, as is likely to be the case for the main sites. The other shows the simplest example being a basic laydown area. However, most sites will include only some elements of the main site as indicated in the set of Figures 3.8.

The use of these sites will conform to the construction hours as defined in Chapter 6 “Statement of Commitments” under the heading of Noise Impact Management.

All buildings and amenities (such as offices, lunchroom/kitchen, shower and toilet facilities) will be of a modular/transportable/temporary nature and will be clustered together in a compound as indicated on the layout plan. Disposal of rubbish and wastewater will be privately contracted and addressed as part of the construction contract.



Example construction stage – access road



Example construction stage – site offices



Example – turbine foundation



Example – mobile batching facility

Temporary Concrete Batching Plant

Up to three temporary batching plants may be required for the construction phase of this project, located within temporary construction areas. While it is possible that an alternative concrete supply may be sourced from within the region, at this stage such a source appears unlikely and therefore approval is sought for these plants as part of this application.

The temporary batching plants are entirely ancillary to the wind farm project given that:

- The temporary batching plants are necessary for the construction of the wind farm;
- The temporary batching plants will be operated solely for the purposes of supplying concrete for the wind farm and will not be used for supply to third parties;
- The period of operation of the temporary batching plants will be limited to the construction phase of the wind farm; and

- The temporary batching plants would not be developed were it not for the development of the wind farm.

The Statements of Commitments section includes reference to the requirement for these temporary facilities to be removed and the sites rehabilitated post the construction phase.

Environmental authorisation will also need to be obtained from the EPA for the temporary batching plants as these activities are classified as prescribed activities of environmental significance under Schedule 1 of the *Environment Protection Act 1993* as follows:

Concrete batching works, being the conduct of works for the production of concrete or concrete products that are manufactured or are capable of being manufactured by the mixing of cement, sand, rock, aggregate or other similar materials, being works with a total capacity for production of such products exceeding 0.5 cubic metres per production cycle.

The draft CEMP includes requirements for the site arrangement and operational management (stormwater, stock pile management, dust and pollution prevention) of these facilities.

The civil contractor will be responsible for obtaining authorisation from the EPA prior to such activities being undertaken.

Details of the temporary concrete batching plants are set out below and the indicative layout is indicated on Plan A108 in Appendix A:

- Each plant will be sized to accommodate a complete foundation pour each day, which comprises approximately 500m³ of concrete;
- The plant will occupy an area of approximately 100m by 100m, including the stockpile area for aggregate, sand and cement;
- Indicative locations of the plants are shown in Figure 3.8-4, 3.8-6 and 3.8-10; and
- The plant will be removed from the site upon completion of the construction works and the site of the plant will be remediated to its original condition upon removal.

Each plant will include the following components:

- Trailer mounted concrete mixer;
- Cement bins;
- Sand and aggregate stockpiles;
- Storage container for equipment and tools;
- Powered by diesel generators or local power if available; and
- Water for concrete manufacturing (potable) and dust suppression (bore) to be sourced from either on-site (bores/ dams) or commercial water sources.

There are a number of potential impacts associated with the operation of a concrete batching plant, including dust emissions, noise, stormwater runoff, wastewater and waste.

A Construction and Environmental Management Plan has been prepared for the wind farm which includes measures to manage potential impacts associated with construction, including the concrete batching plant. This is included as an appendix to the overall CEMP contained in Appendix B.

Dust management

- Plant to be appropriately sited e.g. out of prevailing winds, utilising natural or artificial wind barriers.

- Minimise work during very windy conditions to minimise dust.
- Stockpiles and unsealed areas to be watered down where required.
- Vehicle speed limits imposed.

Noise management

- Operating hours of the plant to be limited to 7am-7pm Monday to Saturday and no work to occur on Sundays or Public Holidays without prior approval from the EPA/ Council (subject to qualifications in the approved CEMP).
- Equipment will have appropriate mufflers, silencers and/or enclosures fitted to reduce noise transmission.
- All construction activities to be carried out in accordance with the EPA *Noise Policy 2007* and EPA Construction Noise Information Sheet (EPA 425/10).
- Minimum separation distance of 100m between the plant and residential dwellings.

Wastewater and stormwater management

- All contaminated stormwater and process wastewater collected and retained on site.
- Locate stockpiles away from drainage lines and in areas least susceptible to wind erosion.
- Effectively control surface runoff entering and leaving the site.
- Truck and wheel wash facilities to be provided at exit points.
- All equipment wash down to be undertaken within an identified wash down area and contained within that area.
- The refuelling of vehicles or equipment shall not be conducted within 30 metres of a water body, water course or drainage channel.
- All construction activities to be undertaken in accordance with the EPA Stormwater Pollution Prevention – Code of Practice for the Building and Construction Industry.

Waste management

- Undertake a waste audit to identify sources types and quantities of waste generated.
- Implement the principles of the waste hierarchy, with waste minimisation being the key focus during construction.
- Concrete waste produced to be recycled for construction purposes where possible.
- Waste concrete that cannot be reused to be disposed to a licensed waste disposal facility.

Impact Management and Rehabilitation

The construction phase of the project is significant but it is also temporary and various measures will be employed to manage the potential impacts during construction. There will also be measures put in place to rehabilitate the areas that are no longer required after construction.

These measures are covered under the respective specialist assessments included in Volume 3 and 4 and the consolidated Statement of Commitments in Chapter 6 of this Volume.

In the context of the above, the following aspects are requested to facilitate a smooth construction phase.

Staging of Construction Works and Building Rules Consent

Due to the nature of the construction program and activities, and the desire to commence site works as soon as practical following contract award, the following provisions are requested in the final approval to provide for staging of the separate elements of the construction works:

- Those works which do not require Building Rules consent (in accordance with relevant building regulations codes and standards e.g. site mobilisation activities, establishing temporary staging areas and facilities, access road formation etc.) to commence construction as soon as practical following the issue of all other relevant consents/approvals, provided that all relevant conditions of such consents/approvals are first met in all respects (such as provision and endorsement of the required CEMP).
- Those elements of works which do require Building Rules consent (in accordance with relevant building regulations codes and standard) to commence construction separately once Building Rules consent has been obtained for that element, provided that all other relevant consents/approvals have been satisfied, including the requirement to produce final, element specific, management plan documents.

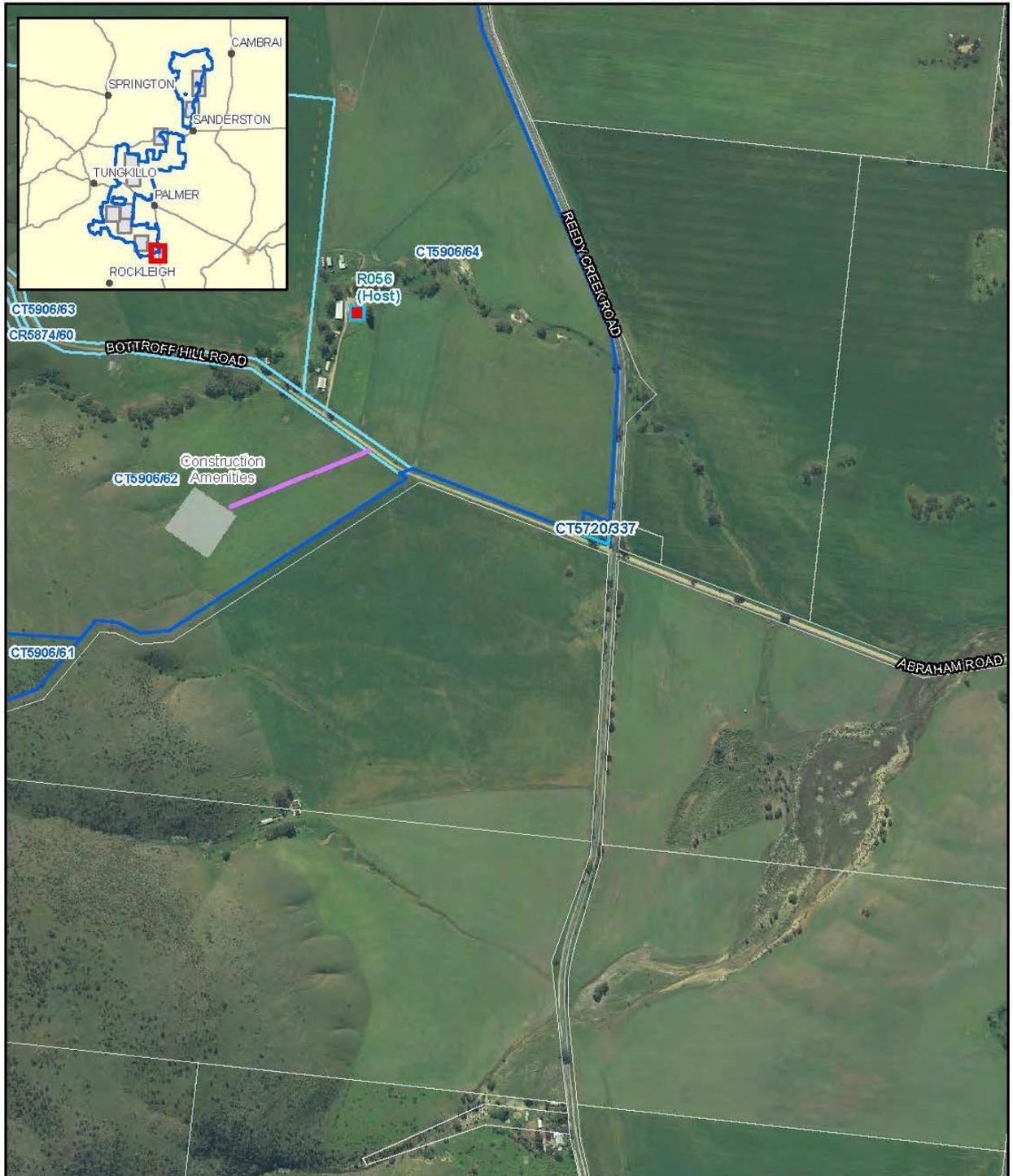
If Building Rules consent has not been obtained for some elements, this will not preclude construction works commencing in respect of those elements that have obtained Building Rules consent and all other relevant consents/approvals have been issued (where deemed appropriate by the consent authority).

It is expected the following project elements will require separate Building Rules consent and separate full Development Approval to commence construction:

- Turbine foundations;
- Other equipment foundations (e.g. substation power transformers);
- Any on-site buildings such as offices and work-sheds associated with the operations and maintenance compounds and on-site 275/33kV substation;
- The 275kV transmission connection switching station;
- The 275kV on-site overhead transmission lines; and
- Concrete batching plant(s).

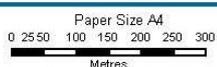
Construction timing

Approval is sought for construction to substantially commence within five (5) years of the date of granting planning approval.



Legend

- Project Boundary
- Titles inside Project Boundary
- Temporary Construction Amenities
- Cadastre
- Dwellings within 500m from Constr. Facility
- Access Track
- Host Landowner



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

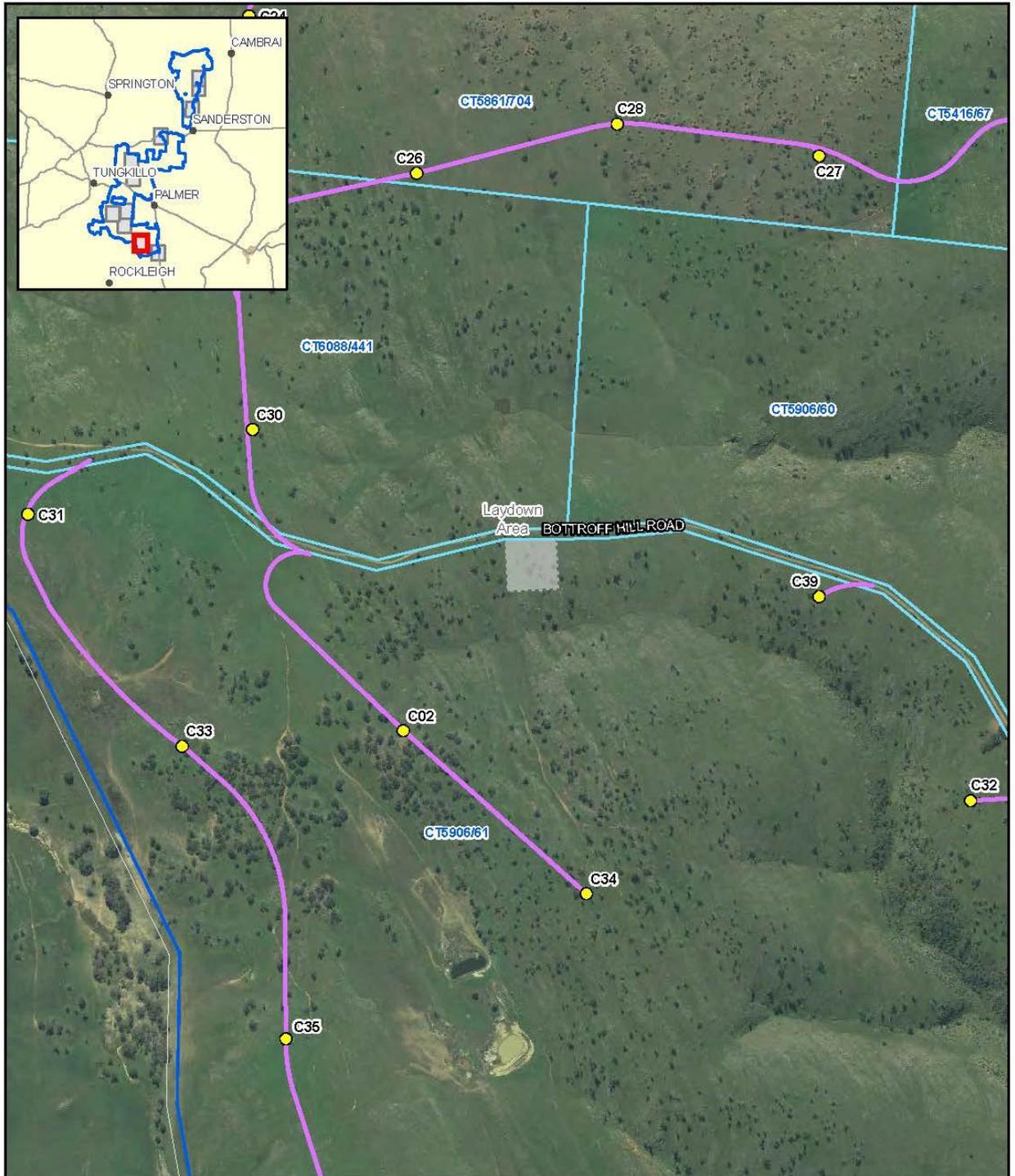


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**Palmer Wind Farm
Indicative Construction Facility Layout** **Figure 3.8-1**

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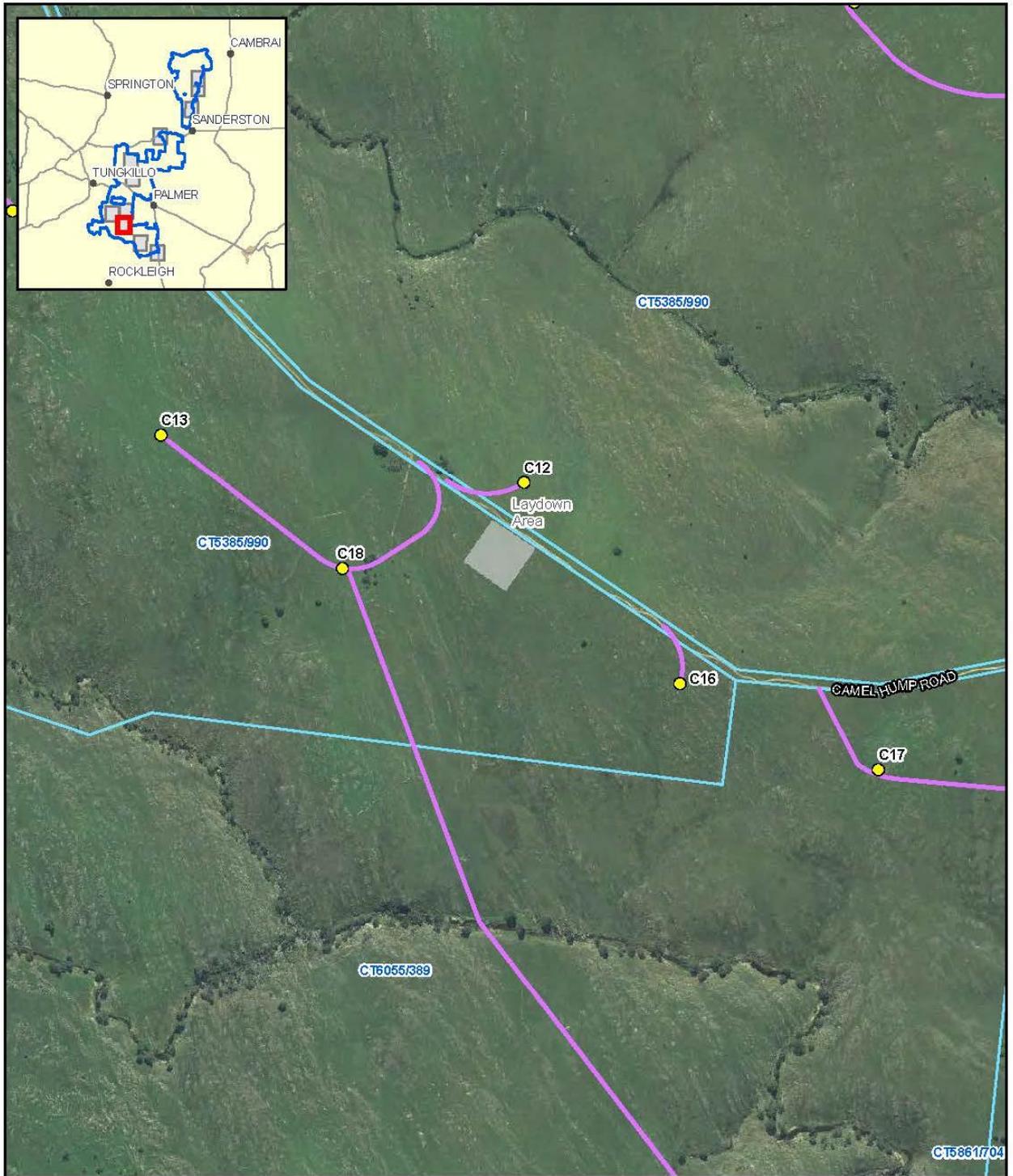
Legend

- Indicative Turbine Location
- Project Boundary
- Temporary Construction Amenities
- Access Track
- Titles inside Project Boundary
- Cadastre

<p>Paper Size A4 0 25 50 100 150 200 250 300 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 54</p>			<p>TrustPower Australia Holdings Pty Ltd Palmer Wind Farm Technical Studies</p> <p>Palmer Wind Farm Indicative Construction Facility Layout</p>	<p>Job Number 33-17234 Revision 0 Date 14 Aug 2014</p>
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Figure 3.8-2

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Legend

- Indicative Turbine Location
- Project Boundary
- Temporary Construction Amenities
- Access Track
- Titles inside Project Boundary
- Cadastre



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 54

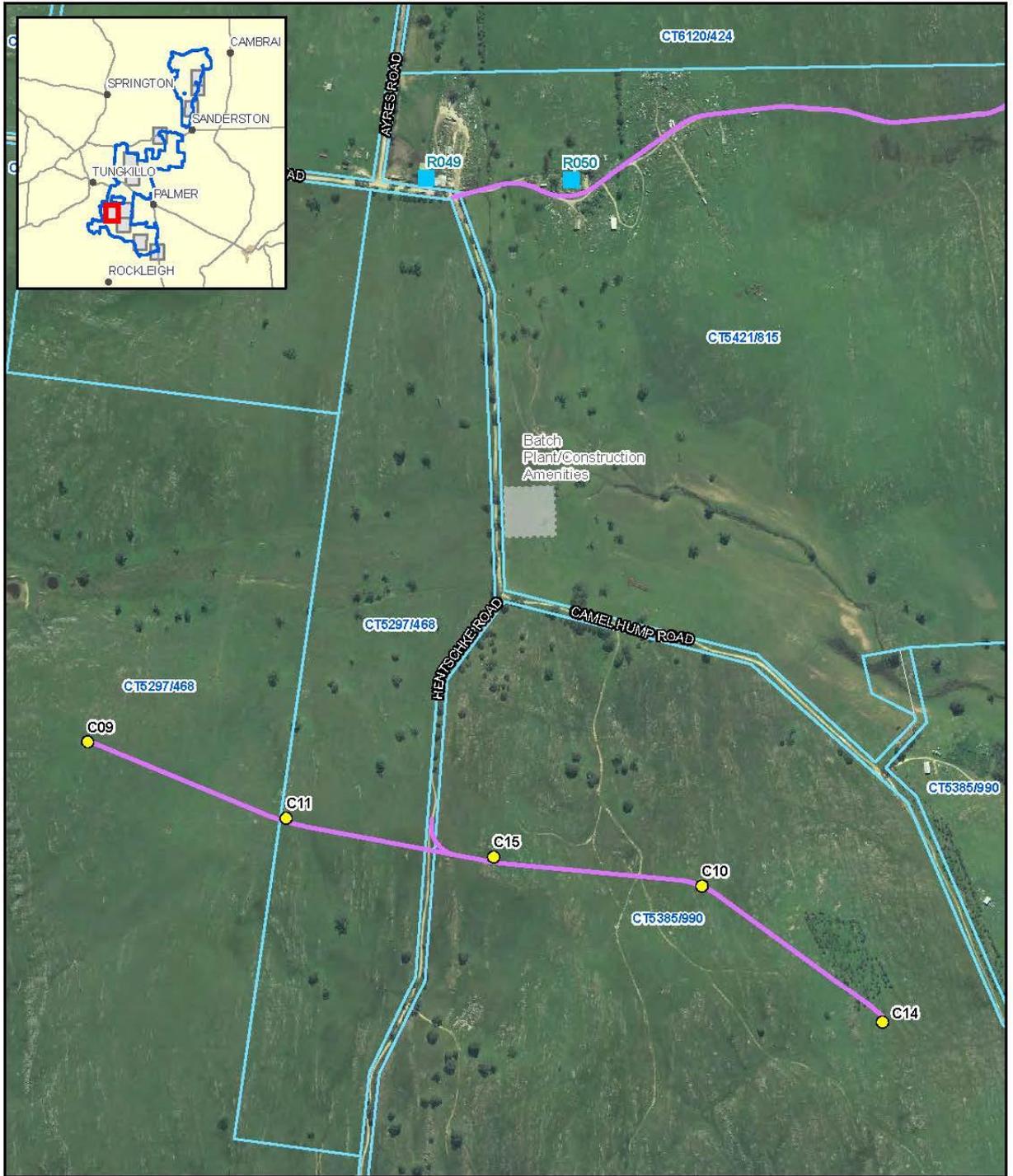


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**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-3**

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Legend

- Indicative Turbine Location
- Access Track
- Project Boundary
- Titles inside Project Boundary
- Temporary Construction Amenities
- Cadastre
- Host Landowner

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 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 54

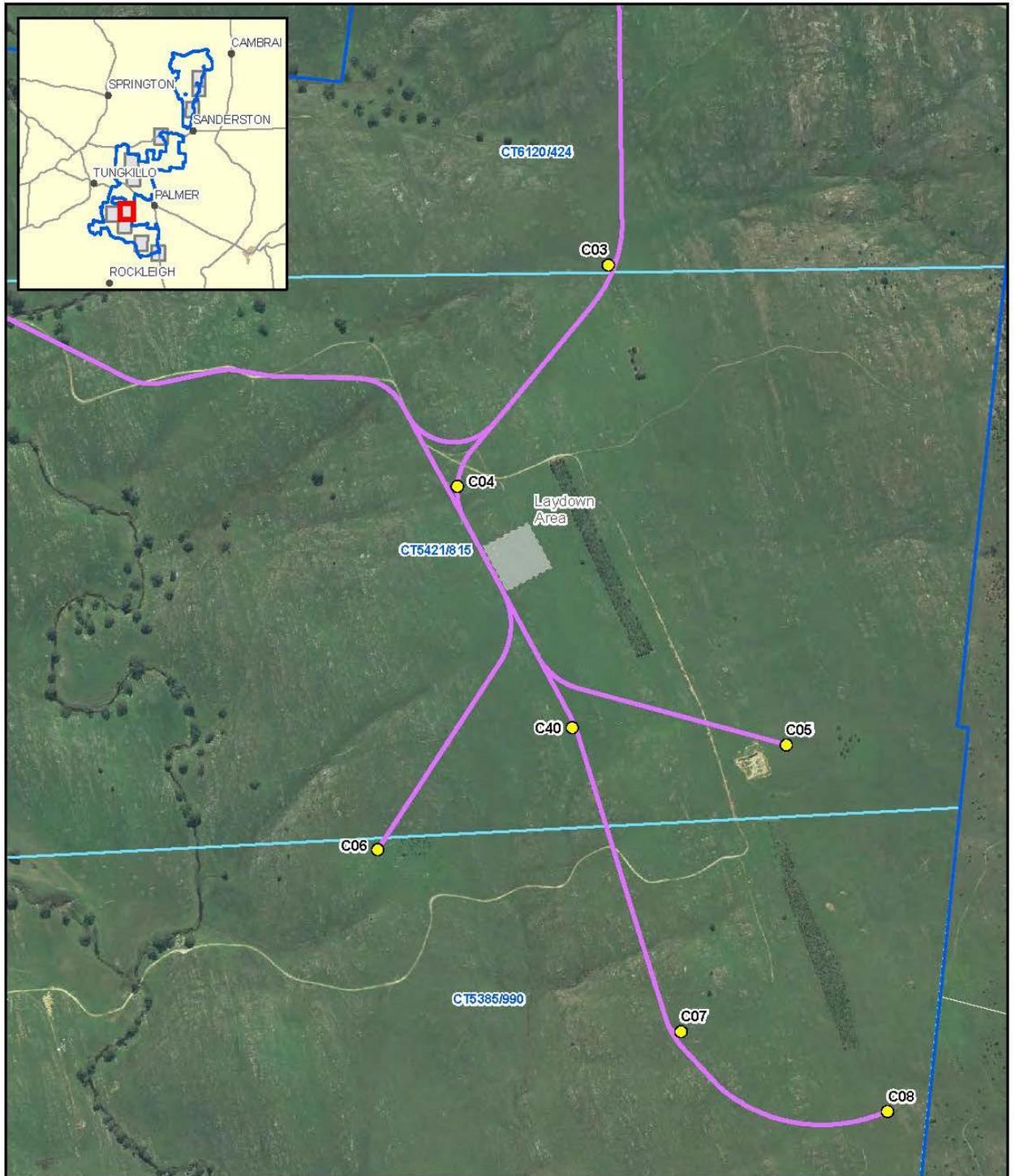


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**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-4**

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Legend

- Indicative Turbine Location
- Access Track
- Project Boundary
- Titles inside Project Boundary
- Temporary Construction Amenities
- Cadastre



Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 54

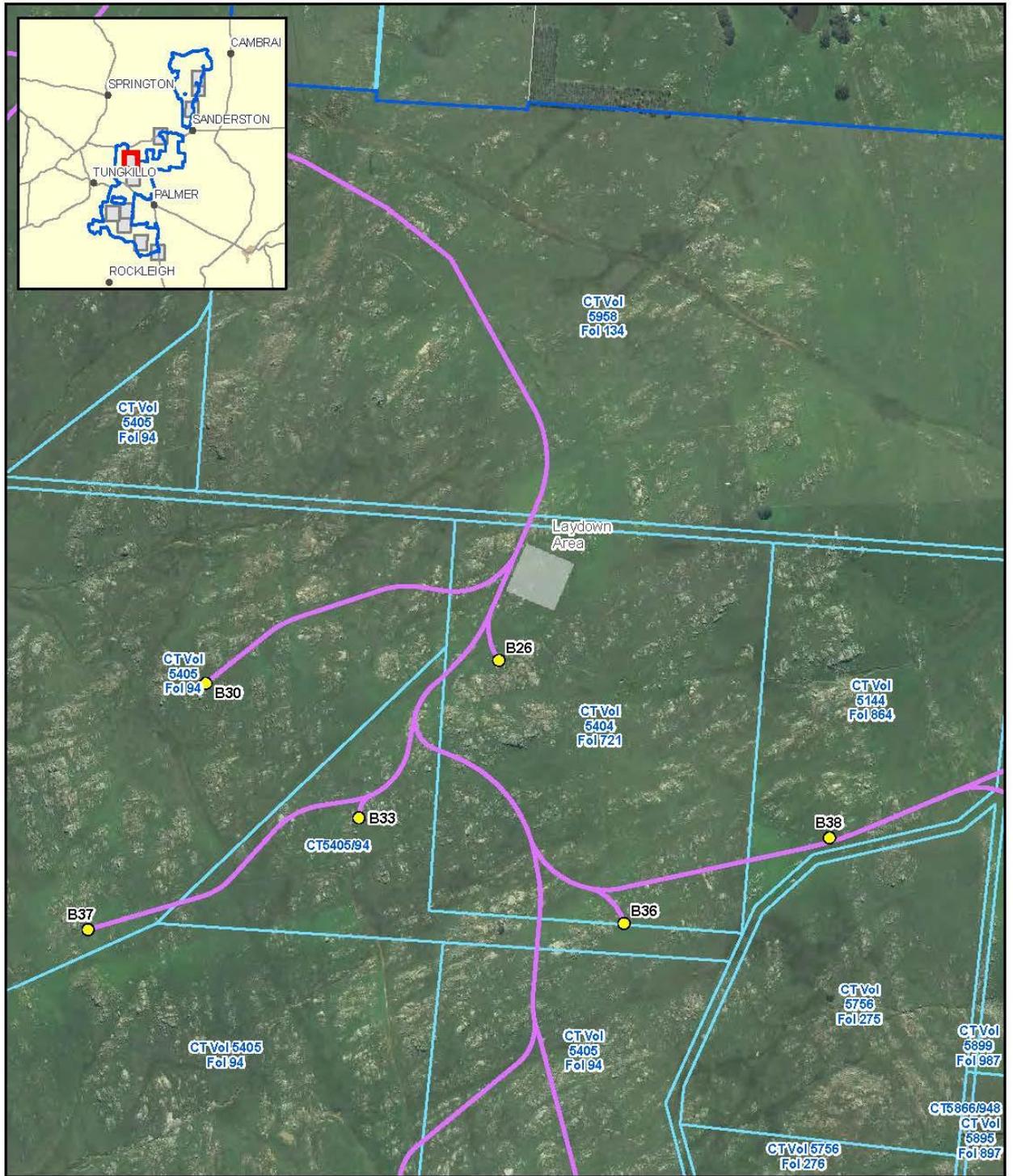


TrustPower Australia Holdings Pty Ltd
 Palmer Wind Farm Technical Studies

Job Number | 33-17234
 Revision | 0
 Date | 14 Aug 2014

**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-5**

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- Legend**
- Indicative Turbine Location
 - Access Track
 - Project Boundary
 - Titles inside Project Boundary
 - Temporary Construction Amenities
 - Cadastre



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 54

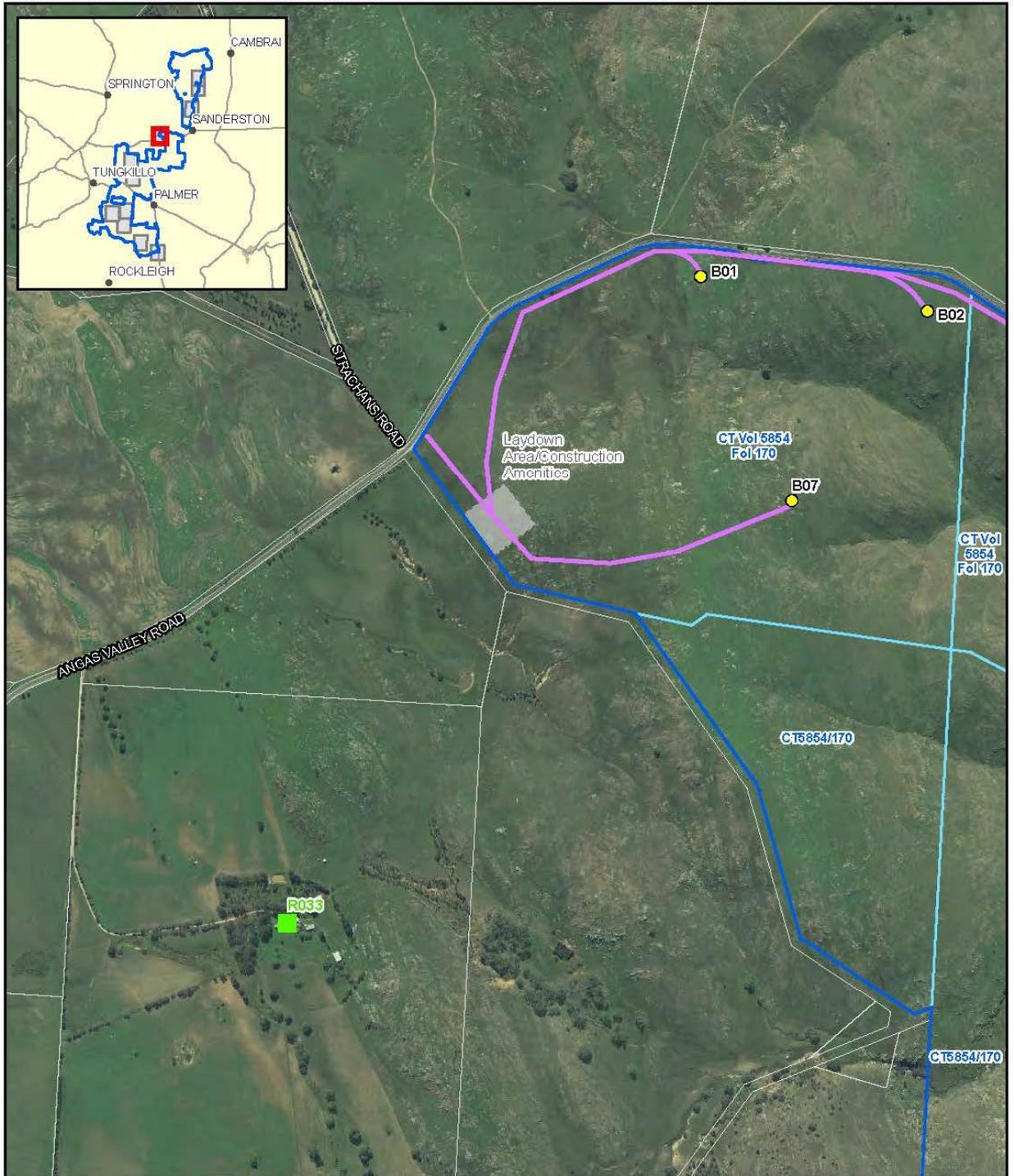


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Job Number | 33-17234
Revision | 0
Date | 14 Aug 2014

**Palmer Wind Farm
Indicative Construction Facility Layout** Figure 3.8-7

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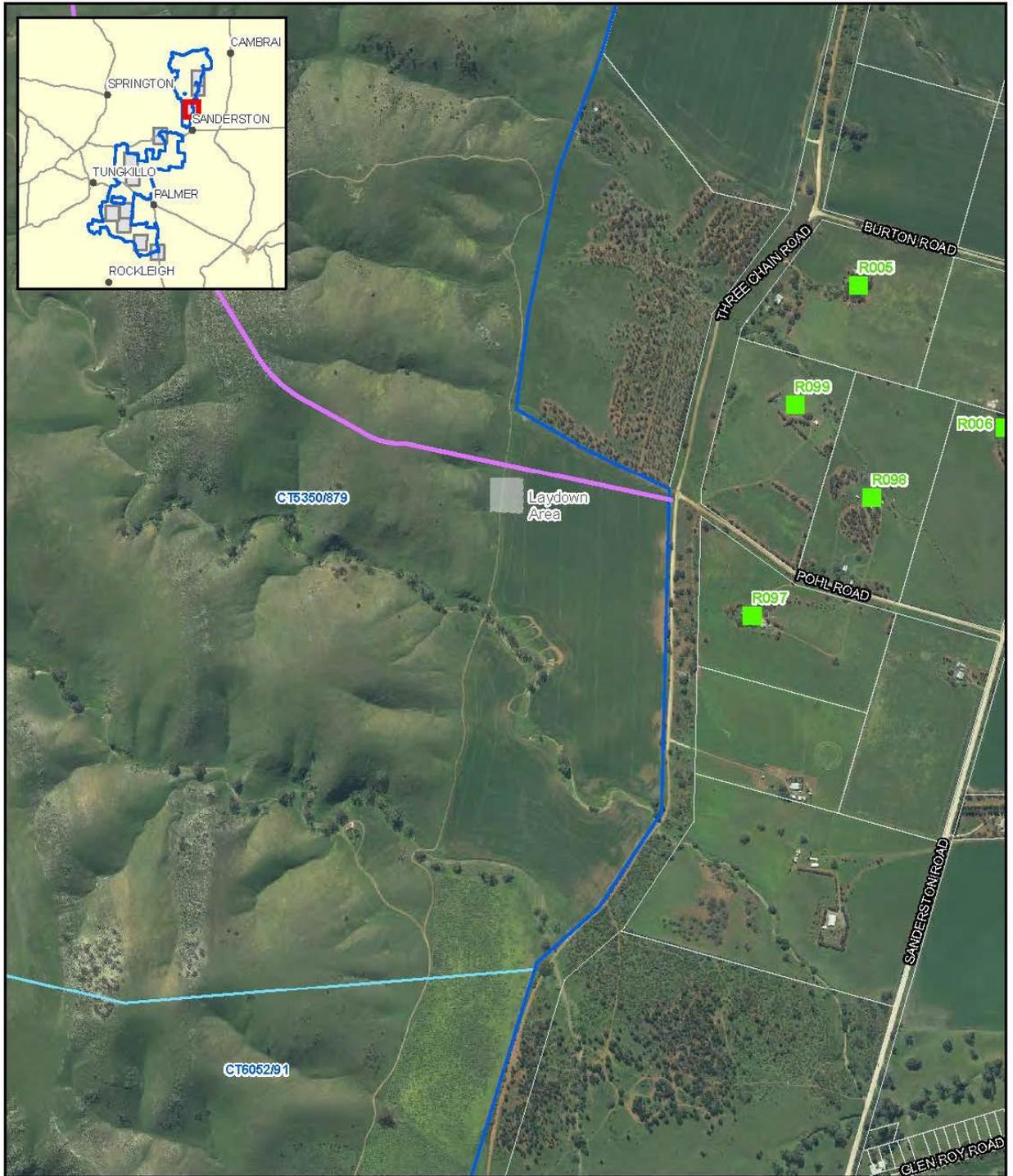
Legend

- Indicative Turbine Location
- Project Boundary
- Temporary Construction Amenities
- Non Host Landowner
- Access Track
- Titles inside Project Boundary
- Cadastre

<p>Paper Size A4 0 25 50 100 150 200 250 300 Metres</p> <p>Map Projection: Transverse Mercator Horizontal Datum: GDA 1994 Grid: GDA 1994 MGA Zone 54</p>			<p>TrustPower Australia Holdings Pty Ltd Palmer Wind Farm Technical Studies</p> <p>Palmer Wind Farm Indicative Construction Facility Layout</p>	<p>Job Number 33-17234 Revision 0 Date 14 Aug 2014</p>
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Figure 3.8-8

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Legend

- Project Boundary
- Temporary Construction Amenities
- Non Host Landowner
- Access Track
- Titles inside Project Boundary
- Cadastre

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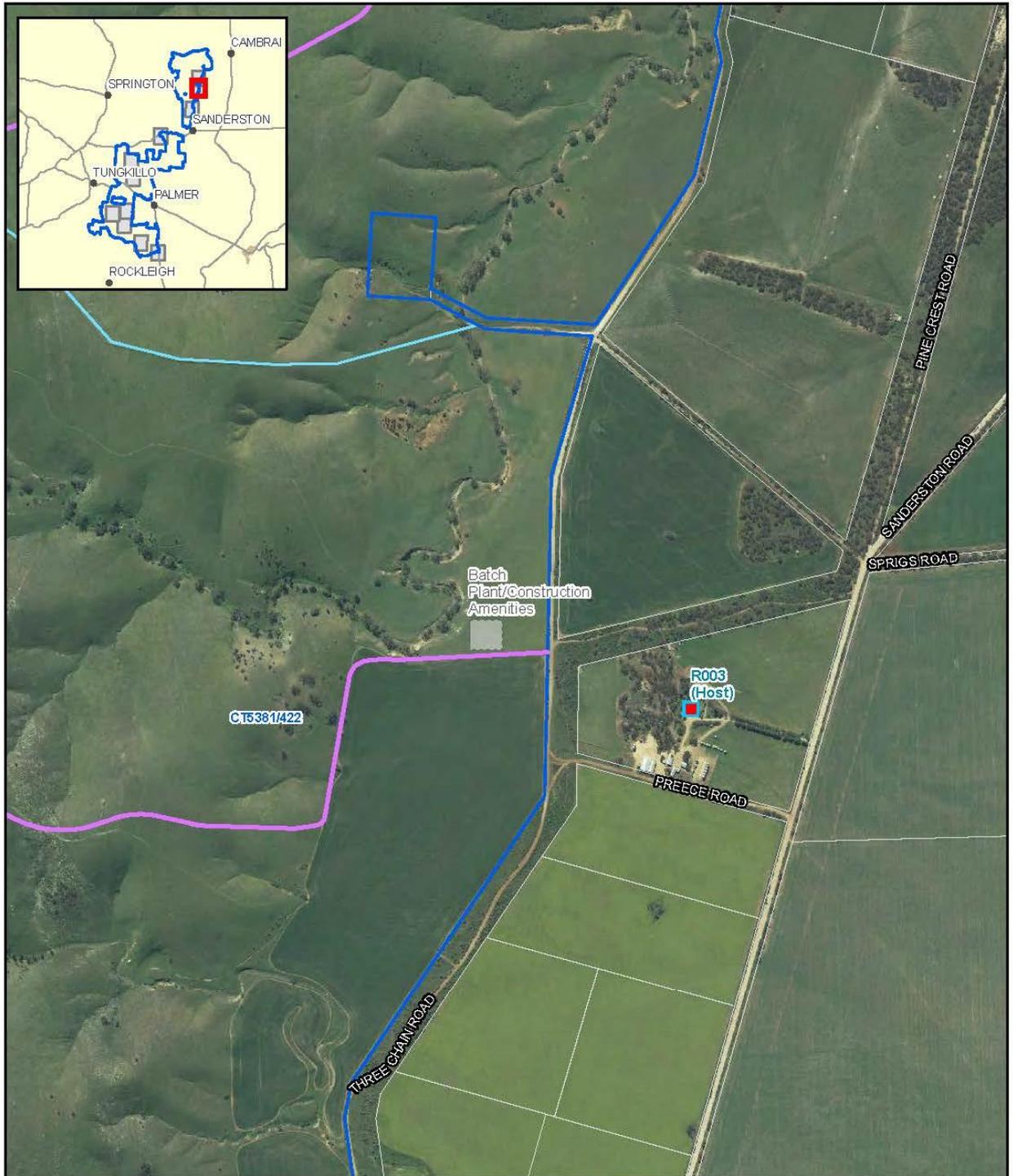


TrustPower Australia Holdings Pty Ltd
 Palmer Wind Farm Technical Studies

Job Number 33-17234
 Revision 0
 Date 14 Aug 2014

**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-9**

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Legend

- Project Boundary
- Temporary Construction Amenities
- Dwellings within 500m from Constr. Facility
- Host Landowner
- Access Track
- Titles inside Project Boundary
- Cadastre

Paper Size A4
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 Metres

Map Projection: Transverse Mercator
 Horizontal Datum: GDA 1994
 Grid: GDA 1994 MGA Zone 54

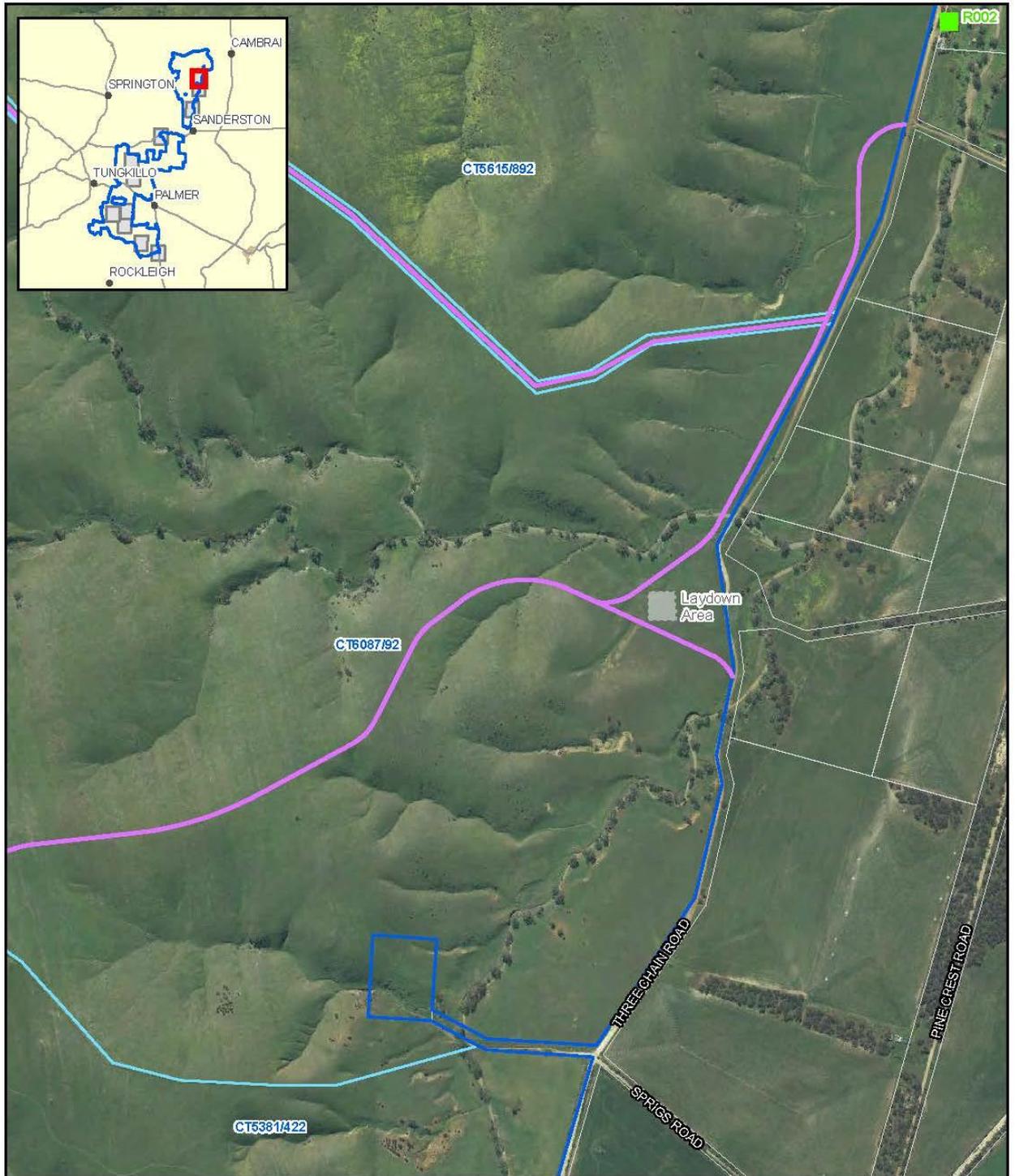


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**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-10**

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Legend

- Project Boundary
- Temporary Construction Amenities
- Non Host Landowner
- Access Track
- Titles inside Project Boundary
- Cadastre



Paper Size A4
 Map Projection: Transverse Mercator
 Horizontal Datum: GDA1994
 Grid: GDA 1994 MGA Zone 54



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 Palmer Wind Farm Technical Studies

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**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-11**

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4. Strategic Justification

This section provides a justification for the project with regards its local and national setting. It also outlines the benefits of the project in reducing Australia's greenhouse gas emissions, supporting Federal and State renewable energy targets as well as other local and wider community benefits.

The justification for the Palmer Wind Farm is based on the following forecasts:

- It will generate around 1,300 GWh of electricity per year - sufficient electricity to supply around 200,000 average Australian homes.
- It will improve the security of electricity supply through diversification of generation sources and locations in the national electricity network.
- It will reduce annual greenhouse gas emissions by approximately 1 million tonnes of carbon dioxide equivalent (CO_{2e}) or the equivalent of removing over 230,000 cars from the roads.
- It will contribute to the Federal Government's target of providing 20% of consumed energy from renewable sources by 2020.
- It will contribute to the SA Government's target of reducing greenhouse gas emissions by 33% by the year 2020.
- It will create local employment opportunities and will generate \$407 million of value injection into the State over the period of construction and \$19 million per annum during operation.

4.1 National context

Reducing Greenhouse Gas Emissions

There is growing and overwhelming scientific evidence that the earth's climate is changing. Studies have shown global increases in air and ocean temperatures, the widespread melting of snow and ice and rising sea levels and many of the world's natural systems are already being affected by the change of regional climates (IPCC, 2008¹). Observed implications include altered rainfall patterns and more frequent or intense weather patterns such as heatwaves, drought, and storms. In Australia, this is anticipated to have an impact on a number of areas including ecosystems, water supply and quality, agriculture and forestry, fisheries, industry and human health.

The main contributor towards climate change has been identified as the release of greenhouse gases (GHG) into the atmosphere (IPCC, 2008). These greenhouse gases stay in the atmosphere for decades and a global warming of 0.2°C or higher per decade is already expected regardless of future emission levels. However, continued release of greenhouse gas emissions at the current rate will likely result in more extreme changes to the global climate system. A reduction in greenhouse gas emissions could assist in reducing the rate and magnitude of climate change. The IPCC indicates that mitigation efforts over the next 20-30 years will be crucial to stabilising the amount of change (IPCC, 2008).

¹ IPCC (2008) *Climate Change 2007: Synthesis Report*. Intergovernmental Panel on Climate Change

Greenhouse gas emissions from the stationary energy sector, are the largest and fastest growing contribution to total greenhouse gas emissions released in Australia, accounting for 52% of total emissions in 2009. Within this sector, emissions from electricity generation contributed over 70% (DSEWPC, 2011²).

The Palmer Wind Farm will not only generate electricity without producing greenhouse gas emissions once operational, but will also reduce the overall amount of GHG emissions produced by the electricity generation sector by displacing electricity produced by fossil fuel sources such as coal and gas.

It is estimated that the Palmer wind farm will reduce annual greenhouse gas emissions by approximately 1 million tonnes of carbon dioxide equivalent (CO₂e), the equivalent of removing over 230,000 cars from the roads. The payback term to offset manufacturing and construction activities is typically between 9 and 14 months.

Federal Renewable Energy Target

The Australian Government established a Mandatory Renewable Energy Target (MRET) scheme in 2001 to expand the renewable energy market and increase the amount being utilised in Australia's electricity supply. The MRET required that an additional 2% (9,500 GWh) of renewable energy be sourced by 2010 (DCC, 2009³). In August 2009 the Federal Government revised the MRET legislation to include the Renewable Energy Target (RET) as an expansion of the MRET and the current legislation requires 41,000 GWh of electricity (at least 20% of Australia's total electricity supply) to be sourced from renewable projects by 2020 (DCC, 2009). This equates to an additional 8,000 - 10,000 MW of new renewable energy generators to be built across Australia up to 2020.

Further amendments were made to the RET legislation to divide the renewable sources into two categories, the small-scale renewable energy generators (SRET) and large scale renewable energy generators (LRET). The purpose of this amendment was to ensure continued investment in large scale renewable energy projects, such as wind farms (i.e. projects greater than 30 MW).

The Palmer Wind Farm will directly contribute to meeting the requirements of the Federal LRET legislation and target by generating up to 375MW (1,300 GWh) of renewable energy.

4.2 State Context

State Renewable Energy Targets

In March 2009 the South Australian Government increased its previous 20% State renewable energy target to 33 per cent by 2020. The increase was in response to a key recommendation by the Economic Development Board to position South Australia as a leader in renewable energy. The Economic Development Board identified, in its Economic Statement in March 2009, renewable energy as an important industry for South Australia's economic future and recommended strategies to promote technological innovation in a diverse range of technologies, fast track demonstration plants, minimise regulatory impediments and secure industry investment.

The Palmer Wind Farm will directly contribute to the State's renewable target of 33% by generating up to 375MW (1,300 GWh) of renewable energy.

² DSEWPC (2011) *State of the Environment 2011*. Department of Sustainability, Environment, Water, Population and Communities.

³ DCC (2009) *Australia's Renewable Energy Target*. Department of Climate Change.

Wind Farm Planning Policy

On 19 October 2011, the South Australian Government released wind farm policy reforms to reflect the Government's commitment to certainty for communities and wind farm investors. On 18 October 2012, the Minister for Planning approved the Statewide Wind Farm Development Plan Amendment (DPA) which, amongst other aspects, explicitly envisages wind farms in all rural type zones in SA.

South Australia's Strategic Plan

South Australia's Strategic Plan (SASP) was originally developed to provide overarching guidance on key directions for the State. It was comprehensively reviewed and up-dated in 2011. It contains six interrelated objectives and sets of actions and targets.

The State's commitment to the development of renewable energy is clear and has been a feature of the SASP since 2004. This plan has played a pivotal role in promoting environmental sustainability of the state. South Australia was the first state to introduce legislation to reduce carbon emissions which has resulted in a 33% renewable energy target by the 2020.

The SASP identifies a number of key challenges for South Australia including the need to boost population levels in order to maintain a strong economy and counteract the impact of an ageing population. This in turn requires approaches that foster and support economic development and growth.

At the same time the SASP highlights the need to address important environmental impacts and issues and focus on green energy, a reduction in greenhouse gases, energy efficiency and an acknowledgement of climate change as a key challenge. Reducing reliance on traditional energy sources is seen as one way in which SA can address the uncertainties of the future.

Strategic Infrastructure Plans

The *Strategic Infrastructure Plan for South Australia 2014-15* provides guidance for new infrastructure investment by government and the private sector over the next five to ten years.

The following excerpt from the Plan relates specifically to wind farm development:

"Forecast growth in demand for electricity shows that the state will need additional supply capacity in coming years and decades. There are a number of options being considered to meet this increasing demand. These include investment in new base-load generation or interconnector capacity through to increased use of renewable energy sources."

4.3 Project Benefits

Trustpower has been committed to developing this project in a manner that maximizes the benefits to the local, regional and national community. At the same time, Trustpower has also been committed to eliminating or minimizing the impacts on the local community.

An Economic Impact Report was prepared by Hudson Howels (contained in Appendix B of this Volume). The following economic benefits were identified:

- The economic modeling identified that the project will generate \$407 million of value added (contribution to Gross State Product) in the State over the period of construction and that this would happen over three years (allowing for lagged flow through effects).
- A total of 3,550 person years of employment would be supported at State level during construction – or an average of over 1,180 jobs sustained per year over three years.
- Once operational the project is estimated to support annually \$19 million of value added, and support directly and indirectly of the order of 180 jobs per year.

- From a regional perspective, the modelling indicates that the project will generate \$107 million of value added (contribution to Gross Regional Product) in the region over the period of construction and, again allowing for lagged flow through effects, this would happen over three years.
- 970 person years of employment would be supported at Regional level during construction, or an average of 320 jobs sustained per year over three years.
- Once operational the project is estimated to support annually \$7 million of value added in the region, and support directly and indirectly (including the multiplier impact) approximately 60 jobs per year.
- Renewable wind energy generation has significant environmental benefits through **carbon emissions reduction** where it replaces coal or gas generated electricity. It is conservatively estimated that the value of carbon emission savings associated with the Palmer Wind Farm is \$21 million per annum or a net present value of \$223 million over a 20 year period.

Trustpower will also implement an annual community benefit scheme once the project proceeds to construction and will engage with the local community on the most appropriate structure and administration of the community fund.

5. Development Plan Policy

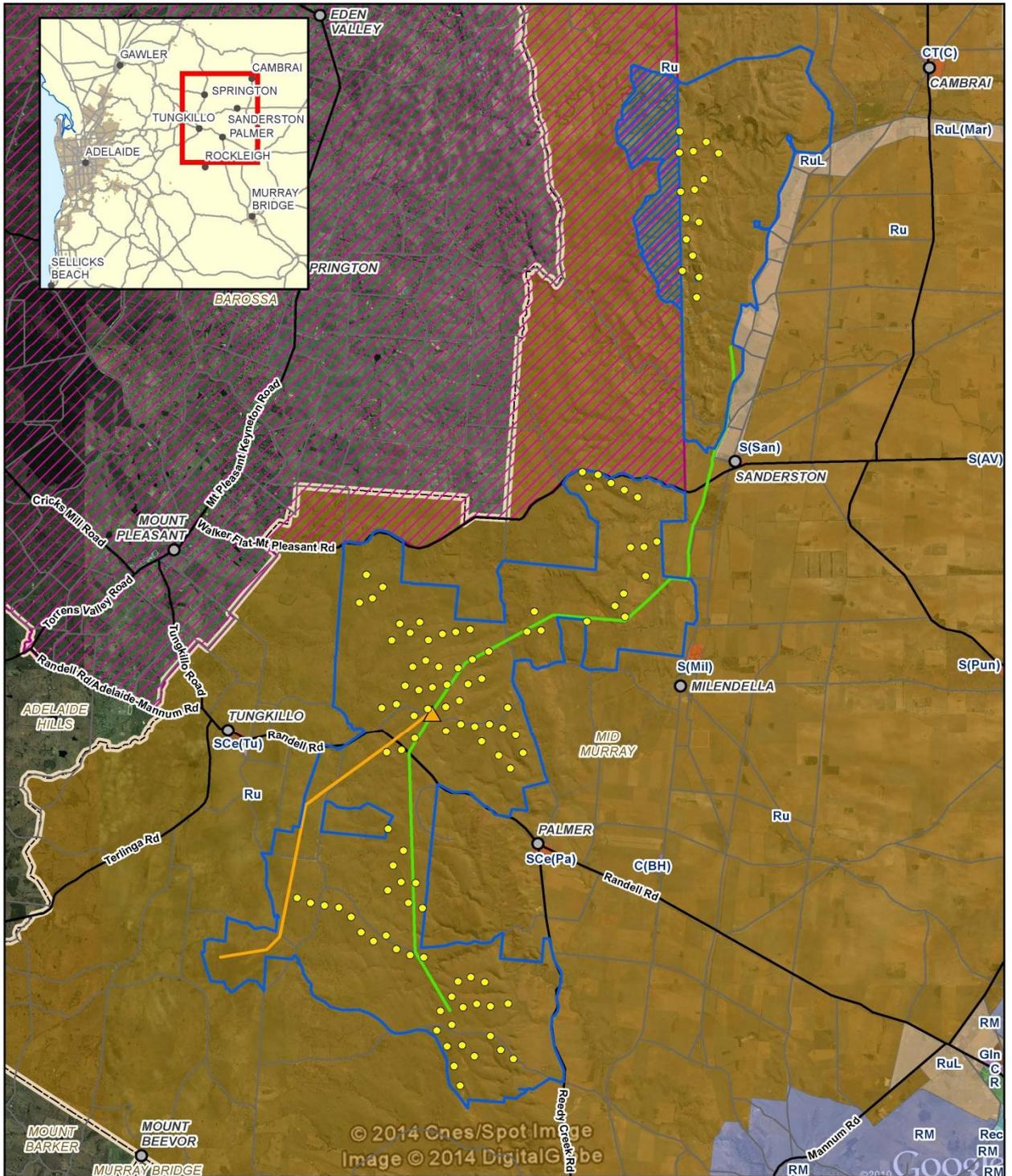
As described in previous chapters, the proposed wind farm extends over a relatively large area. Figure 5.1 provides a summary of the current Development Plan zoning that covers and surrounds the project.

The wind farm and its key elements are located within the Rural Zone of the Mid Murray Development Plan. Within this Zone it spans Marne Watercourse Policy Area 13 and the Hills Policy Area 14.

A portion of the 33 kV transmission line runs along the road reserve of Three Chain Road and Milendella Road. The boundary of the Rural Living (Sanderston) Zone also extends along a portion of these roads. Figure 5.2 demonstrates that this element of the project does not extend into the Rural Living Zone. Notwithstanding this, a 33kV transmission line is a relatively minor scale form of infrastructure and common in residential areas.

Wind farms and ancillary development is neither complying nor non-complying in both the Rural and Rural Living Zones.

This section is in addition to the Development Plan Assessment undertaken by Masterplan and contained in Volume 3.

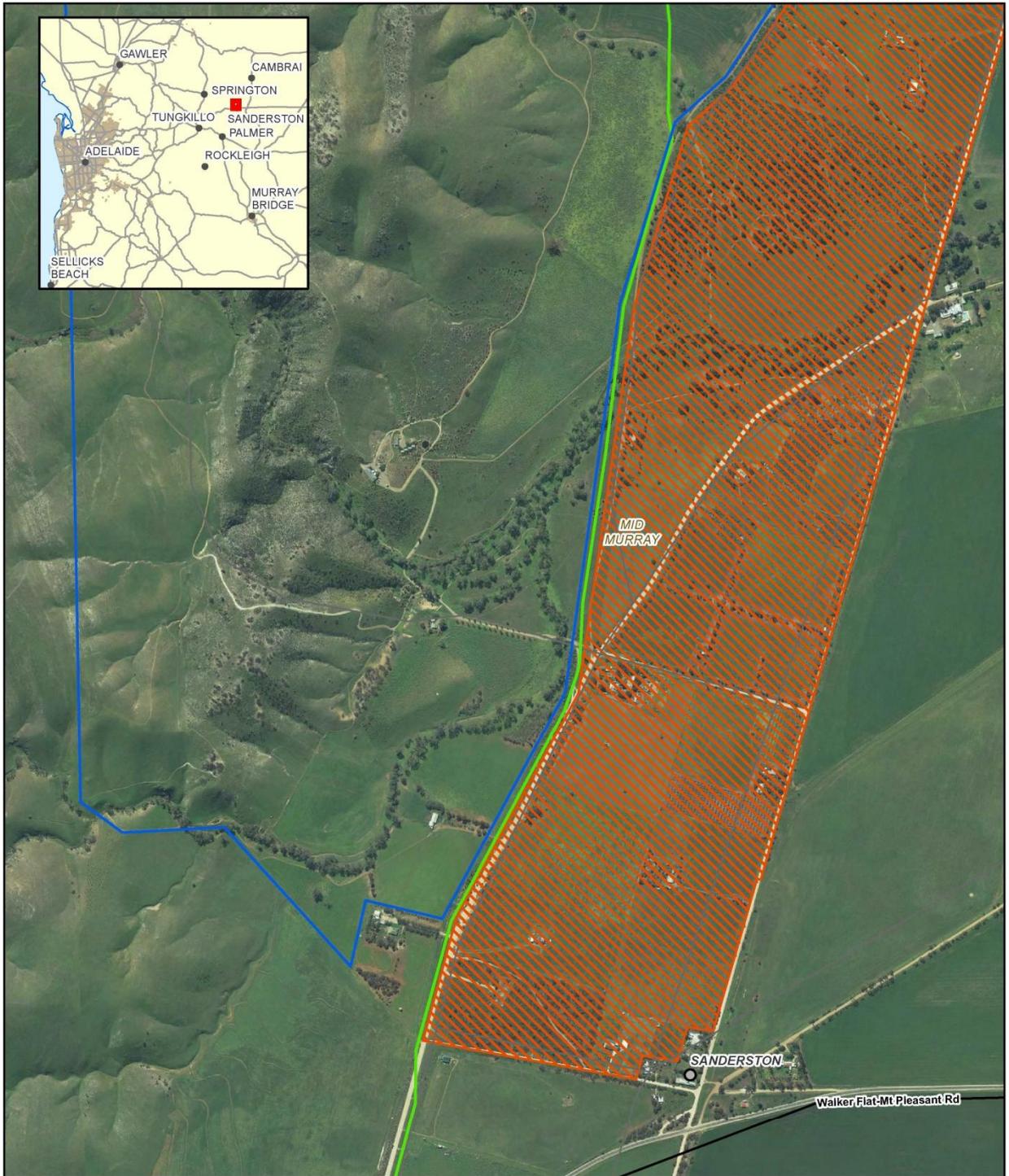


Legend

- | | | | | |
|---|-------------------------|-----------------------|--------------|---|
| Not within site of development | 33kV Transmission Lines | Planning Zones | MIXED USES | Barossa Character Preservation District |
| Project Boundary | 275kV Transmission Line | COMMERCIAL | RECREATION | Council Boundary |
| Indicative Turbine Location | Secondary Roads | COUNTRY TOWNSHIP | RESIDENTIAL | |
| Substation/Operation & Maintenance Facility | Minor Roads | INDUSTRY | RURAL | |
| | | | RURAL LIVING | |

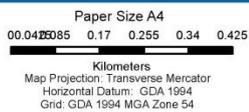
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Legend

- Not within site of development
- RuL SAN
- Project Boundary
- Indicative Turbine Location
- Secondary Roads
- Minor Roads
- Council Boundary



TrustPower Australia Holdings Pty Ltd
 Palmer Wind Farm Technical Studies

Job Number 33-17234
 Revision A
 Date 15 Aug 2014

**Palmer Wind Farm
 Planning Areas (Rural Living)**

Figure 5.2

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 Data source: Google: Aerial - 20140203, TrustPower Australia Holdings Pty Ltd: Design - 201400123, GA: Geodata Topo 250K Series 3 - 2006, Roads - 2006 Created by: cillingworth [KBM: 11]

6. Statement of Commitments

The following Section provides a consolidated statement of commitments summarising all impact mitigation measure commitments agreed to by Trustpower from the recommendations under the various specialist assessment reports and in consultation with the community and government agencies. It provides for clarity and assurance regarding the approach to the final detailed design and proposed conditions of approval for the project.

These commitments will be incorporated and addressed in the relevant management plans prior to construction.

To avoid duplication, mitigation measures are included under the most appropriate heading only and are not repeated in subsequent sections.

The nature of large projects is such that the process of specific siting and design requires a detailed level of collaboration between the project proponents and the successful construction tenderer. It is intended that process will be undertaken in a manner that the final siting will comply with agreed criteria (e.g. relating to noise, vegetation, cultural heritage) and will be subject to agreed management practices.

Management Plans

It is envisaged that two sets of management plans will be prepared:

- A Construction Environmental Management Plan (CEMP) which will address all the issues relevant to the construction phase of the project including the batch plants. A draft CEMP is provided in Appendix B of this Volume.
- An Operational Management Plan (OMP) that addresses the issues relevant to the operation, maintenance and decommissioning of the wind farm. These management plan elements will be drafted prior to the construction phase (indicative example provided in Appendix C).

The management plans will provide a framework for the management and control of activities in regards to construction, communication and environmental aspects and the key risks identified. The final Plans will include timeframes, implementation and reporting responsibilities, communication protocols, monitoring, auditing and review arrangements, emergency responses, induction and training and complaint/dispute resolution procedures. Adaptive management would ensure that improvements were consolidated in updated plans.

The CEMP and OMP will cover the following matters relevant to their respective stages;

- Community information management;
- Compounds and ancillary facilities management;
- Construction noise and vibration;
- Operational noise management;
- Traffic management;
- Soil and water quality management (including erosion control);
- Air quality and dust management;
- Aboriginal and European heritage management;
- Soil contamination, hazardous material and waste management;
- Hazard and risk management.

- Site rehabilitation;
- Bird and bat management;
- Weed and pest management;
- Health and Safety;
- Fire and bushfire risk management;
- Telecommunication and Digital TV interference; and
- Decommissioning.

The management plans will be formally reviewed periodically after the commencement of construction and operation respectively to ensure it is up to date and that changes to procedures and practices have been implemented according to the plan.

Temporary Construction Facilities

- All temporary construction sites will be cleared and rehabilitated within 12 months of the completion of construction.
- All batching plants will be removed and their sites rehabilitated within 12 months of the completion of construction.
- Rehabilitation will be in accordance with the requirements set out in the CEMP.

Landscape and Visual Impact Management

- The final wind farm layout will ensure no non-involved landholder dwellings, existing at the time of lodgment of this Development Application, are located within 1km from a turbine (in accordance with Council Wide PDC 397(a)(i) of the Mid Murray Development Plan).
- Minimise the extent of cut and fill requirements for access roads by following natural contours and tops of ridgelines where practicable.
- As far as possible source road materials locally to blend with existing landscape.
- Re-vegetate temporary construction facilities as soon as practical after construction completion.
- Plant vegetation screening around the permanent Substation and Operations & Maintenance Compound.
- Avoid use of advertising, signs or logos mounted on turbine structures, except those required for safety purposes.
- Turbines must be within approved turbine corridors and spaced in an ellipse of no less than three times the rotor diameter by two times the rotor diameter. The ellipse will be oriented into the predominant wind direction.

Flora and Fauna Impact Management

- An EPBC referral will be lodged and approval secured (if required) prior to construction for Lomandra Grassland.
- A clearance approval will be obtained from the Native Vegetation Council for any native vegetation clearance and associated offset plans for the final layout prior to construction.
- A Weed and pest management plan and Site rehabilitation plan will be prepared and approved prior to construction.

- Develop an internal reporting system for any potential bird strikes at the Palmer Wind Farm.
- Where construction activities are planned within 500 and 1000 m of known Wedge-tailed Eagle and Peregrine Falcon nests respectively during their peak breeding seasons, nest checks should be employed to determine their breeding status and if necessary buffers put in place or specific management strategies implemented to minimise any potential impact on the breeding success of these birds.
- A 1000 m buffer will be maintained around all recorded Peregrine Falcon nests for all wind turbine generators.
- A 500 m buffer will be maintained around all recorded Wedge-tailed Eagle nests for all wind turbine generators.
- Use existing access tracks where possible to minimise additional disturbance.
- Minimise clearance of significant native vegetation as a principle of the detailed layout planning stage and the micro-siting stage where complete avoidance is not possible.
- Undertake additional detailed surveys in Areas A and C at the detailed layout stage where EBS have proposed alternative access routes in order to minimise impact on sensitive vegetation should this be confirmed as such.
- Consult and collaborate with horse riding clubs and/or enthusiasts prior to construction to accommodate current agreements with host landowners for riding activities, including consideration of the existing trails or assistance towards alternative routes as required. This will be subject to standard site health and safety considerations.
- Consider horse familiarisation events to assist with overcoming any short term concerns for horses and assist with the familiarisation of with the sound and movements of turbines, subject to standard site health and safety considerations.

Noise Impact Management

- A final noise assessment will be undertaken on the final turbine selected and wind farm layout to ensure that it complies with the required SA EPA noise criteria for wind farms.
- Confirmation of commercial arrangements with houses listed as involved landholders will be provided to the Council prior to construction commencement.
- Ensure final turbine selection and layout complies with the World Health Organisation Guidelines for Community Noise requiring 45 dB(A) or background plus 5 dB(A) (whichever is higher) for all involved residential receivers who have entered into a noise agreement with Trustpower in accordance with the SA EPA Noise Guidelines.
- A final Construction, Vibration and Operational Noise Management Plan will be prepared and approved prior to construction (draft contained in Appendix B).
- An Operational Noise Management Plan will be finalised prior to operation (draft contained in Appendix B).
- Include the following in the noise management plans:
 - Develop and implement an operational noise compliance testing program in accordance with the SA EPA noise guidelines;
 - Develop a complaints response procedure in relation to any noise complaints as a result of the operation of the wind farm;

- Locate fixed noise sources such as crushing plant at the maximum practical distance from the nearest dwellings and where possible use existing landforms to block line of sight between equipment and the dwelling; and
- Implement a community consultation process to ensure adequate community awareness and notice of expected construction noise.
- Construction hours will be limited to Monday to Saturday between 7am and 7pm. Works carried out outside of the hours will only entail:
 - works that do not cause noise emissions which exceed the noise limits of SA Policy at any nearby dwelling not associated with the project; or
 - the delivery of materials as requested by Police or other authorities for safety reasons; or
 - emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or
 - works with the prior consent of the Environment Protection Authority (EPA) (an example might be occasional concrete pours on hot days).

Cultural Heritage Impact Management

- Ensure where necessary all areas of infrastructure in the final layout have been surveyed prior to construction and compliance with impact mitigation measures agreed with the traditional owners (MACAI), such as construction monitoring where requested.
- Avoid impacting on or disturbing any registered or newly identified aboriginal sites in accordance with the Aboriginal Heritage Act and agreement with MACAI.
- Work with the MACAI to agree and subsequently manage potential issues during the construction phase.
- Comply with the Aboriginal site discovery procedure provided in the Heritage Assessment report if Aboriginal sites, objects or remains are discovered during works in the Project Area.
- Prior to work commencing, construction workers on the project will be given appropriate cultural heritage awareness training in consultation with MACAI.
- All on site workers should remain within the project footprint at all times and avoid going into nearby gullies and rocky outcrops outside of the project footprint wherever possible as these are likely to contain Aboriginal heritage sites.
- Utilise as much as possible existing access tracks and avoid any disturbance or development in the gullies between hills. Wherever possible, access tracks should keep to the crest or upper slopes of the hills within the project area.
- Avoid impacts on the dry stone walls, where possible. If impacts cannot be avoided, to limit and mitigate these impacts in consultation with the Dry Stone Wall Association (e.g. use damaged areas, minimise the access road width).

Traffic Impact Management

- In consultation with the Council, DPTI and any other relevant agency, develop a Traffic Management Plan (construction and operational) to manage the overall impacts and disturbance to infrastructure and other road users during the construction and ongoing operation phases of the project, including any special safety considerations for historic traffic hot spot areas and impact mitigation measures for residential dwellings along proposed public access routes.

- Implement a thorough public notification and complaints process for advance notifications of anticipated construction and over dimensional traffic.
- Enter into a commercial Deed of Agreement with Council on any Council road upgrade and or ongoing maintenance contributions by Trustpower prior to construction commencement.

Civil, Geology, Geotechnical and Hydrology Impact Management

- Prepare and secure Council approval for the final CEMP(s) for the construction phase of the project that will address the normal scope of construction issues but specifically including soil erosion and sediment control measures, management of any practices such as blasting.
- Ensure that appropriate permit applications will be made should any surface or groundwater be required for the project.

Electromagnetic Interference Impact Management

- Avoid intrusion of the Fixed PTP Microwave radio links as a criteria for the detailed layout design process.
- Conduct additional consultation with Telstra, SA Water and the Bureau of Meteorology as part of finalising the final layout.
- Use of primarily non-metallic turbine blades.
- Use (wherever practical) of equipment complying with the Electromagnetic Emission Standard, AS/NZS 61000.6.4:2012.

Aeronautical, Aviation and Qualitative Risk Assessment and Obstacle Lighting

- Ensure that the final layout will equally avoid impacts with respect to Aeronautical, Aviation and Qualitative Risk Assessment and Obstacle Lighting.
- Ensure the following information is provided to CASA and RAAF AIS for their register of tall structures and aeronautical maps:
 - Prior to construction commencement - the design locations of all wind turbines and meteorological masts; and
 - Within three months of construction completion - the as-built locations of all wind turbines and meteorological masts.

Shadow Flicker and Blade Glint Impact Management

- The surface of WTG blades will have a non-reflective coating.
- The final layout will be re-evaluated to ensure that the predicted actual estimate for shadow flicker will not exceed 10 hours annual or 30 hours theoretical at any non-host residence.
- Ensure any complaints are investigated to confirm actual impacts and mitigated if required as soon as practicable.

Economic Impact Management

- Encourage the ultimate construction and turbine supply contractors to identify and utilize local services and employment where possible – both locally and regionally.
- Capture and maintain a register of local expressions of interest for delivery of goods and services to be provided to the contractors prior to construction commencement.

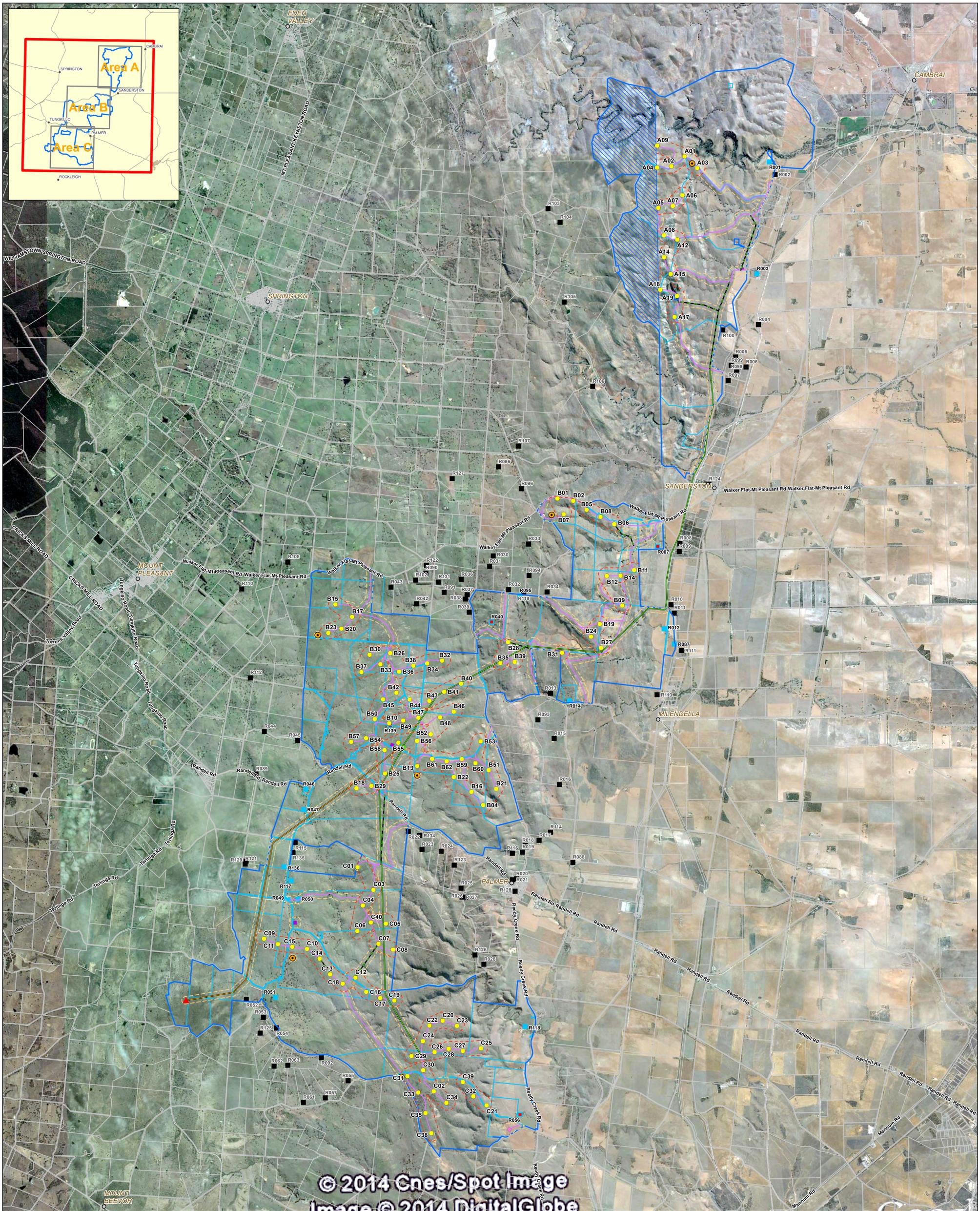
- Implement an annual ongoing community benefit scheme in consultation and collaboration with the local community.
- Establish, in consultation with the Council, a community and tourist information display for the wind farm after construction completion and consider potential for wind farm tourism options in collaboration with appropriate stakeholders.

Fire and Bushfire Management

- Ensuring that all project components are designed, constructed and operated to minimise ignition risks, providing for asset protection consistent with relevant CFS design and providing for necessary emergency management including appropriate fire-fighting equipment and water supplies on site to respond to a bush fire.
- Regularly consult with the local CFS to ensure familiarity with the project, including the construction timetable and the final location of the entire infrastructure on the site. Trustpower will comply with any reasonable requests of the local CFS to reduce the risk of bushfire and to enable fast access in emergencies.
- Prepare in consultation with the CFS a Bushfire Management Plan as part of the Construction Environmental Management Plan. As a minimum the plan will include hot-work procedures, asset protection zones, safety, communication, site access and response protocols in the event of a fire originating in the wind farm infrastructure. All flammable materials and ignition sources brought onto the site, such as hydrocarbons, will be handled and stored as per manufacturer's instructions.
- Ensure appropriate firefighting equipment will be held on site during the construction phase, and training in its use as necessary. Fire extinguishers will be stored onsite in the control building and within any substations.
- Appropriate bunding will be installed in the substation with a capacity exceeding the volume of the transformer oil to contain the oil in the event of a major leak or fire. The facilities will be regularly inspected and maintained to ensure leaks do not present a fire hazard, and to ensure the banded area is clear (including removing any rainwater).
- Turbines will be shut down if the components reach critical temperatures or if directed by the CFS in the case of a nearby wildfire being declared (all hours contact points will be available to the CFS).
- Overhead power line easements will be periodically inspected to monitor and maintain regrowth of encroaching vegetation.

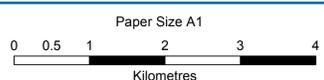
Appendices

Appendix A – Indicative Project Layout Plans



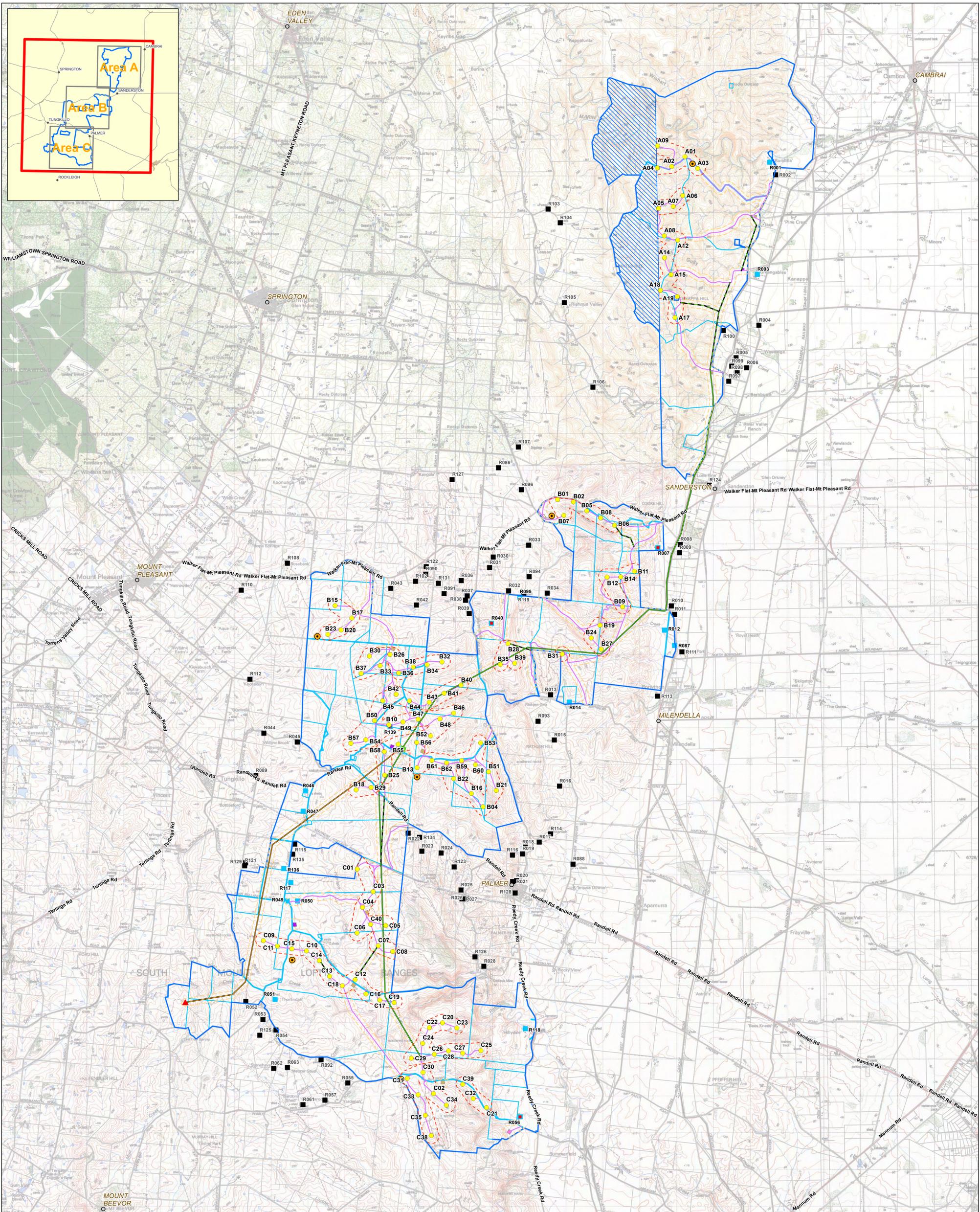
© 2014 Cnes/Spot Image
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- Legend**
- Indicative Turbine Location
 - ▲ Tungkillo Substation
 - Turbine Corridor
 - 33kV Transmission Lines
 - 275kV Transmission Line
 - Underground Cable not within Proposed Access Track
 - Proposed Access Tracks
 - Project Boundary
 - Not within site of development
 - ▭ Corridor around other infrastructure
 - ▭ Titles inside Project Boundary
 - ▭ Dwelling within 1km
 - ▭ Host Dwelling
 - ▭ Occupied Dwelling
 - ▭ Construction Amenities
 - ▭ Batch Plant/Construction Amenities
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 - ▭ Substation and Operations & Maintenance Compound
 - Meteorological Mast

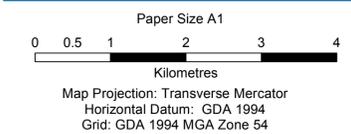


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Palmer Wind Farm Technical Studies
Palmer Wind Farm Layout
Indicative Project Layout

Job Number | 33-17234
Revision | 0
Date | 15 Aug 2014

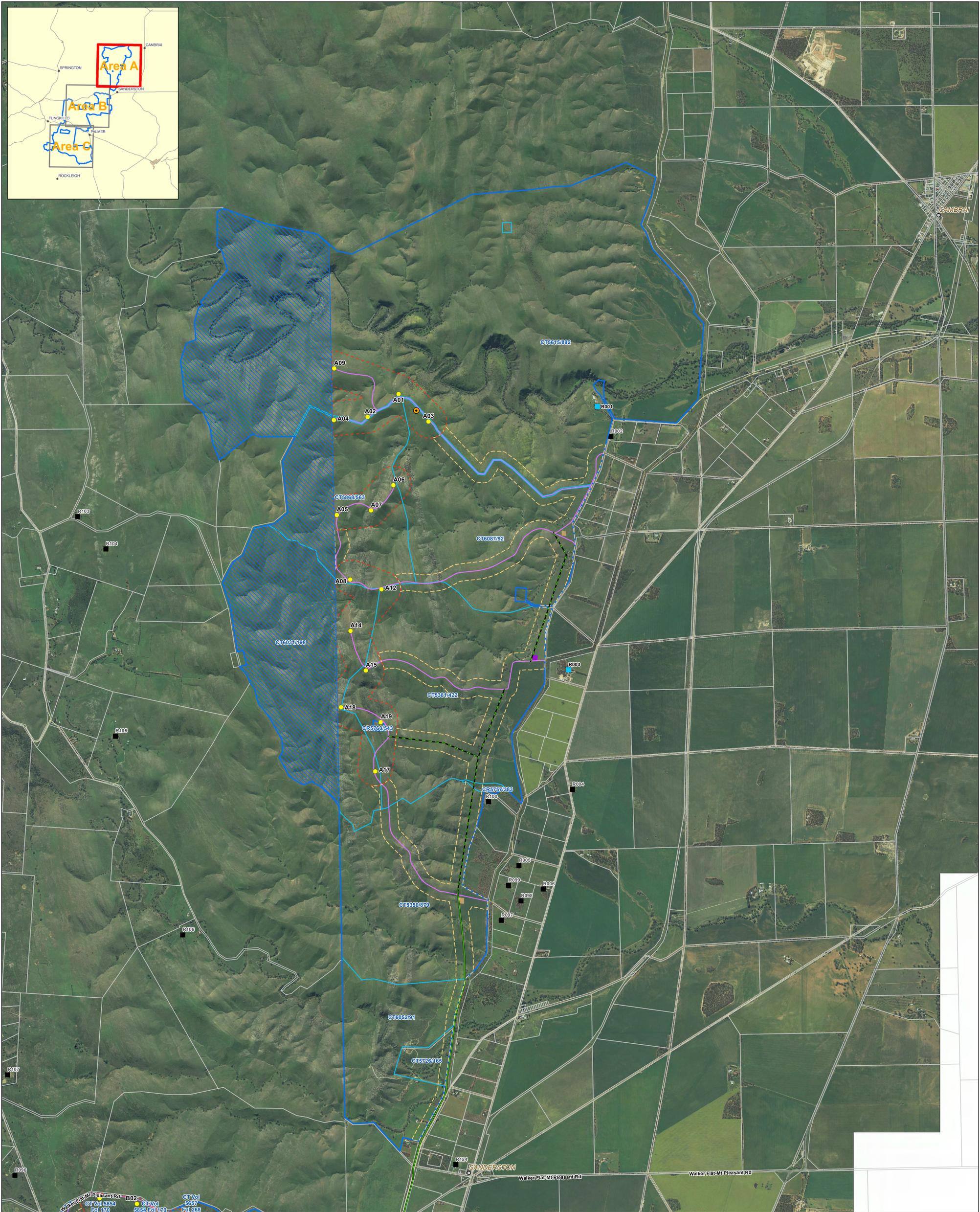
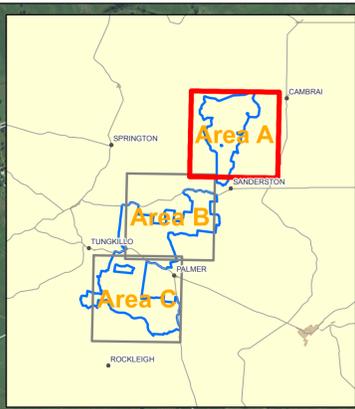


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Palmer Wind Farm Layout
Indicative Project Layout

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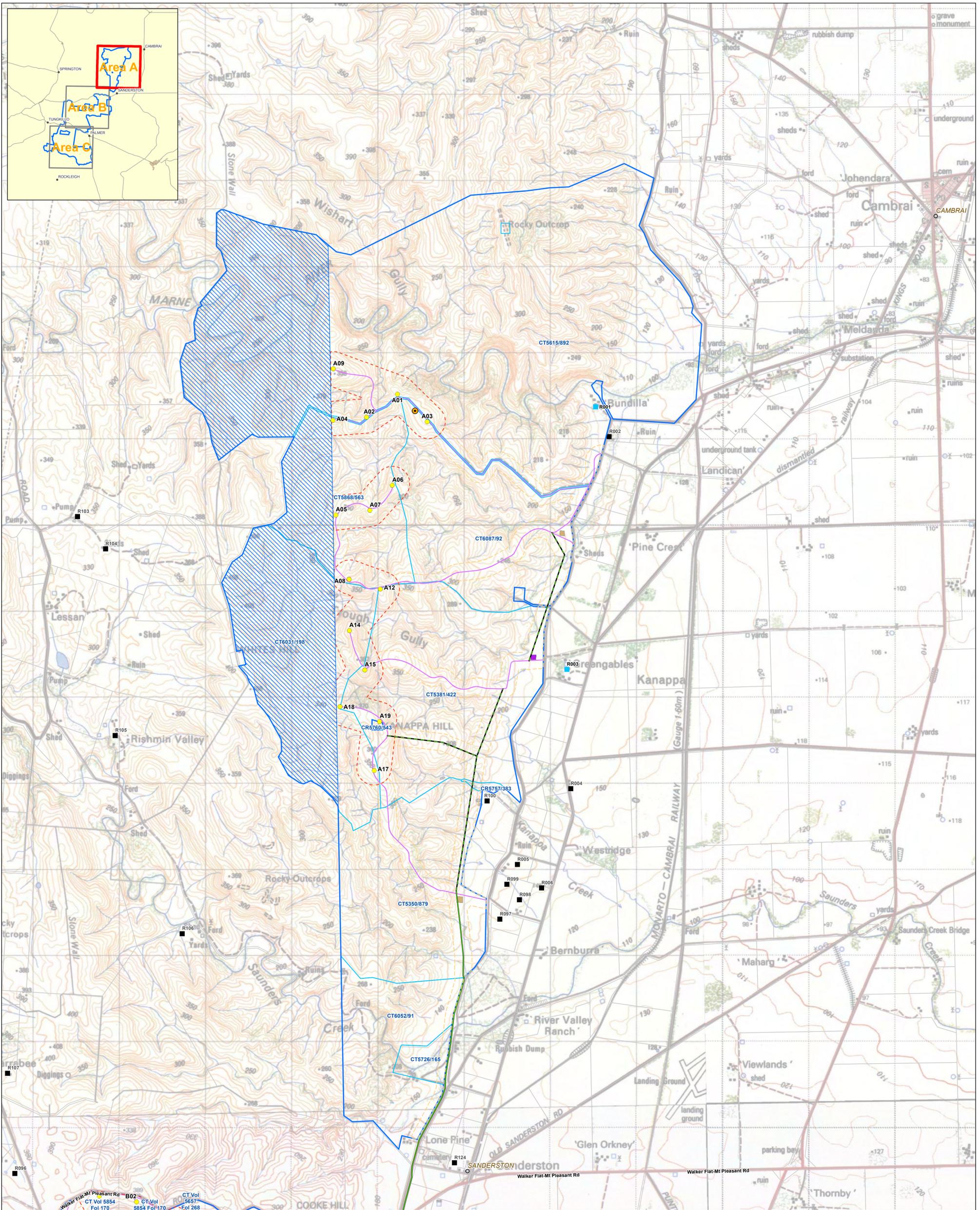
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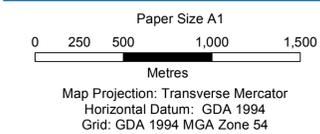
TrustPower Australia Holdings Pty Ltd
 Palmer Wind Farm Technical Studies
 Palmer Wind Farm Layout
 Area A Indicative Project Layout

Job Number | 33-17234
 Revision | D
 Date | 14 Aug 2014

Map of Area A



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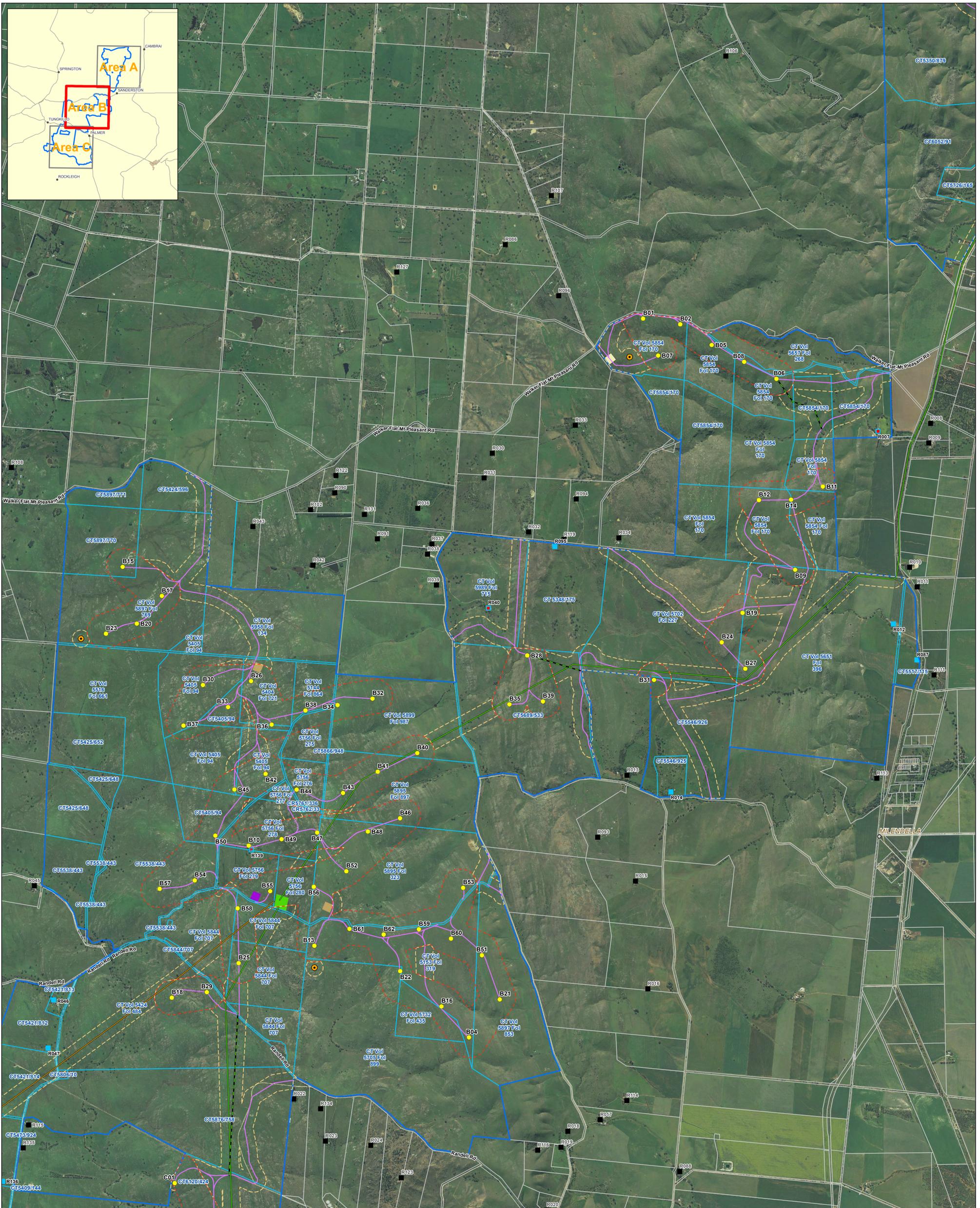


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Palmer Wind Farm Layout
Area A Indicative Project Layout

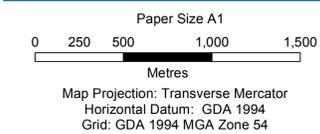
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Revision | D
Date | 14 Aug 2014

Map of Area A

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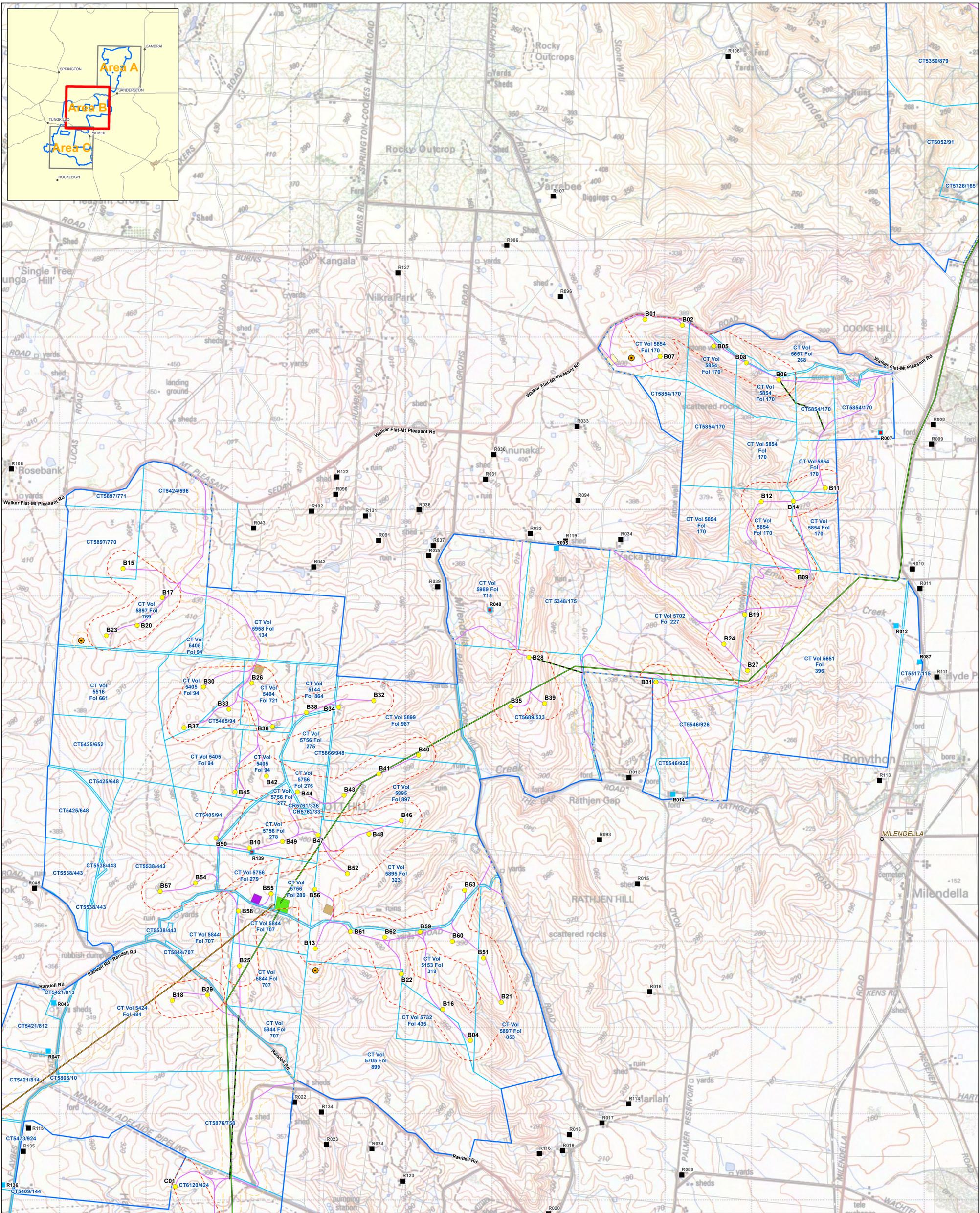
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Palmer Wind Farm Layout
Area B Indicative Project Layout

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Date | 14 Aug 2014

Map of Area B



- Legend**
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 Grid: GDA 1994 MGA Zone 54

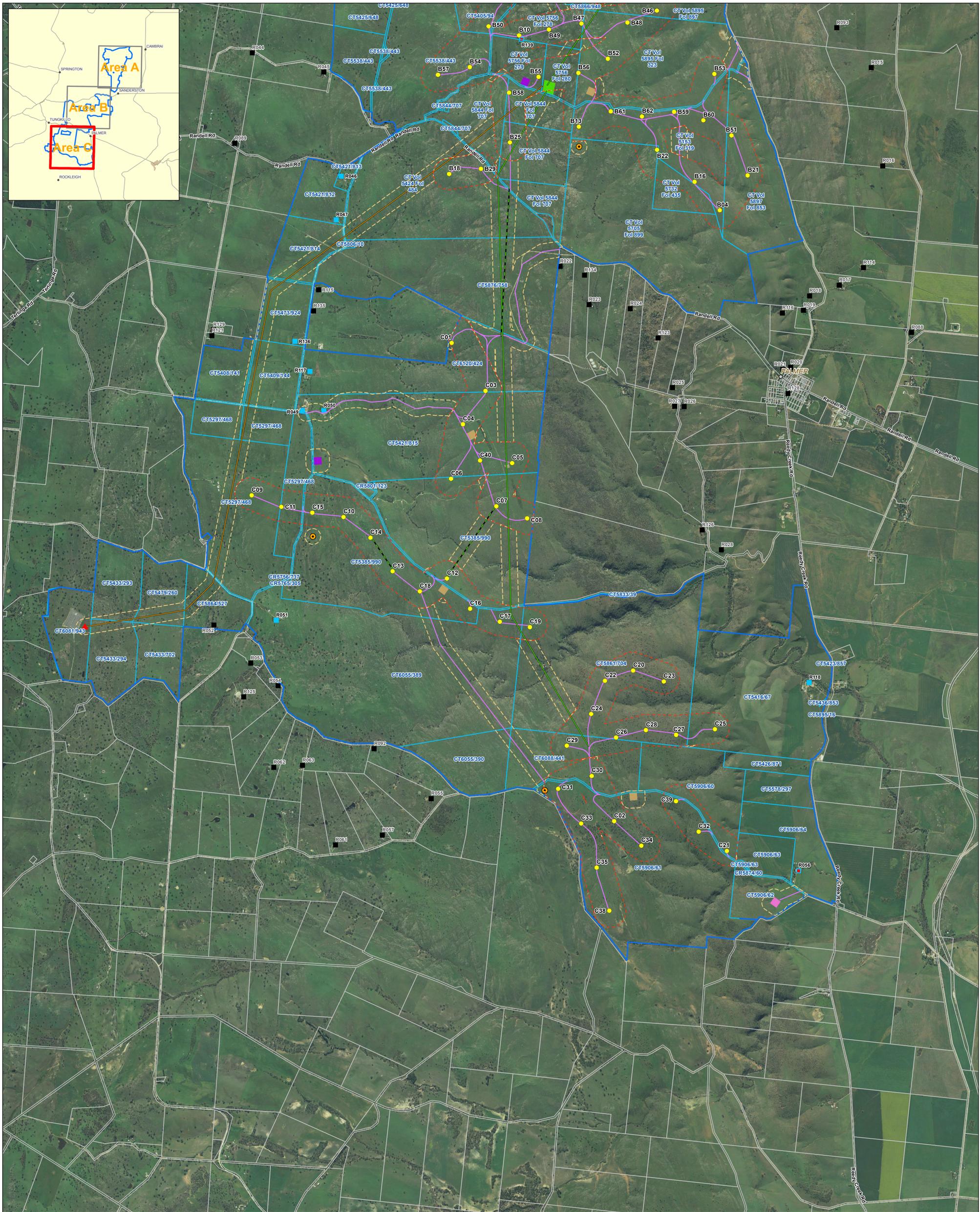


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 Palmer Wind Farm Layout
 Area B Indicative Project Layout

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 Date | 14 Aug 2014

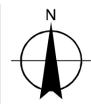
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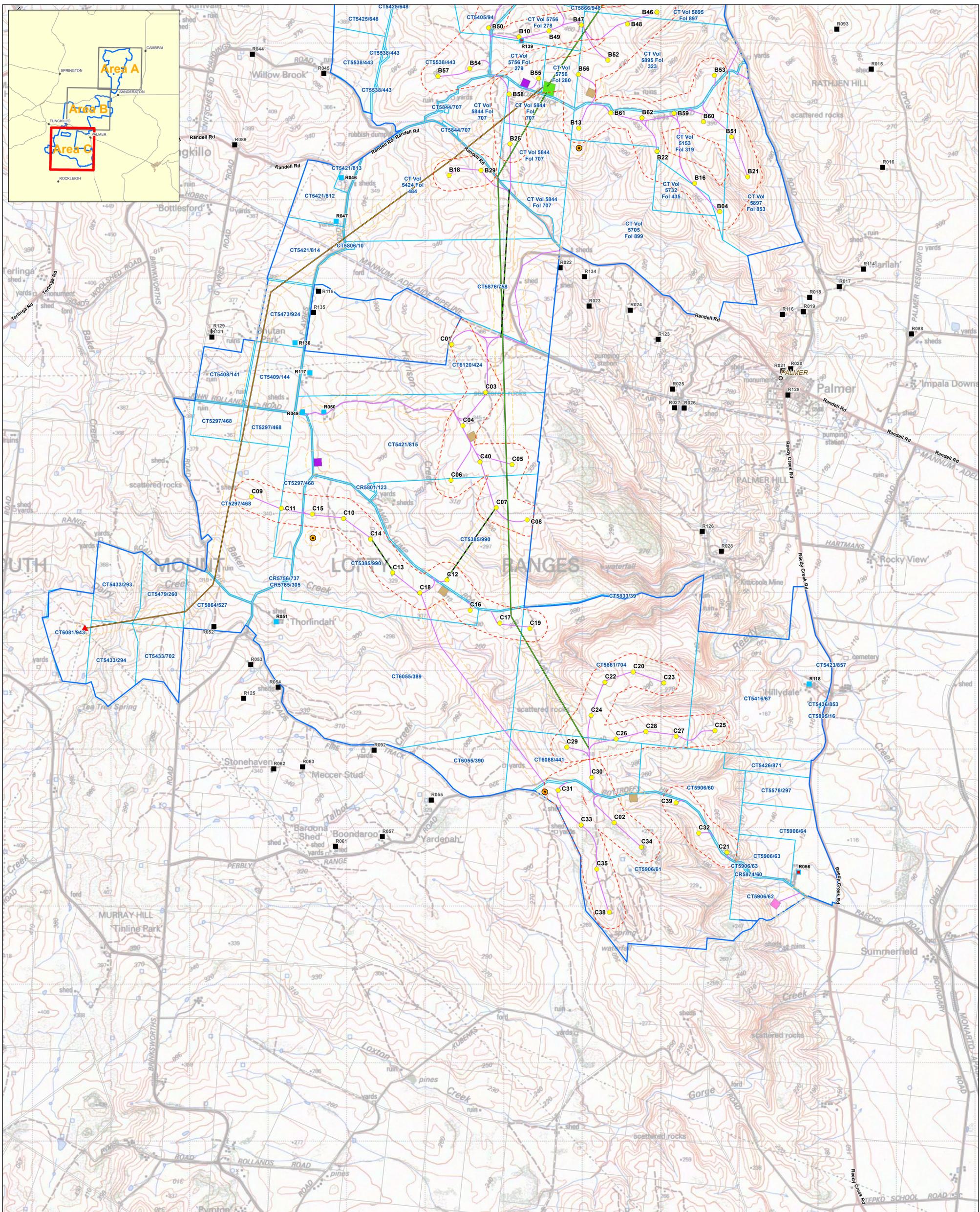
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 Area C Indicative Project Layout

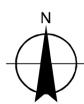
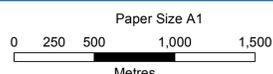
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 Date | 14 Aug 2014

Map of Area C



Legend

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- - - 33kV Transmission Lines
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 Area C Indicative Project Layout

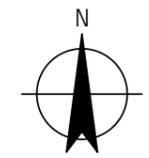
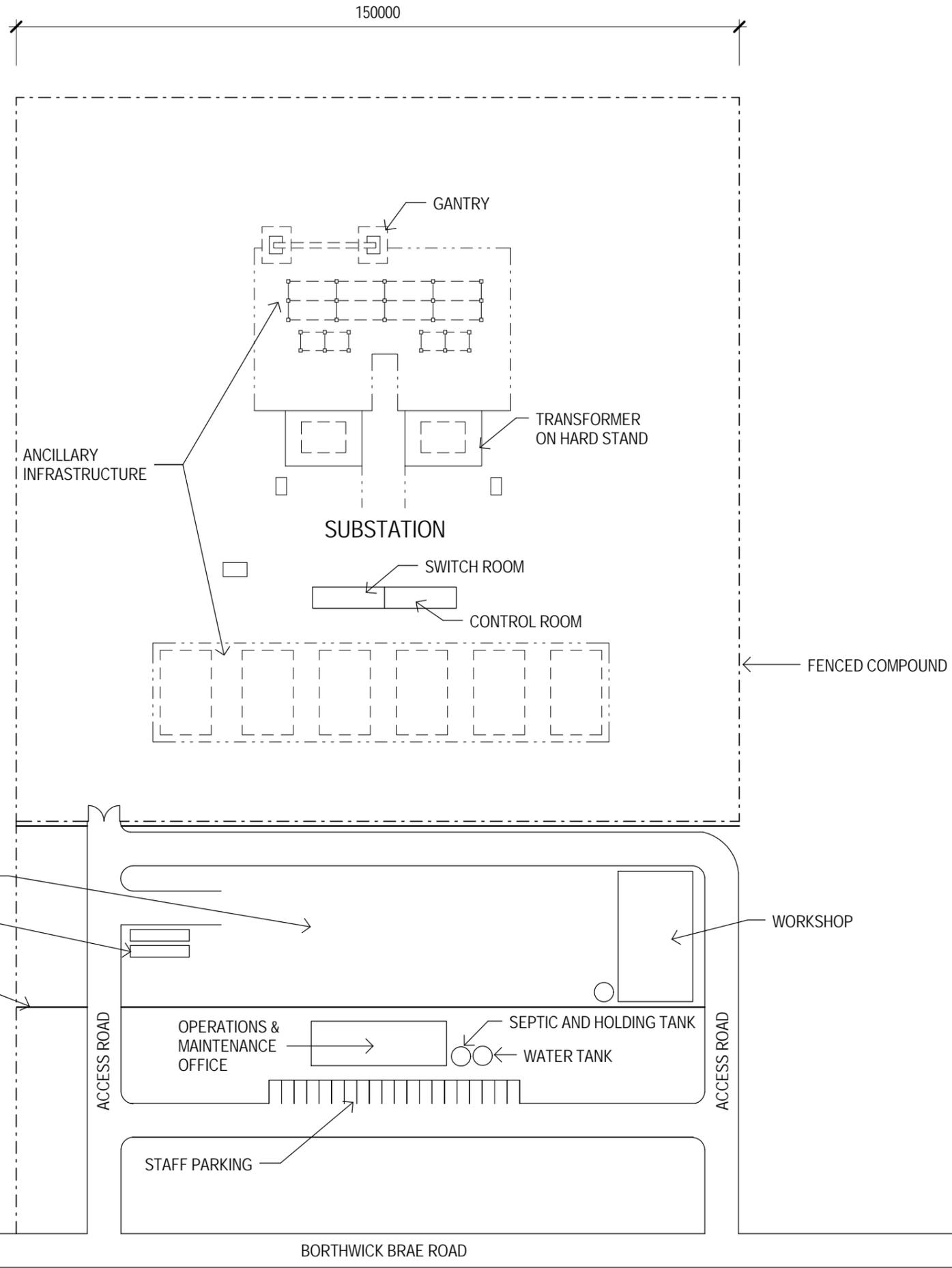
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Map of Area C

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Project **PALMER WIND FARM**

Title **SUBSTATION, OPERATIONS AND MAINTENANCE FACILITY SITE LAYOUT**

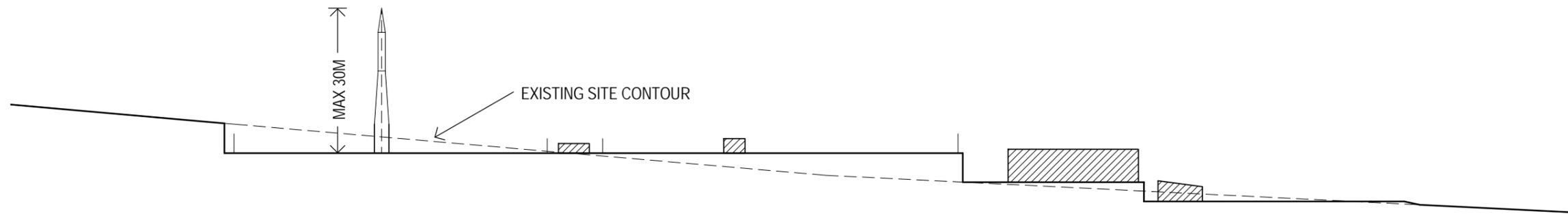
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 Drafting Check Design Check Checker

Approved (Project Director) Approver
 Date 15.08.2014

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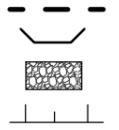
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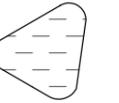
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- SWALE
- HEADWALL
- ROCK PROTECTION
- COMPACTED EARTH BANK

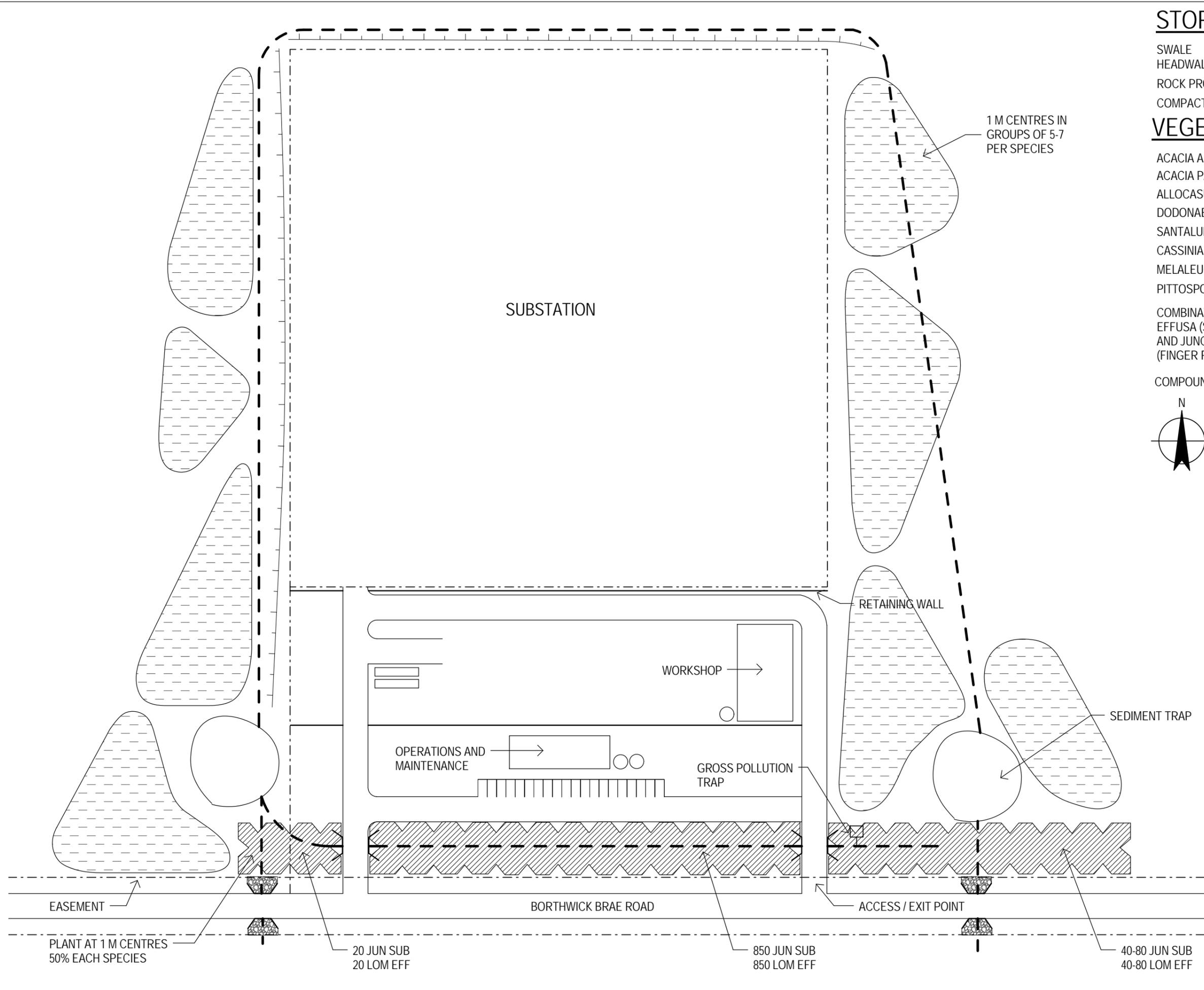
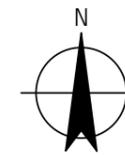


VEGETATION

- ACACIA ARGYROPHYLLA
- ACACIA PARADOXA
- ALLOCASUARINA VERT
- DODONAEA VISCOSA
- SANTALUM ACUMINATUM
- CASSINIA UNCATA
- MELALEUCA LANCEOLATA
- PITTOSPORUM ANGUSTIFOLIUM
- COMBINATION OF LOMANDRA EFFUSA (SCENTED MAT RUSH) AND JUNCUS SUBSECUNDUS (FINGER RUSH)



COMPOUND FENCING



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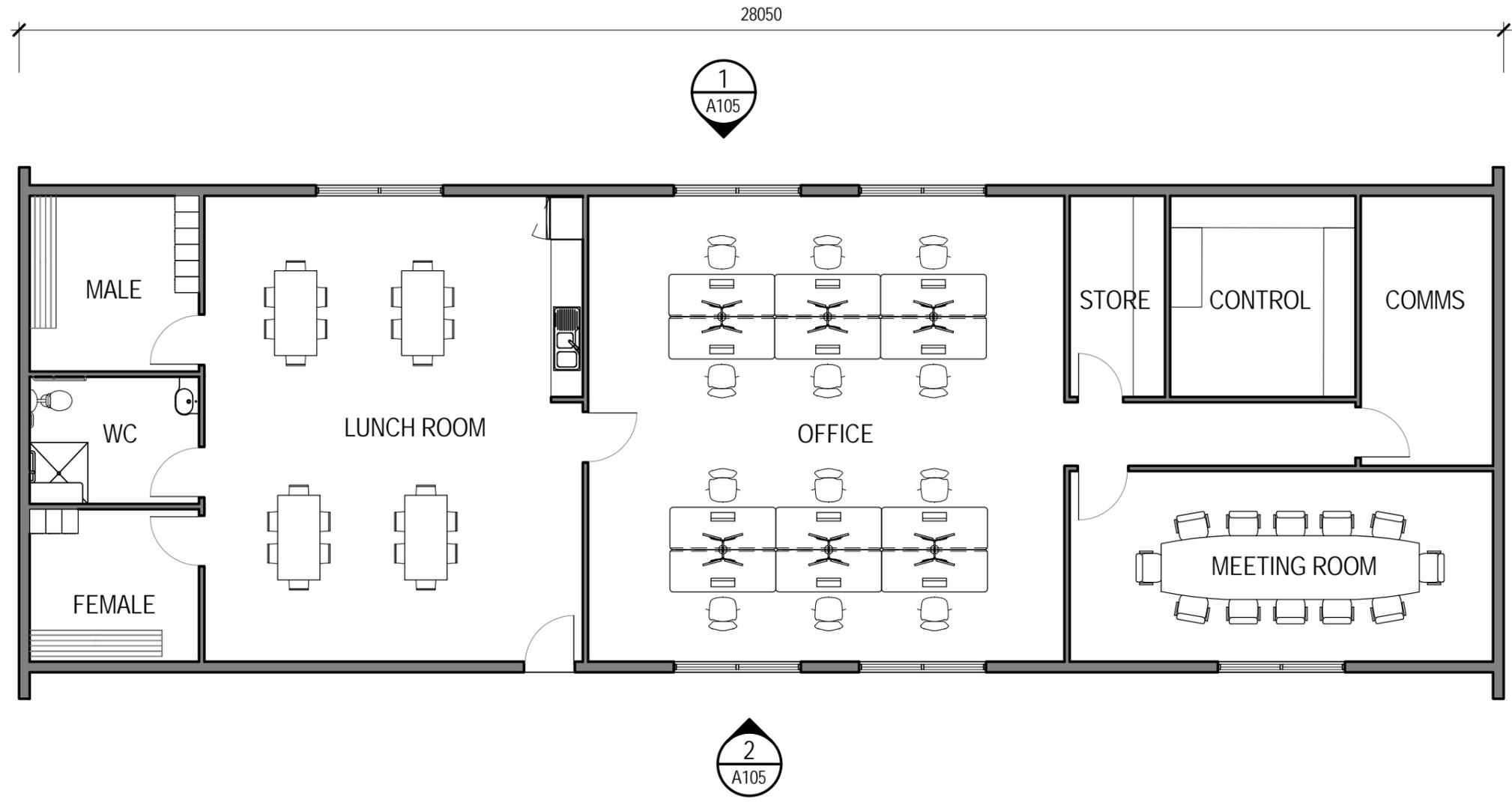
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Drafting Check		Design Check Checker
Approved (Project Director)	Approver	
Date	15.08.2014	

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Client **TRUST POWER**

Project **PALMER WIND FARM**

Title **SUBSTATION, OPERATIONS AND MAINTENANCE OM OFFICE FLOORPLAN**

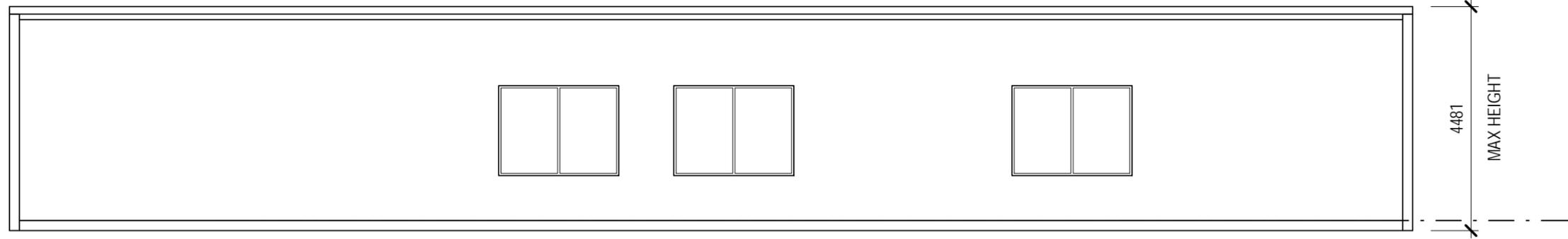
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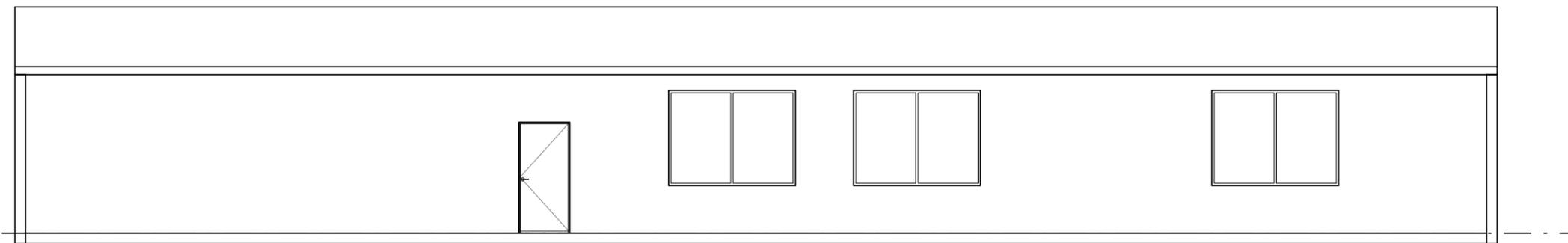
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 Date 15.08.2014

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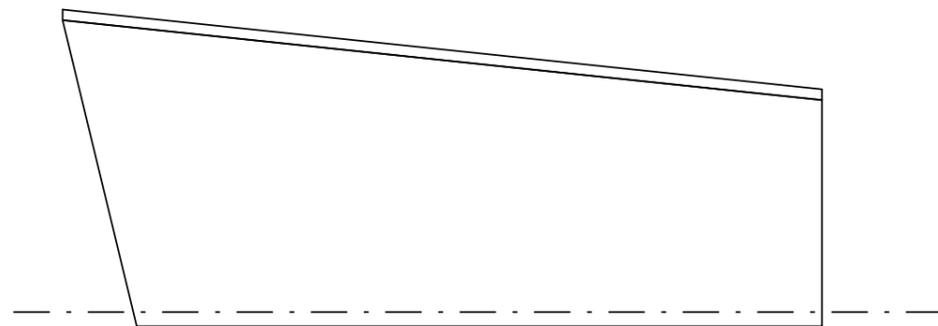
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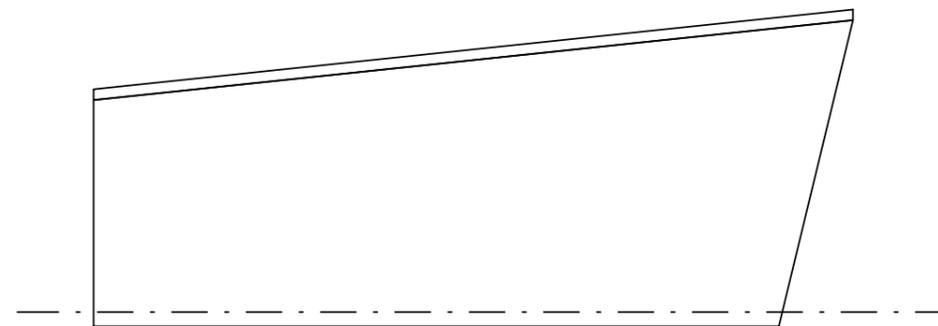
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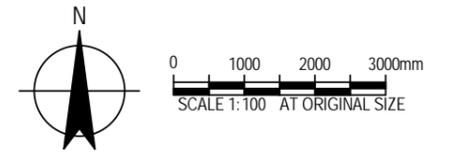
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SCALE 1 : 100



WEST ELEVATION
SCALE 1 : 100



EAST ELEVATION
SCALE 1 : 100



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Client **TRUST POWER**

Project **PALMER WIND FARM**

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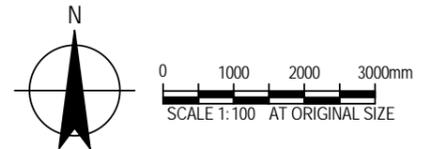
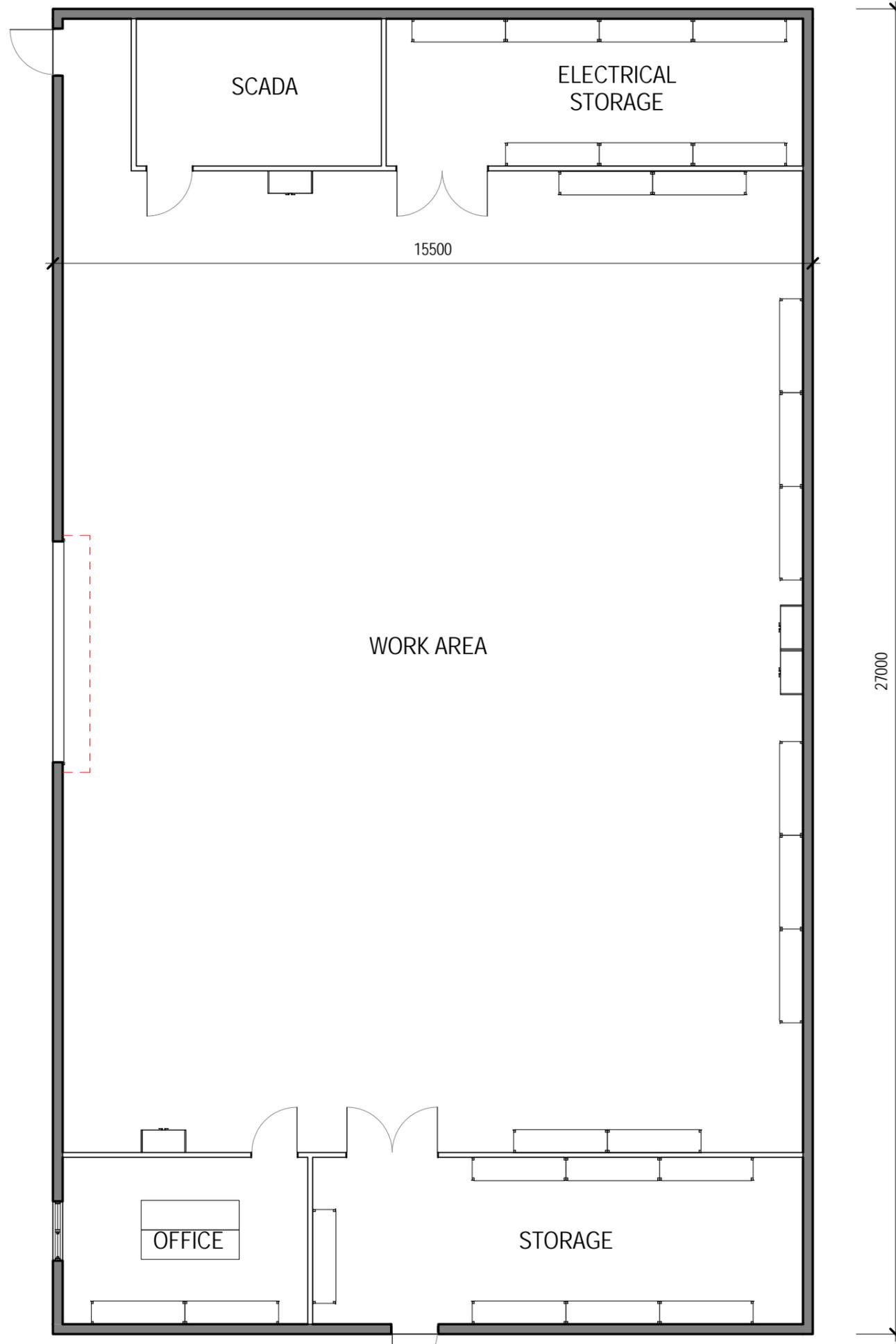
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Drafting Check	Design Check Checker

Approved (Project Director)	Approver
Date	15.08.2014

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Rev:	



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Title **SUBSTATION, OPERATIONS AND MAINTENANCE WORKSHOP FLOORPLAN**

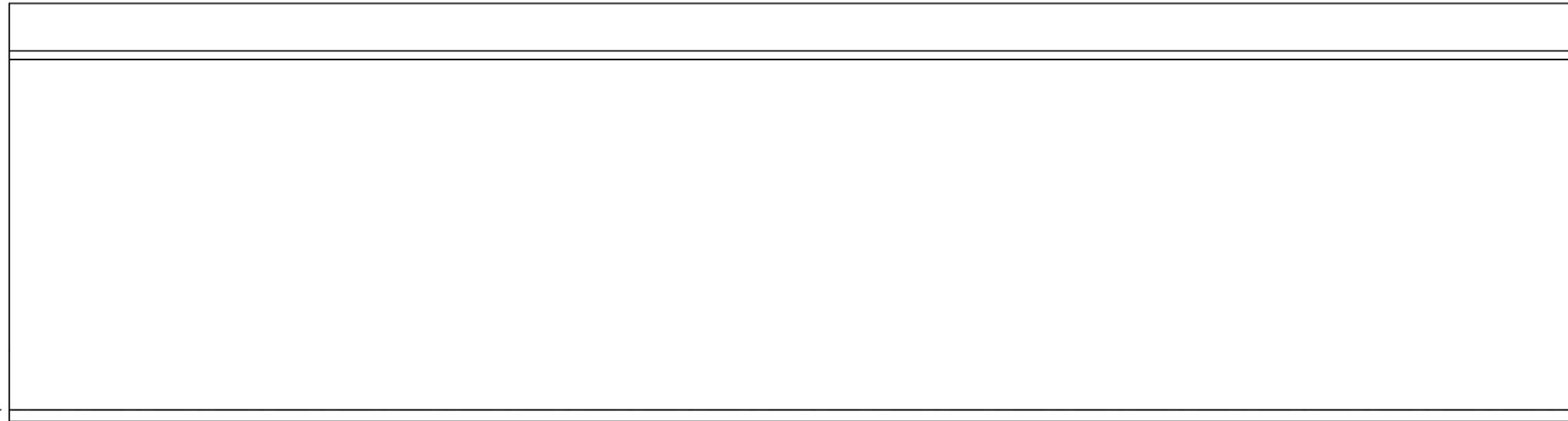
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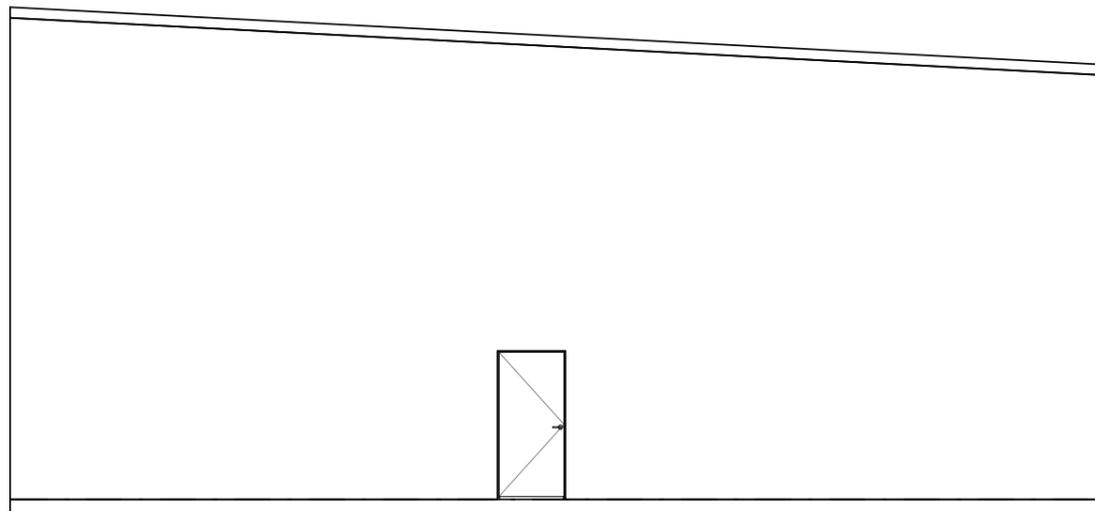
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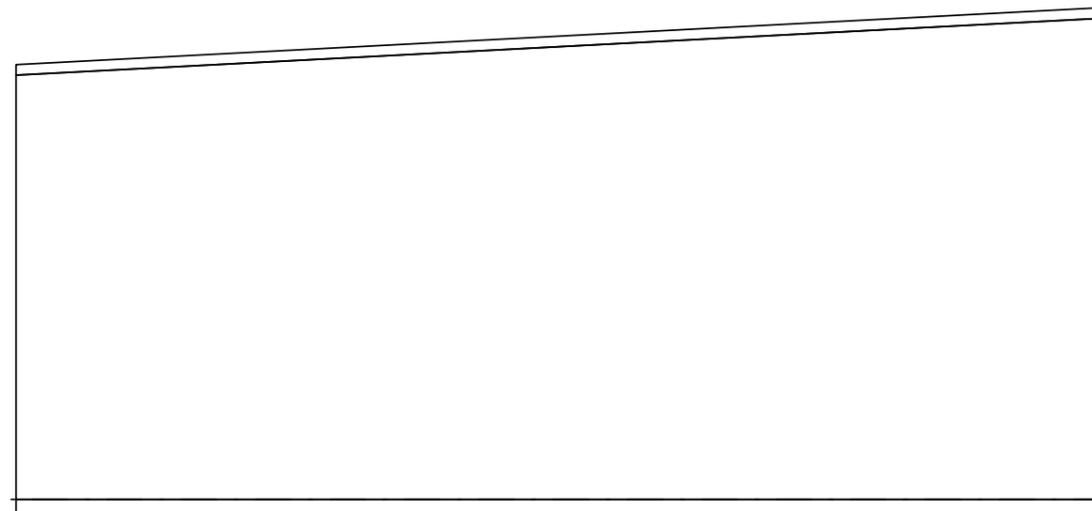
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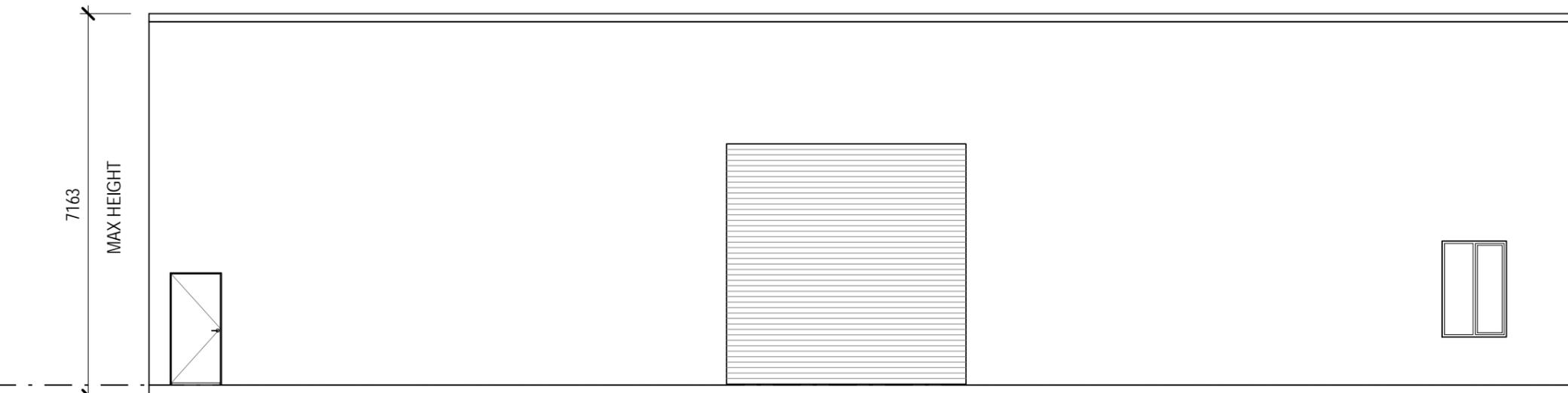
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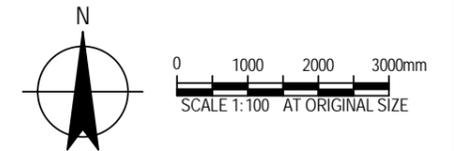
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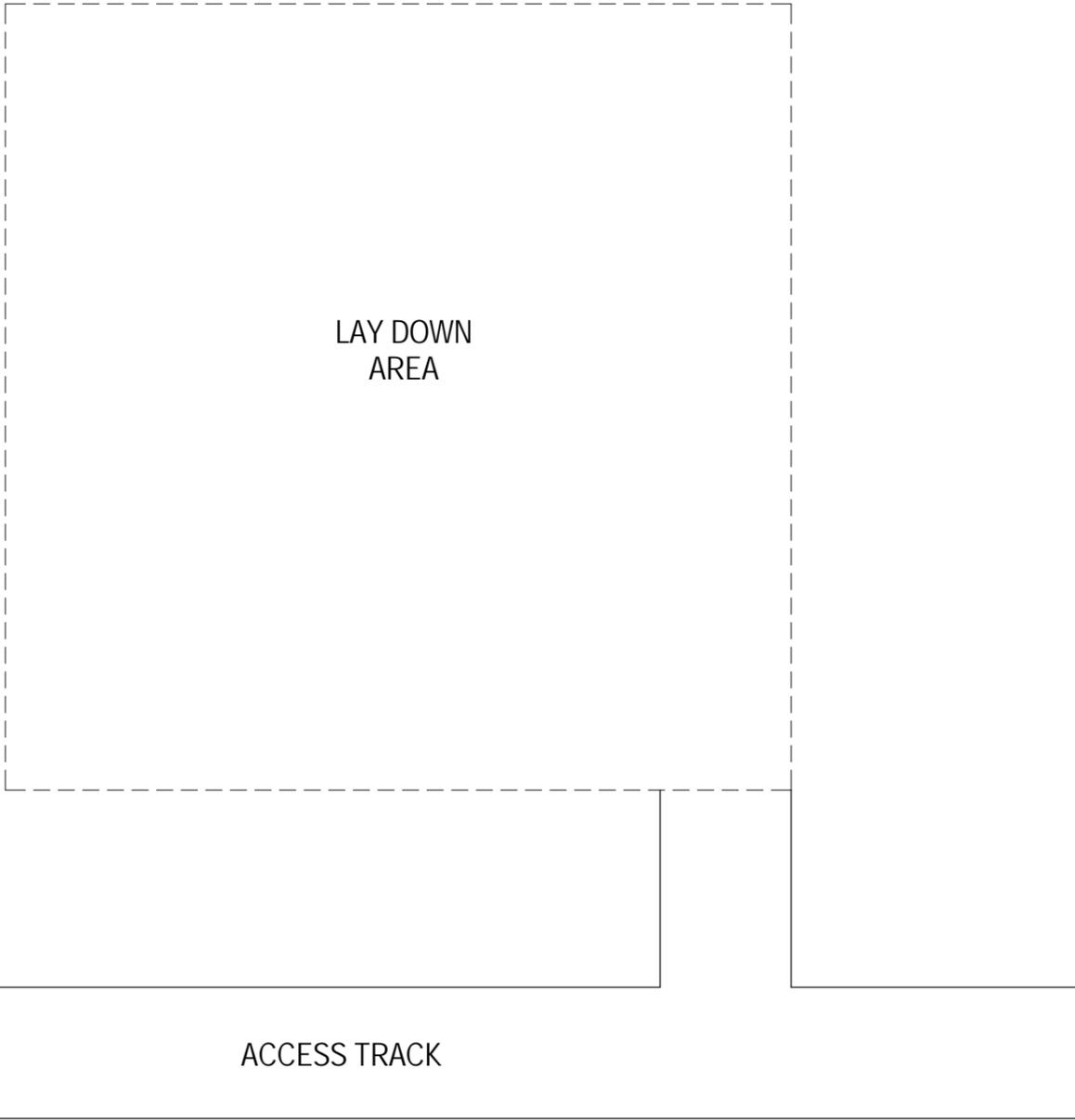
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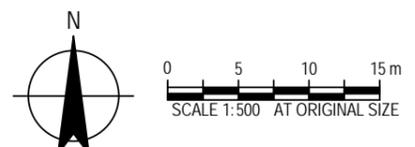
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LAY DOWN
AREA

ACCESS TRACK



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Project **PALMER WIND FARM**

Title **LAYDOWN AREA**

INDICATIVE LAYOUT

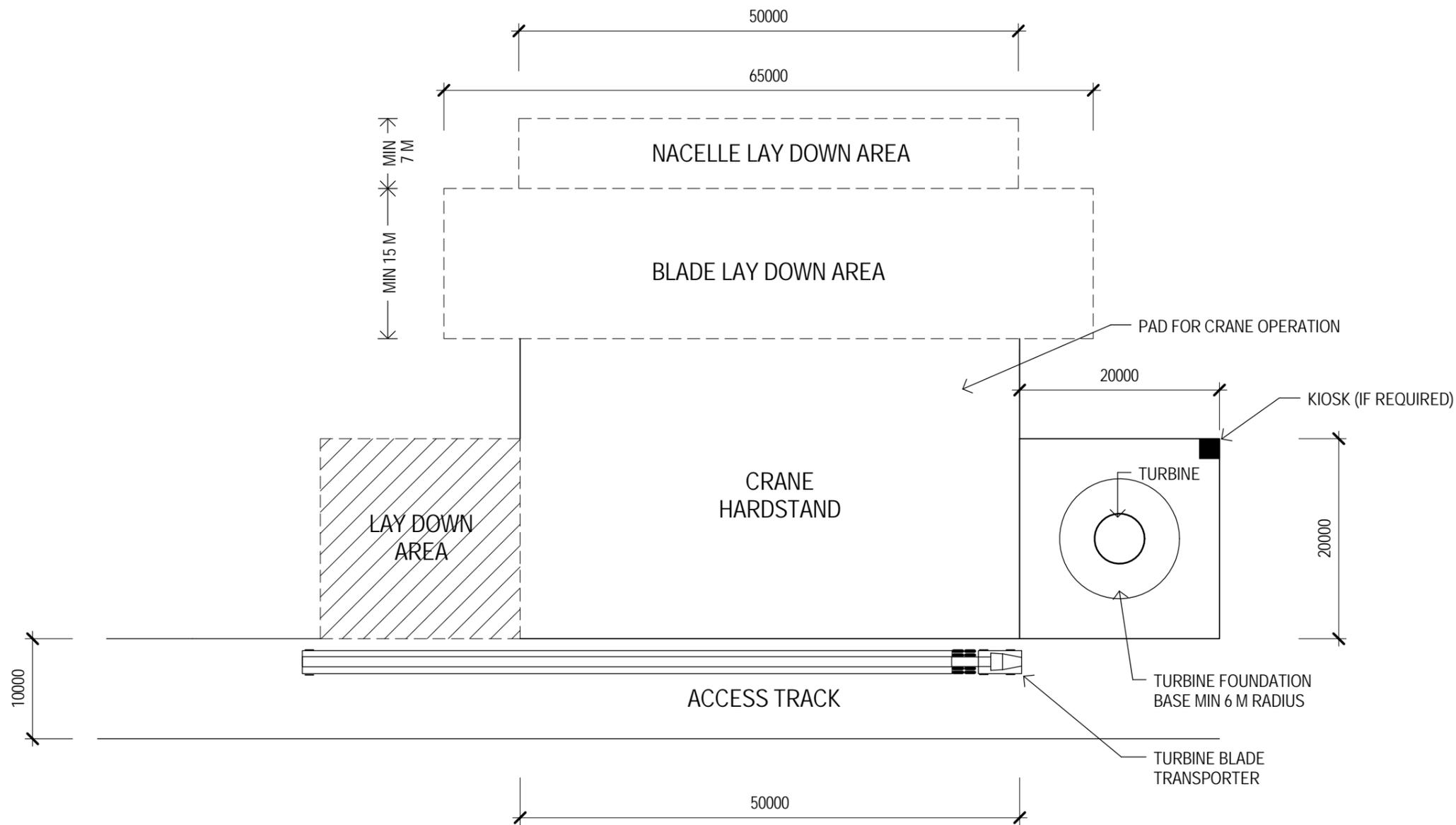
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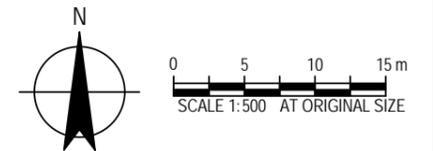
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 Title **TOWER SITE**

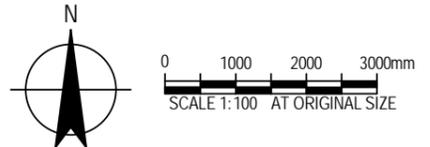
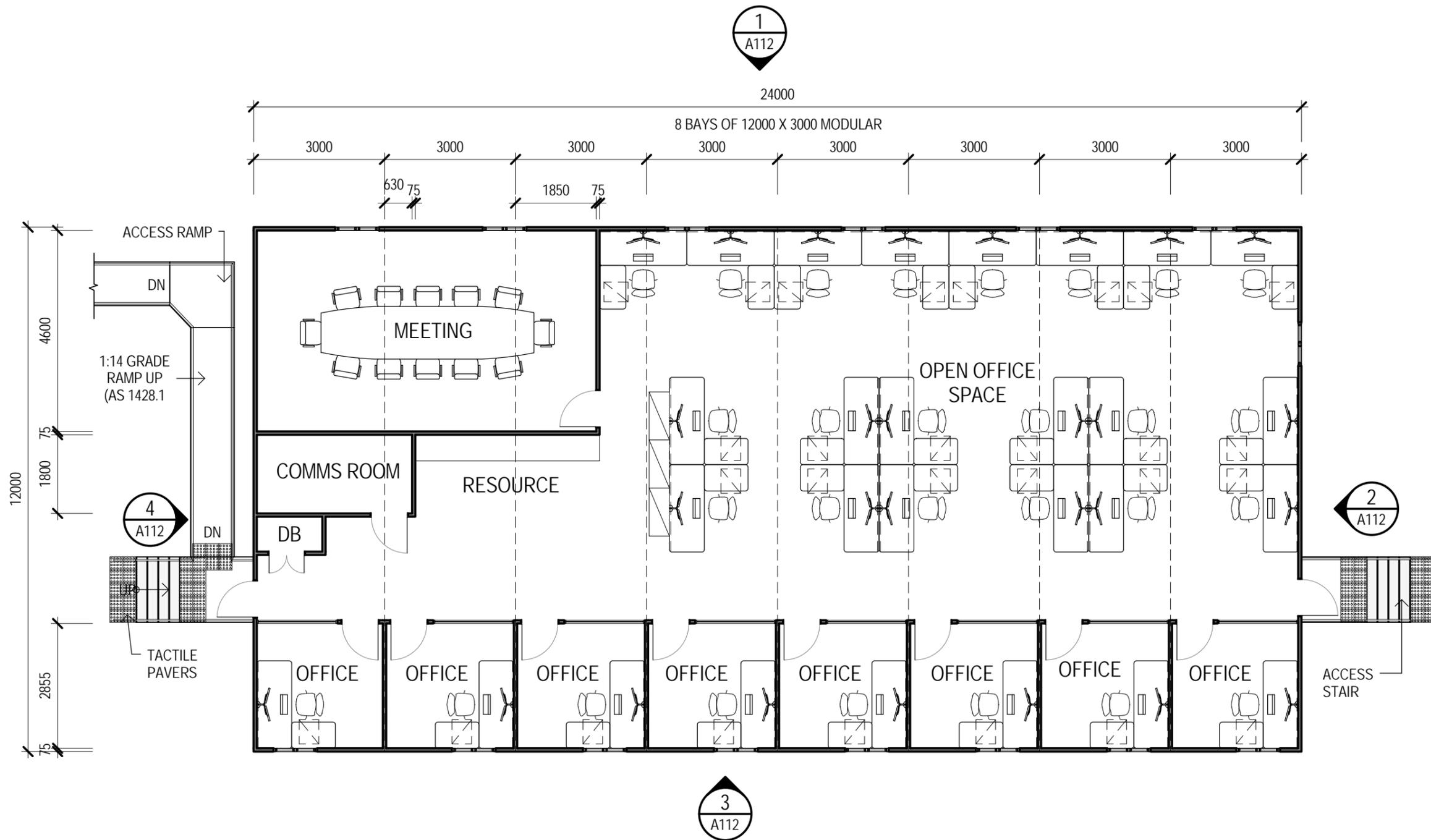
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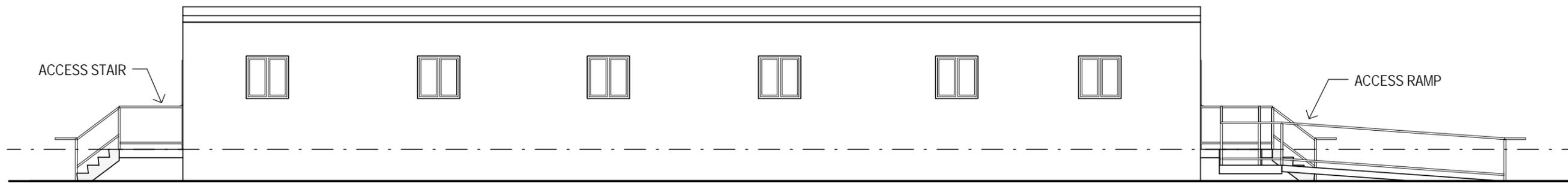
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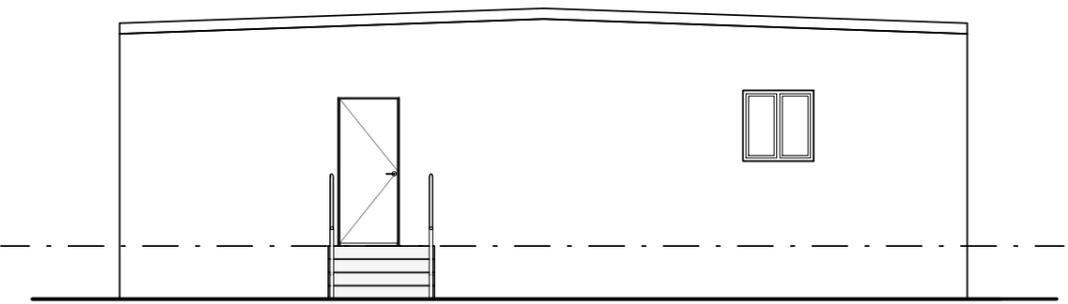


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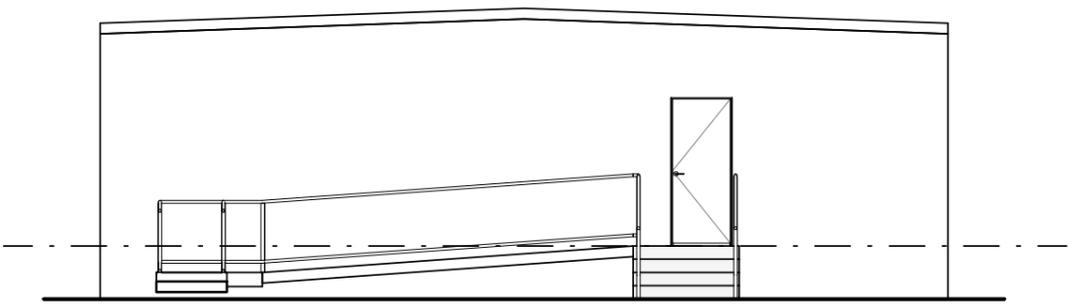
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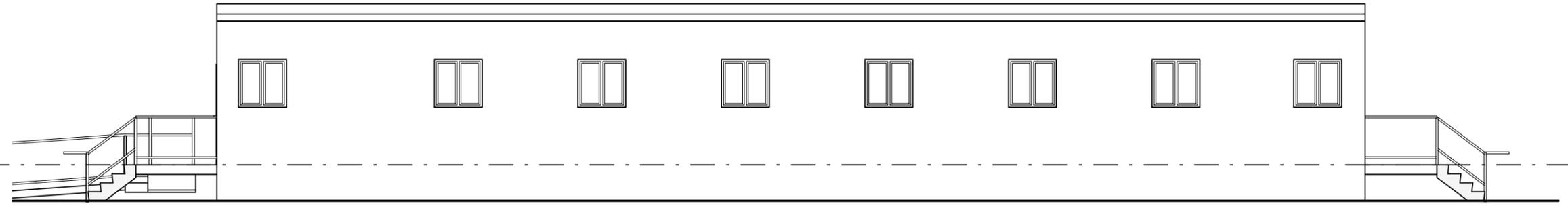
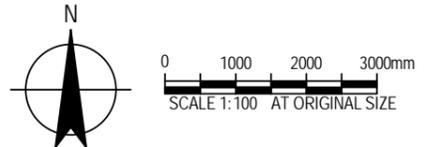
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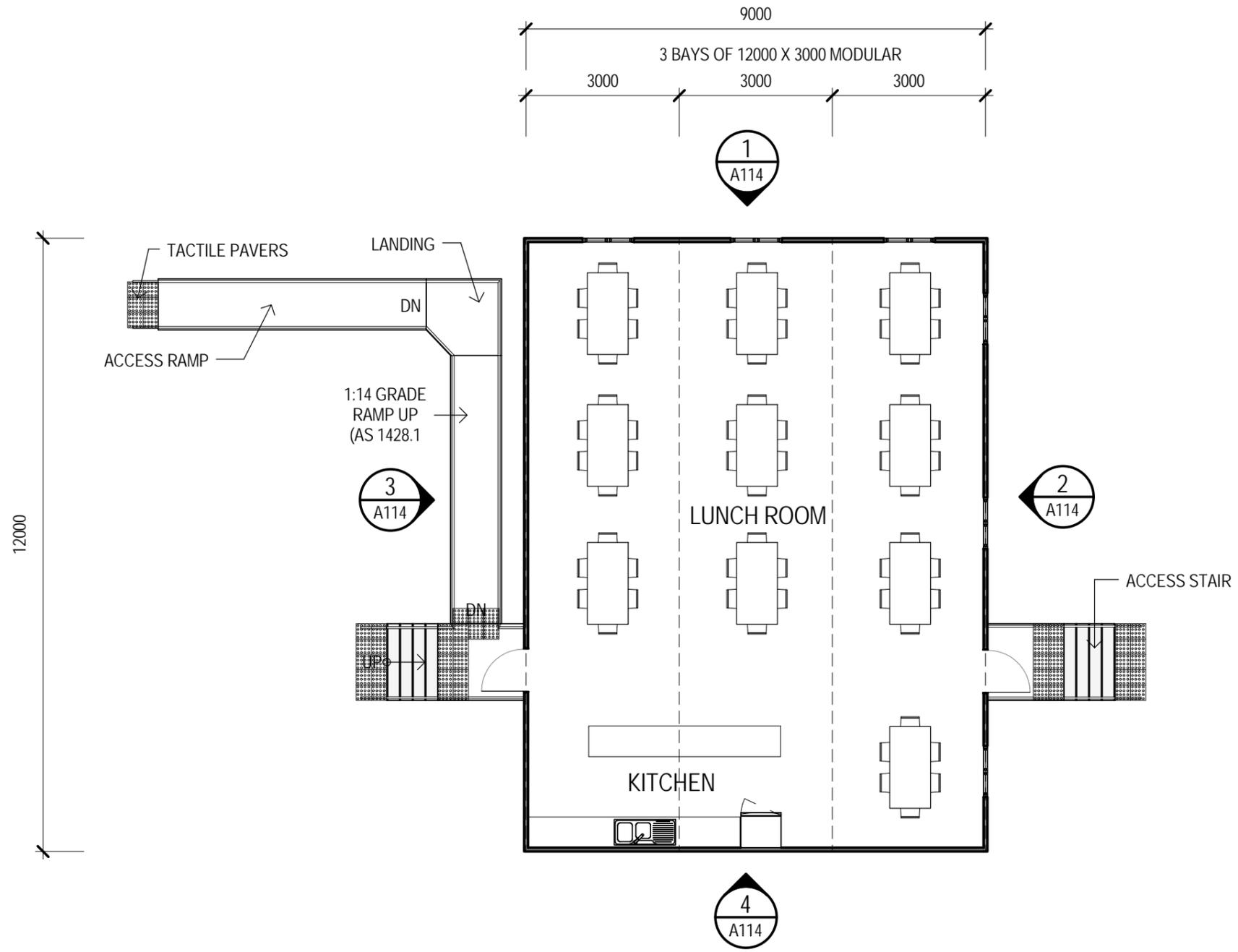
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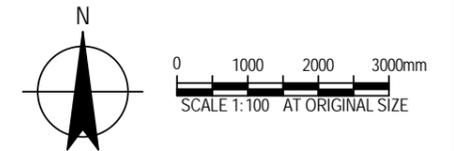
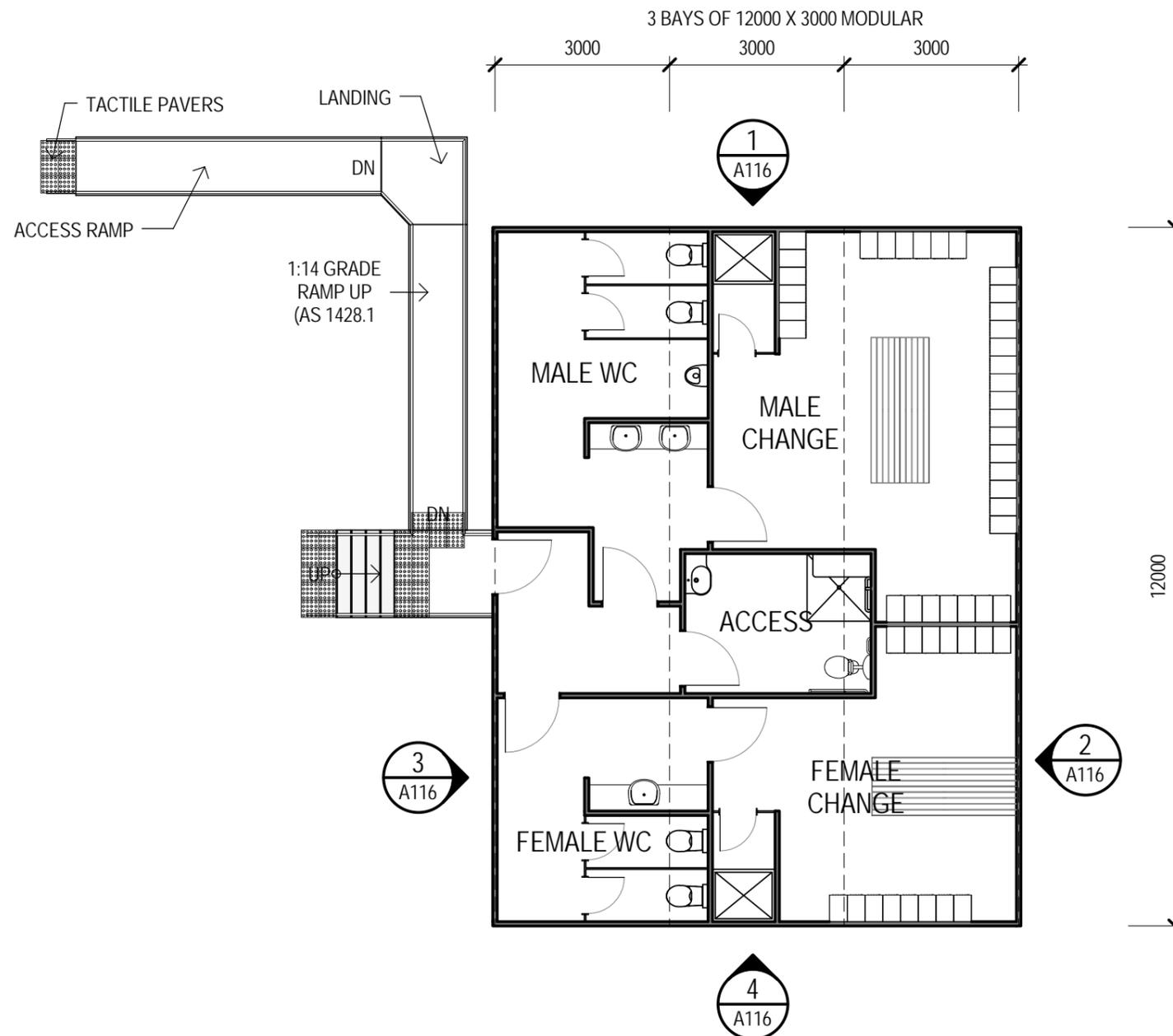
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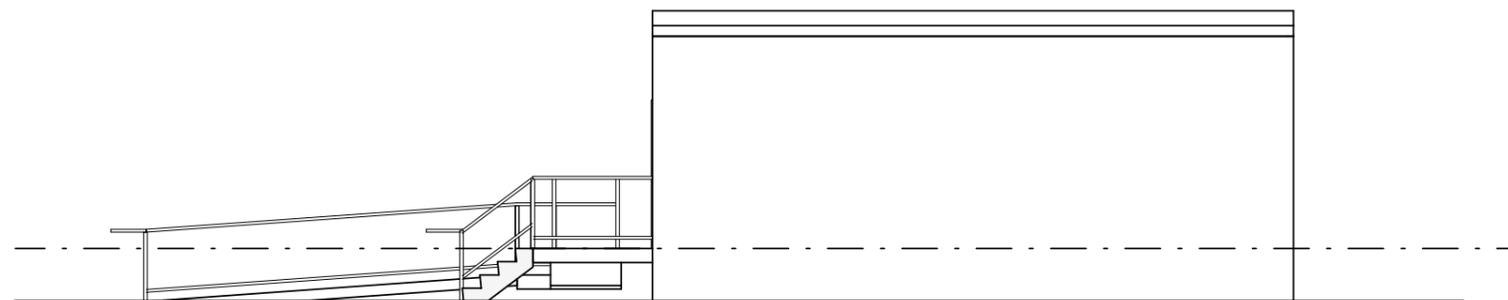
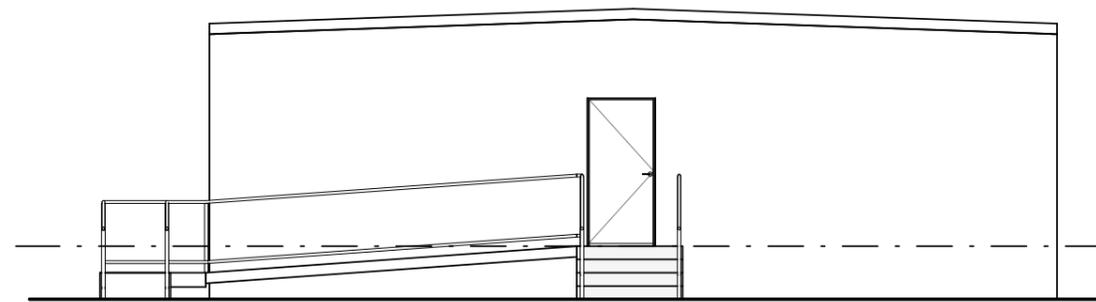
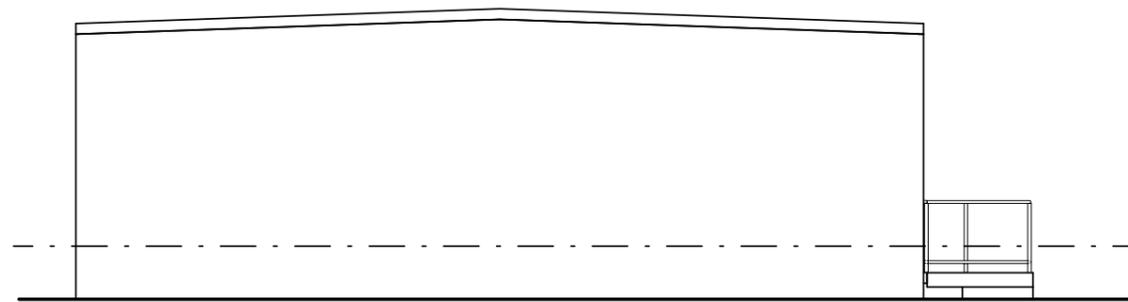
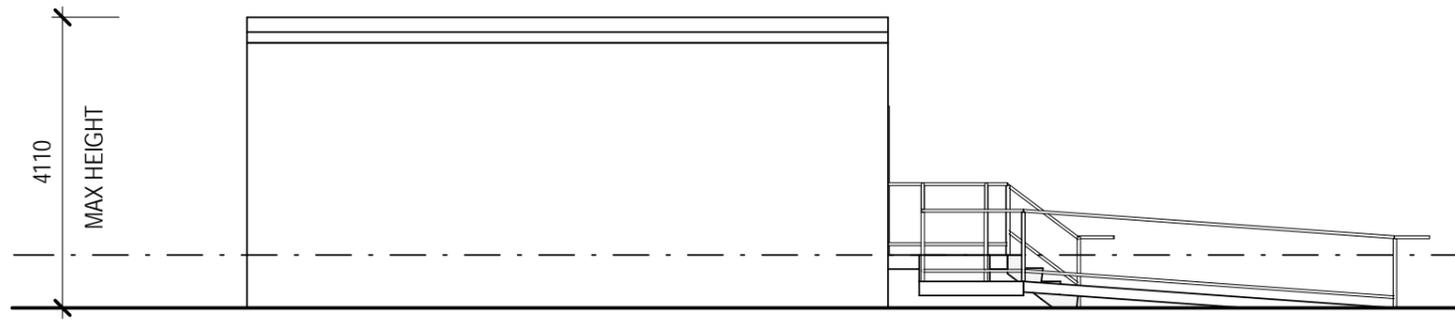
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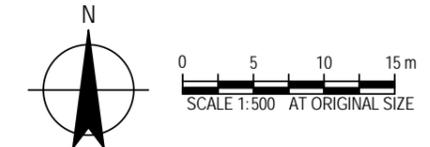
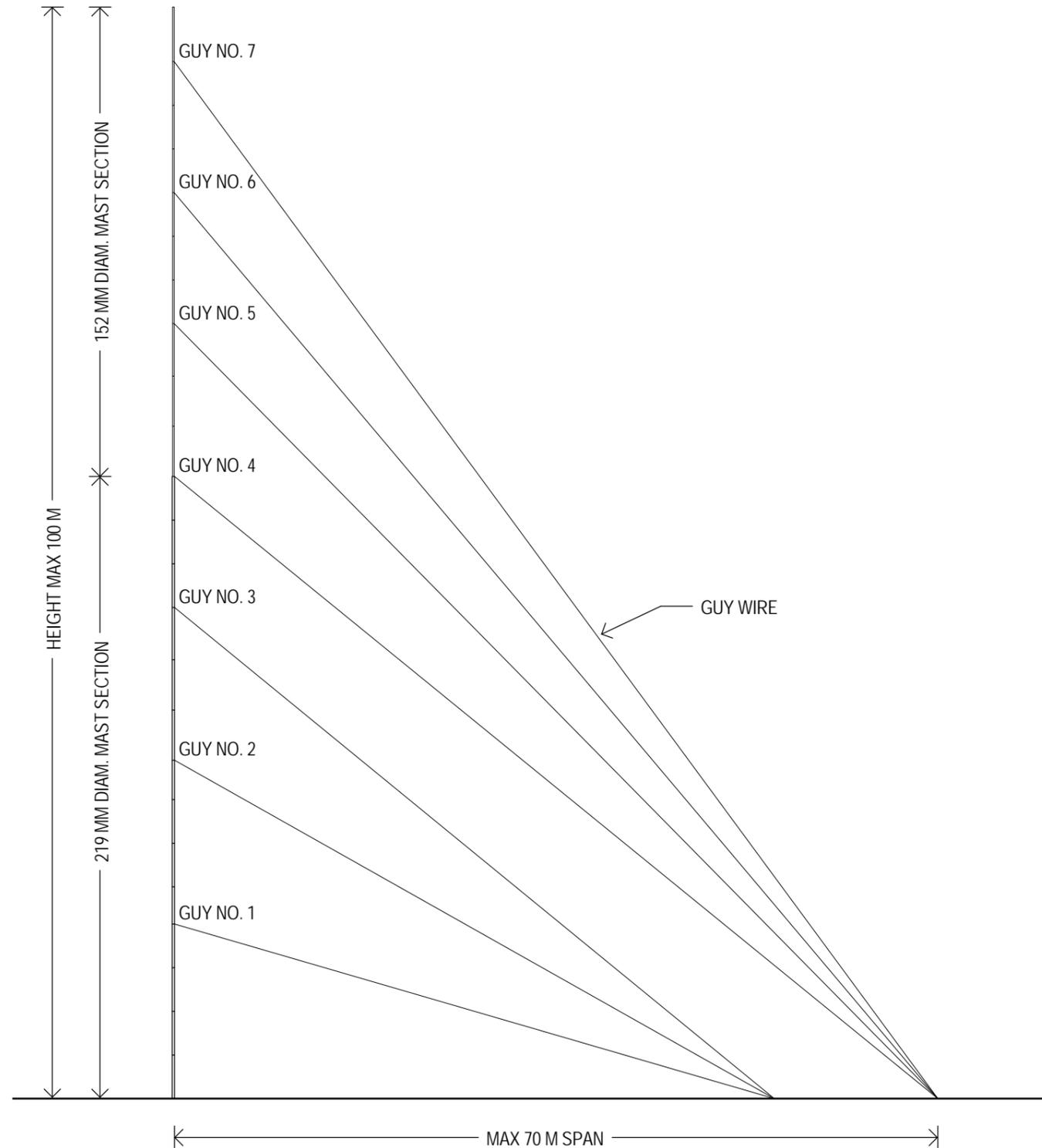
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Title
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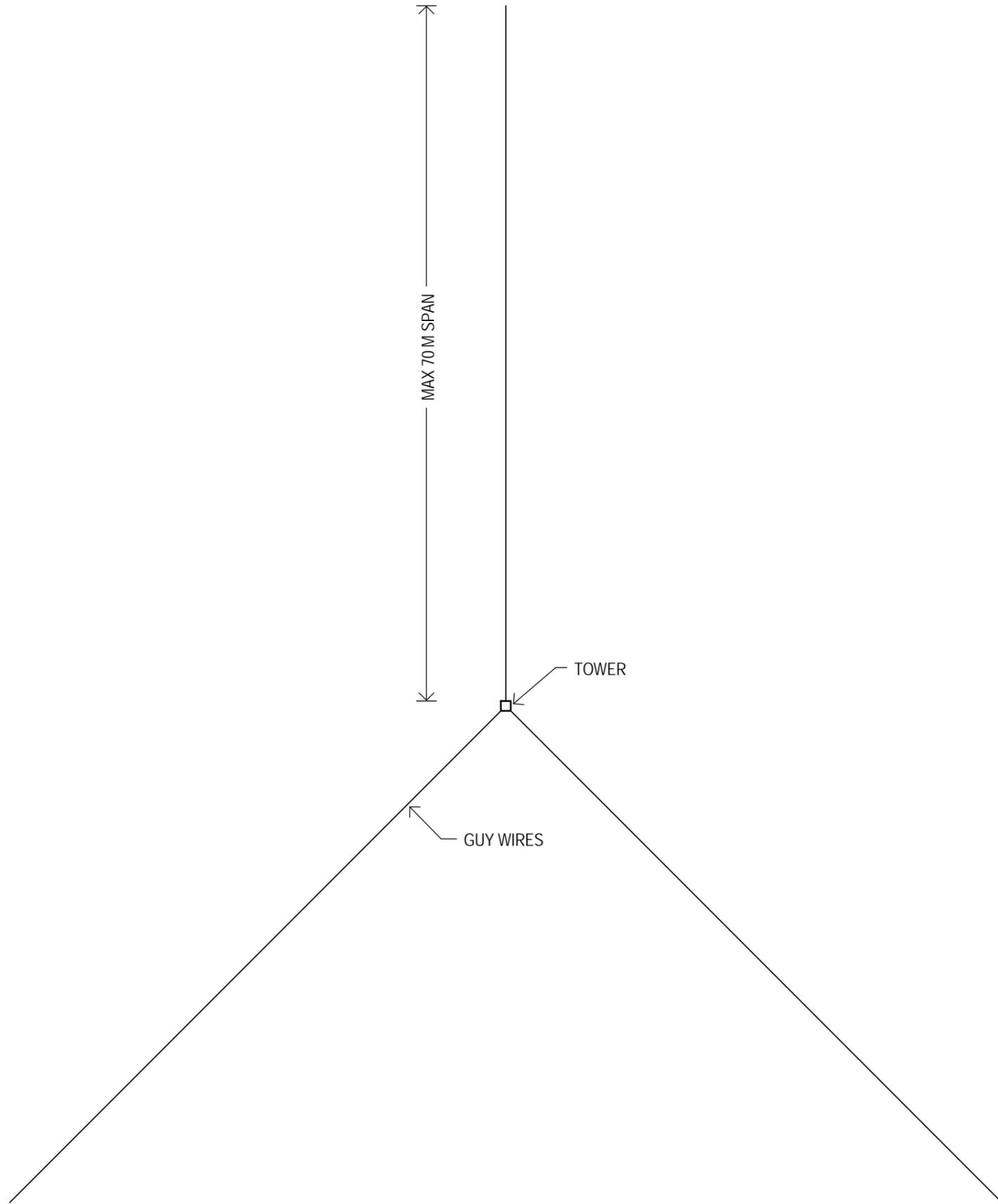
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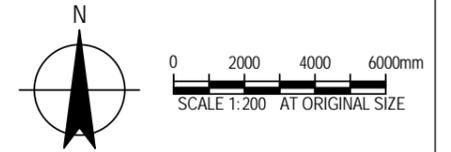
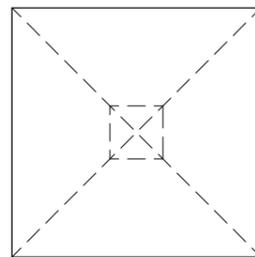
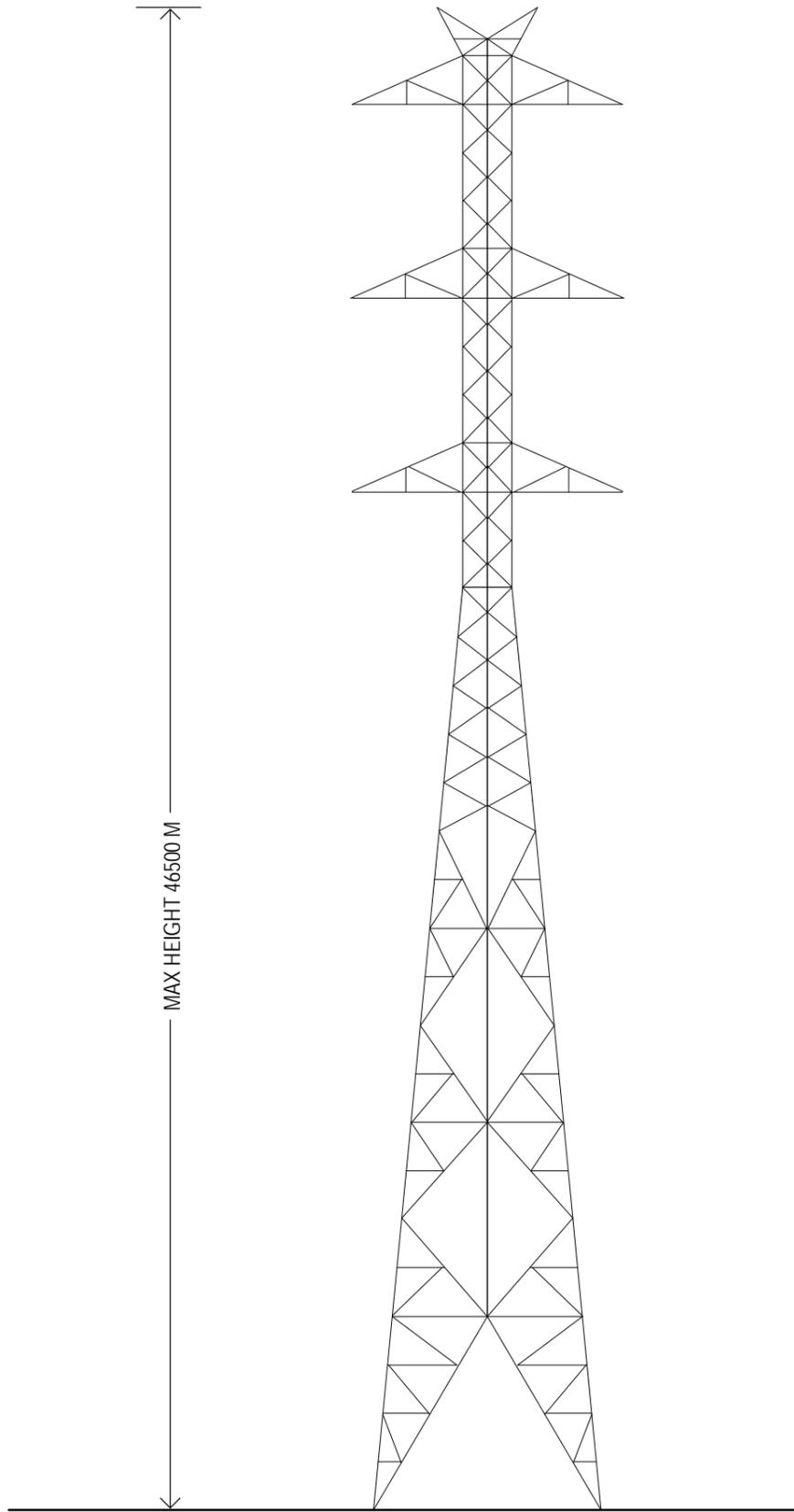
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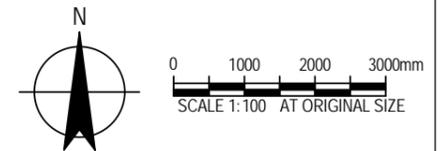
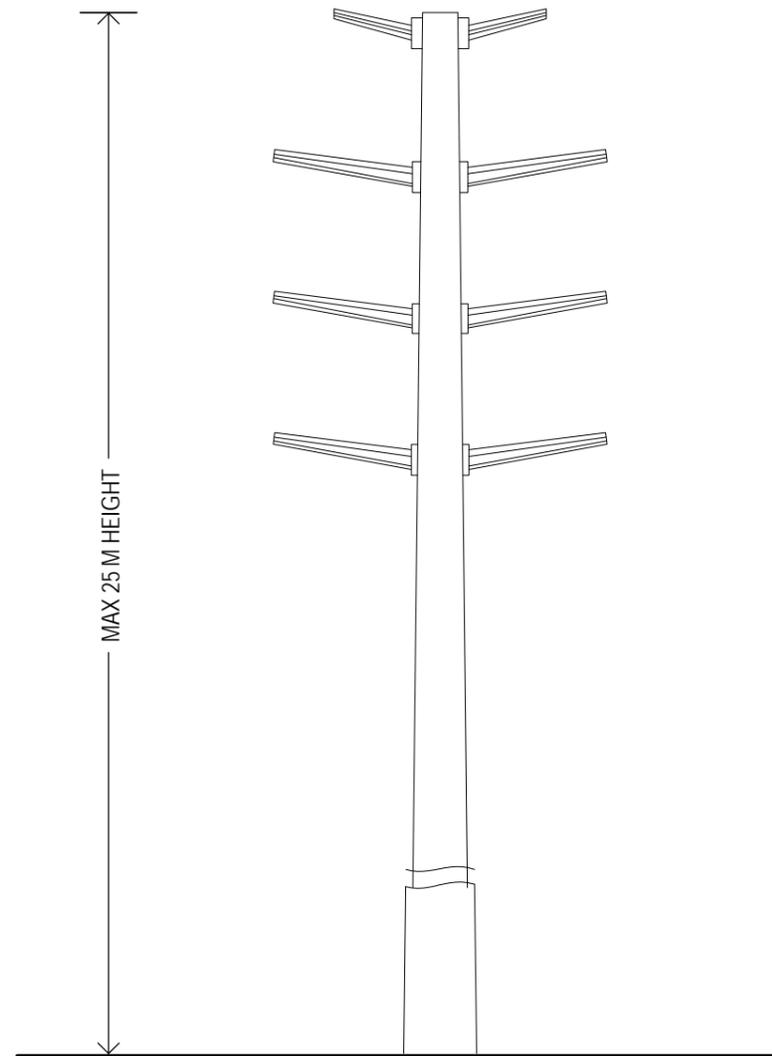
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Title
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Appendix B – Draft CEMP



Trustpower
Palmer Wind Farm
Draft Construction Environmental Management Plan

August 2014

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Appendices

Appendix A - Construction Noise and Vibration Management Plan (Sonus August 2014)

Appendix B – Draft CEMP – Temporary Concrete Batching Plant

1. Introduction

1.1 Introduction

This draft Construction Environmental Management Plan (CEMP) has been prepared to accompany a development application for the proposed Palmer Wind Farm.

This draft plan sets the guiding principles for final CEMPs to be prepared by the respective construction element contractors and accepted by Mid Murray Council prior to construction. The CEMP will be submitted to the Development Assessment Panel, before being issued to prospective contractors who will undertake the construction works associated with this Project.

This document has been prepared to cover the following phases:

- Implementation and construction phase.
- Site closure and make good phase.

1.2 Purpose of this CEMP

This draft CEMP seeks to provide high level guidance to avoid and/or minimise potential environmental impacts associated with the construction of the Palmer Wind Farm and identifies potential mitigation measures and strategies that should be adopted during construction.

A final CEMP(s) will be prepared by the respective construction contractors for review and acceptance prior to works commencing on site. Detailed site-specific mitigation measures will be developed and included in any final CEMP(s) to be prepared by the construction contractors. A CEMP is a dynamic document and is to be updated by the contractor(s) as required to reflect detailed methodology, changes to site conditions or scheduled works. The construction contractor(s) will take responsibility for reviewing and managing the outcomes identified in the CEMP.

The purpose of the CEMP is to:

- Provide for works to be carried out in accordance with the environmental conditions outlined in the Development Approval;
- Provide for works to be carried out in accordance with the applicable environmental legislation and standards;
- Outline how the environmental features of the site are to be protected during construction;
- Ensure all potential environmental risks associated with construction are identified and assessed;
- Protect environmental features and sensitive receptors;
- Outline measures to monitor and control potential environmental impacts associated with the works that are implemented effectively;
- Provide government, community and other stakeholders with assurance that environmental issues associated with the works are managed appropriately;
- Allocate clear responsibilities for the environmental management at all levels; and
- Optimise construction methods.

1.3 Data Sources

The following reports and data sources have been reviewed during the preparation of this draft CEMP:

- Palmer Wind Farm Flora and Fauna Survey (EBS Ecology Feb 2014);
- Environmental Noise Assessment (Sonus Feb 2014, S4171C4);
- Construction Noise and Vibration Management Plan (Sonus August 2014) – Provided in Appendix A;
- Trustpower Palmer Wind Farm Cultural Heritage Desktop Assessment (ACHM, Oct 2013)
- Civil, Geology, Geotechnical and Hydrology Assessment (GHD, Oct 2013);
- Australian Heritage Places Inventory – online database (planning.sa.gov.au);
- South Australian Heritage Places Database – online database (heritage.gov.au); and
- NatureMaps – online database (naturemaps.sa.gov.au).

These studies, and any other finalised post production of this draft document, will need to be reviewed by the contractor prior to completion of the final CEMP.

2. Project Information

2.1 Project Description

2.1.1 Site Location

The wind farm site is located in the eastern Mount Lofty Ranges, South Australia, approximately 50 km east of Adelaide CBD. There are five key localities near the development: Palmer, Tungkillo, Cambrai, Sanderston and Milendella. The area of Tungkillo has a population of approximately 600 people, and includes the township of Tungkillo and the town of Palmer, a small township (approximate population 75 people) that consists of a general store, hotel and a small primary school consisting of approximately 25 students.

Mount Pleasant is the regional centre of the area with a population of approximately 1000 people. Mount Pleasant has a number of facilities, including a small primary school.

The wind farm will be located on a number of private properties, primarily used for farming (involving approximately 20-30 landowners). The project area is predominantly rural in nature with limited residential properties.

The topography of the area comprises undulating hills of the eastern Mount Lofty Ranges, with steep escarpments present along geological fault zones, particularly at the eastern extent of the ranges. Steep sided valleys occur where watercourses cross the escarpments. There are a number of watercourses within the area, with the majority being ephemeral.

Transportation networks in the wider area consist of mainly unsealed gravel roads owned and maintained by the Mid Murray Council, plus regional / collector sealed roads servicing the townships.

2.1.2 Description of works

This site is approximately 30km long along the ridgelines of the eastern Mount Lofty Ranges on roughly 12,000 hectares and is in close proximity to the Tungkillo substation.

The windfarm will include up to 114 turbines. Each turbine will be up to a tip height of 165m. The turbines will be connected by underground and overhead electrical cables to up to two on-site substations.

The current layout has three distinct clusters of turbines. The three areas will include turbines, substation, overhead and underground transmission, construction facilities (including potential concrete batching plants) and access tracks:

- Area A Northern Site – South of Walker Flat-Mt Pleasant Road, on the eastern ridges of the hills before descending into Sanderston;
- Area B Central Site – between Walker Flat-Mt. Pleasant Road and Adelaide-Mannum Road along Davenport Road; and
- Area C Southern Site – between Adelaide –Mannum Road and Bottroff Hill Road.

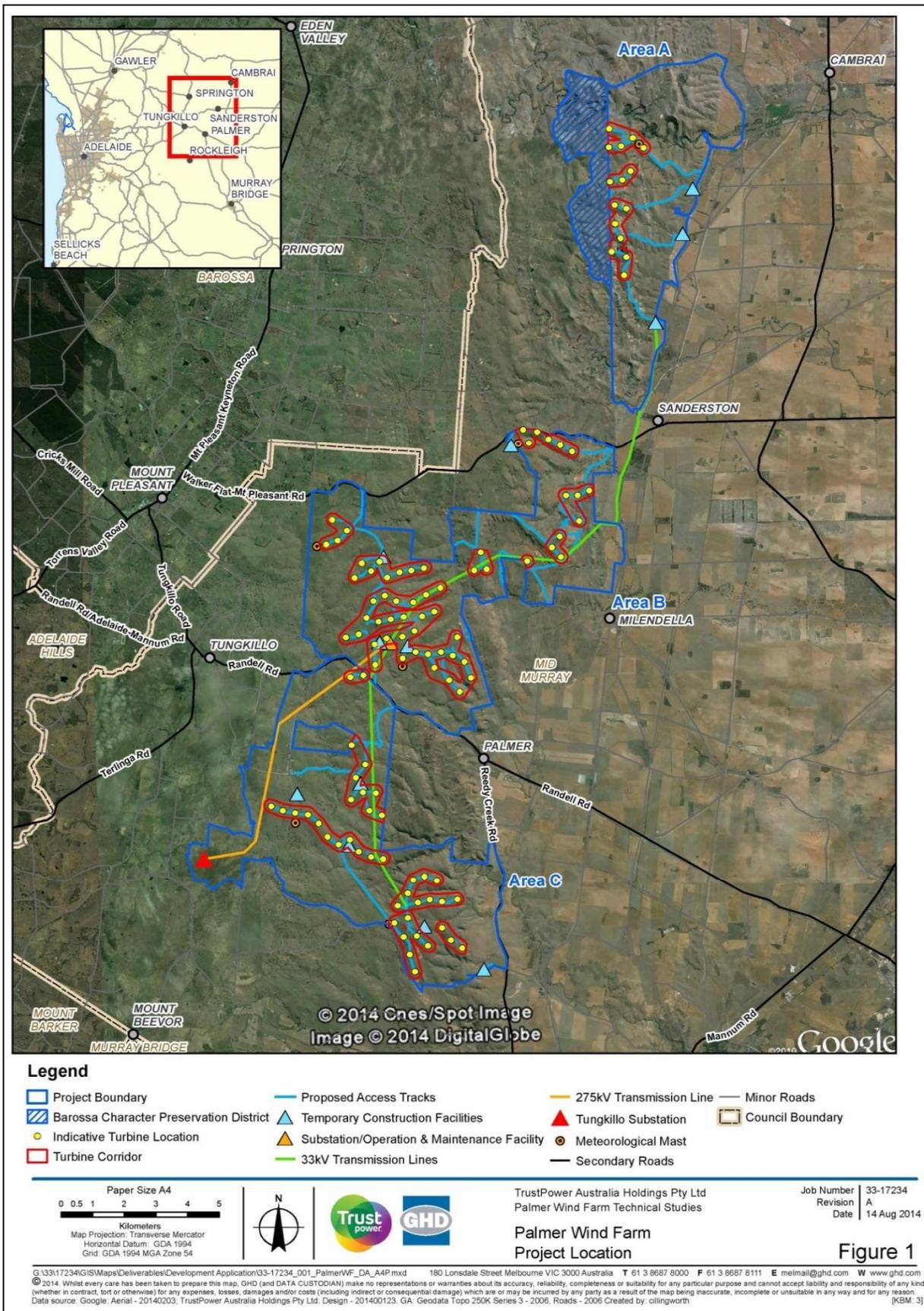


Figure 1 Project Location

The infrastructure required for the installation and operation of the wind farm includes permanent facilities, with an expected life of 30 to 50 years and temporary facilities for the duration of construction phase. The permanent infrastructure will include, but is not limited to:

- Wind turbines and adjacent hardstands
- Internal access tracks
- Underground electrical cables and overhead transmission lines
- Substation
- Maintenance and operation facility
- Wind monitoring masts

Construction activities associated with the development will be undertaken over the following phases (which may start simultaneously):

- Site establishment
- Access tracks and hardstand construction
- Turbine foundation construction
- Underground cabling installation
- Overhead line installation
- Substation construction
- Operations and maintenance building construction
- Turbine delivery and erection
- Connection to the electricity grid
- Commissioning of the wind farm
- Construction site decommissioning, removal of all temporary structures and restoration of the site.

Temporary infrastructure associated with the construction phase of the proposed wind farm includes a main compound area, site offices and staff facilities.

It is expected that the processes involved in the construction will include the following key elements:

- Temporary storage of chemicals, spoil and equipment
- Topsoil stripping and vegetation removal
- Excavation and borrow pit development
- Blasting (may be required)
- Grading and compaction (cut and fill if required)
- Bore hole drilling
- Concrete pouring (opportunity of utilising temporary concrete batching plant)
- Haul and construction vehicle movements
- Installation of turbines, equipment, fencing and overhead power lines.

A specific management plan for the concrete batching plant should be developed prior to works commencing (a draft CEMP – Temporary Concrete Batching Plant, is included in Appendix B).

Temporary construction facilities will be dismantled and sites rehabilitated post construction.

Figure 2 provides a suggested storm water treatment arrangement for the maintenance and operations facility and key landscaping elements.

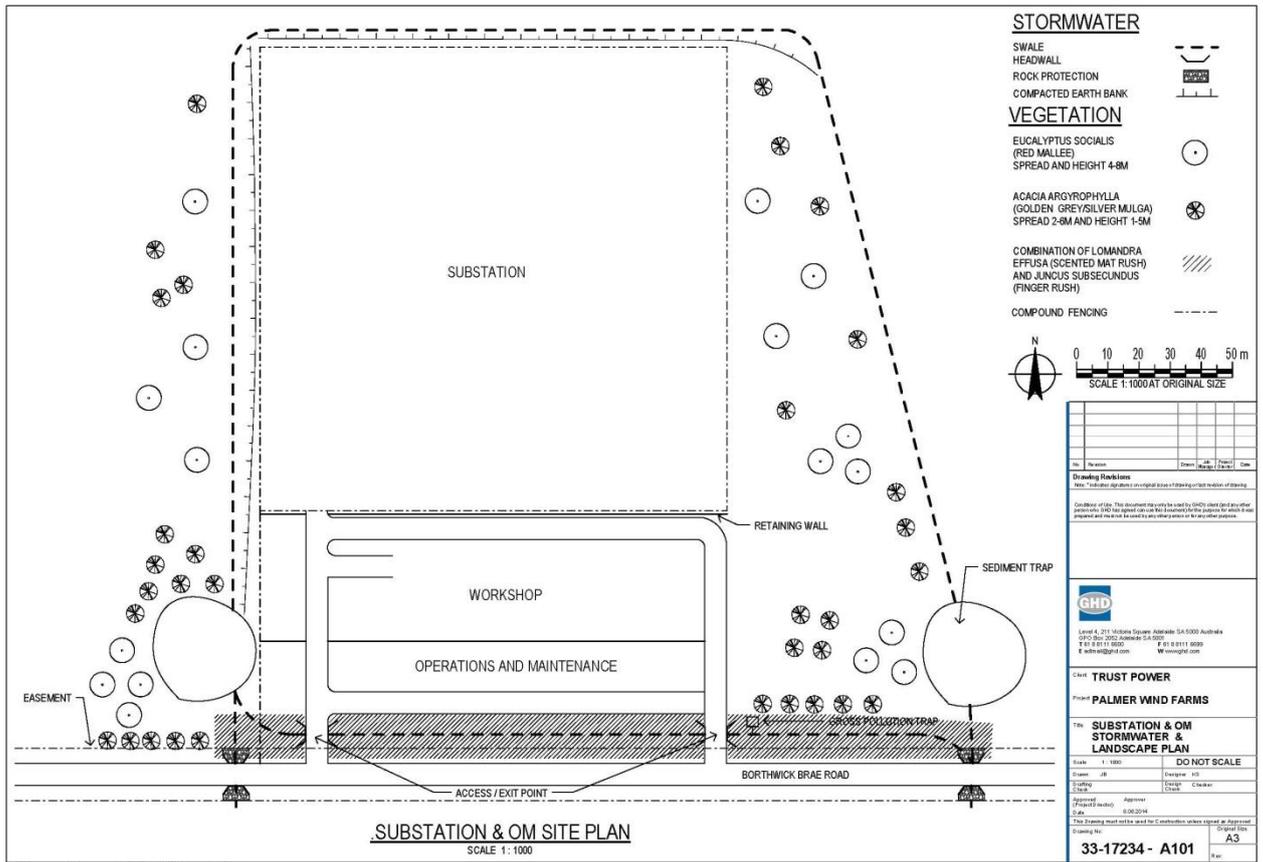


Figure 2 Suggested stormwater and landscape arrangements

2.2 Sensitive Receptors

This section summarises the environmental features which have been identified as potential sensitive receptors for this project. The potential construction impacts upon these receptors are considered in Section 3.

Table 1 Sensitive Receptors

Standard	Management Criteria
Community	<p>There are five towns in the location of the development: Palmer, Tungkillo, Cambrai, Sanderston and Milendella. In addition Mount Pleasant is the regional centre of the area.</p> <p>The wind farm will be located on a number of private properties primarily used for farming which will involve approximately 20-30 landowners.</p> <p>The majority of these communities are serviced by unsealed gravel roads with sealed roads located around the towns. The existing traffic volumes along these roads are low and the roads are generally only used by local farmers for access to their properties and transportation of farming equipment and materials.</p> <p>The Project Area includes traditional lands of the Peramangk Aboriginal group. The Peramangk Aboriginal group do not have a native title claim lodged over its asserted traditional land and is represented for heritage matters by the Mannum Aboriginal Community Association Incorporated (MACAI). A work area clearance agreement is in place with MACAI for the management of aboriginal heritage aspects and potential impacts.</p>
Ecology	<p>The soil condition of the project site has made it favourable for agricultural land use, which in turn has resulted in the clearing of the majority of native vegetation in the area.</p> <p>Remnant native vegetation only exists in discrete parcels in the project area and is categorised as woodland transitioning to scrub and grassland. This is usually found in very steep locations such as gullies.</p> <p>An ecological survey has identified Iron-grass Natural Temperate Grassland of South Australia as existing in the proposed development area. This is a threatened ecological community listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) within the Palmer Wind Farm Area A and B.</p> <p>Part of the site is in an area identified as a Vegetation Heritage Agreement area. This is a program that encourages landowners to conserve native vegetation on their properties and help to reverse the effects of over-clearance.</p> <p>The project area is upstream of a Wetland of International importance, being the RAMSAR listed Coorong and Lakes Alexandrina</p>
Water Resources	<p>There are a number of watercourses within the wind farm area, predominantly fed by rainfall and the majority are ephemeral. The average rainfall in the area generally decreases in an easterly direction.</p> <p>The groundwater table is closely linked to rainfall, falling during dry winters and rising during wet winters. As at late 2011 depth to the groundwater table below ground surface varied across the site from less than 2 metres in a relatively small area south west of site B, to greater than 20 metres in larger areas south of Tungkillo, in the vicinity of Palmer, and isolated areas north of Palmer. No strong correlation between depth to groundwater and surface elevation was noted, indicating that other factors affect groundwater levels such as upstream catchment sizes and local extraction rates.</p> <p>Both surface water and groundwater are prescribed within the area, requiring permits for use.</p>

Standard	Management Criteria
Soils and Geology	<p>The topography of the Project Area comprises undulating hills of the eastern Mount Lofty Ranges, with steep escarpments present along geological fault zones, particularly at the eastern extent of the ranges. Steep sided valleys occur where watercourses cross the escarpments.</p> <p>The soils of the eastern slopes of the Mount Lofty Ranges generally have a high to very high erosion potential by water and are likely to be subject to soil erosion by water, and potentially wind, if ground is disturbed.</p> <p>The site is in an area bounded by known fault lines that are seismically active. The likelihood of a major earthquake occurring is not known, however no significant (>4 magnitude) earthquakes have been recorded in the area. The Granite Boulders Area Geological Site (see Table 2) is located in the project area.</p>
Cultural Heritage	<p>There are numerous recorded sites of Aboriginal or European heritage within close proximity of the Wind Farm Project Area. The Project Area includes Traditional lands of the Peramangk Aboriginal group.</p> <p>Further details of local cultural and heritage sites are provided in the final Trustpower Palmer Wind Farm Cultural Heritage Assessment Study. This study indicates the more likely areas that indigenous heritage features may be located.</p> <p>Dry stone walls are noticeable feature on the landscape. Some parts of the walls are in a good state of repair.</p>

3. Environmental Management System

Managing environmental issues and promoting environmental awareness during the site works is an essential component of responsible project management. It requires the active consideration of environmental issues and health and safety as a prerequisite to all construction operations. This section identifies the key management measures which will be required to avoid or minimise these likely impacts. The contractor's EMS is expected to comprise an environmental policy and the basic elements indicated in Section 3 of this report.

3.1 Implementation Responsibility

The roles and responsibilities of the following key participants in the construction works for the project are outlined below:

- Trustpower Principal
- Contractor Superintendent
- Contractor Environmental Manager
- Contractor and Staff.

The Trustpower Principal will engage a construction company ("the Contractor") who will be responsible for ensuring the final CEMP is developed and implemented by all staff and their subcontractors involved with the construction works.

The Principal should ensure that all contractual documents specifically quote a CEMP in terms of responsibility for addressing and implementing relevant environmental requirements. The contractual documents should also indicate that the Contractor is responsible for ensuring legislative and CEMP compliance controls are maintained on site.

The Contractor is responsible for obtaining all relevant approvals/permits/licences prior to works commencing. The Contractor will appoint an Environmental Manager who is responsible for developing environmental impact mitigation measures compliant with all approvals, permits, licences and management measures and incorporating this into the CEMP for construction works. The Contractor will assign a superintendent who will have overall responsibility for ensuring that all employees, subcontractors, and persons involved with the planning and carrying out of the proposed works are familiar with their obligations to comply with environmental requirements.

Successful implementation relies upon support for, and compliance with, the CEMP's requirements from all involved parties. Responsibilities are detailed below:

Trustpower Principal (the "Principal")

- Key contact and representative of Trustpower.
- Ensure contractual documents include environmental responsibilities, adequate training and preparation of a final CEMP prior to construction commencing.
- Overall responsibility for ensuring the project meets its compliance obligations and environmental requirements are implemented.
- Agree procedures for emergency response.
- Agree frequency and method of auditing, monitoring and other matters which are to be reported to Trustpower.

Environmental Manager (assigned by the Contractor)

- Responsible for managing environmental aspects during the construction and site closure phases and that the Superintendent has the information required to implement site controls successfully.
- Checks all environmental requirements, licences and procedures are implemented.
- Advises staff of special requirements.
- Conducts or commissions a consultant to undertake environmental audits/monitoring during all stages to ensure implementation of requirements.
- Determines and/or ensures environmental controls and procedures are in place and maintained during all phases of the project.
- Determines the training/instructions required for staff to be able to meet their environmental obligations.
- Reports environmental incidents during construction.
- Responsible for the emergency response procedure for environmental incidents.

Superintendent (assigned by the Contractor)

- Supervises and implements environmental controls on site during the construction works.
- Ensures training/instructions required by staff to be able to meet their environmental obligations, are undertaken and recorded.
- Reporting of environmental incidents to the Environmental Manager.
- During an emergency situation, responsible for informing the Environmental Manager and activating the response procedure.

Contractor(s) and Staff

- Implement environmental controls as directed
- Report environmental incidents to the superintendent.

Table 2 summarises the relevant project phase responsibilities relevant to implementation of a CEMP.

Table 2 Project Role Description and Responsibility

Planning	Principal	Oversees planning and Tender phase. Responsible for ensuring environmental compliance during the design phase and CEMP preparation.
	Design Consultant	Responsible for design of the wind farm facilities Responsible for preparation of a draft CEMP to guide development of a project-specific CEMP and outline legislative requirements.
	Environmental Manager	Responsible for review of the draft CEMP and preparation of final CEMP prior to construction commencing.
Construction Works	Principal	Responsible for environmental compliance.
	Superintendent	Oversees construction phase and enforces environmental controls on site.
	Environmental Manager	Ensures Contractor complies with environmental requirements.

3.2 CEMP Review, Reporting and Monitoring

The CEMP will only be effective if it is appropriately managed and utilised. Although the final CEMP will be developed prior to the commencement of construction works by the Contractor with the intention of covering the detailed methodology, circumstances may differ from those anticipated. Consequently it is very important that the CEMP be regularly reviewed and updated. This will ensure that the measures, responsibilities, criteria and corrective actions remain achievable, effective and suitable to the project, whilst maintaining compliance with relevant legislation and policy.

An important principle that is embodied in this draft CEMP is that of “continuous improvement”. To facilitate this process it is critical that an appropriate monitoring, reporting and review process be developed and adopted.

3.2.1 Review of CEMP

The CEMP is to be reviewed throughout the construction phase monthly (or at a frequency determined by the Contractor). The review is to examine the following as a minimum:

- The implemented environmental management activities
- The incident reporting and preventative action procedures
- The complaints handling procedures
- The emergency response procedures for environmental incidents.

3.2.2 Monitoring Records

The results of any monitoring required by any approvals, licences or Conditions of Consent granted for the construction phase of the development must be:

- In a legible form
- Kept for at least 4 years after the monitoring or event to which they relate/took place
- Be available upon request to any authorised person.

The following minimum records will be kept in regards to any monitoring / sampling activity:

- The date(s) on which the monitoring was taken
- The time(s) at which the monitoring was collected
- The point at which the monitoring was taken
- The name of the person who conducted the sample.

3.2.3 Sampling Quality Control Plan

Where practicable NATA accredited laboratories will be used for any testing of samples taken in association with approvals, licences or consent conditions. Laboratory detection limits must be below the adopted assessment criteria.

Quality Assurance / Control measures such as collection and testing of duplicates and blind duplicates will be used to ensure the accuracy and quality of the required monitoring.

3.2.4 Follow Up Action

Where adherence to the requirements in this document are found to be unsatisfactory in achieving broader environmental and site management goals, action will be taken to investigate the cause and make amendments to the CEMP as required.

3.2.5 Reporting

The Contractor shall provide a fortnightly report to the Principal to cover the following circumstances:

- Include a report on any monitoring undertaken in accordance with licences, approvals or conditions of consent
- Provide a summary of complaints received during the construction phase of this project
- Report of compliance with the CEMP.

3.3 Training and Site Induction

The Contractor will oversee that all employees, sub- contractors and visitors receive environmental instruction in relation to the CEMP and legislative requirements. Each person will be made aware of and have an understanding of their obligations and duties detailed in this CEMP. Everyone involved with the project should be familiar with the CEMP components that are relevant to their role.

The Principal is responsible for overseeing that the contractual agreement with the Contractor specifies the necessity of providing adequate training to the construction teams. This responsibility is to be assigned to the Superintendent who can liaise with the Principal and other agencies, if required. During construction works, the Contractor must ensure that each operative is trained to use the machinery and materials on site efficiently to avoid environmental nuisance, including noise, air pollution, impacts on water quality, spread of waste material and land contamination.

3.4 Emergency Response and Incident Management

The final CEMP should detail emergency response procedures, with clear lines of responsibility to enable effective response with minimal environmental harm or disruption. The following sections provide an outline of procedures and protocols that should be included in the final CEMP.

3.4.1 Environmental Incidents (Notification of Environmental Harm)

The type of incidents that may require notification in accordance with legislation depends on the extent of harm or the potential damage to the environment. To ensure that Trustpower has a consistent approach to incident reporting, the Principal must be contacted immediately after the site has been made safe. However, the steps necessary to render the site safe and notify appropriate authorities may require an immediate response from Trustpower's Principal. In addition valuable time may be lost in attempts to contact the Principal who may be unavailable to respond, however attempts to contact the Principle should be made immediately following an event. Therefore the Contractor's Environmental Manager and Superintendent will be responsible for ensuring:

- An immediate assessment of the potential onsite and offsite impacts of the incident
- Consulting (if necessary) with emergency services
- Instigating appropriate steps to mitigate the impacts
- Advising regulatory authorities, where these authorities can provide assistance with mitigation of impacts.

Failure to report an incident may result in enforcement action on all involved.

The Principal will provide written details of the notification to the appropriate authorities within 7 days of the dates on which the incident occurred.

The Principal will liaise with the appropriate authorities to provide suitable details within the time specified.

3.4.2 Emergency Response Plan

Emergencies that may occur during the construction phase of the project include:

- Fire
- Chemical spill
- Flooding
- Explosion
- Wildlife Injury
- Damage to power or services cables
- Personnel injury
- Seismic activity.

Prior to the commencement of the construction phase, the Principal and the Contractor are to agree on procedures for emergency response. It is the responsibility of the Contractor to develop, implement and train staff in the emergency response procedures.

To ensure emergencies are managed in an appropriate manner the Contractor is to follow the general procedures outlined in Table 4.

Table 3 General Emergency Response Plan

Standard	Management Criteria
Policy	To minimise the risk of an environmental accident or emergency during construction phase of the Project.
Performance Objective	Ensure that an Emergency Response Plan is kept in place to respond to any accidents or incidents that may impact on the environment and that all personnel are inducted in its application.
Implementation Strategy/ Mitigation Measures	Material Safety Data Sheets for all relevant materials used or stored on site, regardless of quantity, for the construction works shall be kept on site by the Contractor.
	Spill Response Kits, fire extinguishers and other emergency response equipment should be fully maintained and readily available.
	In the event of an emergency the Contractor's Superintendent is to immediately notify the Principal. The Superintendent will also notify the relevant emergency services.
Monitoring	Following an emergency, the affected areas shall be monitored as required. In the event of a spill, it should be ensured that all contaminated material, including soil, has been removed and properly disposed of by a suitably qualified contractor.
	Follow up action is to be undertaken to ensure adequate provisions are implemented to minimise or eliminate the risk of reoccurrence of the emergency.

Standard	Management Criteria
Reporting	<p>Once immediate mitigation steps have been undertaken and the incident contained. All incidents/emergencies will be reported to the Principal. The Contractor is to record emergency information on an Incident/Complaints Form and will include the following:</p> <ul style="list-style-type: none"> • Location of the emergency or incident • Name and telephone number of the designated contact person • Time of the emergency/incident • The environmental harm or nuisance caused, threatened, or to be caused by the emergency/incident • Any remediation work undertaken • Actions to be taken to prevent further incidents/emergencies and mitigate any environmental harm and/or nuisance caused by the incident/emergency.
Corrective Action	Non-conformance with this plan shall be documented by the Principal and corrective action undertaken to ensure future conformance. All non-conformances shall be documented and passed onto the Contractor.

3.4.3 Incident and Corrective Action Records

All environmental incidents need to be documented, recorded and followed up with identified corrective action(s). Incident Reporting documentation needs to be completed by those personnel involved along with the Contractor's Environment Manager; approval should be sought from the Principal. Corrective actions should be identified and documented in Corrective Action documentation and approved by the Principal's Representative. While identifying corrective actions to be taken, personnel responsible for implementing the corrective action need to be identified and informed of their responsibilities. Corrective Action documentation should be updated throughout the course of the construction works and/or until the identified actions have been fully completed.

Incident/Emergency Response Plan Contact Register

In the event of an incident or emergency occurring at the site, contact will be made with the key emergency services as identified in Table 4.

Table 4 Incident/Emergency Contact Register

Organisation	Title	Telephone Number
Principal (Trustpower)	TBC	TBC
Trustpower Representative	TBC	TBC
Contractor Environmental Manager	TBC	TBC
Contractor nominated Superintendent	TBC	TBC
EPA	Pollution and Environmental Incident reporting (24 hour)	(08) 8204 2004
Fire Brigade Police Ambulance	Emergency	000

3.5 Community information and grievance procedure

A programme will be established of public information provision to residents or other nearby sensitive receptors which may be impacted by the construction works, including haul traffic. A grievance procedure will be included in the final CEMP and implemented during the construction phase. A complaints register including details of the complaint, how the complaint was actioned / resolved should be maintained and retained throughout the construction period.

3.6 Fire prevention

Fires can eventuate from work activities or during operation. The dry grass may ignite causing damage to the grazing paddocks and adjacent dwellings. Fire may spread causing damage to the ancillary services and structures and smoke may disrupt traffic on adjacent roads.

Liaison with the CFS will be required prior to construction commencing, with regards to requirements during the “Fire Danger Period”. Determine, in consultation with CFS, the appropriate firefighting measure and equipment required on site during construction.

A Fire Prevention Management Plan should be developed as part of the final CEMP.

Table 5 Fire prevention outline plan

Objective	Minimise the risk of fire resulting from the construction of the Palmer Wind Farm.
Legislation / Policy	<p><i>Electricity Act 1996</i></p> <p><i>Fire and Emergency Services Act 2005</i></p> <p><i>Electricity Regulations 2012- General</i></p> <p><i>Electricity Regulations 2010 – Principles of Vegetation Clearance</i></p> <p><i>Australian Standard 1851(2012) – Portable Fire Extinguishers</i></p> <p><i>Australian Standard 1940(2004) – The storage and handling of flammable and combustible liquids.</i></p>
Potential Impacts	<p>Fires can eventuate from work activities or during operation. The dry grass may ignite causing damage to the grazing paddocks and adjacent dwellings.</p> <p>Fire may spread causing damage to the wind turbines and ancillary services and structures.</p> <p>Smoke may disrupt traffic on adjacent roads.</p>
Mitigation	<p>Liaise with CFS during the pre-construction stage with regards to requirements surrounding turbine and other infrastructure, during the “Fire Danger Period”</p> <p>Determine, in consultation with CFS, the appropriate fire fighting measure and equipment required on site during construction.</p> <p>Provide CFS and SES information regarding the location of the equipment and measures implemented during the construction stage.</p> <p>During construction, the area surrounding each turbine to a distance of 30m will be maintained as follows:</p> <ul style="list-style-type: none"> • Grass must be no more than 200mm in height; • Maintenance works such as mowing and tree pruning to be done before entering the Fire Danger Season or under CFS supervision. • Leaf litter must be less than 20mm deep; • No fires would be lit at any time, for any purpose, including burning waste materials; • Spark-arrestors to be installed on all vehicle and machinery powered by internal combustion engines;

- Vehicles may only be operated on approved roads and tracks for that class of vehicle. Only diesel powered vehicles may operate “off road” at any time.
- Welding to be undertaken under controlled manner;
- Minimise on-site storage of flammable materials; and
- All vehicles to be equipped with compliant fire extinguishers.

When conducting work using or generating intensive heat:

- Use a fire resistant shield to prevent sparks or hot material from leaving the work area;
- Provide a fire proof container for off-cuts;
- The work area around active grinding equipment (10m) and hot work source (1.5m) to be kept clear of flammable material or will be kept wet; and
- Fire extinguishers and water tap to be made available in close proximity of the hot works area.

During periods of High Fire Danger:

- All hot work will be banned and no permits will be issued (including explosives)

During **operation and decommissioning** of the wind farm, same categories of work may be undertaken, therefore all the above applies for the life cycle of the wind farm. Particular measures for the safe operation of the wind turbine includes:

- Communication protocol in case of fire to be implemented to all staff involved and operation and maintenance works;
- All staff to be trained in working in bushfire prone area, to be able to respond in case of emergency;
- Constant updates to be given to CFS regarding firefighting materials and measures implemented on the wind farm site;
- Location of water supply infrastructure to be clearly indicated on site; and
- Firebreaks will typically be created around each turbine, the substation and facilities buildings due to the proposed hard stands and access tracks.

Strategy

A Fire Prevention Management Plan will be provided as part of the final CEMP.

4. Environmental Sub-management Plans

The following sections outlines potential mitigation strategies to avoid and/or minimise potential impacts to various environmental aspects associated with the construction works. Key legislative considerations and potential approvals/permits are highlighted. This will need reviewing against the construction methodology, once finalised. The Contractor's Environmental Manager will need to define the Inspection / Criteria/ Target / Evidence required to determine compliance with each element of the CEMP. Mitigation measures provided represent the minimum requirements that should be adopted in any final CEMP to be prepared prior to commencement of construction. Where indicated, Management Plans should be prepared and provided as part of the final CEMP.

The following outline sub-management plans provided here are:

- Flora and Fauna Protection
- Weed, Pest and Disease Control
- Water Quality Protection
- Soil Management, Erosion and Sediment Control
- Construction Noise and Vibration Control
- Air Quality Control
- Materials, Fuels and Waste Management
- Protection of Sites of Cultural and Natural Heritage Significance.

4.1 Flora and Fauna and Rehabilitation

Table 6 Flora and Fauna Protection

Objective	Minimise Impacts to flora and fauna including vegetation clearance and manage the works so as to avoid damage to retained vegetation and fauna.
Legislation / Policy	<p><i>Native Vegetation Act 1991</i></p> <p><i>Native Vegetation Regulations 2003</i></p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i></p> <p><i>Natural Resources Management Act 2004</i></p> <p><i>National Parks and Wildlife Act 1972</i></p>
Permits/Approvals	<p>Submission of an EPBC referral for Lomandra Grassland.</p> <p>Consent to clear Native Vegetation under Native Vegetation Act 1991.</p>

Table 7 Flora and Fauna Protection Mitigation and Controls

Key Construction Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment</p> <p>Topsoil stripping and vegetation removal</p> <p>Excavation and borrow pit development</p>	<p>Potential disturbance to fauna located in areas to be cleared.</p> <p>Potential disturbance to fauna residing in habitats adjacent works area.</p> <p>Native vegetation located within the works area could be impacted.</p> <p>Vegetation within the footprint of the proposal may require clearance.</p>	<p>A Flora and Fauna Management Plan will be provided as part of the final CEMP.</p> <p>Minimise the construction area footprint and avoid where possible disturbance to preferred habitat of conservation significant species predicted as likely to occur at the site and those recorded during the Flora and Fauna survey (EBS Ecology 2014).</p> <p>Vegetation exclusion zones should be clearly identified and communicated to site personnel.</p> <p>Place site depots, equipment compounds and stockpile areas on previously cleared areas away from trees, bushes and native grasses, where possible.</p> <p>Avoid work/storage within the drip-line of trees to prevent damage to the tree roots and soil compaction.</p> <p>If there is any removal of native vegetation required during construction, it will be conducted in accordance with the requirements of and approvals under Native Vegetation Act</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>

Key Construction Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>1991. Any direction provided by the NVC must be adhered to.</p> <p>Apply a 1000 m buffer around all recorded Peregrine Falcon nests for all wind turbine generators</p> <p>Apply a 500 m buffer around all recorded Wedge-tailed Eagle nests for all wind turbine generators</p> <p>Do not burn off cleared vegetation; reuse cleared vegetation, where possible.</p>		
Construction traffic movement	Increased potential for wildlife vehicle strike on haul roads to and from site.	<p>Use existing access tracks where possible to minimise additional disturbance</p> <p>Speed limits on haulage traffic may be required to be imposed to prevent increased occurrence of wildlife strike.</p> <p>Confirm the status of potential category B Lomandra grassland as identified in the EBS Flora and Fauna Assessment (Feb 2014). Should the status be confirmed as category B, seek to avoid these areas where possible.</p> <p>Undertake additional survey in Areas A and C at the detailed layout stage where EBS Ecology have proposed alternative routes in order to minimise impact on sensitive vegetation.</p>	TBC	Environmental Manager Superintendent
Tidy and make good work areas	Minimise permanent impacts to flora and fauna.	<p>Reinstatement of any areas of vegetation, including road verges, which have been impacted during the construction phase in accordance with Native Vegetation Council Approval requirements, conditions and directives.</p> <p>In areas of native vegetation return topsoil and mulched vegetation to approximately the same area of the roadside it came from.</p> <p>The reinstatement works will be undertaken as soon as practical after the completion of earthworks.</p> <p>Temporary or permanent measures will be implemented either to help with the revegetation process or to provide additional protection against erosion. On steep slopes erosion control matting may be used to provide interim protection until the vegetation cover is fully established.</p>	TBC	Environmental Manager Superintendent

4.2 Weed, Pest and Disease Control

Table 8 Weed, Pest and Disease Control

Objective	Prevent the movement or increase in weeds, pests or diseases.
Legislation / Policy	<p><i>Native Vegetation Act 1991</i></p> <p><i>Native Vegetation Regulations 2003</i></p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i></p> <p><i>Natural Resources Management Act 2004</i></p> <p><i>National Parks and Wildlife Act 1972</i></p>
Permits/Approvals	Permit to move pest plants or animals (Natural Resources Management Act 2004)

Table 9 Weed, Pest and Disease Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment</p> <p>Topsoil stripping and vegetation removal</p> <p>Excavation and borrow pit development</p>	<p>Potential spreading of weeds, pests and diseases.</p> <p>Potential increase in prevalence of pest animals.</p>	<p>A Vegetation and Fauna Management Plan will be provided as part of the final CEMP, and this will need to cover the issue of Weed, Pest and Disease Management.</p> <p>Control weeds on site during construction and monitor the site for any outbreaks.</p> <p>Ensure that raw materials, such as rubble, gravel, sand, soil and water brought into the construction site are free of Phytophthora. Check rock prior to transportation and clean/spray as appropriate.</p> <p>Ensure that all floras brought into this zone are free of Phytophthora.</p> <p>Vegetation from weed species should be disposed of separately at a licensed waste depot.</p>	TBC	Environmental Manager Superintendent
Construction traffic movement	<p>Potential spreading of weeds and pests.</p> <p>Potential increase in prevalence of pest animals.</p>	Follow weed or disease hygiene procedures ensuring vehicles and equipment are cleaned as required.	TBC	Superintendent

4.3 Water Quality Protection

Table 10 Water Quality Protection

Objective	Minimise impact to surface and ground water quality within works area and haul routes.
Legislation / Policy	<p><i>Environment Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Water Quality) Policy 2003</i></p> <p><i>Natural Resources Management Act, 2004</i></p> <p><i>Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry</i></p> <p><i>EPA Guidelines (EPA 396/10) - Water Quality, Dredging and Earthworks Drainage.</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p>
Permits/Approvals	<p>Earthworks drainage authorisation (section 7(6) of Schedule 1 of the Environment Protection Act 1993).</p> <p>Exception to exceed water quality criteria above Protected Environmental Values under the Environment Protection (Water Quality) Policy 2003.</p> <p>Approvals may be require for actions/activities that have an impact on water resources such as up-grades of watercourse crossings, water extraction, water degradation (Natural Resource Management Act, 2004).</p> <p>EPA licensing (e.g. a concrete batching plant)</p>

Table 11 Water Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment Topsoil stripping and vegetation removal Excavation and borrow pit development Bore hole drilling Grading and compaction (cut and fill if required) Concrete pouring Water usage for construction works Instillation of permanent equipment Temporary storage areas</p>	<p>Impact to the natural movement of surface and groundwater affecting availability to flora and fauna and local communities and landowners. Impacts to water quality can affect aquatic fauna, decreases the aesthetic value of a watercourse or water body and can damage transport infrastructure.</p>	<p>A Water Management Plan will be prepared prior to construction. Minimise areas of vegetation loss to areas identified for clearance as part of the scheme. Existing natural drainage paths and stormwater facilities not blocked or restricted. Runoff from unsealed areas at the construction site does not enter stormwater drains or natural drainage lines. Stormwater diverted around stockpiles. Control surface run-off entering and leaving the work area The stormwater drainage infrastructure installed will be inspected and its suitability to the permanent configuration of the access tracks, hardstands and buildings compounds will be assessed. Consideration to stormwater drainage control will be given when establishing the construction site. The following objectives will be considered:</p> <ul style="list-style-type: none"> • Limit site access to designated routes and controlled area; • Locate and secure all stockpiles resulted from excavation or imported materials away from watercourses and concentrated water flow paths; • Ensure that all the stormwater drainage are in place before site clearing works begin; • Assess the impact of the proposed stormwater drainage systems on the adjacent properties; • Consideration to existing underground services will be given when establishing the access tracks and construction site, and protection will be provided where required. 	<p>TBC</p>	<p>Environmental Manager Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<ul style="list-style-type: none"> • Construction of access road networks may alter surface drainage paths. Drainage should be installed to mitigate potential effects, taking into consideration ephemeral watercourses • Ensure any conditions/obligations relating to a Permit for surface or groundwater extraction is complied with. <p>Chemical testing of any identified water source should be carried out to determine the suitability of water for use in mixing concrete, or for dust suppression.</p>		
<p>Reinstatement of excavation and borrow pit areas Tidy and make good work areas</p>		<p>Cleared areas to be stabilised / rehabilitated promptly and where possible enhance the natural value of these areas.</p>	TBC	<p>Environmental Manager Superintendent</p>

4.4 Soil Management, Erosion and Sediment Control

Table 12 Soil Management, Erosion and Sediment Control

Objective	Minimise erosion within works area and haul routes and minimise sediment laden stormwater leaving the site.
Legislation / Policy	<p><i>Environment Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Water Quality) Policy 2003</i></p> <p><i>Natural Resources Management Act, 2004</i></p> <p><i>Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p>
Permits/Approvals	<p>Earthworks drainage authorisation (section 7(6) of Schedule 1 of the Environment Protection Act 1993.)</p> <p>EPA licensing (e.g. a concrete batching plant)</p>

Table 13 Soil Management, Erosion and Sediment Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment</p> <p>Excavation and borrow pit development</p> <p>Grading and compaction (cut and fill if required)</p> <p>Concrete pouring</p>	<p>The soil characteristics are likely to be subject to soil erosion by water and potentially wind if ground is disturbed.</p> <p>Soil erosion can contaminate watercourses, lead to loss of vegetation, impact on aquatic fauna, decreases the aesthetic value of a watercourse, reduce the agricultural capacity of land and can damage transport infrastructure.</p>	<p>Soil erosion and generation should be minimised during construction.</p> <p>Final CEMP will include a Soil, Erosion and Sedimentation Management Plan.</p> <p>A management plan for the concrete batching plant should be developed prior to works commencing (a <i>draft CEMP – Temporary Concrete Batching Plant</i>, is included in Appendix B)</p> <p>Minimise areas of vegetation loss to areas identified for clearance as part of the scheme.</p> <p>Erosion and sedimentation control devices installed prior to commencement of construction/works.</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>
<p>Topsoil stripping and vegetation removal</p>	<p>Damage to top soil and subsoil.</p>	<p>The Management Plan should be developed that includes the following:</p> <ul style="list-style-type: none"> • Maps showing areas to be stripped and left in-situ. 	TBC	<p>Environmental Manager</p> <p>Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<ul style="list-style-type: none"> • Minimise areas of vegetation loss to areas identified for clearance as part of the scheme. • The appropriate method for stripping, stockpiling, respreading and ameliorating the soils. • The location of soil stockpiles and content (e.g. Topsoil type A subsoil type B). • Schedules of volumes for each material. • Expected after-use for each soil whether topsoil to be used on site, used or sold off site, or subsoil to be retained for landscape areas, used as structural fill or for topsoil manufacture. • Identification of person responsible for supervising soil management. <p>Soil should be handled in the right conditions of weather and soil moisture and using suitable machinery in an appropriate way. Soil that is wet or very moist (wetter than the plastic limit) should ideally be allowed to dry further.</p> <p>Use tracked equipment wherever possible to reduce compaction.</p> <p>Confine movement of trucks or dumpers to designated temporary haul routes. Multiple handling of soil materials increases the risk of damage to soil structure so should be minimised.</p> <p>Avoid stripping topsoil, intended for reuse, too deeply so that subsoil becomes incorporated, thereby reducing fertility.</p> <p>Do not remove topsoil from below the spread of trees to be retained.</p>		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Temporary storage of spoil	Soil erosion can contaminate watercourses, lead to loss of vegetation, impact on aquatic fauna, decreases the aesthetic value of a watercourse, reduce the agricultural capacity of land and can damage transport infrastructure.	<p>Implement controls to prevent and minimise the risk of any sediment from earthworks entering the stormwater system. Areas of exposed soil, including stockpiles, are protected from erosion, or that suitable control measures are in place to prevent any mobilised soil being transported off site.</p> <p>Locate stockpiles away from watercourses and not in drainage lines.</p> <p>Stormwater diverted around stockpiles.</p> <p>Any dewatering on site to be undertaken in a manner which prevents sediment entering stormwater drains and water course.</p> <p>Use of sediment curtains, cofferdams or similar to prevent suspended sediment movement during construction within water or areas likely to be inundated.</p> <p>Maintain the sediment control and stormwater drainage devices at all times.</p>	TBC	Environmental Manager Superintendent
Construction traffic movement	Soil compaction	Construction traffic must use agreed haul roads to travel to move around site and approved areas for parking to reduce unnecessary soil compaction.	TBC	Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Reinstatement of excavation and borrow pit areas</p> <p>Tidy and make good work areas</p>		<p>All stockpiles resulting from excavation works will be removed from site.</p> <p>The access tracks width will be reduced to approximately 5 metres. Top soil will be spread over exposed batters and vegetation will be reinstated.</p> <p>The reinstatement works will be undertaken as soon as practical after the completion of earthworks.</p> <p>Cleared/excavated areas to be stabilised / rehabilitated promptly and where possible enhance the natural value of these areas.</p> <p>Temporary or permanent measures will be implemented either to help with the revegetation process or to provide additional protection against erosion. On steep slopes erosion control matting will be used to provide interim protection until the vegetation cover is fully established.</p>	TBC	Superintendent

4.5 Construction Noise and Vibration

Table 14 Construction Noise and Vibration

Objective	Avoid and/or minimise noise and vibration emissions during construction works.
Legislation / Policy	<p><i>Environmental Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Noise) Policy 2007</i></p> <p><i>AS2436 – 1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites</i></p> <p><i>The Wind Farms Environmental Noise Guidelines 2009 (the SA Guidelines)</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p> <p><i>Australian Standard AS 1055–1997 Acoustics – Description and measurement of environmental noise</i></p> <p><i>Australian Standard 2187.2 2006 – Explosives – Part 2: Use of explosives</i></p>
Permits/Approvals	<p>Blasting permits.</p> <p>EPA licensing (e.g. a concrete batching plant)</p>

Table 15 Construction Noise and Vibration Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment.</p> <p>All construction activities</p> <p>All installation activities</p> <p>Bore hole drilling</p> <p>Tidy and make good work areas.</p>	<p>Noise and vibration from construction activities may impact on nearby sensitive receptors including residential dwellings and/or wildlife.</p>	<p>A Construction Noise and Vibration Management Plan has been developed by Sonus (2014) (see Appendix A). This should be reviewed and updated where there are changes in construction methodology or works locations.</p> <p>Throughout construction activities the Contractor will be required to observe all obligations under the Environment Protection Act 1993 and Section 6 of AS2436 – 1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”.</p> <p>Activities to be undertaken must be compliant with requirements of Environment Protection (Noise) Policy 2007.</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Plant and equipment used to be properly maintained and have noise limitation equipment installed as per manufacturer's specification.</p> <p>Plant and equipment used on site to be stood down when not required.</p> <p>Construction to occur only during the hours specified. (7:00 am to 7:00 pm Monday to Saturday).</p> <p>Works carried out outside of the hours will only entail:</p> <ul style="list-style-type: none"> • works that do not cause noise emissions which exceed the noise limits of the Policy at any nearby dwelling not associated with the project; or • the delivery of materials as requested by Police or other authorities for safety reasons; or • emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or • works with the prior consent of the Environment Protection Authority (EPA) (an example might be occasional concrete pours on hot days). <p>Nearby residents/stakeholders will be notified of construction activities.</p> <p>Separation distances maintained to the greatest extent possible from construction works or fixed plant, to any sensitive receptors including nearby wildlife (see Appendix A Construction Noise and Vibration Management Plan Sonus 2014).</p> <p>Site perimeter fencing may need to be established for the work area and include a noise and vibration barrier.</p> <p>Noise monitoring/inspections to be undertaken as prescribed in the Construction Noise and Vibration Management Plan (Sonus 2014).</p>		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Noise monitoring undertaken if required upon receipt of a complaint.</p> <p>To monitor potential vibration impacts from construction works on nearby structures, dilapidation surveys may be required.</p>		
Blasting (may be required)	Noise and vibration from blasting activities may impact on nearby sensitive receptors including residential dwellings, structures and/or wildlife.	Blasting permits are required prior to construction, and all blasting will comply with current legislation, ensuring safety for workers and minimisation of impact on surrounding infrastructure and sensitive receptors.	TBC	Superintendent
Construction traffic movement	Haul traffic may cause noise and vibration nuisance or damage to residential and sensitive receptors traveling to and from the site	<p>A Construction Traffic Management Plan will be established prior to construction commencing.</p> <p>Appropriate routes for light and heavy construction vehicles selected to minimise disturbance prior to commencement of construction works.</p> <p>Construction traffic must use agreed haul roads to travel to and from site. Approved areas for parking will be identified.</p> <p>All vehicles and equipment will be operated and maintained to comply with regulatory standards in order to control noise emissions.</p> <p>Best practice in regard to construction traffic in residential areas.</p>	TBC	Environmental Manager Superintendent

4.6 Air Quality Control

Table 16 Air Quality Control

Objective	Avoid and/or minimise air quality impacts during construction works.
Legislation / Policy	<p><i>Environmental Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Air Quality) Policy 1994</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p>
Permits/Approvals	EPA licensing (e.g. a concrete batching plant)

Table 17 Air Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment.</p> <p>All construction works</p> <p>Concrete pouring</p> <p>Tidy and make good work areas.</p>	<p>Dust from construction impacting surrounding environment including residential areas, water bodies and wildlife.</p> <p>Odour from construction works impacting amenity of surrounding area.</p>	<p>An Air Quality Management Plan will be provided as part of the final CEMP.</p> <p>Dust controls to be implemented during construction including management of stockpiles (height, orientation etc.) and the use of suppressants including water spraying as required.</p> <p>Works that are likely to generate dust will cease when dry or windy conditions are conducive to the release of dust should dust suppression strategies be rendered ineffective.</p> <p>Air Quality monitoring undertaken if required upon receipt of a complaint.</p> <p>Stockpiles covered or watered down.</p> <p>Develop and follow a fire prevention plan.</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>
Construction traffic movement.	<p>Exhaust fumes from construction and haulage to and from site impacting surrounding environment including residential areas and wildlife.</p> <p>Dust emitted from transported loads.</p>	<p>A Construction Traffic Management Plan will be prepared prior to construction commencing which will identify the haul route and any specific mitigation required i.e. management of potential fugitive material during transportation, operation of equipment to control exhaust emissions, a procedure for complaints.</p>	TBC	Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>All vehicles and equipment will be operated and maintained to comply with regulatory standards for exhaust emissions.</p> <p>Construction site roads watered down.</p> <p>Spray with water and/or cover pavement materials and aggregates before transporting.</p> <p>Any loads of dust generating or odorous materials entering or leaving site to be covered.</p>		

4.7 Materials, Fuels and Waste Management

Table 18 Materials, Fuels and Waste Management

Objective	Avoid and/or minimise impacts associated with the release of hazardous substances or materials. Avoid and/or minimise waste generation during the construction works.
Legislation / Policy	<i>Environment Protection Act 1993</i> <i>Environment Protection Regulations 2009</i> <i>Dangerous Substances Act 1979</i> <i>Dangerous Substances Regulations 2002.</i> <i>Controlled Substances Act, 1984</i> <i>Natural Resources Management Act, 2004</i> <i>Environment Protection (Waste to Resources) Policy 2010</i> <i>EPA Guidelines for Stockpile Management – Waste and Waste Derived Fill</i> <i>EPA Guidelines for Bunding and Spill Management</i> <i>EPA Current criteria for the classification of waste - including Industrial and Commercial Waste (Listed) and Waste Soil</i> <i>Concrete batching Industry Guidelines (EPA) 2009</i>
Permits/Approvals	Waste Transporter's licence (Environment Protection Act 1993 and Environment Protection Regulations 2009.) EPA licensing (e.g. a concrete batching plant)

Table 19 Materials, Fuels and Waste Management Mitigation and Control

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment. Temporary storage of chemicals, spoil and equipment. Permanent storage areas for fuels and equipment. Blasting Concrete pouring Tidy and make good work areas.</p>	<p>Contamination of the environment with hazardous substances and/or materials.</p>	<p>Prior to construction commencing, a Materials, Fuels and Site Waste Management Plan will be established which will identify the materials and storage requirements for all chemicals used on site or transported to site.</p> <p>All hazardous chemicals and dangerous goods used or stored at the subject site during construction will be stored in accordance with the Dangerous Substances Act and the EPA Guidelines.</p> <p>Material Safety Data Sheets for all relevant materials used or stored on site, regardless of quantity, for the construction works shall be kept on site by the Contractor.</p> <p>Spill kits will be located on site to be used in the event that there is an incident and appropriate personnel will be trained in the use of this equipment.</p> <p>Storage of materials should not be in areas at risk of inundation.</p> <p>All hazardous chemicals and dangerous goods should be stored away from any drainage channels and stormwater drains.</p> <p>Decanting/pumping of hazardous substances and materials to occur in bunded area where possible.</p> <p>Spills cleaned up immediately (spill kit).</p> <p>Emergency procedures in the event of a spill should be documented.</p>	<p>TBC</p>	<p>Environmental Manager Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment. All construction works Tidy and make good work areas.</p>	<p>Waste generated during construction impacting upon the environment. Waste generated during construction inappropriately disposed of offsite and impacting the environment.</p>	<p>Prior to construction commencing, a Materials, Fuels and Site Waste Management Plan will be established which will identify the type and amount of waste to be generated during construction and procedures for the storage, reuse, recycling and/or appropriate disposal of waste. Contaminated soil and/or groundwater disposed of appropriately, if required. Management of waste in accordance with all statutory and licensing requirements. Any food waste should be contained and removed from site regularly to prevent attracting pest species. Implement to reduce waste:</p> <ul style="list-style-type: none"> • Re-use of materials wherever possible in accordance with legislative requirements. • Adequate waste separation repositories. • All waste generated during construction separated at source and taken to an appropriately licenced waste disposal facility if not able to be re-used on site. • No burning or waste burial on site. • Management of litter and site debris. 	TBC	Environmental Manager Superintendent
Grading and compaction (cut and fill if required)		<p>Any use of waste derived fill undertaken in accordance with legislative requirements. If waste fill required, should be suitably assessed by a qualified environmental professional and have classification status confirmed prior to importation to site. Site Contamination Audit Report, if required, prior to the use of waste derived fill during construction.</p>	TBC	Environmental Manager Superintendent

4.8 Protection of Sites of Cultural and Natural Heritage Significance

Table 20 Protection of Sites of Cultural and Natural Heritage Significance

Objective	Manage the works to prevent or minimise impacts to sites or artefacts of Indigenous or European heritage.
Legislation / Policy	<p><i>Native Title (South Australia) Act 1994</i></p> <p><i>Aboriginal Heritage Act 1988</i></p> <p><i>Heritage Places Act 1993</i></p> <p><i>Aboriginal and Torres Strait Island Heritage Protection Act 1984 (Cwth)</i></p> <p><i>Native Title Act 1993 (Cwth)</i></p> <p><i>Environment Protection Act 1993</i></p>
Permits/Approvals	Authority to disturb an Aboriginal site or object (Section 23 approval under the Aboriginal Heritage Act 1988).

Table 21 Protection of Sites of Cultural and Natural Heritage Significance Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site Establishment.</p> <p>Topsoil stripping and vegetation removal.</p> <p>Excavation and borrow pit development</p> <p>Blasting.</p> <p>Tidy and make good work areas.</p>	Damage to sites or artefacts of indigenous or European heritage or to their setting.	<p>An Archaeological and Cultural Heritage Management Plan will be provided as part of the final CEMP.</p> <p>Mannum Aboriginal Community Association Incorporated (MACAI) would expect monitoring of any areas as identified in the final Aboriginal Survey Report.</p> <p>A heritage survey of the areas not previously cleared, in conjunction with MACAI prior to construction commencing. This should also consider onsite access routes.</p> <p>Should any archaeological occurrences be located during the course of the works the contractor and the Principal must report such an occurrence to the appropriate Aboriginal organisations and AARD in accordance with the Aboriginal Heritage Act 1988. All work is to cease that may negatively impact on the sites integrity until it has been assessed by an appropriately qualified Cultural Heritage professional with representation from the Indigenous recognised</p>	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Aboriginal stakeholders.</p> <p>Should known or suspected human remains be located during the course of construction all work should cease within the locations vicinity that may compromise it and the process outlined in the below flowchart followed.</p> <p>Avoid impacts on the dry stone walls, where possible. If impacts cannot be avoided, to limit and mitigate these impacts in consultation with the Dry Stone Wall Association (e.g use damaged areas, minimise the access road width).</p> <p>Avoid damaging or altering any features relating to the State Heritage Place Geological Site. If there are doubts as to which granite boulder features are protected, advice must be sought before construction commences.</p>		
Construction traffic movement.	Damage to sites or artefacts of indigenous or European heritage or to their setting.	<p>A Construction Traffic Management Plan will be established prior to construction commencing.</p> <p>When selecting appropriate routes for light and heavy construction vehicles these should consider heritage features located along haul routes.</p> <p>Construction traffic must use agreed haul roads to travel to and from site. Approved areas for parking will be identified which are located away from heritage features.</p>	TBC	Environmental Manager Superintendent



Procedure to follow if potential Aboriginal skeletal remains and/or an archaeological site are found

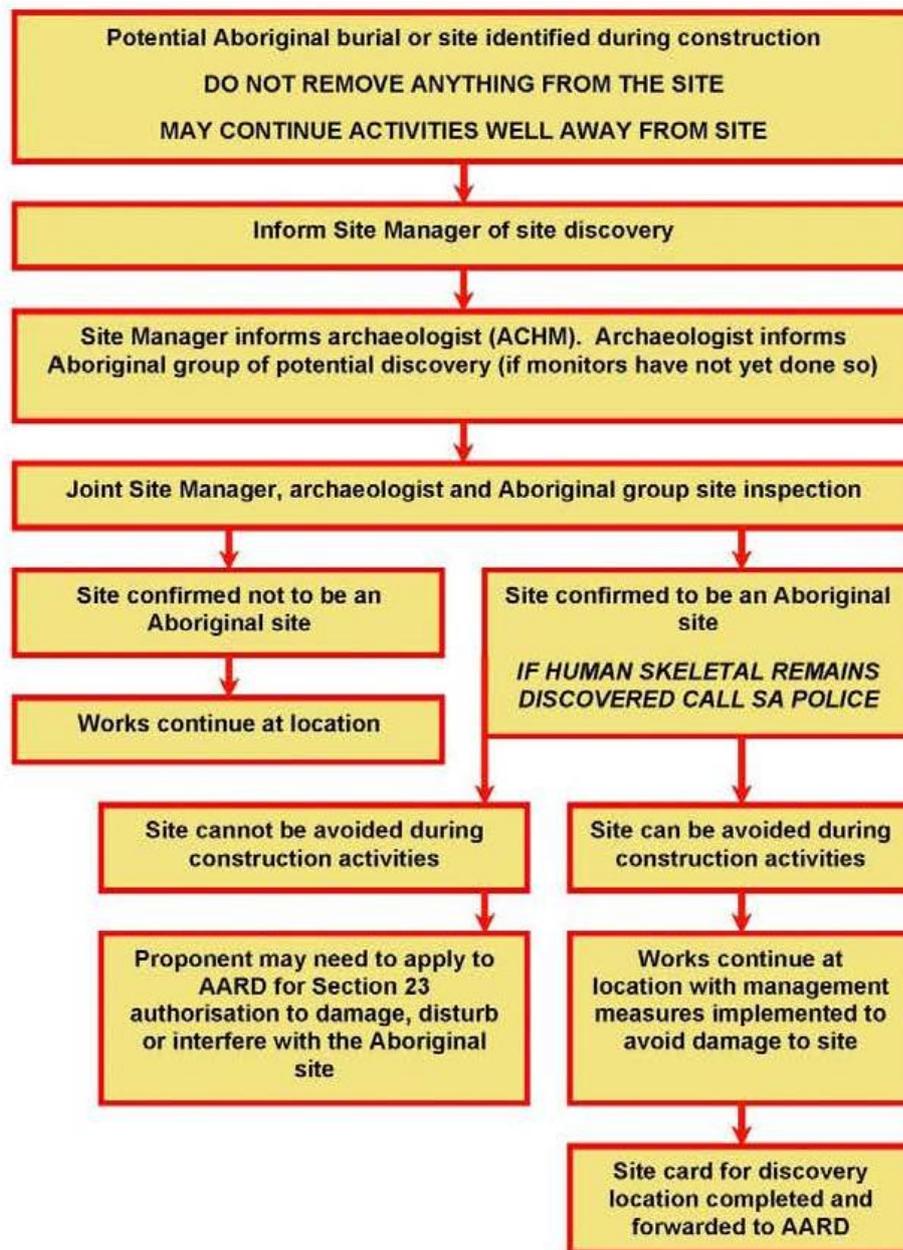


Figure 3 Site Discovery Procedure

4.9 Scope and limitations

This report has been prepared by GHD for Trustpower and may only be used and relied on by Trustpower for the purpose agreed between GHD and the Trustpower as set out in this report.

GHD otherwise disclaims responsibility to any person other than Trustpower arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

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Appendices

Appendix A - Construction Noise and Vibration Management Plan (Sonus August 2014)

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PALMER WIND FARM

ENVIRONMENTAL NOISE ASSESSMENT

Construction Noise and Vibration Management Plan



For

**Trustpower
Truman Road
Te Maunga, Mt Maunganui**

**S4171C13
August 2014**

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SUMMARY

The construction of a wind farm comprises activities such as road construction, civil works, excavation and hardstand construction, electrical infrastructure works and turbine erection requiring processes such as heavy vehicle movements, possible concrete batching, rock trenching, loaders, excavators, generators, cranes and possible blasting. These activities are similar to other construction projects in that they generally generate short term and transient noise; however, in the case of a wind farm, the construction occurs at significant separation distances. The separation distances will result in appreciable attenuation of the noise and vibration generated by the activity.

Notwithstanding, the management of construction noise requires appropriate programming, community consultation and the use of the best available and practical work practices and mitigation measures balanced against the requirement to expedite completion of the project.

This Construction Noise and Vibration Management Plan (CNVMP) has been prepared as a specific part of the broader Palmer Wind Farm Construction and Environmental Management Plan (CEMP). The proposed wind farm layout and receiver locations are provided in Appendix A.

The CNVMP aims to provide high level guidance to secure compliance of the construction activities with the general environmental duty of the *Environment Protection Act 1993*. As such, the CNVMP provides a framework document within which the final construction contractor can develop action plans for each individual activity once it is known and detailed.

The requirements for the CNVMP are based on the general environmental duty of the *Environment Protection Act 1993* (the EP Act) and the tailored requirements of Part 6 Division 1 Clause 23 of the *Environment Protection (Noise) Policy 2007*.

In broad terms, the legislative requirements effectively allow construction to occur between 7am and 7pm from Monday to Saturday, subject to the site taking reasonable and practicable noise reduction measures, and provides an opportunity to conduct works outside of these hours if noise limits can be met or "if other grounds exist that the Authority.....determines to be sufficient" (an example might be occasional concrete pours on hot days).



To this end, the CNVMP provides:

- An indication of the likely construction activities and associated details;
- Identification of the reasonable and practicable measures to minimise the construction noise activities;
- Recommendations for specific community consultation and notification methods;
- Recommendations for specific compliance monitoring plans;
- Recommendations for specific complaint handling procedures including corrective actions to be taken and feedback methods.



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CONSTRUCTION ACTIVITY CRITERIA

Construction Noise

The appropriate assessment methodology for noise from construction activities is provided by Part 6 Division 1 Clause 23 of the *Environment Protection (Noise) Policy 2007* (the Policy).

The Policy provides an emphasis on implementing reasonable and practicable noise reduction measures and does not set mandatory standards or objective criteria for activity which is conducted during typical day time construction hours. This approach is consistent with other jurisdictions.

The Policy establishes a quantitative approach for night time activity, whereby an average goal noise level of 45 dB(A) and a maximum goal noise level of 60 dB(A) are to be met for activity outside of typical day time hours. The goal noise level does not apply "if other grounds exist that the Authority.....determines to be sufficient".

Construction Vibration

Specific 'policy' providing objective vibration criteria do not exist in South Australian legislation; however, the general environmental duty of the EP Act can be interpreted to apply to vibration and there are accepted standards that are regularly referenced for projects where vibration might be an issue.

Vibration assessment can be separated into two categories, comprising levels at which the vibration might be felt to cause annoyance and concern, and levels at which building or infrastructure damage might occur. The vibration levels associated with human annoyance are significantly more onerous than those associated with structural damage.

The vibration criteria for human annoyance are based on human exposure provided by the Australian Standard AS2670.2 'Evaluation of human exposure to whole-body vibration (AS2670)'. AS2670 provides guidance on the levels of vibration at which annoyance might arise for different locations and scenarios.



Vibration criteria for structural damage are provided by the German Standard DIN 4150-3 'Effects of vibration on structures' (DIN 4150) which is a common reference in the absence of a specific Australian Standard relating to structural building damage. DIN 4150 establishes limits for residential, commercial, industrial and heritage listed buildings, and states that damage will not occur at these properties when exposed to vibration within those limits.

The human annoyance criteria are generally only used for assessment of ongoing operations whereas the structural damage limits are generally applied to construction activity due to its transient nature. Structural damage limits are provided in the following table based on DIN4150-3 'Structural Vibration Part 3 – Effects of vibration on structures':

Structure	Peak Particle Velocity (PPV) level in any direction in mm/s (rms)		
	Main driving frequency less than 10Hz	Main driving frequency between 10 to 50 Hz	Any frequency
	Commercial, industrial and similar buildings	20	40
Dwellings and buildings of similar design and/or use	5	15	20
Structures sensitive to vibration and that have intrinsic value (eg heritage listed buildings without modern foundations)	3	8	10

The levels have been established such that no damage will occur up to the limits and that vibration above the limits will not necessarily translate into damage, defined as cracking forming in plastered surfaces of walls, existing cracks in a building becoming enlarged, and separation of lightweight walls from load bearing walls. A dilapidation survey is therefore an important element in the assessment of vibration impacts from construction activity when it is conducted in close proximity to a dwelling.

In the case of a wind farm, construction vibration is rarely of concern due to the separation distances involved in comparison to other intensive construction sites.



Blasting Noise and Vibration

Whilst the need for and the extent of a blasting regime is yet to be established, the appropriate assessment methodology for noise from on-site blasting activities is provided by the *Australian Standard AS2187.2-2006 "Explosives – Storage, Transport and Use – Pt 2: Use of Explosives"* (the Standard). The Standard provides the following "human comfort limits" for sensitive sites for operations lasting longer than 12 months or more than 20 blasts:

- Peak component particle velocity of 5 mm/s for 95% blasts per year and 10 mm/s maximum unless agreement is reached with the occupier that a higher limit may apply.
- Peak sound pressure level of 115 dBL for 95% blasts per year and 120 dBL maximum unless agreement is reached with the occupier that a higher limit may apply.



CONSTRUCTION ACTIVITIES

Construction Noise

The equipment and activities that are present at the site will vary throughout the project, depending on the construction phase. The envisaged phase, associated plant and equipment, and duration are provided in Table1.

Table1: Construction activity.

Construction Phase	Main Plant and Equipment	Start (Month)	Duration (Months)
Site Set-Up and Civil Works	Generator Transport truck Excavator Low loader	1	3
Road and Hard Stand Construction	Mobile crushing and screening plant Dozer Roller Low loader Tipper truck Excavator Scraper Transport truck	4	7
Excavation and Foundation Construction	Concrete batching plant Mobile crushing and screening plant Truck-mounted concrete pump Concrete mixer truck Excavator Front End Loader Mobile crane Transport truck Tipper truck	6	5
Earthing	Percussion drilling rig	7	8
Electrical Installation	Rock trencher Concrete mixer truck Low loader Tipper truck Mobile crane	10	14
Turbine Delivery and Erection	Extendable trailer truck Low loader Mobile crane Impact rattle gun	14	4.5



Construction Vibration

It is expected that the main sources of vibration will be a percussion drilling rig (if used), rock trenching equipment and roller operation during the road and hard stand construction. The level of vibration at a distance will be subject to the energy input of the equipment and the local ground conditions. Typically, the distances required to achieve the construction vibration criteria are in the order of 20m to 100m. The 100m distance is a conservative estimate, with vibration from these activities unlikely to be detectable to humans at such a distance.

Based on the separation distances between the construction activities and the nearest dwellings being well in excess of the conservative distance of 100m, vibration levels are expected to easily achieve the criteria.



Blasting Noise and Vibration

The levels of airblast and ground vibration experienced at residences from blasting operations are generally dependent on a number of factors, including:

- the distance between the blast site and the residence;
- the type, size and number of charges used, and;
- the depth and manner in which the charge is installed.

The separation distances between the potential blasting activity and the nearest dwellings are of the order of magnitude for which ground vibration and airblast levels have been adequately controlled at other sites. Given the range of factors associated with both the generation and control of blasting noise and vibration, it is recommended that a monitoring regime, in accordance with the Monitoring section of this CNVMP, is implemented to ensure the objective criteria provided by the *Australian Standard AS2187.2-2006* are achieved.

Comparison with assessment criteria

Based on the above, vibration and blasting activity associated with the proposed construction activities are expected to achieve the relevant assessment criteria and, with the exception of the implementation of a monitoring regime for blasting activity, no further noise or vibration measures need to be considered for these aspects of the construction.

Traffic and general construction activity have the potential to trigger the adoption of “all reasonable and reasonable” noise mitigation measures. These measures are provided below.



PROJECT MITIGATION MEASURES

Pro-active noise control strategies to minimise noise during construction may include engineering measures such as the construction of temporary acoustic barriers, the use of proprietary enclosures around machines, the use of silencers, the substitution of alternative construction processes and the fitting of broadband reversing signals. It may also include administrative measures such as inspections, scheduling and providing training to establish a noise minimisation culture for the works.

The following mitigation measures provide a suite from which the construction contractor can develop action plans for each individual activity, construction phase or stage. The action plans will be the “tool on the ground” for implementation and ongoing use by the construction contractor.

Scheduling

Construction works and any blasting activity, excluding heavy vehicle movements into and out of the site, should generally be restricted to between 7am and 7pm Monday to Saturday.

Works carried out outside of the hours will only entail:

- works that do not cause noise emissions which exceed the noise limits of the Policy at any nearby dwelling not associated with the project; or
- the delivery of materials as requested by Police or other authorities for safety reasons; or
- emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or
- works with the prior consent of the Environment Protection Authority (EPA) (an example might be occasional concrete pours on hot days).

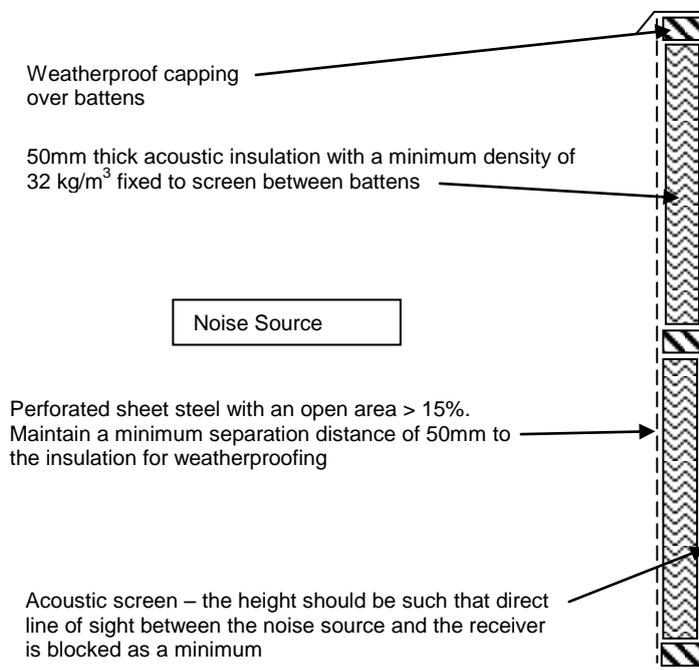
Location of Fixed Noise Sources

Locate fixed noise sources such as crushing and screening plant, concrete batching plant, percussion drilling rigs and generators and compressors at the maximum practicable distance to the nearest dwellings.

Provide Acoustic Screens around Fixed Noise Sources

Provide acoustic screens or mounding for fixed crushing and screening plant, concrete batching plant and percussion drilling rigs wherever these noise sources are located within 1000m of a non-associated dwelling and do not have direct line of sight blocked to that dwelling, in accordance with the following requirements:

- Locate as close as practicable to the noise source;
- Construct from mounding using excavated soil from the site, or a material with a minimum surface density of 10 kg/m^2 , such as 1.2mm thick sheet steel or 9mm thick compressed fibre cement sheeting. Alternatively, proprietary portable noise barriers, such as *Peace Engineering* "SOUND BARRIERS" may be utilised;
- Construct to a minimum height that blocks direct line of sight between the noise source and any receiver within the 1000m limit;
- Construct such that there are no air gaps or openings at joints;
- Extend such that the length is at least 5 times greater than its height or so that it is bent around the noise source;
- If barriers (rather than mounding from excavated soil) are constructed, then include acoustic insulation facing into the noise source in accordance with the following detail should there be a dwelling in the direction of the insulated face within 1000m.



In addition, the site topography, and other shielding features (e.g. large stationary machines, mounds of topsoil and piles of materials) should be used to an advantage in terms of increased shielding when locating fixed noise sources within the 1000m distance.

With acoustic screens installed around a noise source to block line of sight to dwelling, a minimum noise reduction of 5 dB can be achieved, which subjectively will result in a clearly noticeable reduction.

Enclose Generators and Compressors

Provide proprietary acoustic enclosures for site compressors and generators.

Alternative Processes

Investigate and implement alternative processes where feasible and practicable, such as hydraulic or chemical splitters as an alternative to impact rock breaking, or the use of broadband reversing alarms in lieu of the high pitched devices (a broadband reversing alarm emits a unique sound which addresses the annoyance from the high pitched devices. The fitting of a broadband alarm should be subject to an appropriate risk assessment, with the construction team being responsible for ensuring the alarms are installed and operated in accordance with all relevant occupational, health and safety legislative requirements).

Site Management

- Select and locate centralised site activities and material stores and work compounds as far from noise-sensitive receivers as possible;
- Care should be taken not to drop materials such as rock, to cause peak noise events, including materials from a height into a truck. Site personnel should be directed as part of an off-site training regime to place material rather than drop it;
- Plant known to emit noise strongly in one direction, such as the exhaust outlet of an attenuated generator set, shall be orientated so that the noise is directed away from noise sensitive areas if practicable;
- Machines that are used intermittently shall be shut down in the intervening periods between works or throttled down to a minimum;
- Implement worksite induction training, educating staff on the requirements of the CNVMP.



Equipment and Vehicle Management

- Ensure equipment has Original Equipment Manufacturer (OEM) mufflers installed;
- Ensure equipment is well maintained and fitted with adequately maintained silencers which meet the OEM design specifications. This inspection should be part of the monitoring regime;
- Ensure silencers and enclosures are intact, rotating parts are balanced, loose bolts are tightened, frictional noise is reduced through lubrication and cutting noise reduced by keeping equipment sharp. These items should be part of a monitoring (inspection) regime in accordance with the Monitoring section of this CNVMP;
- Use only necessary power to complete the task;
- Inspect, as part of the monitoring regime, plant and equipment to determine if it is noisier than other similar machines, and replace or rectify as required.

Community Consultation

Establish and implement a community consultation program in accordance with the requirements in this CNVMP and the project's community consultation plan where relevant.

Monitoring

Establish and implement a monitoring process in accordance with the requirements in this CNVMP.

Complaints Resolution

Establish and implement a complaints resolution process in accordance with the requirements in this CNVMP and the project's community consultation plan where relevant. .



COMMUNITY CONSULTATION

Noise and vibration elements should be included in the overall community consultation process. The aim of the consultation is to ensure adequate community awareness and notice of expected construction noise. Whilst the engineering measures reduce the noise levels, an important element in reducing the impacts of construction activity is awareness through adequate notification.

The minimum elements should include:

- Regular newsletters, providing details of the construction plan and duration of the construction phases, distributed through a site notice board and email,;
- A site notice board in a community location providing copies of the newsletters, updated construction program details, and contact details of relevant project team members and an ability to register for email updates of the newsletter;
- A feedback mechanism for the community to submit questions to the construction team, and for the construction team to respond;
- Regular updates on the construction activities to Council and the local Police to assist in complaint management.
- Contact details of the project manager and / or site “Environmental Representative”;
- Letter drops informing residences adjoining site access routes in advance of major activities, such as concrete pours, and the details of such activities

In addition, prior to any blasting activity, or construction activity occurring within 1000m of a non-associated dwelling, or significant construction traffic periods or impacts on local road conditions, contact the local community potentially affected by the proposed works and inform them of the proposed work, the location, day(s), date(s) and the hours involved¹. This contact shall be made a reasonable time before the proposed commencement of the work and should provide the contact details of the project manager and / or site “Environmental Representative”.

¹ It is preferable to over estimate the hours of work, rather than extending the work hours for longer than anticipated.



MONITORING

The aim of the monitoring procedure is to ensure the works are being carried out in accordance with the CNVMP.

Plant and Equipment

The minimum elements should include:

- Regular on site inspections by the “Environmental Representative” to identify:
 - Equipment has quality OEM mufflers installed;
 - Equipment is well maintained and fitted with adequately maintained silencers which meet the OEM design specifications;
 - Silencers and enclosures are intact and closed, rotating plants are balanced, loose bolts are tightened, frictional noise is reduced through lubrication and cutting noise reduced by keeping equipment sharp;
 - Site personnel are using only necessary power to complete the task;
 - Plant and equipment is not being used that is significantly noisier than other similar machines;
 - Care is being taken to place material rather than being dropped;
 - Plant emitting noise strongly in one direction is orientated so that the noise is directed away from noise sensitive areas if practicable;
 - Machines that are used intermittently are being shut down in the intervening periods between works or throttled down to a minimum.

Blasting Noise and Vibration

- Prior to the first blasting activity:
 - Measure the peak component particle velocity and sound pressure levels at a distance similar to the closest expected separation distance to enable comparison and confirmation of compliance with the requirements AS2187.2-2006;
 - The measurements should be made by an acoustic engineer, defined for the purposes of the CNVMP as an engineer eligible for Membership of the Australian Acoustical Society and the Institution of Engineers Australia.
 - Adjust the blasting procedure to ensure compliance with the requirements.



- Prior to any blasting activity that differs from that tested :
 - Repeat the procedure above.

Note that a separate trial is not required to comply with the CNVMP, but rather a monitoring program that is integrated with the blasting regime to ensure compliance.



COMPLAINTS RESOLUTION

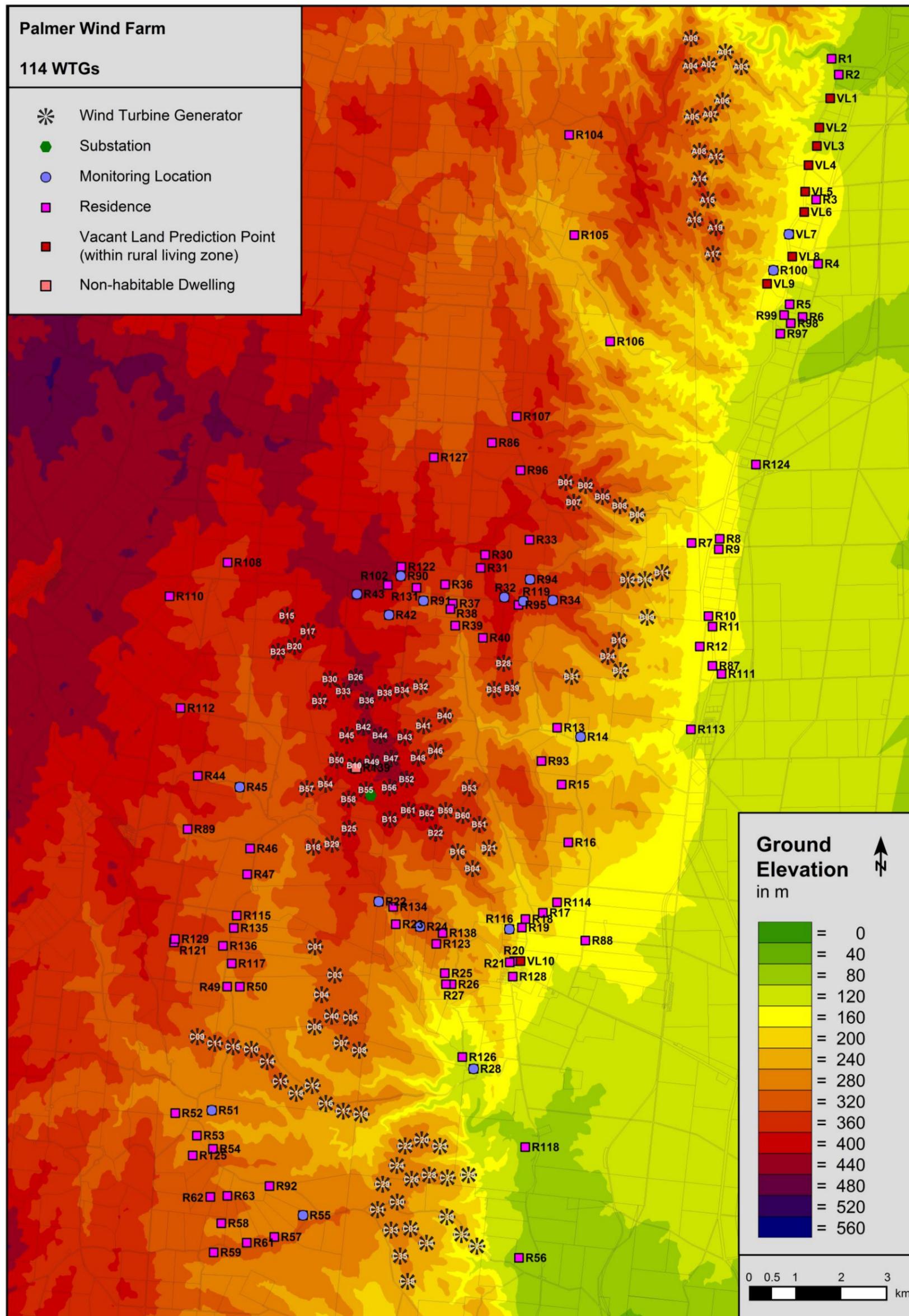
Noise and vibration elements should be included into the overall complaints resolution process. The aim of the complaints resolution process is to identify any reasonable and practicable measures that may further reduce impacts following a complaint, and to provide feedback to the community on the above process within a reasonable timeframe.

The minimum elements should include:

- Establishment of a complaints mechanism for the community via either telephone or email and in accordance with the *community consultation plan as relevant*;
- Notification of the relevant contact details through the community consultation process;
- Provision of an “Environmental Representative” dealing with any complaints who is appropriately trained in the CNVMP requirements and in community consultation, and has the ability to action the complaint;
- Establishment of a complaints handling procedure that:
 - Assesses whether the issue can be resolved easily and take immediate action if possible;
 - If not, ensures that the appropriate consultation has been undertaken for the activity;
 - Ensures the on-site inspections of the CNVMP have been carried out regularly for the activity;
 - Assesses the construction site and activities to determine whether there is any reason to believe the noise exposure of receivers is higher than anticipated and / or reasonable in the circumstances;
 - Takes remedial action if any of the above cannot be confirmed;
 - Advises complainant of action taken;
 - Maintains a record of the above to enable review by an independent authority such as EPA.



APPENDIX A: RECEIVER AND TURBINE LOCATIONS



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PALMER WIND FARM

ENVIRONMENTAL NOISE ASSESSMENT

Operational Noise Management Plan



For

**Trustpower
Truman Road
Te Maunga, Mt Maunganui**

**S4171C14
August 2014**

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GLOSSARY

A range of nomenclature with a range of meanings is used for environmental noise assessments. The following definitions are relevant to this document.

A weighting	Frequency adjustment applied to measured noise levels to replicate the frequency response of the human ear.
Ambient noise level	The noise level of all existing noise sources in the environment (in the absence of the wind farm).
Background noise level	The ambient noise level which excludes intermittent noise sources.
dB(A)	A weighted noise level measured in decibels.
L_{A90}	The A-weighted sound pressure level that is exceeded for 90 percent of a 10 minute time period. Represents the background noise level.
L_{Aeq}	The A weighted equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a 10 minute time period.



1 INTRODUCTION

The South Australian Environment Protection Authority *July 2009 Wind farms environmental noise guidelines* (the 2009 Guidelines) provide the requirements for “compliance checking”. That is, the 2009 Guidelines provide a framework for testing and confirming that a wind farm achieves its environmental noise criteria as provided by the Guidelines.

This Operational Noise Management Plan details the specific compliance checking actions for the Palmer Wind Farm in accordance with the 2009 Guidelines. The Plan also provides the complaint response actions for the ongoing operation of the Palmer Wind Farm.

2 THE 2009 GUIDELINES

The following table lists the Section of the Operational Noise Management Plan (ONMP) that addresses each relevant requirement of the 2009 Guidelines:

2009 Guidelines Section	Noise Requirement	ONMP Section
4.1	Data acquisition	3.2
4.2	Data analysis	3.2.3
4.3	Wind farm noise level determination	3.2
4.4	Background noise subtraction	3.2.3
4.5	Alternative measurement techniques	3.2.4
4.6	Tonality testing	3.2.5
4.7	Annoying characteristics	4.2.1
4.8	Complaint investigation	4
5.3	Reporting	3.2.6



3 OPERATIONAL NOISE MANAGEMENT PLAN

3.1 Noise Limits

The noise limits for the project at each dwelling are provided in the Sonus Environmental Noise Assessment S4171C12 dated August 2014 (the assessment). The limits have been determined in accordance with the 2009 Guidelines.

3.2 Compliance Testing

3.2.1 Locations

Compliance testing will be conducted at a sufficient number of non-stakeholder dwellings to confirm compliance with the project criteria at all dwellings. The non-stakeholder dwellings will be selected from those where background noise levels have been measured as part of the assessment.

The location of the equipment will be consistent with the positions documented in the assessment, subject to any changes to the local conditions that might result in modified results such as the construction of structures, change in vegetation or the installation of pumps or air conditioning units. The changes will be documented and the rationale provided for any alternative location.

3.2.2 Equipment

Sound level meters with a noise floor no greater than 20 dB(A) will be used.

The equipment will be either Type 1 or Type 2 sound level meters in accordance with the AS 1259:1990¹ and IEC 61672.1:2004², as relevant.

A calibrated reference sound source will be used before and after the compliance testing regime.

¹ Australian Standard *AS 1259-1990 Acoustics – Sound Level Meters*

² International Standard *IEC 61672.1-2004 Electroacoustics – Sound Level Meters*



3.2.3 Data

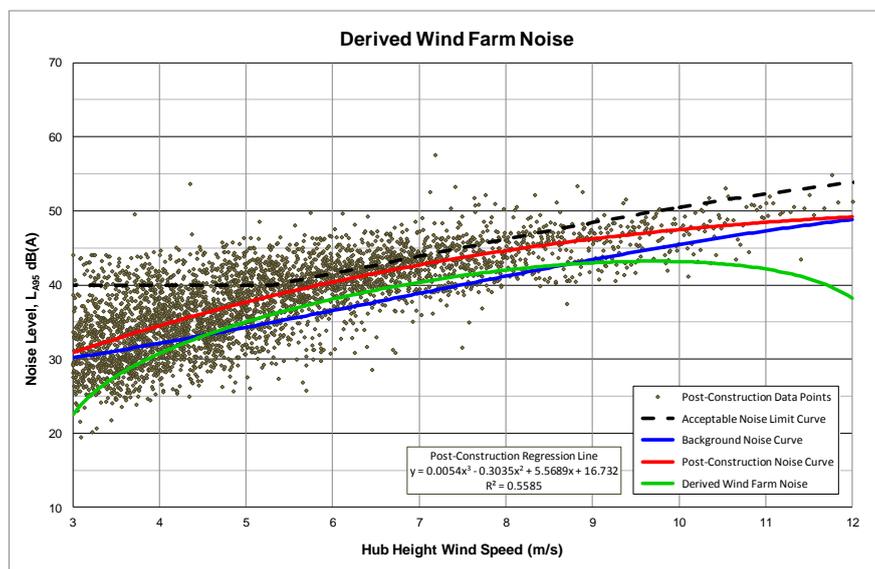
Data points “adversely affected” by rain or wind on the microphone will be removed based on a weather logger placed at an equivalent location to one of the noise loggers.

Data is adversely affected where rain occurs in a 10 minute period or where a wind speed greater than 5 m/s is exceeded for 90% of a 10 minute period.

The compliance testing will collect L_{A90} data to enable comparison against the project criteria. The measurements will be made continuously over 10 minute intervals for either a period which enables 500 downwind points to be collected within 6 weeks, or for 6 weeks. A downwind data point will be as defined in the 2009 Guidelines.

Following removal of adversely affected data, the remaining noise data will be correlated with the corresponding wind data for each monitored dwelling.

The wind farm noise contribution at the dwelling will be derived by logarithmically subtracting the background noise curve from the curve generated by the compliance testing data correlation in accordance with Section 4.4 of the 2009 Guidelines. An example of a wind farm noise contribution line derived from the post-construction measured noise regression line and background noise curve is shown in the figure below.





3.2.4 Testing Methodology

The derived wind farm noise curve will be compared against the project noise limits (Section 3.1).

The test method of Section 3.2 cannot be used in all circumstances to demonstrate compliance. This is primarily related to changes in local conditions or extraneous noise sources when compared to the conditions and noise sources that existed at the time of the original testing regime.

Where the test method of Section 3.2 (“the primary test method”) cannot be used to demonstrate compliance, then the following secondary test method in accordance with Section 4.5 of the 2009 Guidelines “Alternative compliance checking procedures” will be applied at that dwelling. The secondary test method will require “on/off” compliance testing, and will be conducted as follows:

- Only at dwellings where the primary test method cannot be used to demonstrate compliance;
- Only at integer wind speeds where the primary test method cannot be used to demonstrate compliance;
- With the noise monitoring equipment at the same position where the primary test had been conducted, or if that position is considered to be a factor in the inability of the primary test to demonstrate compliance, at an equivalent position with respect to turbine noise at the dwelling, but which has a higher turbine to background noise level ratio;
- Over a minimum interval of 2-minutes with the wind farm operational, then a measurement over the same interval with the wind farm shut off to obtain the background noise level;
- monitoring the wind speed and direction over the measurement intervals to identify the comparable “on” and “off” measurements.
- repeating the above “on” and “off” process to collect at least 3 intervals with comparable wind speed and direction conditions at each integer wind speed of interest. The wind farm noise will be determined by an arithmetic average of noise measurements at each integer wind speed after background noise (the “off” measurement) has been subtracted.



The supplementary “on/off” test method cannot be used in all circumstances to demonstrate compliance. This would occur where it is not practicable to consistently achieve comparable wind conditions between the on and off conditions.

Where the supplementary testing cannot be used to demonstrate compliance, an alternative method such as measurement at an intermediate location and extrapolation of the results will be developed and submitted to the Environment Protection Authority for approval.



3.2.5 Testing Methodology - Tonality

The tonality testing shall be conducted in two stages, with the first stage conducted close to a turbine, in accordance with IEC 61400-11:2006³ (IEC61400) and the second stage conducted at a residence if required.

Stage 1

The first stage shall be conducted in accordance with the tonality testing method of IEC61400, including the requirements for measurement location (close to turbines), length of measurements, and adjustment of background noise. The test shall be conducted at a sufficient number of turbines to be representative of all turbines.

It is noted that manufacturers often test for tonality and publish the results of the tonal audibility of the turbine.

Where the testing indicates that the tonal audibility of the turbine is 0 dB or less (in accordance with IEC 61400), no penalty for tonality shall be applied and no further testing is required.

Where the testing indicates that the tonal audibility of the turbines exceeds 0 dB at any integer wind speed, Stage 2 testing shall be conducted.

Stage 2

Where required, Stage 2 testing shall occur at the non-stakeholder dwelling with the highest predicted noise level where compliance checking is being conducted. Stage 2 testing shall occur at the same time as compliance testing over a period of at least 2 weeks.

For each 10 minute period, the narrowband test for tonality shall be conducted in accordance with IEC61400 (including the 10 second measurement intervals), except that the measurement location shall be at the residence and no adjustment shall be made for background noise. The narrowband test shall only be conducted for tonal frequencies identified in Stage 1. Where the narrowband test

³ International Standard *IEC 61400-11:2006 Wind turbine generator systems – Part 11: Acoustic noise measurements techniques*



shows a tonal audibility exceeding 0 dB (in accordance with IEC61400) and there is no evidence (such as an audio recording) that the tone is from a source unrelated to the wind farm, the 10 minute interval shall be deemed to exhibit tonality.

A 5 dB(A) penalty shall be added to the measured noise level in all 10 minute intervals exhibiting tonality, prior to the regression analysis required for compliance checking.

If the application of the tonality penalty to the data results in the derived wind farm noise level at an integer wind speed increasing by more than 1 dB(A), then the margin between the measured noise level and the project criteria at the “next closest dwelling” (being that dwelling with the next highest predicted noise level where compliance checking is being conducted) will be determined. Where that increase would result in that margin decreasing to less than 1 dB(A), then the tonality testing will be extended to the “next closest dwelling”.

3.2.6 Testing Schedule

The primary testing will commence within four weeks from the date of the completion of commissioning⁴ at identified dwellings for which consent for testing has been obtained.

The results will be provided to the Council and the EPA within 2 months following the completion of the testing. The results will be in a report format that is consistent with Section 5.3 of the 2009 Guidelines (the “final test report”).

The proposed testing schedule will be extended if specific weather conditions are required or there is the need for supplementary “on/off” noise compliance testing or any other alternative compliance testing regime.

The proposed testing schedule will be extended if the primary and secondary testing indicate the project criteria are exceeded. The procedure in such a circumstance is provided in Section 3.3 below.

⁴ For the purposes of this Plan, “completion of commissioning” is taken to mean the point at which all turbines have been commissioned to a stage deemed suitable for handover.



3.3 Noise Reduction Methodology

Where the results of the primary and supplementary testing indicate that the project criteria are exceeded, the following actions will be taken:

1. Inspect the turbines to determine if a maintenance related issue or mechanical defect is the cause of excessive noise generation. Where such issues are found, resolve the issue and conduct noise compliance testing as per Step 7 below;
2. Review the turbine manufacturer's near field⁵ sound power level results. If the actual sound power level results differ from that used in the modelling, implement Step 4;
3. If a penalty is applied for tonality, consider the application of acoustic treatment to eliminate the tonality at the dwellings and repeat the noise compliance testing. If the tonality is not eliminated, implement Step 4;
4. Determine the potential noise management system based on the test results, which will include the parking of turbines for particular conditions;
5. Conduct noise modelling with the Step 4 noise management system options implemented to ensure that compliance can be achieved. The noise modelling is to include any differences in the installed turbine sound power levels (as determined in Step 2) and the effect of any penalties (if the penalties could not be removed in Step 3);
6. If the modeled noise levels exceed the project criteria, then repeat steps 4 and 5;
7. Confirm noise compliance of the wind farm through testing in accordance with Section 3.2 at the relevant dwellings;
8. Document the final noise management system and test results in accordance with Section 5.3 of the 2009 Guidelines.

The final test report will be provided to the Council and the EPA. The wind farm will operate in accordance with the report.

⁵ The turbine manufacturer will confirm the sound power level through measurements of the installed wind farm.



4 NOISE COMPLAINT EVALUATION AND RESPONSE

4.1 Noise Complaints

4.1.1 Complaint Lodgement

1. A section of the project website will be provided to enable a complaint to be lodged;
and
2. A sign on the site to advise the public of the project website will be provided.

4.1.2 Complaint Receipt

1. All complaint details will be maintained in a complaints log;
2. The following complainant details will be recorded via prompts in the website lodgement form or the complaint receipt process:
 - Location of the dwelling (if provided);
 - Contact details of the complainant (if provided);
 - The time of the complaint;
 - Confirmation that the complainant has been informed that the complaint will be logged but no further action will be taken if the location and contact details are not provided (if relevant).
3. The following noise source details will be recorded via prompts in the website lodgement form or the complaint receipt process:
 - What is the subjective description of the noise?
 - Does the noise relate to the typical operation of the wind farm?
 - Does the noise relate to the operation of the wind farm under certain weather conditions? If so, what are those weather conditions?; and
 - Does the noise relate to a new noise source that has not appeared previously during the typical operation of the wind farm?



4.2 Noise Response

4.2.1 Maintenance Issues or Mechanical Defects

1. Determine whether the issue is related to a maintenance issue or a mechanical defect based on either the:
 - information provided during the Complaint Receipt; or
 - discussion with operational employees; or
 - an inspection of the location during the conditions of the complaint;
2. Where the issue is related to a maintenance issue or a mechanical defect, rectify the issue and provide the complainant with a summary of the above investigations. No further action is required.

4.2.2 Typical Operation

1. Where the issue is not related to a maintenance issue or a mechanical defect, review the final test report to determine the following:
 - a) Whether compliance noise monitoring has been conducted at the dwelling; or
 - b) Whether compliance noise monitoring has been conducted at a dwelling in the vicinity of the complainant that is closer to the nearest turbine;
2. In the circumstance where both 1a) and 1b) are not confirmed, proceed to Step 7;
3. In the circumstance where either 1a) or 1b) are confirmed, compare the operational status of the turbines, the weather conditions at the time of the complaint and any potential change in local conditions that might result in modified results such as the construction of structures, change in vegetation or the installation of pumps or air conditioning units against the conditions of the final test report;
4. Where the wind farm is found to be operating consistently with the conditions of the final test report and there has been no change in the local conditions, provide the complainant with a summary of the above investigations and a copy of the final test report, where that document has not been provided to the complainant previously. Record the above in the complaints log. No further action is required;



5. Where the wind farm is found to be operating inconsistently with the operational conditions of the final test report, modify the operation accordingly and provide the complainant with a summary of the above investigations, the actions taken and a copy of the final test report, where that document has not been provided to the complainant previously;
6. After one week of modified operation in accordance with the final test report, review the operating modes and record in the complaints log. No further action is required;
7. In all other circumstances, review the final test report and determine the predicted noise levels at the complainant's location;
8. Where the predicted noise levels do not exceed 35 dB(A)⁶ at any integer wind speed at the complainant's location, provide the complainant with a summary of the above investigations and a copy of the final test report, where that document has not been provided to the complainant previously. Record the above in complaints log. No further action is required;
9. Where the predicted noise levels exceed 35 dB(A)⁷ at any integer wind speed, conduct compliance testing in accordance with Section 3.1;
10. Prepare the revised final test report and provide to the complainant. Record the above in the complaints log. No further action is required.

^{6,7} A 35 dB(A) trigger level is for residences in the Rural Zone. For residences in the Rural Living (Sanderston) Zone, a trigger level of 30 dB(A) is applicable.

Appendix B – Draft CEMP – Temporary Concrete Batching Plant



Trustpower
Palmer Wind Farm
Draft Construction Environmental Management Plan -
Temporary Concrete Batching Plant

August 2014

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Appendices

Appendix A - Construction Noise and Vibration Management Plan (Sonus August 2014)

1. Introduction

1.1 Introduction

This draft Construction Environmental Management Plan (CEMP) has been prepared to accompany a development application for the proposed Palmer Wind Farm, specifically in relation to temporary Concrete Batching Plants (CBP).

This document has been prepared to cover the following phases:

- Implementation and construction phase.
- Site closure and make good phase.

1.2 Purpose of this CEMP

This draft CEMP seeks to provide high level guidance to avoid and/or minimise potential environmental impacts associated with installation, use and removal of temporary concrete batching plants as part of the construction phase of the Palmer Wind Farm. It seeks to identify potential mitigation measures and strategies that should be adopted during construction.

A final CEMP(s) will be prepared by the respective construction contractors for review and acceptance prior to works commencing on site. Detailed site-specific mitigation measures will be developed and included in any final CEMP(s) to be prepared by the construction contractors. A CEMP is a dynamic document and is to be updated by the contractor(s) as required to reflect detailed methodology, changes to site conditions or scheduled works. The construction contractor(s) will take responsibility for reviewing and managing the outcomes identified in the CEMP.

The purpose of the CEMP is to:

- Provide for concrete batching plant works to be carried out in accordance with the environmental conditions outlined in the Development Approval and EPA License requirements;
- Provide for works to be carried out in accordance with the applicable environmental legislation and standards;
- Outline how the environmental features of the site are to be protected during construction;
- Ensure all potential environmental risks associated with construction are identified and assessed;
- Protect environmental features and sensitive receptors;
- Outline measures to monitor and control potential environmental impacts associated with the works that are implemented effectively;
- Provide government, community and other stakeholders with assurance that environmental issues associated with the works are managed appropriately;
- Allocate clear responsibilities for the environmental management at all levels; and
- Optimise construction methods.

1.3 Data Sources

The following reports and data sources have been reviewed during the preparation of this draft CEMP:

- Palmer Wind Farm Flora and Fauna Survey (EBS Ecology Feb 2014);
- Environmental Noise Assessment (Sonus Feb 2014, S4171C4);
- Construction Noise and Vibration Management Plan (Sonus August 2014) – Provided in Appendix A;
- Trustpower Palmer Wind Farm Cultural Heritage Desktop Assessment (ACHM, Oct 2013)
- Civil, Geology, Geotechnical and Hydrology Assessment (GHD, Oct 2013);
- Australian Heritage Places Inventory – online database (planning.sa.gov.au);
- South Australian Heritage Places Database – online database (heritage.gov.au); and
- NatureMaps – online database (naturemaps.sa.gov.au).

These studies, and any other finalised post production of this draft document, will need to be reviewed by the contractor prior to completion of the final CEMP.

2. Project Information

2.1 Project Description

2.1.1 Site Location

The wind farm site is located in the eastern Mount Lofty Ranges, South Australia, approximately 50 km east of Adelaide CBD. There are five key localities near the development: Palmer, Tungkillo, Cambrai, Sanderston and Milendella. The area of Tungkillo has a population of approximately 600 people, and includes the township of Tungkillo and the town of Palmer, a small township (approximate population 75 people) that consists of a general store, hotel and a small primary school consisting of approximately 25 students.

Mount Pleasant is the regional centre of the area with a population of approximately 1000 people. Mount Pleasant has a number of facilities, including a small primary school.

The wind farm will be located on a number of private properties, primarily used for farming (involving approximately 20-30 landowners). The project area is predominantly rural in nature with limited residential properties.

The topography of the area comprises undulating hills of the eastern Mount Lofty Ranges, with steep escarpments present along geological fault zones, particularly at the eastern extent of the ranges. Steep sided valleys occur where watercourses cross the escarpments. There are a number of watercourses within the area, with the majority being ephemeral.

Transportation networks in the wider area consist of mainly unsealed gravel roads owned and maintained by the Mid Murray Council, plus regional / collector sealed roads servicing the townships.

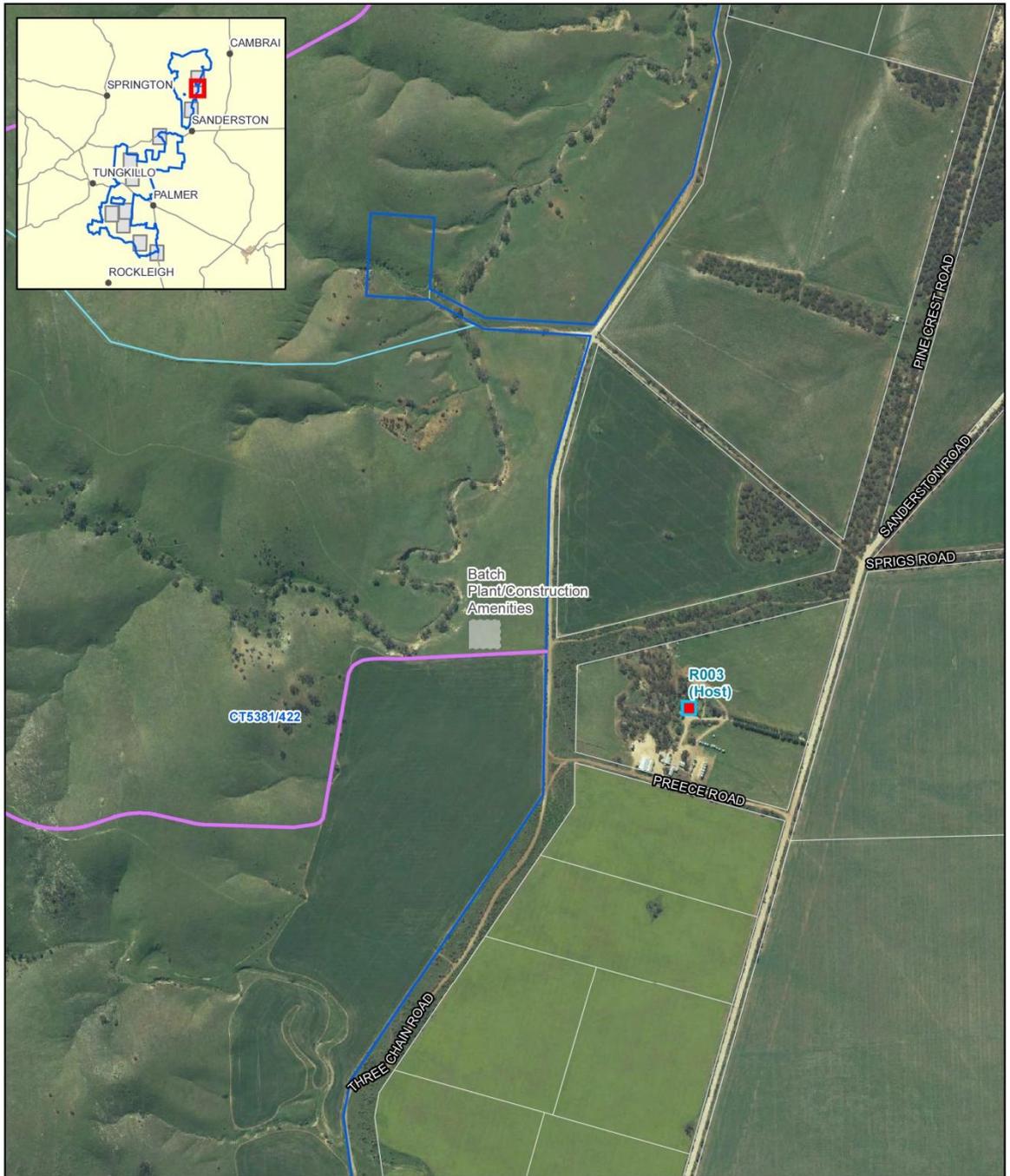
2.1.2 Description of works

This wind farm site is approximately 30km long along the ridgelines of the eastern Mount Lofty Ranges on roughly 12,000 hectares and is in close proximity to the Tungkillo substation.

The windfarm will include up to 114 turbines. Each turbine will be up to a tip height of 165m. The turbines will be connected by underground and overhead electrical cables to up to two on-site substations.

The current layout has three distinct clusters of turbines. The three areas will include turbines, substation, overhead and underground transmission, construction facilities (including potential concrete batching plants) and access tracks:

- Area A Northern Site – South of Walker Flat-Mt Pleasant Road, on the eastern ridges of the hills before descending into Sanderston;
- Area B Central Site – between Walker Flat-Mt. Pleasant Road and Adelaide-Mannum Road along Davenport Road; and
- Area C Southern Site – between Adelaide –Mannum Road and Bottroff Hill Road.



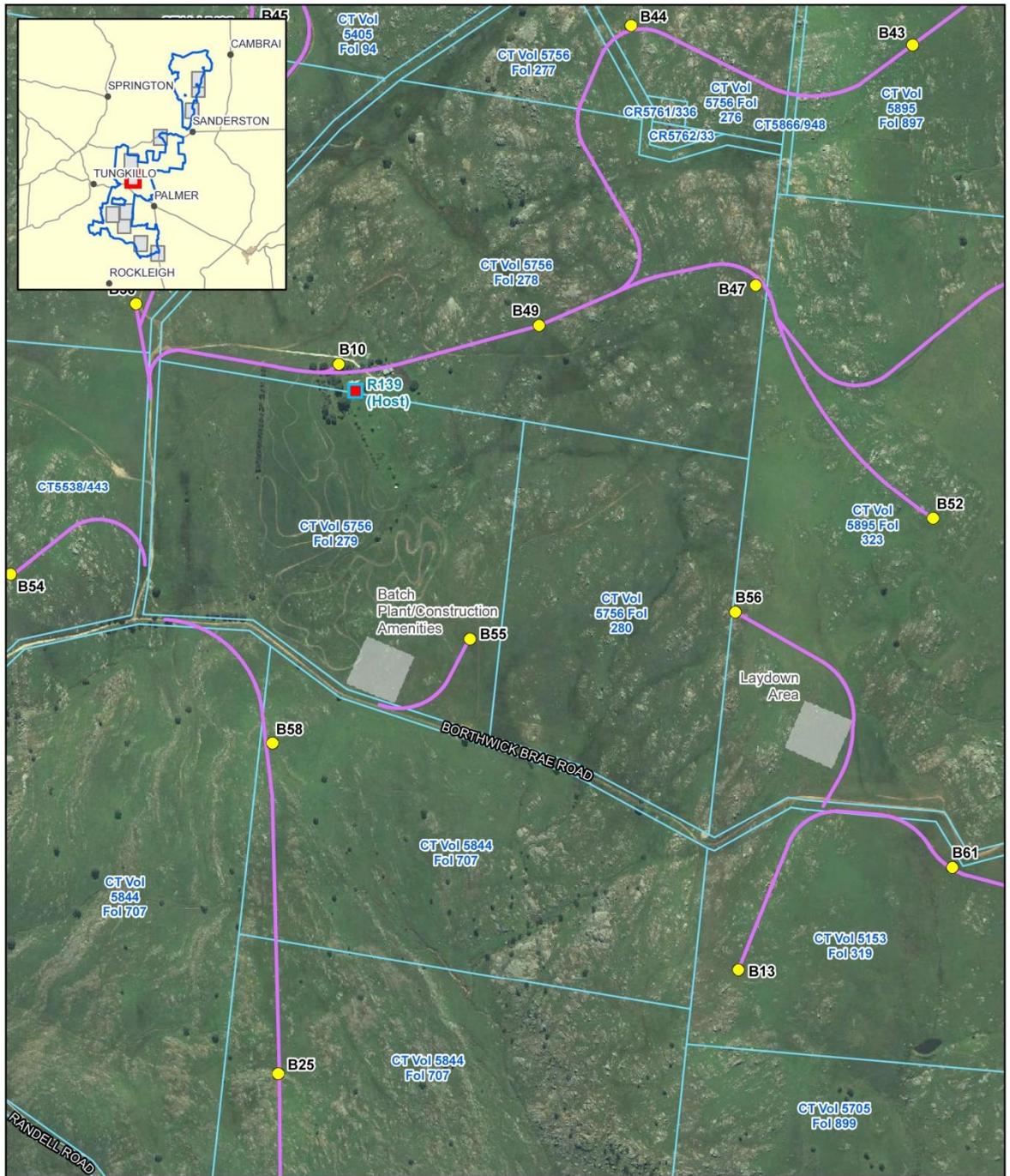
Legend

- Project Boundary
- Temporary Construction Amenities
- Dwellings within 500m from Constr. Facility
- Host Landowner
- Access Track
- Titles inside Project Boundary
- Cadastre

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Figure 1 Proposed location for Area A temporary CBP



Legend

- Indicative Turbine Location
- Project Boundary
- Temporary Construction Amenities
- Dwellings within 500m from Constr. Facility
- Host Landowner
- Access Track
- Titles inside Project Boundary
- Cadastre

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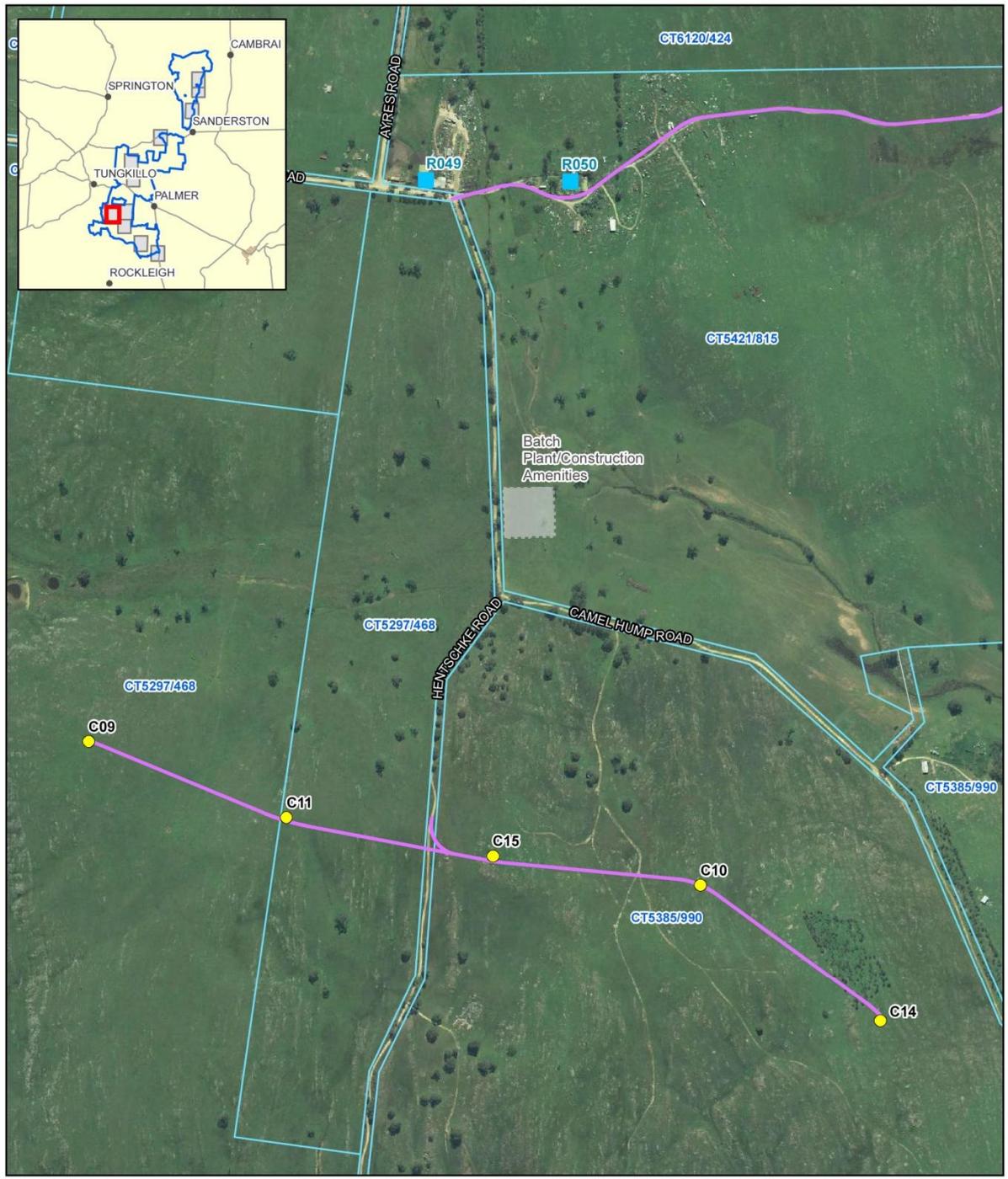
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 Palmer Wind Farm Technical Studies

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 Revision | 0
 Date | 14 Aug 2014

**Palmer Wind Farm
 Indicative Construction Facility Layout Figure 3.8-6**

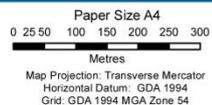
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Figure 2 Proposed location for Area B temporary CBP



Legend

- Indicative Turbine Location
- Access Track
- Project Boundary
- Titles inside Project Boundary
- Temporary Construction Amenities
- Cadastre
- Host Landowner



TrustPower Australia Holdings Pty Ltd
Palmer Wind Farm Technical Studies

Job Number	33-17234
Revision	0
Date	14 Aug 2014

Palmer Wind Farm
Indicative Construction Facility Layout **Figure 3.8-4**

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Data source: TrustPower Australia Holdings Pty Ltd; Aerial, Design - 201400123; GA: Geodata Topo 250K Series 3 - 2006; Roads - 2006; DPTI - Land Use - 2013; Created by: cillingworth

Figure 3 Proposed location for Area C temporary CBP

Up to three temporary CBP may be operated on site during the construction of the wind farm, indicative locations of the plants are shown in Figure 1. These will be located within temporary construction facility areas (which may include materials storage, laydown areas for equipment and parts etc.). Plant details are set out below.

- Each plant will be sized to accommodate a complete foundation pour each day, which comprises approximately 500m³ of concrete.
- The plant will occupy an area of approximately 100m by 100m, including the stockpile area for aggregate, sand and cement.
- The plant will be removed from the site upon completion of the construction works. The site of the plant will be remediated to its original condition upon removal.

Each plant will include the following components:

- Trailer mounted concrete mixer
- Cement bins
- Sand and aggregate stockpiles
- Storage container for equipment and tools
- Powered by diesel generators or local power if available
- Water for concrete manufacturing (potable) and dust suppression (bore) to be sourced from either on-site (bores/ dams) or commercial water sources.

The principle activities associated with the temporary CBP are listed below:

- Site establishment and set up,
- Topsoil stripping and vegetation removal,
- Water provision and management,
- Aggregated storage and stockpiles,
- Temporary storage of chemicals, spoil and equipment,
- Concrete mixing,
- Construction traffic movement,
- Tidy and make good work areas.

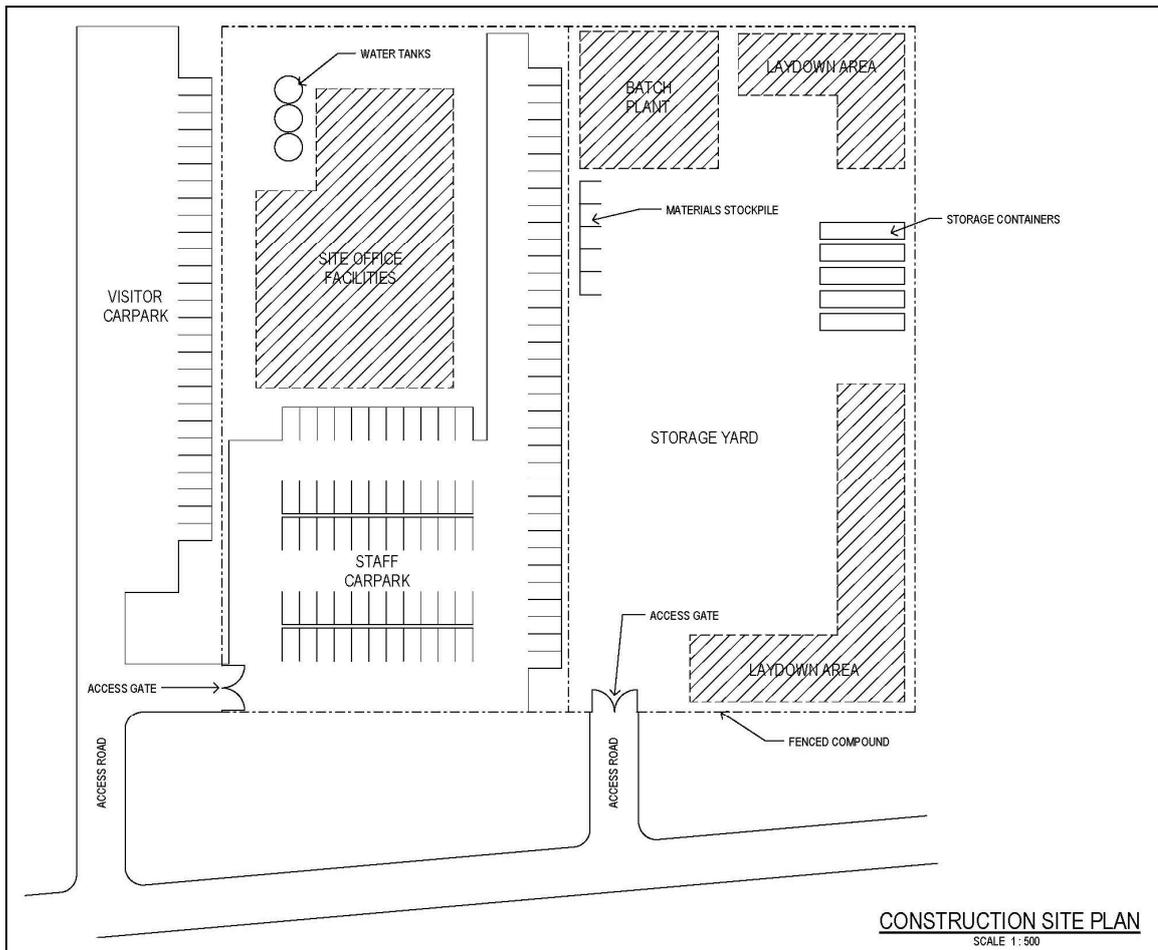


Figure 4 Suggested layout for site compound with temporary CBP

Temporary construction facilities will be dismantled and sites rehabilitated post construction.

2.2 Sensitive Receptors

This section summarises the environmental features which have been identified as potential sensitive receptors for this project. The potential construction impacts upon these receptors are considered in Section 3.

Table 1 Sensitive Receptors

Standard	Management Criteria
Community	<p>There are five towns in the location of the development: Palmer, Tungkillo, Cambrai, Sanderston and Milendella. In addition Mount Pleasant is the regional centre of the area.</p> <p>The wind farm will be located on a number of private properties primarily used for farming which will involve approximately 20-30 landowners.</p> <p>The majority of these communities are serviced by unsealed gravel roads with sealed roads located around the towns. The existing traffic volumes along these roads are low and the roads are generally only used by local farmers for access to their properties and transportation of farming equipment and materials.</p> <p>The Project Area includes traditional lands of the Peramangk Aboriginal group. The Peramangk Aboriginal group do not have a native title claim lodged over its asserted traditional land and is represented for heritage matters by the Mannum Aboriginal Community Association Incorporated (MACAI). A work area clearance agreement is in place with MACAI for the management of aboriginal heritage aspects and potential impacts.</p>
Ecology	<p>The soil condition of the project site has made it favourable for agricultural land use, which in turn has resulted in the clearing of the majority of native vegetation in the area.</p> <p>Remnant native vegetation only exists in discrete parcels in the project area and is categorised as woodland transitioning to scrub and grassland. This is usually found in very steep locations such as gullies.</p> <p>An ecological survey has identified Iron-grass Natural Temperate Grassland of South Australia as existing in the proposed development area. This is a threatened ecological community listed under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) within the Palmer Wind Farm Area A and B.</p> <p>Part of the site is in an area identified as a Vegetation Heritage Agreement area. This is a program that encourages landowners to conserve native vegetation on their properties and help to reverse the effects of over-clearance.</p> <p>The project area is upstream of a Wetland of International importance, being the RAMSAR listed Coorong and Lakes Alexandrina</p>
Water Resources	<p>There are a number of watercourses within the wind farm area, predominantly fed by rainfall and the majority are ephemeral. The average rainfall in the area generally decreases in an easterly direction.</p> <p>The groundwater table is closely linked to rainfall, falling during dry winters and rising during wet winters. As at late 2011 depth to the groundwater table below ground surface varied across the site from less than 2 metres in a relatively small area south west of site B, to greater than 20 metres in larger areas south of Tungkillo, in the vicinity of Palmer, and isolated areas north of Palmer. No strong correlation between depth to groundwater and surface elevation was noted, indicating that other factors affect groundwater levels such as upstream catchment sizes and local extraction rates.</p> <p>Both surface water and groundwater are prescribed within the area, requiring permits for use.</p>

Standard	Management Criteria
Soils and Geology	<p>The topography of the Project Area comprises undulating hills of the eastern Mount Lofty Ranges, with steep escarpments present along geological fault zones, particularly at the eastern extent of the ranges. Steep sided valleys occur where watercourses cross the escarpments.</p> <p>The soils of the eastern slopes of the Mount Lofty Ranges generally have a high to very high erosion potential by water and are likely to be subject to soil erosion by water, and potentially wind, if ground is disturbed.</p> <p>The site is in an area bounded by known fault lines that are seismically active. The likelihood of a major earthquake occurring is not known, however no significant (>4 magnitude) earthquakes have been recorded in the area.</p> <p>The Granite Boulders Area Geological Site (see Table 2) is located in the project area.</p>
Cultural Heritage	<p>There are numerous recorded sites of Aboriginal or European heritage within close proximity of the Wind Farm Project Area. The Project Area includes Traditional lands of the Peramangk Aboriginal group.</p> <p>Further details of local cultural and heritage sites are provided in the final Trustpower Palmer Wind Farm Cultural Heritage Assessment Study. This study indicates the areas that indigenous heritage features are more likely to be located.</p> <p>Dry stone walls are noticeable feature on the landscape. Some parts of the walls are in a good state of repair.</p>

3. Environmental Management System

Managing environmental issues and promoting environmental awareness during the site works is an essential component of responsible project management. It requires the active consideration of environmental issues and health and safety as a prerequisite to all construction operations. This section identifies the key management measures which will be required to avoid or minimise these likely impacts. The contractor's EMS is expected to comprise an environmental policy and the basic elements indicated in Section 3 of this report.

3.1 Implementation Responsibility

The roles and responsibilities of the following key participants in the construction works for the project are outlined below:

- Trustpower Principal
- Contractor Superintendent
- Contractor Environmental Manager
- Contractor and Staff.

The Trustpower Principal will engage a construction company ("the Contractor") who will be responsible for ensuring the final CEMP is developed and implemented by all staff and their subcontractors involved with the construction works.

The Principal should ensure that all contractual documents specifically quote a CEMP in terms of responsibility for addressing and implementing relevant environmental requirements. The contractual documents should also indicate that the Contractor is responsible for ensuring legislative and CEMP compliance controls are maintained on site.

The Contractor is responsible for obtaining all relevant approvals/permits/licences prior to works commencing. The Contractor will appoint an Environmental Manager who is responsible for developing environmental impact mitigation measures compliant with all approvals, permits, licences and management measures and incorporating this into the CEMP for construction works. The Contractor will assign a superintendent who will have overall responsibility for ensuring that all employees, subcontractors, and persons involved with the planning and carrying out of the proposed works are familiar with their obligations to comply with environmental requirements.

Successful implementation relies upon support for, and compliance with, the CEMP's requirements from all involved parties. Responsibilities are detailed below:

Trustpower Principal (the "Principal")

- Key contact and representative of Trustpower.
- Ensure contractual documents include environmental responsibilities, adequate training and preparation of a final CEMP prior to construction commencing.
- Overall responsibility for ensuring the project meets its compliance obligations and environmental requirements are implemented.
- Agree procedures for emergency response.
- Agree frequency and method of auditing, monitoring and other matters which are to be reported to Trustpower.

Environmental Manager (assigned by the Contractor)

- Responsible for managing environmental aspects during the construction and site closure phases and that the Superintendent has the information required to implement site controls successfully.
- Checks all environmental requirements, licences and procedures are implemented.
- Advises staff of special requirements.
- Conducts or commissions a consultant to undertake environmental audits/monitoring during all stages to ensure implementation of requirements.
- Determines and/or ensures environmental controls and procedures are in place and maintained during all phases of the project.
- Determines the training/instructions required for staff to be able to meet their environmental obligations.
- Reports environmental incidents during construction.
- Responsible for the emergency response procedure for environmental incidents.

Superintendent (assigned by the Contractor)

- Supervises and implements environmental controls on site during the construction works.
- Ensures training/instructions required by staff to be able to meet their environmental obligations, are undertaken and recorded.
- Reporting of environmental incidents to the Environmental Manager.
- During an emergency situation, responsible for informing the Environmental Manager and activating the response procedure.

Contractor(s) and Staff

- Implement environmental controls as directed
- Report environmental incidents to the superintendent.

Table 2 summarises the relevant project phase responsibilities relevant to implementation of a CEMP.

Table 2 Project Role Description and Responsibility

Planning	Principal	Oversees planning and Tender phase. Responsible for ensuring environmental compliance during the design phase and CEMP preparation.
	Design Consultant	Responsible for design of the wind farm facilities Responsible for preparation of a draft CEMP to guide development of a project-specific CEMP and outline legislative requirements.
	Environmental Manager	Responsible for review of the draft CEMP and preparation of final CEMP prior to construction commencing.
Construction Works	Principal	Responsible for environmental compliance.
	Superintendent	Oversees construction phase and enforces environmental controls on site.
	Environmental Manager	Ensures Contractor complies with environmental requirements.

3.2 CEMP Review, Reporting and Monitoring

The CEMP will only be effective if it is appropriately managed and utilised. Although the final CEMP will be developed prior to the commencement of construction works by the Contractor with the intention of covering the detailed methodology, circumstances may differ from those anticipated. Consequently it is important that the CEMP be regularly reviewed and updated. This will ensure that the measures, responsibilities, criteria and corrective actions remain achievable, effective and suitable to the project, whilst maintaining compliance with relevant legislation and policy.

An important principle that is embodied in this draft CEMP is that of “continuous improvement”. To facilitate this process it is critical that an appropriate monitoring, reporting and review process be developed and adopted.

3.2.1 Review of CEMP

The CEMP is to be reviewed throughout the construction phase monthly (or at a frequency determined by the Contractor). The review is to examine the following as a minimum:

- The implemented environmental management activities
- The incident reporting and preventative action procedures
- The complaints handling procedures
- The emergency response procedures for environmental incidents.

3.2.2 Monitoring Records

The results of any monitoring required by any approvals, licences or Conditions of Consent granted for the construction phase of the development must be:

- In a legible form
- Kept for at least 4 years after the monitoring or event to which they relate/took place
- Be available upon request to any authorised person.

The following minimum records will be kept in regards to any monitoring / sampling activity:

- The date(s) on which the monitoring was taken
- The time(s) at which the monitoring was collected
- The point at which the monitoring was taken
- The name of the person who conducted the sample.

3.2.3 Sampling Quality Control Plan

Where practicable NATA accredited laboratories will be used for any testing of samples taken in association with approvals, licences or consent conditions. Laboratory detection limits must be below the adopted assessment criteria.

Quality Assurance / Control measures such as collection and testing of duplicates and blind duplicates will be used to ensure the accuracy and quality of the required monitoring.

3.2.4 Follow Up Action

Where adherence to the requirements in this document are found to be unsatisfactory in achieving broader environmental and site management goals, action will be taken to investigate the cause and make amendments to the CEMP as required.

3.2.5 Reporting

The Contractor shall provide a fortnightly report to the Principal to cover the following circumstances:

- Include a report on any monitoring undertaken in accordance with licences, approvals or conditions of consent
- Provide a summary of complaints received during the construction phase of this project
- Report of compliance with the CEMP.

3.3 Training and Site Induction

The Contractor will oversee that all employees, sub- contractors and visitors receive environmental instruction in relation to the CEMP and legislative requirements. Each person will be made aware of and have an understanding of their obligations and duties detailed in this CEMP. Everyone involved with the project should be familiar with the CEMP components that are relevant to their role.

The Principal is responsible for overseeing that the contractual agreement with the Contractor specifies the necessity of providing adequate training to the construction teams. This responsibility is to be assigned to the Superintendent who can liaise with the Principal and other agencies, if required. During construction works, the Contractor must ensure that each operative is trained to use the machinery and materials on site efficiently to avoid environmental nuisance, including noise, air pollution, impacts on water quality, spread of waste material and land contamination.

3.4 Emergency Response and Incident Management

The final CEMP should detail emergency response procedures, with clear lines of responsibility to enable effective response with minimal environmental harm or disruption. The following sections provide an outline of procedures and protocols that should be included in the final CEMP.

3.4.1 Environmental Incidents (Notification of Environmental Harm)

The type of incidents that may require notification in accordance with legislation depends on the extent of harm or the potential damage to the environment. To ensure that Trustpower has a consistent approach to incident reporting, the Principal must be contacted immediately after the site has been made safe. The Contractor's Environmental Manager and Superintendent will be responsible for ensuring:

- An immediate assessment of the potential onsite and offsite impacts of the incident
- Consulting (if necessary) with emergency services
- Instigating appropriate steps to mitigate the impacts
- Advising regulatory authorities, where these authorities can provide assistance with mitigation of impacts.

Failure to report an incident may result in enforcement action on all involved.

The Principal will provide written details of the notification to the appropriate authorities within 7 days of the dates on which the incident occurred.

The Principal will liaise with the appropriate authorities to provide suitable details within the time specified.

3.4.2 Emergency Response Plan

Emergencies that may occur during the construction phase of the project include:

- Fire
- Chemical spill
- Flooding
- Explosion
- Wildlife Injury
- Damage to power or services cables
- Personnel injury
- Seismic activity.

Prior to the commencement of the construction phase, the Principal and the Contractor are to agree on procedures for emergency response. It is the responsibility of the Contractor to develop, implement and train staff in the emergency response procedures.

To ensure emergencies are managed in an appropriate manner the Contractor is to follow the general procedures outlined in Table 4.

Table 3 General Emergency Response Plan

Standard	Management Criteria
Policy	To minimise the risk of an environmental accident or emergency during construction phase of the Project.
Performance Objective	Ensure that an Emergency Response Plan is kept in place to respond to any accidents or incidents that may impact on the environment and that all personnel are inducted in its application.
Implementation Strategy/ Mitigation Measures	<p>Material Safety Data Sheets for all materials used or stored on site relevant to the concrete batching plant, regardless of quantity, for the construction works shall be kept on site by the Contractor.</p> <p>Spill Response Kits, fire extinguishers and other emergency response equipment should be fully maintained and readily available.</p> <p>In the event of an emergency the Contractor's Superintendent is to immediately notify the Principal.</p> <p>The Superintendent will also notify the relevant emergency services.</p>
Monitoring	<p>Following an emergency, the affected areas shall be monitored as required. In the event of a spill, it should be ensured that all contaminated material, including soil, has been removed and properly disposed of by a suitably qualified contractor.</p> <p>Follow up action is to be undertaken to ensure adequate provisions are implemented to minimise or eliminate the risk of reoccurrence of the emergency.</p>

Standard	Management Criteria
Reporting	<p>Once immediate mitigation steps have been undertaken and the incident contained. All incidents/emergencies will be reported to the Principal. The Contractor is to record emergency information on an Incident/Complaints Form and will include the following:</p> <ul style="list-style-type: none"> • Location of the emergency or incident • Name and telephone number of the designated contact person • Time of the emergency/incident • The environmental harm or nuisance caused, threatened, or to be caused by the emergency/incident • Any remediation work undertaken • Actions to be taken to prevent further incidents/emergencies and mitigate any environmental harm and/or nuisance caused by the incident/emergency.
Corrective Action	Non-conformance with this plan shall be documented by the Principal and corrective action undertaken to ensure future conformance. All non-conformances shall be documented and passed onto the Contractor.

3.4.3 Incident and Corrective Action Records

All environmental incidents need to be documented, recorded and followed up with identified corrective action(s). Incident Reporting documentation needs to be completed by those personnel involved along with the Contractor's Environment Manager; approval should be sought from the Principal. Corrective actions should be identified and documented in Corrective Action documentation and approved by the Principal's Representative. While identifying corrective actions to be taken, personnel responsible for implementing the corrective action need to be identified and informed of their responsibilities. Corrective Action documentation should be updated throughout the course of the construction works and/or until the identified actions have been fully completed.

Incident/Emergency Response Plan Contact Register

In the event of an incident or emergency occurring at the site, contact will be made with the key emergency services as identified in Table 4.

Table 4 Incident/Emergency Contact Register

Organisation	Title	Telephone Number
Principal (Trustpower)	TBC	TBC
Trustpower Representative	TBC	TBC
Contractor Environmental Manager	TBC	TBC
Contractor nominated Superintendent	TBC	TBC
EPA	Pollution and Environmental Incident reporting (24 hour)	(08) 8204 2004
Fire Brigade Police Ambulance	Emergency	000

3.5 Community information and grievance procedure

A programme will be established of public information provision to residents or other nearby sensitive receptors which may be impacted by the construction works, including the concrete batching plants and haul traffic. A grievance procedure will be included in the final CEMP and implemented during the construction phase. A complaints register including details of the complaint, how the complaint was actioned / resolved should be maintained and retained throughout the construction period.

3.6 Fire prevention

Fires can eventuate from work activities or during operation. The dry grass may ignite causing damage to the grazing paddocks and adjacent dwellings. Fire may spread causing damage to the ancillary services and structures and smoke may disrupt traffic on adjacent roads.

Liaison with the CFS will be required prior to construction commencing, with regards to requirements during the “Fire Danger Period”. Determine, in consultation with CFS, the appropriate firefighting measure and equipment required on site during construction.

A Fire Prevention Management Plan should be developed as part of the final CEMP.

Table 5 Fire prevention outline plan

Objective	Minimise the risk of fire resulting from a concrete batching plant the construction of the Palmer Wind Farm.
Legislation / Policy	<i>Electricity Act 1996</i> <i>Fire and Emergency Services Act 2005</i> <i>Electricity Regulations 2012- General</i> <i>Electricity Regulations 2010 – Principles of Vegetation Clearance</i> <i>Australian Standard 1851(2012) – Portable Fire Extinguishers</i> <i>Australian Standard 1940(2004) – The storage and handling of flammable and combustible liquids.</i>
Potential Impacts	Fires can eventuate from work activities or during operation. The dry grass may ignite causing damage to the grazing paddocks and adjacent dwellings. Fire may spread causing damage to the wind turbines and ancillary services and structures. Smoke may disrupt traffic on adjacent roads.
Mitigation	Liaise with CFS during the pre-construction stage with regards to requirements surrounding compound areas, during the “Fire Danger Period” Determine, in consultation with CFS, the appropriate fire fighting measure and equipment required on site during construction. Provide CFS and SES information regarding the location of the equipment and measures implemented during the construction stage. During construction , the area surrounding each turbine to a distance of 30m will be maintained as follows: <ul style="list-style-type: none"> • Grass must be no more than 200mm in height; • Maintenance works such as mowing and tree pruning to be done before entering the Fire Danger Season or under CFS supervision. • Leaf litter must be less than 20mm deep; • No fires would be lit at any time, for any purpose, including burning waste materials; • Spark-arrestors to be installed on all vehicle and machinery powered by internal combustion engines;

	<ul style="list-style-type: none"> • Vehicles may only be operated on approved roads and tracks for that class of vehicle. Only diesel powered vehicles may operate “off road” at any time. • Welding to be undertaken under controlled manner; • Minimise on-site storage of flammable materials; and • All vehicles to be equipped with compliant fire extinguishers. <p>When conducting work using or generating intensive heat:</p> <ul style="list-style-type: none"> • Use a fire resistant shield to prevent sparks or hot material from leaving the work area; • Provide a fire proof container for off-cuts; • The work area around active grinding equipment (10m) and hot work source (1.5m) to be kept clear of flammable material or will be kept wet; and • Fire extinguishers and water tap to be made available in close proximity of the hot works area. <p>During periods of High Fire Danger:</p> <ul style="list-style-type: none"> • All hot work will be banned and no permits will be issued (including explosives)
Strategy	A Fire Prevention Management Plan will be provided as part of the final CEMP.

4. Environmental Sub-management Plans

The following sections outlines potential mitigation strategies to avoid and/or minimise potential impacts to various environmental aspects associated with the concrete batching plants. Key legislative considerations and potential approvals/permits are highlighted. This will need reviewing against the construction methodology, once finalised. The Contractor's Environmental Manager will need to determine the Inspection / Criteria/ Target / Evidence required to determine compliance with each element of the CEMP. Mitigation measures provided represent the minimum requirements that should be adopted in any final CEMP to be prepared prior to commencement of construction. Where indicated, Management Plans should be prepared and provided as part of the final CEMP.

The following outline sub-management plans provided here are:

- Flora and Fauna Protection
- Weed, Pest and Disease Control
- Water Quality Protection
- Erosion and Sediment Control
- Construction Noise and Vibration Control
- Air Quality Control
- Materials, Fuels and Waste Management
- Protection of Sites of Cultural and Natural Heritage Significance.

4.1 Flora and Fauna and Rehabilitation

Table 6 Flora and Fauna Protection

Objective	Minimise Impacts to flora and fauna including vegetation clearance and manage the works so as to avoid damage to retained vegetation and fauna.
Legislation / Policy	<p><i>Native Vegetation Act 1991</i></p> <p><i>Native Vegetation Regulations 2003</i></p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i></p> <p><i>Natural Resources Management Act 2004</i></p> <p><i>National Parks and Wildlife Act 1972</i></p>
Permits/Approvals	<p>Submission of an EPBC referral for Lomandra Grassland.</p> <p>Consent to clear Native Vegetation under Native Vegetation Act 1991.</p>

Table 7 Flora and Fauna Protection Mitigation and Controls

Key Construction Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up,</p> <p>Topsoil stripping and vegetation removal,</p> <p>Aggregate storage and stockpiles,</p> <p>Temporary storage of chemicals, spoil and equipment,</p> <p>Concrete mixing,</p>	<p>Potential disturbance to fauna located in areas to be cleared.</p> <p>Potential disturbance to fauna residing in habitats adjacent works area.</p> <p>Native vegetation located within the works area could be impacted.</p> <p>Vegetation within the footprint of the proposal may require clearance.</p>	<p>A Flora and Fauna Management Plan will be provided as part of the final CEMP.</p> <p>Located concrete batching works within temporary construction facility areas in order to minimise the construction area footprint and avoid where possible disturbance to preferred habitat of conservation significant species predicted as likely to occur at the site and those recorded during the Flora and Fauna survey (EBS Ecology 2014).</p> <p>Vegetation exclusion zones should be clearly identified and communicated to site personnel.</p> <p>Place site depots, equipment compounds and stockpile areas on previously cleared areas away from trees, bushes and native grasses, where possible.</p> <p>Avoid work/storage within the drip-line of trees to prevent damage to the tree roots and soil compaction.</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>

Key Construction Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>If there is any removal of native vegetation required during construction, it will be conducted in accordance with the requirements of and approvals under Native Vegetation Act 1991. Any direction provided by the NVC must be adhered to.</p> <p>Do not burn off cleared vegetation; reuse cleared vegetation, where possible.</p>		
Construction traffic movement	Increased potential for wildlife vehicle strike on haul roads to and from site.	<p>Use existing access tracks where possible to minimise additional disturbance</p> <p>Speed limits on haulage traffic may be required to be imposed to prevent increased occurrence of wildlife strike.</p>	TBC	Environmental Manager Superintendent
Tidy and make good work areas	Minimise permanent impacts to flora and fauna.	<p>Reinstatement of any areas of vegetation, including road verges, which have been impacted during the construction phase in accordance with Native Vegetation Council Approval requirements, conditions and directives.</p> <p>In areas of native vegetation return topsoil and mulched vegetation to approximately the same area of the roadside it came from.</p>	TBC	Environmental Manager Superintendent

4.2 Weed, Pest and Disease Control

Table 8 Weed, Pest and Disease Control

Objective	Prevent the movement or increase in weeds, pests or diseases.
Legislation / Policy	<i>Native Vegetation Act 1991</i> <i>Native Vegetation Regulations 2003</i> <i>Environment Protection and Biodiversity Conservation Act 1999</i> <i>Natural Resources Management Act 2004</i> <i>National Parks and Wildlife Act 1972</i>
Permits/Approvals	Permit to move pest plants or animals (Natural Resources Management Act 2004)

Table 9 Weed, Pest and Disease Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Site establishment and set up, Topsoil stripping and vegetation removal, Aggregate storage and stockpiles, Tidy and make good work areas.	Potential spreading of weeds, pests and diseases. Potential increase in prevalence of pest animals.	A Vegetation and Fauna Management Plan will be provided as part of the final CEMP, and this will need to cover the issue of Weed, Pest and Disease Management. Control weeds on site during construction and monitor the site for any outbreaks. Ensure that raw materials, such as rubble, gravel, sand and water brought into the construction site are free of Phytophthora. Check rock prior to transportation and clean/spray as appropriate. Vegetation from weed species should be disposed of separately at a licensed waste depot.	TBC	Environmental Manager Superintendent
Construction traffic movement	Potential spreading of weeds and pests. Potential increase in prevalence of pest animals.	Follow weed or disease hygiene procedures ensuring vehicles and equipment are cleaned as required.	TBC	Superintendent

4.3 Water Quality Protection

Table 10 Water Quality Protection

Objective	Minimise impact to surface and ground water quality within works area and haul routes.
Legislation / Policy	<p><i>Environment Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Water Quality) Policy 2003</i></p> <p><i>Natural Resources Management Act, 2004</i></p> <p><i>Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry</i></p> <p><i>EPA Guidelines (EPA 396/10) - Water Quality, Dredging and Earthworks Drainage.</i></p> <p><i>Guidelines for separation distances (EPA) 2007</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p>
Permits/Approvals	<p>Earthworks drainage authorisation (section 7(6) of Schedule 1 of the Environment Protection Act 1993).</p> <p>Approvals may be required for actions/activities that have an impact on water resources such as up-grades of watercourse crossings, water extraction, water degradation (Natural Resource Management Act, 2004).</p> <p>EPA licensing (e.g. a concrete batching plant)</p>

Table 11 Water Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up, Topsoil stripping and vegetation removal, Water provision and management, Aggregate storage and stockpiles, Temporary storage of chemicals, spoil and equipment, Concrete mixing, Construction traffic movement</p>	<p>Impact to the natural movement of surface and groundwater affecting availability to flora and fauna and local communities and landowners. Impacts to water quality can affect aquatic fauna, decreases the aesthetic value of a watercourse or water body and can damage transport infrastructure.</p>	<p>A Water Management Plan will be prepared prior to construction and operation of the concrete batching plant. Ensure any conditions/obligations relating to a Permit for surface or groundwater extraction is complied with. Chemical testing of any identified water source should be carried out to determine the suitability of water for use in mixing concrete, or for dust suppression. Consideration to stormwater drainage control will be given when establishing the construction site. The following objectives will be considered:</p> <ul style="list-style-type: none"> • Limit site access to designated routes and controlled area; • Locate and secure all stockpiles areas away from watercourses and concentrated water flow paths; • Ensure that all the stormwater drainage are in place before site clearing works begin; • Assess the impact of the proposed stormwater drainage systems on the adjacent properties; • Consideration to existing underground services will be given when establishing the access tracks and construction site, and protection will be provided where required. • Construction of access road networks may alter surface drainage paths. Drainage should be installed to mitigate potential effects, taking into consideration ephemeral watercourses • Minimise areas of vegetation loss to areas identified for clearance as part of the scheme. 	<p>TBC</p>	<p>Environmental Manager Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Control surface run-off entering and leaving the work area:</p> <ul style="list-style-type: none"> • Existing natural drainage paths and stormwater facilities must not be blocked or restricted. • Runoff from unsealed areas at the construction site must not enter stormwater drains or natural drainage lines. • Stormwater should be diverted around stockpiles. 		
Waste Water Management	Reduction in quality of water resources.	<p>The site must incorporate a wastewater management system; and effectively operate the system in respect of any wastewater generated at the site. Regular inspection and maintenance of the system is necessary.</p> <p>Waste water generated at the premises must not be discharged into any waters; or onto land in a place from which it is reasonably likely to enter any waters (including by processes such as seepage or infiltration or carriage by wind, rain, or by the rising of the water table).</p> <p>Settling ponds should be lined with an impervious liner capable of containing all contaminants found within the water they are designed to collect.</p> <p>Concrete agitator bowls and chutes must not be washed out to the stormwater system or roadways.</p> <p>A wastewater collection and recycling system should be designed to collect contaminated water from:</p> <ul style="list-style-type: none"> • agitator washout • truck washing • yard washdown • contaminated stormwater • concrete batching area • slump stand • any other wastewater from the batching plant operation. 	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Tidy and make good work areas	Long term effects arising from the development of the project.	Cleared areas to be stabilised / rehabilitated promptly and where possible enhance the natural value of these areas.	TBC	Superintendent

4.4 Soil Management, Erosion and Sediment Control

Table 12 Erosion and Sediment Control

Objective	Minimise erosion within works area and haul routes and minimise sediment laden stormwater leaving the site.
Legislation / Policy	<i>Environment Protection Act 1993</i> <i>Environment Protection Regulations 2009</i> <i>Environment Protection (Water Quality) Policy 2003</i> <i>Natural Resources Management Act, 2004</i> <i>Stormwater Pollution Prevention, Code of Practice for the Building and Construction Industry</i> <i>Concrete batching Industry Guidelines (EPA) 2009</i>
Permits/Approvals	Earthworks drainage authorisation (section 7(6) of Schedule 1 of the Environment Protection Act 1993.) EPA licensing (concrete batching plant)

Table 13 Erosion and Sediment Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Site establishment and set up,	The soil characteristics are likely to be subject to soil erosion by water and potentially wind if ground is disturbed.	Soil erosion and generation should be minimised during construction. Final CEMP will include a Soil, Erosion and Sedimentation Management Plan. Erosion and sedimentation control devices installed prior to commencement of construction/works.	TBC	Environmental Manager Superintendent
Topsoil stripping and vegetation removal,	Damage to top soil and subsoil.	The Management Plan should be developed that includes the following: <ul style="list-style-type: none"> • Maps showing the areas to be stripped and left in-situ. • Minimise areas of vegetation loss to areas identified for clearance as part of the scheme. • The appropriate method for stripping, stockpiling, respreading and ameliorating the soils. • The location of soil stockpiles and content (e.g. 	TBC	Environmental Manager Superintendent

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Topsoil type A subsoil type B).</p> <ul style="list-style-type: none"> • Schedules of volumes for each material. • Expected after-use for each soil whether topsoil to be used on site, used or sold off site, or subsoil to be retained for landscape areas, used as structural fill or for topsoil manufacture. • Identification of person responsible for supervising soil management. <p>Soil should be handled in the right conditions of weather and soil moisture and using suitable machinery in an appropriate way. Soil that is wet or very moist (wetter than the plastic limit) should ideally be allowed to dry further.</p> <p>Use tracked equipment wherever possible to reduce compaction.</p> <p>Confine movement of trucks or dumpers to designated temporary haul routes. Multiple handling of soil materials increases the risk of damage to soil structure so should be minimised.</p> <p>Avoid stripping topsoil for reuse too deeply so that subsoil becomes incorporated, thereby reducing fertility.</p> <p>Do not remove topsoil from below the spread of trees to be retained.</p>		
<p>Water provision and management, Aggregate storage and stockpiles, Concrete mixing,</p>	<p>Soil erosion can contaminate watercourses, lead to loss of vegetation, impact on aquatic fauna, decreases the aesthetic value of a watercourse, reduce the agricultural capacity of land and can damage transport infrastructure.</p>	<p>Implement controls to prevent and minimise the risk of any sediment from earthworks entering the stormwater system. Areas of exposed soil, including stockpiles, are protected from erosion, or that suitable control measures are in place to prevent any mobilised soil being transported off site.</p> <p>Locate stockpiles away from watercourses and not in drainage lines.</p> <p>Stormwater diverted around stockpiles.</p>	<p>TBC</p>	<p>Environmental Manager Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Any dewatering on site to be undertaken in a manner which prevents sediment entering stormwater drains and water course.</p> <p>Use of sediment curtains, cofferdams or similar to prevent suspended sediment movement during construction within water or areas likely to be inundated.</p> <p>Maintain the sediment control and stormwater drainage devices at all times.</p>		
Tidy and make good work areas	Long term effects arising from the development of the project.	<p>All stockpiles resulting from the concrete batching works will be removed from site.</p> <p>The access tracks width will be reduced to approximately 5 metres. Top soil will be spread over exposed batters and vegetation will be reinstated.</p> <p>The reinstatement works will be undertaken as soon as practical after the completion of earthworks.</p> <p>Cleared/excavated areas to be stabilised / rehabilitated promptly and where possible enhance the natural value of these areas.</p> <p>Temporary or permanent measures will be implemented either to help with the revegetation process or to provide additional protection against erosion. On steep slopes erosion control matting will be used to provide interim protection until the vegetation cover is fully established.</p>	TBC	Superintendent

4.5 Construction Noise and Vibration

Table 14 Construction Noise and Vibration

Objective	Avoid and/or minimise noise and vibration emissions during the temporary concrete batching works.
Legislation / Policy	<p><i>Environmental Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Noise) Policy 2007</i></p> <p><i>AS2436 – 1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p> <p><i>Australian Standard AS 1055–1997 Acoustics – Description and measurement of environmental noise</i></p> <p><i>Guidelines for separation distances (EPA) 2007,</i></p>
Permits/Approvals	EPA licensing (concrete batching plant)

Table 15 Construction Noise and Vibration Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up,</p> <p>Topsoil stripping and vegetation removal,</p> <p>Concrete mixing,</p> <p>Tidy and make good work areas.</p>	<p>Noise and vibration from construction activities may impact on nearby sensitive receptors including residential dwellings and/or wildlife.</p>	<p>A Construction Noise and Vibration Management Plan has been developed by Sonus (2014) (see Appendix A). This should be reviewed and updated where there are changes in construction methodology or works locations.</p> <p>The selection of site location should as a minimum, accord with EPA separation distances to any sensitive receptors including nearby wildlife.</p> <p>Site perimeter fencing may need to be established for the work area and include a noise and vibration barrier.</p> <p>Throughout construction activities the Contractor will be required to observe all obligations under the Environment Protection Act 1993 and Section 6 of AS2436 – 1981 “Guide to Noise Control on Construction, Maintenance and Demolition Sites”.</p> <p>Activities to be undertaken must be compliant with requirements of Environment Protection (Noise) Policy 2007.</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>Plant and equipment used to be properly maintained and have noise limitation equipment installed as per manufacturer's specification.</p> <p>Plant and equipment used on site to be stood down when not required.</p> <p>Construction to occur only during the hours specified. (7:00 am to 7:00 pm Monday to Saturday).</p> <p>Works carried out outside of the hours will only entail:</p> <ul style="list-style-type: none"> • works that do not cause noise emissions which exceed the noise limits of the Policy at any nearby dwelling not associated with the project; or • the delivery of materials as requested by Police or other authorities for safety reasons; or • emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or • works with the prior consent of the Environment Protection Authority (EPA) (an example might be occasional concrete pours on hot days). <p>Nearby residents/stakeholders will be notified of construction activities.</p> <p>Noise monitoring/inspections to be undertaken as prescribed in the Construction Noise and Vibration Management Plan (Sonus 2014).</p> <p>Noise monitoring undertaken if required upon receipt of a complaint.</p> <p>To monitor potential vibration impacts from construction works on nearby structures, dilapidation surveys may be required.</p>		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Construction traffic movement	Haul traffic may cause noise and vibration nuisance or damage to residential and sensitive receptors traveling to and from the site	<p>A Construction Traffic Management Plan will be established prior to construction commencing.</p> <p>Appropriate routes for light and heavy construction vehicles selected to minimise disturbance prior to commencement of construction works.</p> <p>Construction traffic must use agreed haul roads to travel to and from site. Approved areas for parking will be identified.</p> <p>All vehicles and equipment will be operated and maintained to comply with regulatory standards in order to control noise emissions.</p> <p>Best practice in regard to construction traffic in residential areas.</p>	TBC	Environmental Manager Superintendent

4.6 Air Quality Control

Table 16 Air Quality Control

Objective	Avoid and/or minimise air quality impacts during construction works.
Legislation / Policy	<p><i>Environmental Protection Act 1993</i></p> <p><i>Environment Protection Regulations 2009</i></p> <p><i>Environment Protection (Air Quality) Policy 1994</i></p> <p><i>Guidelines for separation distances (EPA) 2007</i></p> <p><i>Concrete batching Industry Guidelines (EPA) 2009</i></p>
Permits/Approvals	EPA licensing (e.g. a concrete batching plant)

Table 17 Air Quality Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up,</p> <p>Topsoil stripping and vegetation removal,</p> <p>Water provision and management,</p> <p>Aggregate storage and stockpiles,</p> <p>Temporary storage of chemicals, spoil and equipment,</p> <p>Concrete mixing,</p> <p>Tidy and make good work areas.</p>	<p>Dust from construction impacting surrounding environment including residential areas, water bodies and wildlife.</p> <p>Odour from construction works impacting amenity of surrounding area.</p>	<p>An Air Quality Management Plan will be provided as part of the final CEMP. This will demonstrate that all reasonable and practicable measures to minimise air quality impacts from the operations have been made.</p> <p>The selection of site location should as a minimum, accord with EPA separation distances to any sensitive receptors including nearby wildlife.</p> <p>The design of the site should consider provision of natural or artificial wind barriers such as trees, fences and landforms. Prevailing wind direction should be considered to ensure bunkers and conveyors are sited in a leeward position to minimising effects from wind.</p> <p>Dust controls to be implemented during construction including management of stockpiles (height, orientation etc.) and the use of suppressants including water spraying as required. Aggregate stored on site in stockpiles should be contained within three-sided storage bunkers with windshields that</p>	TBC	<p>Environmental Manager</p> <p>Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
		<p>project 0.5 metre above the bunker wall. Drive-over in-ground aggregate storage bins should be shielded on at least two sides. Concrete batching sides to 0.5 metre high for the full length and width of the bin. Where overhead aggregate storage bins are not totally enclosed, aggregate should not be loaded within 0.5 metre of the top of the walls.</p> <p>If conveyors are used they must be designed and constructed to prevent fugitive dust emissions e.g. covering the conveyor, installing side protection, equipping them with spill trays, including belt cleaning devices.</p> <p>Mixer loading areas, weigh bins and hoppers (if used) should be designed to reduce fugitive dust.</p> <p>Sweeping of floors, as necessary and after spills, should be considered to prevent dust build-up. Water should not be used in the process of cleaning up spills except where the area drains to a wastewater collection point where washing down would be preferable to generating dust by sweeping.</p> <p>Works that are likely to generate dust will cease when dry or windy conditions are conducive to the release of dust should dust suppression strategies be rendered ineffective.</p> <p>Air Quality monitoring undertaken if required upon receipt of a complaint.</p> <p>Stockpiles covered or watered down.</p> <p>Develop and follow a fire prevention plan.</p>		

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Construction traffic movement.	<p>Exhaust fumes from construction and haulage to and from site impacting surrounding environment including residential areas and wildlife.</p> <p>Fugitive dust from transported loads or haul routes.</p>	<p>A Construction Traffic Management Plan will be prepared prior to construction commencing which will identify the haul route and any specific mitigation required for the concrete batching plants i.e. management of potential fugitive material during transportation, operation of equipment to control exhaust emissions, a procedure for complaints.</p> <p>Travel distances within the site should be reduced by appropriate site layout and design,</p> <p>Hard-surface where necessary roadways and any other areas where there is a regular movement of vehicles. Where roads are temporary consider:</p> <ul style="list-style-type: none"> • armouring (a thin layer of high quality pavement material is placed on the pavement surface) • chemical suppressant products • regular light watering. <p>All vehicles and equipment will be operated and maintained to comply with regulatory standards for exhaust emissions.</p> <p>Construction site roads watered down.</p> <p>Spray with water and/or cover pavement materials and aggregates before transporting.</p> <p>Any loads of dust generating or odorous materials entering or leaving site to be covered.</p>	TBC	Superintendent

4.7 Materials, Fuels and Waste Management

Table 18 Materials, Fuels and Waste Management

Objective	<p>Avoid and/or minimise impacts associated with the release of hazardous substances or materials. Avoid and/or minimise waste generation during the construction works and concrete batching plant operation.</p>
Legislation / Policy	<p><i>Environment Protection Act 1993</i> <i>Environment Protection Regulations 2009</i> <i>Dangerous Substances Act 1979</i> <i>Dangerous Substances Regulations 2002.</i> <i>Controlled Substances Act, 1984</i> <i>Natural Resources Management Act, 2004</i> <i>Environment Protection (Waste to Resources) Policy 2010</i> <i>EPA Guidelines for Stockpile Management – Waste and Waste Derived Fill</i> <i>EPA Guidelines for Bunding and Spill Management</i> <i>EPA Current criteria for the classification of waste - including Industrial and Commercial Waste (Listed) and Waste Soil</i> <i>Concrete batching Industry Guidelines (EPA) 2009</i></p>
Permits/Approvals	<p>Waste Transporter's licence (Environment Protection Act 1993 and Environment Protection Regulations 2009.) EPA licensing (e.g. a concrete batching plant)</p>

Table 19 Materials, Fuels and Waste Management Mitigation and Control

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up, Water provision and management, Aggregate storage and stockpiles, Temporary storage of chemicals, spoil and equipment, Concrete mixing, Construction traffic movement Tidy and make good work areas.</p>	<p>Contamination of the environment with hazardous substances and/or materials.</p>	<p>Prior to construction commencing, a Materials, Fuels and Site Waste Management Plan will be established which will identify the materials and storage requirements for all chemicals used on site or transported to site.</p> <p>All hazardous chemicals and dangerous goods used or stored at the subject site during construction will be stored in accordance with the Dangerous Substances Act and the EPA Guidelines.</p> <p>Material Safety Data Sheets for all relevant materials used or stored on site, regardless of quantity, for the construction works shall be kept on site by the Contractor.</p> <p>Spill kits will be located on site to be used in the event that there is an incident and appropriate personnel will be trained in the use of this equipment.</p> <p>Storage of materials should not be in areas at risk of inundation.</p> <p>All hazardous chemicals and dangerous goods should be stored away from any drainage channels and stormwater drains.</p> <p>Decanting/pumping of hazardous substances and materials to occur in bunded area where possible.</p> <p>Spills cleaned up immediately (spill kit).</p> <p>Emergency procedures in the event of a spill should be documented.</p>	<p>TBC</p>	<p>Environmental Manager Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up, Topsoil stripping and vegetation removal, Aggregate storage and stockpiles, Concrete mixing, Construction traffic movement Tidy and make good work areas.</p>	<p>Waste generated during construction impacting upon the environment. Waste generated during construction inappropriately disposed of offsite and impacting the environment.</p>	<p>Prior to construction commencing, a Materials, Fuels and Site Waste Management Plan will be established which will identify the type and amount of waste to be generated during construction and procedures for the storage, reuse, recycling and/or appropriate disposal of waste.</p> <p>Contaminated soil and/or groundwater disposed of appropriately, if required.</p> <p>Management of waste in accordance with all statutory and licensing requirements.</p> <p>Any food waste should be contained and removed from site regularly to prevent attracting pest species.</p> <p>Implement to reduce waste:</p> <ul style="list-style-type: none"> • Re-use of materials and waste concrete wherever possible in accordance with legislative requirements. • Adequate waste separation repositories. • All waste generated during construction separated at source and taken to an appropriately licenced waste disposal facility if not able to be re-used on site. • No burning or waste burial on site. • Management of litter and site debris. 	<p>TBC</p>	<p>Environmental Manager Superintendent</p>

4.8 Protection of Sites of Cultural and Natural Heritage Significance

Table 20 Protection of Sites of Cultural and Natural Heritage Significance

Objective	Manage the works to prevent or minimise impacts to sites or artefacts of Indigenous or European heritage.
Legislation / Policy	<p><i>Native Title (South Australia) Act 1994</i></p> <p><i>Aboriginal Heritage Act 1988</i></p> <p><i>Heritage Places Act 1993</i></p> <p><i>Aboriginal and Torres Strait Island Heritage Protection Act 1984 (Cwth)</i></p> <p><i>Native Title Act 1993 (Cwth)</i></p> <p><i>Environment Protection Act 1993</i></p>
Permits/Approvals	Authority to disturb an Aboriginal site or object (Section 23 approval under the Aboriginal Heritage Act 1988).

Table 21 Protection of Sites of Cultural and Natural Heritage Significance Mitigation and Controls

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
<p>Site establishment and set up,</p> <p>Topsoil stripping and vegetation removal,</p> <p>Tidy and make good work areas.</p>	<p>Damage to sites or artefacts of indigenous or European heritage or to their setting.</p>	<p>An Archaeological and Cultural Heritage Management Plan will be provided as part of the final CEMP.</p> <p>Concrete batching plants should be located with the temporary construction facility sites, where any monitoring or surveys expected by Mannum Aboriginal Community Association Incorporated (MACAI) has been identified and incorporated into the overall project programme.</p> <p>Should any archaeological occurrences be located during the course of the works the contractor and the Principal must report such an occurrence to the appropriate Aboriginal organisations and AARD in accordance with the Aboriginal Heritage Act 1988. All work is to cease that may negatively impact on the sites integrity until it has been assessed by an appropriately qualified Cultural Heritage professional with representation from the Indigenous recognised Aboriginal stakeholders.</p> <p>Avoid damaging or altering any features relating to the State Heritage Place Geological Site or dry stone walls.</p>	TBC	<p>Environmental Manager Superintendent</p>

Key Tasks	Potential impact	Control / Action	Inspection / Criteria/ Target / Evidence	Responsibility
Construction traffic movement.	Damage to sites or artefacts of indigenous or European heritage or to their setting.	<p>A Construction Traffic Management Plan will be established prior to construction commencing.</p> <p>When selecting appropriate routes for light and heavy construction vehicles these should consider heritage features located along haul routes.</p> <p>Construction traffic must use agreed haul roads to travel to and from site. Approved areas for parking will be identified which are located away from heritage features.</p>	TBC	Environmental Manager Superintendent



Procedure to follow if potential Aboriginal skeletal remains and/or an archaeological site are found

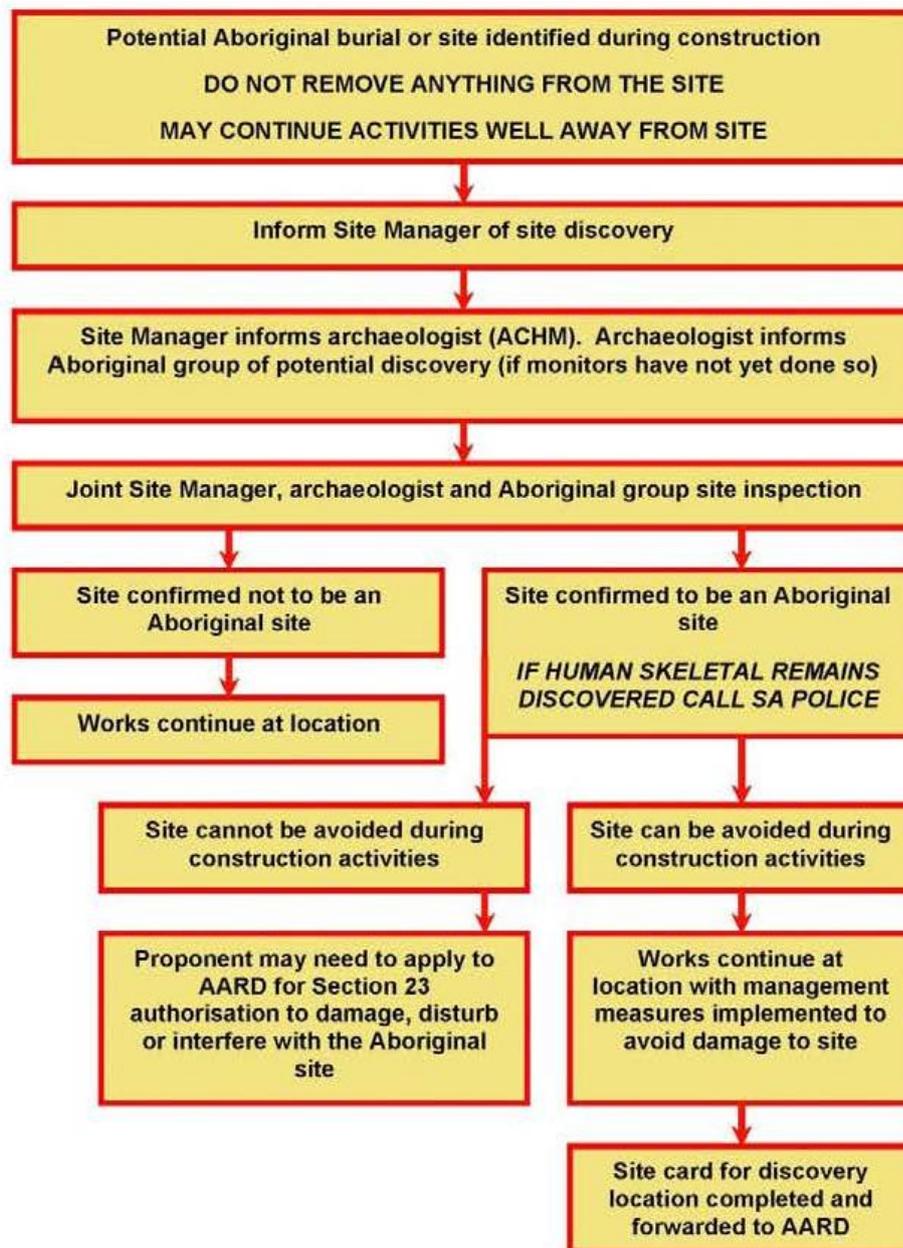


Figure 5 Site Discovery Procedure

4.9 Scope and limitations

This report has been prepared by GHD for Trustpower and may only be used and relied on by Trustpower for the purpose agreed between GHD and the Trustpower as set out in this report.

GHD otherwise disclaims responsibility to any person other than Trustpower arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

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Appendices

Appendix A - Construction Noise and Vibration Management Plan (Sonus August 2014)

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PALMER WIND FARM

ENVIRONMENTAL NOISE ASSESSMENT

Construction Noise and Vibration Management Plan



For

**Trustpower
Truman Road
Te Maunga, Mt Maunganui**

**S4171C13
August 2014**

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SUMMARY

The construction of a wind farm comprises activities such as road construction, civil works, excavation and hardstand construction, electrical infrastructure works and turbine erection requiring processes such as heavy vehicle movements, possible concrete batching, rock trenching, loaders, excavators, generators, cranes and possible blasting. These activities are similar to other construction projects in that they generally generate short term and transient noise; however, in the case of a wind farm, the construction occurs at significant separation distances. The separation distances will result in appreciable attenuation of the noise and vibration generated by the activity.

Notwithstanding, the management of construction noise requires appropriate programming, community consultation and the use of the best available and practical work practices and mitigation measures balanced against the requirement to expedite completion of the project.

This Construction Noise and Vibration Management Plan (CNVMP) has been prepared as a specific part of the broader Palmer Wind Farm Construction and Environmental Management Plan (CEMP). The proposed wind farm layout and receiver locations are provided in Appendix A.

The CNVMP aims to provide high level guidance to secure compliance of the construction activities with the general environmental duty of the *Environment Protection Act 1993*. As such, the CNVMP provides a framework document within which the final construction contractor can develop action plans for each individual activity once it is known and detailed.

The requirements for the CNVMP are based on the general environmental duty of the *Environment Protection Act 1993* (the EP Act) and the tailored requirements of Part 6 Division 1 Clause 23 of the *Environment Protection (Noise) Policy 2007*.

In broad terms, the legislative requirements effectively allow construction to occur between 7am and 7pm from Monday to Saturday, subject to the site taking reasonable and practicable noise reduction measures, and provides an opportunity to conduct works outside of these hours if noise limits can be met or "if other grounds exist that the Authority.....determines to be sufficient" (an example might be occasional concrete pours on hot days).



To this end, the CNVMP provides:

- An indication of the likely construction activities and associated details;
- Identification of the reasonable and practicable measures to minimise the construction noise activities;
- Recommendations for specific community consultation and notification methods;
- Recommendations for specific compliance monitoring plans;
- Recommendations for specific complaint handling procedures including corrective actions to be taken and feedback methods.



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CONSTRUCTION ACTIVITY CRITERIA

Construction Noise

The appropriate assessment methodology for noise from construction activities is provided by Part 6 Division 1 Clause 23 of the *Environment Protection (Noise) Policy 2007* (the Policy).

The Policy provides an emphasis on implementing reasonable and practicable noise reduction measures and does not set mandatory standards or objective criteria for activity which is conducted during typical day time construction hours. This approach is consistent with other jurisdictions.

The Policy establishes a quantitative approach for night time activity, whereby an average goal noise level of 45 dB(A) and a maximum goal noise level of 60 dB(A) are to be met for activity outside of typical day time hours. The goal noise level does not apply "if other grounds exist that the Authority.....determines to be sufficient".

Construction Vibration

Specific 'policy' providing objective vibration criteria do not exist in South Australian legislation; however, the general environmental duty of the EP Act can be interpreted to apply to vibration and there are accepted standards that are regularly referenced for projects where vibration might be an issue.

Vibration assessment can be separated into two categories, comprising levels at which the vibration might be felt to cause annoyance and concern, and levels at which building or infrastructure damage might occur. The vibration levels associated with human annoyance are significantly more onerous than those associated with structural damage.

The vibration criteria for human annoyance are based on human exposure provided by the Australian Standard AS2670.2 'Evaluation of human exposure to whole-body vibration (AS2670)'. AS2670 provides guidance on the levels of vibration at which annoyance might arise for different locations and scenarios.



Vibration criteria for structural damage are provided by the German Standard DIN 4150-3 'Effects of vibration on structures' (DIN 4150) which is a common reference in the absence of a specific Australian Standard relating to structural building damage. DIN 4150 establishes limits for residential, commercial, industrial and heritage listed buildings, and states that damage will not occur at these properties when exposed to vibration within those limits.

The human annoyance criteria are generally only used for assessment of ongoing operations whereas the structural damage limits are generally applied to construction activity due to its transient nature. Structural damage limits are provided in the following table based on DIN4150-3 'Structural Vibration Part 3 – Effects of vibration on structures':

Structure	Peak Particle Velocity (PPV) level in any direction in mm/s (rms)		
	Main driving frequency less than 10Hz	Main driving frequency between 10 to 50 Hz	Any frequency
	Commercial, industrial and similar buildings	20	40
Dwellings and buildings of similar design and/or use	5	15	20
Structures sensitive to vibration and that have intrinsic value (eg heritage listed buildings without modern foundations)	3	8	10

The levels have been established such that no damage will occur up to the limits and that vibration above the limits will not necessarily translate into damage, defined as cracking forming in plastered surfaces of walls, existing cracks in a building becoming enlarged, and separation of lightweight walls from load bearing walls. A dilapidation survey is therefore an important element in the assessment of vibration impacts from construction activity when it is conducted in close proximity to a dwelling.

In the case of a wind farm, construction vibration is rarely of concern due to the separation distances involved in comparison to other intensive construction sites.



Blasting Noise and Vibration

Whilst the need for and the extent of a blasting regime is yet to be established, the appropriate assessment methodology for noise from on-site blasting activities is provided by the *Australian Standard AS2187.2-2006 "Explosives – Storage, Transport and Use – Pt 2: Use of Explosives"* (the Standard). The Standard provides the following "human comfort limits" for sensitive sites for operations lasting longer than 12 months or more than 20 blasts:

- Peak component particle velocity of 5 mm/s for 95% blasts per year and 10 mm/s maximum unless agreement is reached with the occupier that a higher limit may apply.
- Peak sound pressure level of 115 dBL for 95% blasts per year and 120 dBL maximum unless agreement is reached with the occupier that a higher limit may apply.



CONSTRUCTION ACTIVITIES

Construction Noise

The equipment and activities that are present at the site will vary throughout the project, depending on the construction phase. The envisaged phase, associated plant and equipment, and duration are provided in Table1.

Table1: Construction activity.

Construction Phase	Main Plant and Equipment	Start (Month)	Duration (Months)
Site Set-Up and Civil Works	Generator Transport truck Excavator Low loader	1	3
Road and Hard Stand Construction	Mobile crushing and screening plant Dozer Roller Low loader Tipper truck Excavator Scraper Transport truck	4	7
Excavation and Foundation Construction	Concrete batching plant Mobile crushing and screening plant Truck-mounted concrete pump Concrete mixer truck Excavator Front End Loader Mobile crane Transport truck Tipper truck	6	5
Earthing	Percussion drilling rig	7	8
Electrical Installation	Rock trencher Concrete mixer truck Low loader Tipper truck Mobile crane	10	14
Turbine Delivery and Erection	Extendable trailer truck Low loader Mobile crane Impact rattle gun	14	4.5



Construction Vibration

It is expected that the main sources of vibration will be a percussion drilling rig (if used), rock trenching equipment and roller operation during the road and hard stand construction. The level of vibration at a distance will be subject to the energy input of the equipment and the local ground conditions. Typically, the distances required to achieve the construction vibration criteria are in the order of 20m to 100m. The 100m distance is a conservative estimate, with vibration from these activities unlikely to be detectable to humans at such a distance.

Based on the separation distances between the construction activities and the nearest dwellings being well in excess of the conservative distance of 100m, vibration levels are expected to easily achieve the criteria.



Blasting Noise and Vibration

The levels of airblast and ground vibration experienced at residences from blasting operations are generally dependent on a number of factors, including:

- the distance between the blast site and the residence;
- the type, size and number of charges used, and;
- the depth and manner in which the charge is installed.

The separation distances between the potential blasting activity and the nearest dwellings are of the order of magnitude for which ground vibration and airblast levels have been adequately controlled at other sites. Given the range of factors associated with both the generation and control of blasting noise and vibration, it is recommended that a monitoring regime, in accordance with the Monitoring section of this CNVMP, is implemented to ensure the objective criteria provided by the *Australian Standard AS2187.2-2006* are achieved.

Comparison with assessment criteria

Based on the above, vibration and blasting activity associated with the proposed construction activities are expected to achieve the relevant assessment criteria and, with the exception of the implementation of a monitoring regime for blasting activity, no further noise or vibration measures need to be considered for these aspects of the construction.

Traffic and general construction activity have the potential to trigger the adoption of “all reasonable and reasonable” noise mitigation measures. These measures are provided below.



PROJECT MITIGATION MEASURES

Pro-active noise control strategies to minimise noise during construction may include engineering measures such as the construction of temporary acoustic barriers, the use of proprietary enclosures around machines, the use of silencers, the substitution of alternative construction processes and the fitting of broadband reversing signals. It may also include administrative measures such as inspections, scheduling and providing training to establish a noise minimisation culture for the works.

The following mitigation measures provide a suite from which the construction contractor can develop action plans for each individual activity, construction phase or stage. The action plans will be the “tool on the ground” for implementation and ongoing use by the construction contractor.

Scheduling

Construction works and any blasting activity, excluding heavy vehicle movements into and out of the site, should generally be restricted to between 7am and 7pm Monday to Saturday.

Works carried out outside of the hours will only entail:

- works that do not cause noise emissions which exceed the noise limits of the Policy at any nearby dwelling not associated with the project; or
- the delivery of materials as requested by Police or other authorities for safety reasons; or
- emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or
- works with the prior consent of the Environment Protection Authority (EPA) (an example might be occasional concrete pours on hot days).

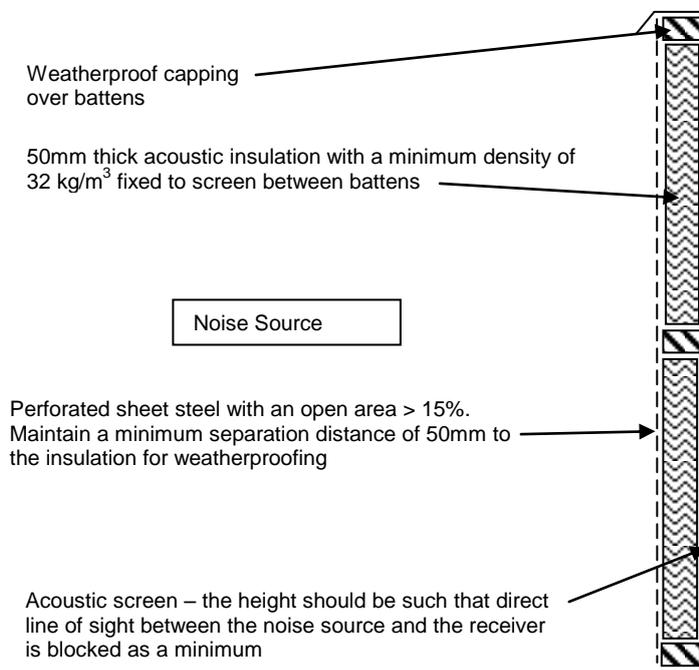
Location of Fixed Noise Sources

Locate fixed noise sources such as crushing and screening plant, concrete batching plant, percussion drilling rigs and generators and compressors at the maximum practicable distance to the nearest dwellings.

Provide Acoustic Screens around Fixed Noise Sources

Provide acoustic screens or mounding for fixed crushing and screening plant, concrete batching plant and percussion drilling rigs wherever these noise sources are located within 1000m of a non-associated dwelling and do not have direct line of sight blocked to that dwelling, in accordance with the following requirements:

- Locate as close as practicable to the noise source;
- Construct from mounding using excavated soil from the site, or a material with a minimum surface density of 10 kg/m^2 , such as 1.2mm thick sheet steel or 9mm thick compressed fibre cement sheeting. Alternatively, proprietary portable noise barriers, such as *Peace Engineering* "SOUND BARRIERS" may be utilised;
- Construct to a minimum height that blocks direct line of sight between the noise source and any receiver within the 1000m limit;
- Construct such that there are no air gaps or openings at joints;
- Extend such that the length is at least 5 times greater than its height or so that it is bent around the noise source;
- If barriers (rather than mounding from excavated soil) are constructed, then include acoustic insulation facing into the noise source in accordance with the following detail should there be a dwelling in the direction of the insulated face within 1000m.



In addition, the site topography, and other shielding features (e.g. large stationary machines, mounds of topsoil and piles of materials) should be used to an advantage in terms of increased shielding when locating fixed noise sources within the 1000m distance.

With acoustic screens installed around a noise source to block line of sight to dwelling, a minimum noise reduction of 5 dB can be achieved, which subjectively will result in a clearly noticeable reduction.

Enclose Generators and Compressors

Provide proprietary acoustic enclosures for site compressors and generators.

Alternative Processes

Investigate and implement alternative processes where feasible and practicable, such as hydraulic or chemical splitters as an alternative to impact rock breaking, or the use of broadband reversing alarms in lieu of the high pitched devices (a broadband reversing alarm emits a unique sound which addresses the annoyance from the high pitched devices. The fitting of a broadband alarm should be subject to an appropriate risk assessment, with the construction team being responsible for ensuring the alarms are installed and operated in accordance with all relevant occupational, health and safety legislative requirements).

Site Management

- Select and locate centralised site activities and material stores and work compounds as far from noise-sensitive receivers as possible;
- Care should be taken not to drop materials such as rock, to cause peak noise events, including materials from a height into a truck. Site personnel should be directed as part of an off-site training regime to place material rather than drop it;
- Plant known to emit noise strongly in one direction, such as the exhaust outlet of an attenuated generator set, shall be orientated so that the noise is directed away from noise sensitive areas if practicable;
- Machines that are used intermittently shall be shut down in the intervening periods between works or throttled down to a minimum;
- Implement worksite induction training, educating staff on the requirements of the CNVMP.



Equipment and Vehicle Management

- Ensure equipment has Original Equipment Manufacturer (OEM) mufflers installed;
- Ensure equipment is well maintained and fitted with adequately maintained silencers which meet the OEM design specifications. This inspection should be part of the monitoring regime;
- Ensure silencers and enclosures are intact, rotating parts are balanced, loose bolts are tightened, frictional noise is reduced through lubrication and cutting noise reduced by keeping equipment sharp. These items should be part of a monitoring (inspection) regime in accordance with the Monitoring section of this CNVMP;
- Use only necessary power to complete the task;
- Inspect, as part of the monitoring regime, plant and equipment to determine if it is noisier than other similar machines, and replace or rectify as required.

Community Consultation

Establish and implement a community consultation program in accordance with the requirements in this CNVMP and the project's community consultation plan where relevant.

Monitoring

Establish and implement a monitoring process in accordance with the requirements in this CNVMP.

Complaints Resolution

Establish and implement a complaints resolution process in accordance with the requirements in this CNVMP and the project's community consultation plan where relevant. .



COMMUNITY CONSULTATION

Noise and vibration elements should be included in the overall community consultation process. The aim of the consultation is to ensure adequate community awareness and notice of expected construction noise. Whilst the engineering measures reduce the noise levels, an important element in reducing the impacts of construction activity is awareness through adequate notification.

The minimum elements should include:

- Regular newsletters, providing details of the construction plan and duration of the construction phases, distributed through a site notice board and email,;
- A site notice board in a community location providing copies of the newsletters, updated construction program details, and contact details of relevant project team members and an ability to register for email updates of the newsletter;
- A feedback mechanism for the community to submit questions to the construction team, and for the construction team to respond;
- Regular updates on the construction activities to Council and the local Police to assist in complaint management.
- Contact details of the project manager and / or site “Environmental Representative”;
- Letter drops informing residences adjoining site access routes in advance of major activities, such as concrete pours, and the details of such activities

In addition, prior to any blasting activity, or construction activity occurring within 1000m of a non-associated dwelling, or significant construction traffic periods or impacts on local road conditions, contact the local community potentially affected by the proposed works and inform them of the proposed work, the location, day(s), date(s) and the hours involved¹. This contact shall be made a reasonable time before the proposed commencement of the work and should provide the contact details of the project manager and / or site “Environmental Representative”.

¹ It is preferable to over estimate the hours of work, rather than extending the work hours for longer than anticipated.



MONITORING

The aim of the monitoring procedure is to ensure the works are being carried out in accordance with the CNVMP.

Plant and Equipment

The minimum elements should include:

- Regular on site inspections by the “Environmental Representative” to identify:
 - Equipment has quality OEM mufflers installed;
 - Equipment is well maintained and fitted with adequately maintained silencers which meet the OEM design specifications;
 - Silencers and enclosures are intact and closed, rotating plants are balanced, loose bolts are tightened, frictional noise is reduced through lubrication and cutting noise reduced by keeping equipment sharp;
 - Site personnel are using only necessary power to complete the task;
 - Plant and equipment is not being used that is significantly noisier than other similar machines;
 - Care is being taken to place material rather than being dropped;
 - Plant emitting noise strongly in one direction is orientated so that the noise is directed away from noise sensitive areas if practicable;
 - Machines that are used intermittently are being shut down in the intervening periods between works or throttled down to a minimum.

Blasting Noise and Vibration

- Prior to the first blasting activity:
 - Measure the peak component particle velocity and sound pressure levels at a distance similar to the closest expected separation distance to enable comparison and confirmation of compliance with the requirements AS2187.2-2006;
 - The measurements should be made by an acoustic engineer, defined for the purposes of the CNVMP as an engineer eligible for Membership of the Australian Acoustical Society and the Institution of Engineers Australia.
 - Adjust the blasting procedure to ensure compliance with the requirements.



- Prior to any blasting activity that differs from that tested :
 - Repeat the procedure above.

Note that a separate trial is not required to comply with the CNVMP, but rather a monitoring program that is integrated with the blasting regime to ensure compliance.



COMPLAINTS RESOLUTION

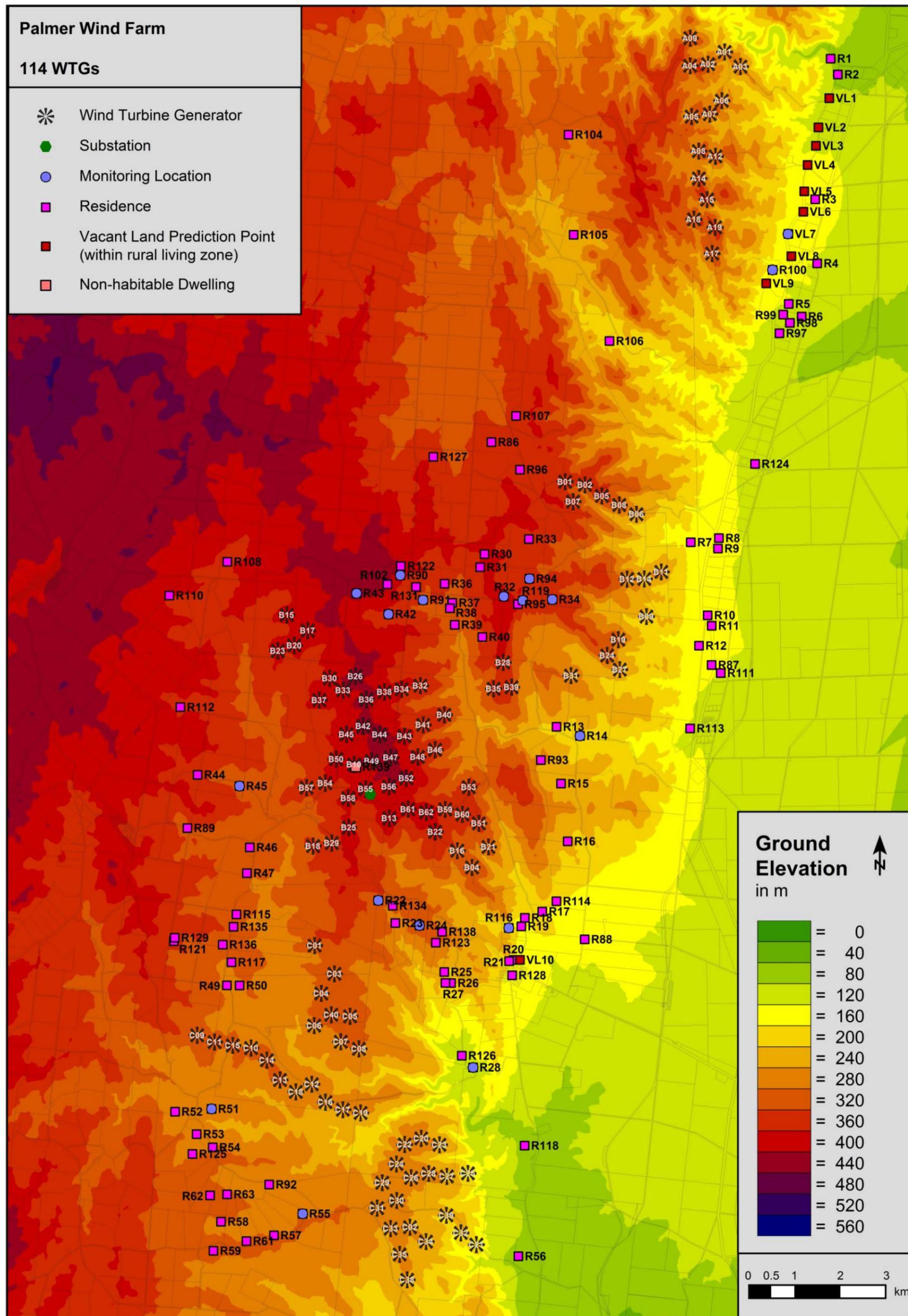
Noise and vibration elements should be included into the overall complaints resolution process. The aim of the complaints resolution process is to identify any reasonable and practicable measures that may further reduce impacts following a complaint, and to provide feedback to the community on the above process within a reasonable timeframe.

The minimum elements should include:

- Establishment of a complaints mechanism for the community via either telephone or email and in accordance with the *community consultation plan as relevant*;
- Notification of the relevant contact details through the community consultation process;
- Provision of an “Environmental Representative” dealing with any complaints who is appropriately trained in the CNVMP requirements and in community consultation, and has the ability to action the complaint;
- Establishment of a complaints handling procedure that:
 - Assesses whether the issue can be resolved easily and take immediate action if possible;
 - If not, ensures that the appropriate consultation has been undertaken for the activity;
 - Ensures the on-site inspections of the CNVMP have been carried out regularly for the activity;
 - Assesses the construction site and activities to determine whether there is any reason to believe the noise exposure of receivers is higher than anticipated and / or reasonable in the circumstances;
 - Takes remedial action if any of the above cannot be confirmed;
 - Advises complainant of action taken;
 - Maintains a record of the above to enable review by an independent authority such as EPA.



APPENDIX A: RECEIVER AND TURBINE LOCATIONS



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PALMER WIND FARM

ENVIRONMENTAL NOISE ASSESSMENT

Operational Noise Management Plan



For

**Trustpower
Truman Road
Te Maunga, Mt Maunganui**

**S4171C14
August 2014**

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GLOSSARY

A range of nomenclature with a range of meanings is used for environmental noise assessments. The following definitions are relevant to this document.

A weighting	Frequency adjustment applied to measured noise levels to replicate the frequency response of the human ear.
Ambient noise level	The noise level of all existing noise sources in the environment (in the absence of the wind farm).
Background noise level	The ambient noise level which excludes intermittent noise sources.
dB(A)	A weighted noise level measured in decibels.
L_{A90}	The A-weighted sound pressure level that is exceeded for 90 percent of a 10 minute time period. Represents the background noise level.
L_{Aeq}	The A weighted equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a 10 minute time period.



1 INTRODUCTION

The South Australian Environment Protection Authority *July 2009 Wind farms environmental noise guidelines* (the 2009 Guidelines) provide the requirements for “compliance checking”. That is, the 2009 Guidelines provide a framework for testing and confirming that a wind farm achieves its environmental noise criteria as provided by the Guidelines.

This Operational Noise Management Plan details the specific compliance checking actions for the Palmer Wind Farm in accordance with the 2009 Guidelines. The Plan also provides the complaint response actions for the ongoing operation of the Palmer Wind Farm.

2 THE 2009 GUIDELINES

The following table lists the Section of the Operational Noise Management Plan (ONMP) that addresses each relevant requirement of the 2009 Guidelines:

2009 Guidelines Section	Noise Requirement	ONMP Section
4.1	Data acquisition	3.2
4.2	Data analysis	3.2.3
4.3	Wind farm noise level determination	3.2
4.4	Background noise subtraction	3.2.3
4.5	Alternative measurement techniques	3.2.4
4.6	Tonality testing	3.2.5
4.7	Annoying characteristics	4.2.1
4.8	Complaint investigation	4
5.3	Reporting	3.2.6



3 OPERATIONAL NOISE MANAGEMENT PLAN

3.1 Noise Limits

The noise limits for the project at each dwelling are provided in the Sonus Environmental Noise Assessment S4171C12 dated August 2014 (the assessment). The limits have been determined in accordance with the 2009 Guidelines.

3.2 Compliance Testing

3.2.1 Locations

Compliance testing will be conducted at a sufficient number of non-stakeholder dwellings to confirm compliance with the project criteria at all dwellings. The non-stakeholder dwellings will be selected from those where background noise levels have been measured as part of the assessment.

The location of the equipment will be consistent with the positions documented in the assessment, subject to any changes to the local conditions that might result in modified results such as the construction of structures, change in vegetation or the installation of pumps or air conditioning units. The changes will be documented and the rationale provided for any alternative location.

3.2.2 Equipment

Sound level meters with a noise floor no greater than 20 dB(A) will be used.

The equipment will be either Type 1 or Type 2 sound level meters in accordance with the AS 1259:1990¹ and IEC 61672.1:2004², as relevant.

A calibrated reference sound source will be used before and after the compliance testing regime.

¹ Australian Standard *AS 1259-1990 Acoustics – Sound Level Meters*

² International Standard *IEC 61672.1-2004 Electroacoustics – Sound Level Meters*



3.2.3 Data

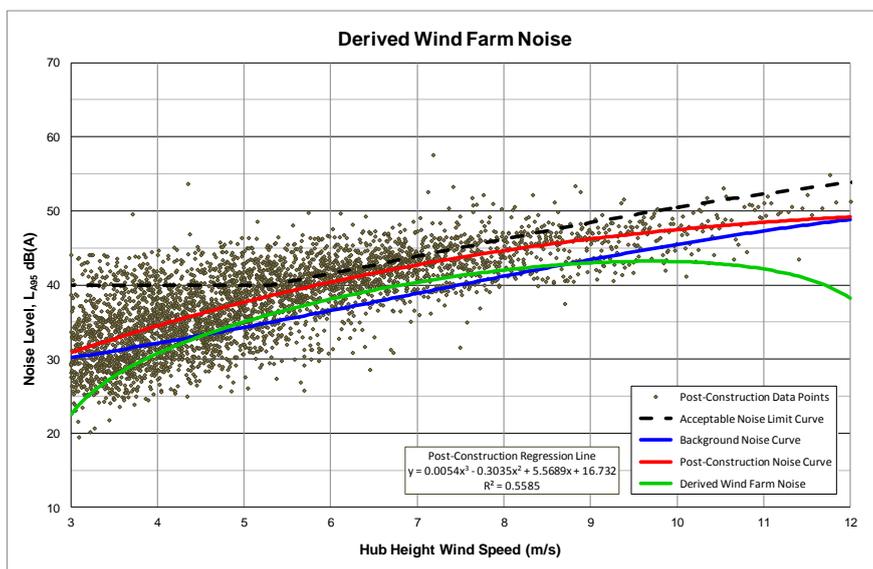
Data points “adversely affected” by rain or wind on the microphone will be removed based on a weather logger placed at an equivalent location to one of the noise loggers.

Data is adversely affected where rain occurs in a 10 minute period or where a wind speed greater than 5 m/s is exceeded for 90% of a 10 minute period.

The compliance testing will collect L_{A90} data to enable comparison against the project criteria. The measurements will be made continuously over 10 minute intervals for either a period which enables 500 downwind points to be collected within 6 weeks, or for 6 weeks. A downwind data point will be as defined in the 2009 Guidelines.

Following removal of adversely affected data, the remaining noise data will be correlated with the corresponding wind data for each monitored dwelling.

The wind farm noise contribution at the dwelling will be derived by logarithmically subtracting the background noise curve from the curve generated by the compliance testing data correlation in accordance with Section 4.4 of the 2009 Guidelines. An example of a wind farm noise contribution line derived from the post-construction measured noise regression line and background noise curve is shown in the figure below.





3.2.4 Testing Methodology

The derived wind farm noise curve will be compared against the project noise limits (Section 3.1).

The test method of Section 3.2 cannot be used in all circumstances to demonstrate compliance. This is primarily related to changes in local conditions or extraneous noise sources when compared to the conditions and noise sources that existed at the time of the original testing regime.

Where the test method of Section 3.2 (“the primary test method”) cannot be used to demonstrate compliance, then the following secondary test method in accordance with Section 4.5 of the 2009 Guidelines “Alternative compliance checking procedures” will be applied at that dwelling. The secondary test method will require “on/off” compliance testing, and will be conducted as follows:

- Only at dwellings where the primary test method cannot be used to demonstrate compliance;
- Only at integer wind speeds where the primary test method cannot be used to demonstrate compliance;
- With the noise monitoring equipment at the same position where the primary test had been conducted, or if that position is considered to be a factor in the inability of the primary test to demonstrate compliance, at an equivalent position with respect to turbine noise at the dwelling, but which has a higher turbine to background noise level ratio;
- Over a minimum interval of 2-minutes with the wind farm operational, then a measurement over the same interval with the wind farm shut off to obtain the background noise level;
- monitoring the wind speed and direction over the measurement intervals to identify the comparable “on” and “off” measurements.
- repeating the above “on” and “off” process to collect at least 3 intervals with comparable wind speed and direction conditions at each integer wind speed of interest. The wind farm noise will be determined by an arithmetic average of noise measurements at each integer wind speed after background noise (the "off" measurement) has been subtracted.



The supplementary “on/off” test method cannot be used in all circumstances to demonstrate compliance. This would occur where it is not practicable to consistently achieve comparable wind conditions between the on and off conditions.

Where the supplementary testing cannot be used to demonstrate compliance, an alternative method such as measurement at an intermediate location and extrapolation of the results will be developed and submitted to the Environment Protection Authority for approval.



3.2.5 Testing Methodology - Tonality

The tonality testing shall be conducted in two stages, with the first stage conducted close to a turbine, in accordance with IEC 61400-11:2006³ (IEC61400) and the second stage conducted at a residence if required.

Stage 1

The first stage shall be conducted in accordance with the tonality testing method of IEC61400, including the requirements for measurement location (close to turbines), length of measurements, and adjustment of background noise. The test shall be conducted at a sufficient number of turbines to be representative of all turbines.

It is noted that manufacturers often test for tonality and publish the results of the tonal audibility of the turbine.

Where the testing indicates that the tonal audibility of the turbine is 0 dB or less (in accordance with IEC 61400), no penalty for tonality shall be applied and no further testing is required.

Where the testing indicates that the tonal audibility of the turbines exceeds 0 dB at any integer wind speed, Stage 2 testing shall be conducted.

Stage 2

Where required, Stage 2 testing shall occur at the non-stakeholder dwelling with the highest predicted noise level where compliance checking is being conducted. Stage 2 testing shall occur at the same time as compliance testing over a period of at least 2 weeks.

For each 10 minute period, the narrowband test for tonality shall be conducted in accordance with IEC61400 (including the 10 second measurement intervals), except that the measurement location shall be at the residence and no adjustment shall be made for background noise. The narrowband test shall only be conducted for tonal frequencies identified in Stage 1. Where the narrowband test

³ International Standard *IEC 61400-11:2006 Wind turbine generator systems – Part 11: Acoustic noise measurements techniques*



shows a tonal audibility exceeding 0 dB (in accordance with IEC61400) and there is no evidence (such as an audio recording) that the tone is from a source unrelated to the wind farm, the 10 minute interval shall be deemed to exhibit tonality.

A 5 dB(A) penalty shall be added to the measured noise level in all 10 minute intervals exhibiting tonality, prior to the regression analysis required for compliance checking.

If the application of the tonality penalty to the data results in the derived wind farm noise level at an integer wind speed increasing by more than 1 dB(A), then the margin between the measured noise level and the project criteria at the “next closest dwelling” (being that dwelling with the next highest predicted noise level where compliance checking is being conducted) will be determined. Where that increase would result in that margin decreasing to less than 1 dB(A), then the tonality testing will be extended to the “next closest dwelling”.

3.2.6 Testing Schedule

The primary testing will commence within four weeks from the date of the completion of commissioning⁴ at identified dwellings for which consent for testing has been obtained.

The results will be provided to the Council and the EPA within 2 months following the completion of the testing. The results will be in a report format that is consistent with Section 5.3 of the 2009 Guidelines (the “final test report”).

The proposed testing schedule will be extended if specific weather conditions are required or there is the need for supplementary “on/off” noise compliance testing or any other alternative compliance testing regime.

The proposed testing schedule will be extended if the primary and secondary testing indicate the project criteria are exceeded. The procedure in such a circumstance is provided in Section 3.3 below.

⁴ For the purposes of this Plan, “completion of commissioning” is taken to mean the point at which all turbines have been commissioned to a stage deemed suitable for handover.



3.3 Noise Reduction Methodology

Where the results of the primary and supplementary testing indicate that the project criteria are exceeded, the following actions will be taken:

1. Inspect the turbines to determine if a maintenance related issue or mechanical defect is the cause of excessive noise generation. Where such issues are found, resolve the issue and conduct noise compliance testing as per Step 7 below;
2. Review the turbine manufacturer's near field⁵ sound power level results. If the actual sound power level results differ from that used in the modelling, implement Step 4;
3. If a penalty is applied for tonality, consider the application of acoustic treatment to eliminate the tonality at the dwellings and repeat the noise compliance testing. If the tonality is not eliminated, implement Step 4;
4. Determine the potential noise management system based on the test results, which will include the parking of turbines for particular conditions;
5. Conduct noise modelling with the Step 4 noise management system options implemented to ensure that compliance can be achieved. The noise modelling is to include any differences in the installed turbine sound power levels (as determined in Step 2) and the effect of any penalties (if the penalties could not be removed in Step 3);
6. If the modeled noise levels exceed the project criteria, then repeat steps 4 and 5;
7. Confirm noise compliance of the wind farm through testing in accordance with Section 3.2 at the relevant dwellings;
8. Document the final noise management system and test results in accordance with Section 5.3 of the 2009 Guidelines.

The final test report will be provided to the Council and the EPA. The wind farm will operate in accordance with the report.

⁵ The turbine manufacturer will confirm the sound power level through measurements of the installed wind farm.



4 NOISE COMPLAINT EVALUATION AND RESPONSE

4.1 Noise Complaints

4.1.1 Complaint Lodgement

1. A section of the project website will be provided to enable a complaint to be lodged;
and
2. A sign on the site to advise the public of the project website will be provided.

4.1.2 Complaint Receipt

1. All complaint details will be maintained in a complaints log;
2. The following complainant details will be recorded via prompts in the website lodgement form or the complaint receipt process:
 - Location of the dwelling (if provided);
 - Contact details of the complainant (if provided);
 - The time of the complaint;
 - Confirmation that the complainant has been informed that the complaint will be logged but no further action will be taken if the location and contact details are not provided (if relevant).
3. The following noise source details will be recorded via prompts in the website lodgement form or the complaint receipt process:
 - What is the subjective description of the noise?
 - Does the noise relate to the typical operation of the wind farm?
 - Does the noise relate to the operation of the wind farm under certain weather conditions? If so, what are those weather conditions?; and
 - Does the noise relate to a new noise source that has not appeared previously during the typical operation of the wind farm?



4.2 Noise Response

4.2.1 Maintenance Issues or Mechanical Defects

1. Determine whether the issue is related to a maintenance issue or a mechanical defect based on either the:
 - information provided during the Complaint Receipt; or
 - discussion with operational employees; or
 - an inspection of the location during the conditions of the complaint;
2. Where the issue is related to a maintenance issue or a mechanical defect, rectify the issue and provide the complainant with a summary of the above investigations. No further action is required.

4.2.2 Typical Operation

1. Where the issue is not related to a maintenance issue or a mechanical defect, review the final test report to determine the following:
 - a) Whether compliance noise monitoring has been conducted at the dwelling; or
 - b) Whether compliance noise monitoring has been conducted at a dwelling in the vicinity of the complainant that is closer to the nearest turbine;
2. In the circumstance where both 1a) and 1b) are not confirmed, proceed to Step 7;
3. In the circumstance where either 1a) or 1b) are confirmed, compare the operational status of the turbines, the weather conditions at the time of the complaint and any potential change in local conditions that might result in modified results such as the construction of structures, change in vegetation or the installation of pumps or air conditioning units against the conditions of the final test report;
4. Where the wind farm is found to be operating consistently with the conditions of the final test report and there has been no change in the local conditions, provide the complainant with a summary of the above investigations and a copy of the final test report, where that document has not been provided to the complainant previously. Record the above in the complaints log. No further action is required;



5. Where the wind farm is found to be operating inconsistently with the operational conditions of the final test report, modify the operation accordingly and provide the complainant with a summary of the above investigations, the actions taken and a copy of the final test report, where that document has not been provided to the complainant previously;
6. After one week of modified operation in accordance with the final test report, review the operating modes and record in the complaints log. No further action is required;
7. In all other circumstances, review the final test report and determine the predicted noise levels at the complainant's location;
8. Where the predicted noise levels do not exceed 35 dB(A)⁶ at any integer wind speed at the complainant's location, provide the complainant with a summary of the above investigations and a copy of the final test report, where that document has not been provided to the complainant previously. Record the above in complaints log. No further action is required;
9. Where the predicted noise levels exceed 35 dB(A)⁷ at any integer wind speed, conduct compliance testing in accordance with Section 3.1;
10. Prepare the revised final test report and provide to the complainant. Record the above in the complaints log. No further action is required.

^{6,7} A 35 dB(A) trigger level is for residences in the Rural Zone. For residences in the Rural Living (Sanderston) Zone, a trigger level of 30 dB(A) is applicable.

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Document Status

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C	Karen Yale	M Scott		M Scott		28/02/14
D	Karen Yale			G M LITON		12/08/14

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Appendix C – Example Operational Management Plan

Safety, Reliability, Maintenance & Technical Management Plan

Snowtown SRMTMP

AU-OM-13-MAN-SNOW-20-01 Ver 6.0

Document Revisions

AU-OM-13-MAN-SNOW-20-1				
Ver	Issued/ Date	Checked/ Date	Approved/ Date	Description of change
1.0	NS 22/08/12	PKT 19/09/12	MT 20/09/12	New document number assigned. Revisions following comment and feedback from the Office of the Technical Regulator for the 2012-13 period.
2.0	NS 31/10/12	PKT 01/11/12	MT 01/11/12	Additions to 1.1, 3.2, 4.3, 4.10 and 4.11 to include details of the prototype S95 WTG.
3.0	PKT 11/02/13	PKT 11/02/13	MT 11/02/13	Updated new OHS legislation links and Org Chart
4.0	NS 11/06/13	PKT 11/06/13	MT 11/06/13	Annual review Minor changes to Org Chart Minor updates to referenced documents
5.0	PKT 09/12/13	PF 09/12/13	PKT 09/12/13	Updated Lead Tech name
6.0	PKT 21/07/14	PKT 21/07/14	MT 22/07/14	Senvion brand plus 2.2 Objectives, 2.3 Responsibilities, 5.9 – Nonconformance and 6.18 – Hazard Recording Log – (HAZOB Log) have been updated

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1 Introduction

1.1 Requirement for the Plan

This document is the Safety, Reliability, Maintenance and Technical Management Plan (SRMTMP) for the Snowtown Wind Farm, as required under the terms of Generation Licences issued by the Essential Services Commission of South Australia (ESCOSA) for the operation of wind turbines located at the Barunga Range near Snowtown.

An initial licence for the operation of forty-seven (47) Suzlon S88 WTGs was issued in January 2007 and varied by ESCOSA on 22 November 2007.

An additional licence was issued on 9 February 2011 for a single (1) Suzlon S95 WTG located adjacent to the existing wind farm.

The S88 and the S95 machines operate under separate licences as issued by ESCOSA, however for the purpose of this SRMTMP references to the Snowtown Wind Farm includes the above mentioned WTGs in the Barunga area, including the S95.

This SRMTMP provides an overview of the systems and processes that have been put in place aimed at ensuring that safety, environmental, quality assurance and technical standards are established and complied with.

The SRMTMP has been prepared by Senvion Australia in their role as Operator and Maintainer of the Snowtown Wind Farm, on behalf of the Licensee, Snowtown Wind Farm Pty Ltd.

Senvion Australia Pty Ltd is part of the Suzlon Group which helps facilitate the performance of the requirements of Suzlon Energy Australia Pty Ltd (SEA).

1.2 Purpose

The purpose of this SRMTMP is to identify and describe the systems and processes required for the technical, safety, environmental and quality aspects of the operation and service of the Snowtown Wind Farm in accordance with Senvion, client and legislative requirements.

This plan provides employees, subcontractors and visitors with a clear understanding of the requirements to be complied with, to ensure that Senvion products and services meet all client expectations and industry best practices.

Senvion Management is responsible for identifying the processes needed, determining their sequence and interaction, and ensuring that their development, implementation and control is effective with the aim of meeting the requirements of AS/NZS ISO 9001:2008, AS/NZS 4801:2001, BS OHSAS 18001:2007 and AS/NZS ISO 14001:2004.

Controls are established to ensure the availability of information and resources, to support the processes and to monitor, measure and improve their performance.

An internal and external auditing regime has been established to ensure objectives are being met and identify and act upon opportunities for improvement.

1.3 Definitions

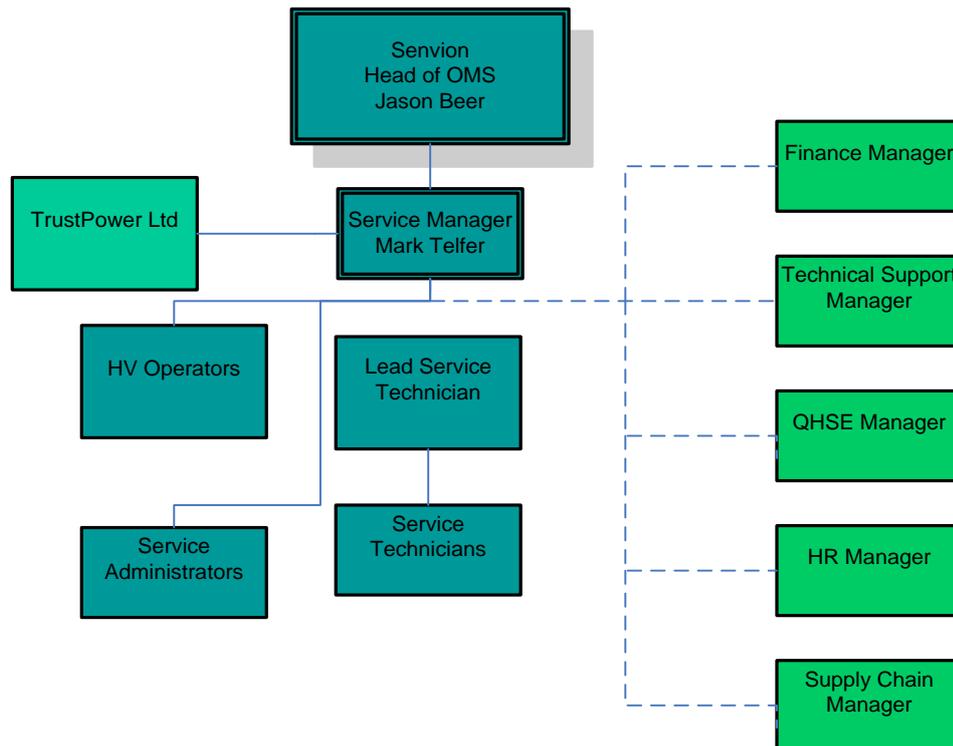
Term	Meaning
AEMO	Australian Energy Market Operator. An independent organisation that operates the energy markets and systems and also delivers planning advice in eastern and south-eastern Australia.
Client	Snowtown Wind Farm Pty Ltd, the owner of SWF and the party to whom Senvion is contracted as operator and maintainer of the Snowtown Wind Farm.
Contractor	Senvion Australia, part of the Suzlon Group, the organisation responsible for the total performance of the works under the Operations and Maintenance Agreement.
SWF	Snowtown Wind Farm
Electrical Installation	Means the whole or part of any system or equipment wherever situated intended for the conveyance, control, measurement or use of electricity supplied or intended to be supplied by a person or body that supplies electricity to the public at a voltage above extra low voltage as defined in <i>Australian Standard AS3000 Wiring Rules</i>
Electrical Work	Means the installation, alteration, repair or maintenance of an electrical installation, and includes work of a class prescribed by regulation.
Emergency Response Plan (ERP)	A document that defines the procedures processes and contact details in the event of an emergency.
Item/s	Used as a general term to refer to material, equipment, fabricated components, etc.
High Voltage Operating Authority	The person nominated by Senvion who is authorised to exercise control over the Senvion High Voltage and Low Voltage Electrical Safety and Switching Manual, the Senvion Wind Farm Power Systems and authorise all personal for electrical work on site.
HSE	Health, Safety, Environment and Community
JSA/SWMS	Job Safety Analysis or Safe Work method Statement. A document that identifies and ranks the likelihood and severity of any potential risks and determines control measures required to mitigate those risks.
OM Contract Agreement	The contract in place for the maintenance and service of the Snowtown Wind Farm.

OMS	Senvion’s Operation, Maintenance and Service Group.
Process Procedure	A work instruction which details the technical/engineering/HSE methodology for a particular service activity.
Senvion	Senvion Australia, part of the Suzlon Group
Suzlon	Suzlon Energy Australia Pty Ltd. Part of the Suzlon Group.
Site	The area defined for the Snowtown Wind Farm.
SMMS	Service Maintenance Management System.
SRMTMP	Safety, Reliability, Maintenance & Technical Management Plan. Reference to this document which sets out the specific HSE and Quality practices, resources, activities and responsibilities as prepared by Senvion and as required by the ESCOSA
Subcontractor	Any company, body or person who is contracted to Senvion for the purpose of supplying goods and/or services.
System Element	The administrative activities which need to be implemented and controlled to ensure that the product or service meets relevant HSE requirements.
WTG	Wind Turbine Generator.

1.4 Organisational Structure

The following diagram indicates the health and safety, environmental and quality hierarchy for the service and maintenance of the Snowtown Wind Farm site.

It is important to note that the Servion QHSE and HR Managers are positioned outside the authority structure and are available to all personnel and subcontractors at all levels in the organisation, for discussion and advice.



1.5 Applicable Legislation

A complete list of applicable legislation is shown in Appendix A.

Those parts of the South Australian legislation that sets requirements for specific Wind Farm activities are identified in the relevant sections of this SRMTMP.

The Servion Lead Service Technician is responsible for monitoring that these requirements are incorporated into task plans and arrangements.

Reference:

Procedure: HSE Legislation Review

2 Policy, Objectives and Targets

2.1 Quality, Health and Safety and Environmental Policies

Policy statements have been developed by the Senvion executive management and are statements of the Senvion objectives for, and commitment to, quality, safety and protection of the environment.

This SRMTMP and the arrangements documented within it are designed to help the organisation meet the broader Senvion policy objectives and commitments.

Copies of the Senvion policies for Quality, Health and Safety and Environment are displayed in the Senvion site buildings at the Snowtown Wind Farm.

References:

Policy: [Senvion Quality Policy](#)

Policy: [Senvion Health and Safety Policy](#)

Policy: [Senvion Environmental Policy](#)

2.2 Objectives

The high level objectives for all Senvion Wind Farms are:

- A Wind Farm availability rate of 97%.
- An incident and injury rate that is continually decreasing.
- To work with our customer to maximise availability on high wind/market days.

The table below present's objectives set by the North Brown Hill Wind Farm team. These objectives are consistent with the broader objectives shown above and in Senvion policies.

The table also describes the relevant strategies identified in this plan designed to achieve them.

OBJECTIVES	STRATEGY	TARGETS
1. Proactively manage risk by ensuring that HSE risk assessments are conducted and control measures are identified and implemented.	1.1 Prepare and maintain a Wind Farm Risk register SMP 6.2	1.1.1 Risk register available at the Wind Farm and accessible to all employees. 1.1.2 Risk register reviewed annually by key stakeholders (Annually)
	1.2 Prepare JSA/SWMS for work activities. SMP 6.8	1.2.1 Completed JSA/SWMS for all activities that require one. (100%)
	1.3 Prepare and maintain a Wind Farm Environmental Aspects and Impacts assessment register. SMP 7.2	1.1.1 Environmental Aspects and Impacts assessment available at the Wind Farm and accessible to all employees. 1.1.2 Environmental Aspects and Impacts assessment reviewed annually by key stakeholders

OBJECTIVES	STRATEGY	TARGETS
		(Annually)
	1.4 Establish and maintain a HSE inspection program. SMP 6.9 and 7.3	1.4.1 Documented HSE inspection each six (6) months or following a significant rainfall event. 1.4.2 Inspection nonconformances logged in the HAZOB register and closed out by the due date (100%)
	1.5 Establish and maintain a hazard observation program. SMP 6.18	1.5.1 Record observed hazards in the HAZOB register and assign required actions to responsible people. (100%) 1.5.2 Actions arising from hazard observations closed out by the due date. (100%)
	1.6 Investigate incidents to determine their root causes so that actions can be taken to prevent recurrence. SMP 8.5	1.6.1 Incident investigations conducted by the due date. (100%). 1.6.2 Corrective Actions arising from incident investigations entered into the Corrective Action Register and closed out by the due date. (100%).
2. Effectively communicate and consult on HSE and operational issues to site personnel, Asset Manager and other stakeholders	2.1 Provide a site specific Wind Farm induction for all Wind Farm personnel. SMP 6.10	2.1.1 Wind Farm inductions undertaken (100%)
	2.2 Conduct toolbox meetings to inform Wind Farm personnel of site issues and concerns. SMP 11.1	2.2.1 Documented weekly toolbox meetings (weekly).
	2.3 Have monthly MSA progress meetings with the Asset Manager. SMP 5.11.1	2.3.1 Documented monthly MSA progress meetings. (Monthly)
	2.4 Maintain a Site Notice Board that contains relevant and up-to-date information for employees and other stake holders. SMP 11.2	2.4.1 Notice Board present in the OMS building that contains up-to-date information as described in the SRMTMP.

OBJECTIVES	STRATEGY	TARGETS
	2.5 Report all incidents and accidents within Senvion and to the Asset Manager. SMP 8.4	2.5.1 Incidents reported as required by the SRMTMP. (100%).
3. Comply with the: <ul style="list-style-type: none"> • Asset Manager's expectations including the contractual performance and availability requirements. • Industry standards. • Statutory requirements. • HSE legislative requirements. 	3.1 Undertake a regime of inspection and testing to ensure that critical elements of work are checked and verified. SMP 4.10	3.1.1 Have a schedule at the Wind Farm for the routine inspection and testing of critical elements. 3.1.2 Compliance with inspection and testing schedule. (100%)
	3.2 Utilise Service Checklists to systematically record that all necessary checks and activities are carried out. SMP 4.11	3.2.1 Have up-to-date service checklists available for key inspection and testing activities. (100%) 3.2.2 Utilisation of service checklists for key inspection and testing activities. (100%)
	3.3 Conduct an Audit program to measure compliance with plans and arrangements. SMP Plan 5.8	3.3.1 Planned audits conducted by the scheduled date. (100%) 3.3.2 Audit nonconformances closed out by the due date. (100%)
	3.4 Conduct SRMTMP Reviews to assess compliance with key performance indicators. SMP Plan 5.11	3.4.1 Planned SRMTMP reviews conducted by the scheduled date. (Annual)
	3.5 Have the SRMTMP reviewed and approved by the Essential Services Commission. SMP Plan 1.1	3.5.1 SRMTMP submitted for review annually to the Essential Services Commission. (Annual)
	3.6 Evaluate major suppliers for their capacity to provide conforming products and services. SMP Plan 5.6	3.6.1 Use of major suppliers that are on a Senvion approved suppliers list. (100%)
	3.7 Manage suppliers and subcontractors to ensure compliance with required service requirements. SMP Plan 5.7	3.7.1 Use of major suppliers that are on a Senvion approved suppliers list. (100%) 3.7.2 Wind Farm induction provided for site based subcontractors. (100%)

OBJECTIVES	STRATEGY	TARGETS
		3.7.3 Verification of required qualifications and competencies of site based subcontractors. (100%)
	3.8 Utilise a Nonconformance Register to identify and control nonconforming products. SMP Plan 5.9	3.8.1 Establish a Nonconformance Register for products that do not meet requirement. 3.8.2 Nonconforming products listed in the register. (100%)
	3.9 Use a trained and competent workforce. SMP 5.10	3.9.1 WTG technical training for Servion full-time technicians. (100%). 3.9.2 Wind Farm inductions undertaken (100%). 3.9.3 Work at Height and First Aid training for Servion technicians. (100%). 3.9.4 Relevant licences held by technicians who undertake High Risk Work (100%). 3.9.5 Verification of required qualifications and competencies of site based subcontractors. (100%)

2.3 Responsibilities

The organisation involves a range of parties, each having their own individual responsibilities within the safety program.

The following tables summarise those accountabilities and responsibilities and the individuals to whom these apply.

Duty A= Accountable, for the task being carried out. R= Responsible for carrying out the task	SRMTMP Section	Senvion Head of OMS	Senvion Service Manager	Senvion Lead Service Technician	High Voltage Operating Authority	Employees	Site Administrators
1. Service Delivery	4.8	A	R	R		R	
2. Service Schedule	4.9		A	R			
3. Inspection and Testing	4.10		A	R		R	
4. Service checklists	4.11		A	R			
5. Safety of Electrical Works	6.4		R	R	A	R	
6. Identification of product	4.13		A	R			
7. Document Data and Control	5.1		A	R			R
8. Technical Documents	5.3	A	R	R			
9. Supplier Evaluation	5.6	A	R	R			
10. Subcontractor and supplier management	5.7	A	R	R			
11. Audits.	5.8		A	R			R
12. Nonconformance management.	5.9		A	R			
13. Training and Competency	5.10	A	R	R			
14. SRMTMP Review	5.11		A	R			
15. HSE Risk Register development and maintenance	6.2		A	R		R	R

Duty A= Accountable, for the task being carried out. R= Responsible for carrying out the task	SRMTMP Section	Senvion Head of OMS	Senvion Service Manager	Senvion Lead Service Technician	High Voltage Operating Authority	Employees	Site Administrators
16. Use of JSA/SWMS documents	6.8		A	R		R	R
17. Wind Farm Inductions	6.10		A	R			
18. Permit systems	6.13		A	R			
19. HAZOB log	6.18		A	R			R
20. Health and Safety inspections	6.9		A	R		R	
21. Environmental inspections	7.3		A	R		R	
22. Reporting of incidents	8.4		A	R		R	R
23. Incident investigations	8.5		A	R			
24. Management of injuries	9		A	R		R	
25. Emergency response plan	10.1		A	R			
26. Toolbox talks	11.1		A	R			

3 Description of the Operation

3.1 Location

The Snowtown Wind Farm is located 150km North of Adelaide, South Australia and is spread over 20km along the Barunga Range with the O&M building located 8km north of Snowtown, off Broughton Road.

3.2 Description of the Snowtown Wind Farm

The Client is a subsidiary of Trust Power Limited (TPL), Senvion has been contracted by the Client to operate the wind farm and service the WTGs under an Operations, Maintenance and Training Agreement (O&M Agreement).

The SWF assets include 47 x Suzlon S88 – 2.1MW turbines, 1 x Suzlon S95 – 2.1MW turbine, 33kV collection system (underground and overhead), 33kV switchboards and switchroom, SCADA system (SC-Commander and CITECT), reactive support equipment (DVar), O & M building and workshop, and the roads and foundations.

The Client has a Transmission Connection Agreement (TCA) with ElectraNet, which allows the connection of up to 98.7MW at the 132kV busbars. The TCA also specifies the required quality of electricity supplied by the SWF, including compliance with Reg 72(2)(b) of the Electricity (General) Regulations 2012..

3.3 Generation Capacity

The SWF has an installed electrical capacity of 100.8 MW.

4 Asset Management

4.1 Site Design

The wind farm has been designed in accordance with all relevant Australian Standards for structural and electrical design and the relevant International Electrotechnical Commission, (IEC) standards.

Senvion designed the wind turbine and tower structure used at the Snowtown Wind Farm in Europe and India using a standard design used worldwide. The Senvion wind turbine design was evaluated and certified for compliance with relevant standards by Germannischer Lloyd.

Foundations and electrical collection, (cables, switchgear and protection systems) were designed in Australia by an Senvion engaged subcontractor to Australian and IEC standards and in accordance with Senvion design instructions and requirements of the generation licence and connection agreement.

All designs produced by the subcontractor were reviewed and approved by both Senvion and the Owners Engineer.

4.2 Construction of the Site

All construction on the site was completed under the Wind Farm Delivery Plan for the Snowtown Wind Farm. All relevant HSE management procedures and regulations were followed.

4.3 Commissioning of the Site

Commissioning of the turbines was done using Senvion Standard commissioning procedure for the S88 – 2.1MW machine and the S95 – 2.1MW turbine. Technicians followed these procedures and completed checklists for each turbine.

The Senvion subcontractor took responsibility for commissioning of the electrical collection system as per their energisation and electrical testing procedures in the Wind Farm Delivery Plan.

The Owners Engineer Representative witnessed all tests to ensure compliance with standards and regulations.

4.4 Asset Management Plan

The Asset Management Plan (AMP) produced by TrustPower Ltd, documents the approved operational and maintenance strategy for the wind farm. The AMP also provides a context and framework for detailed operational plans, systems and procedures required for optimum asset management of the power station over the upcoming 20 year period.

4.5 Site Decommissioning

Should decommissioning of any plant or equipment become a requirement, the development of approved decommissioning procedures will be required. The procedures will meet all regulatory requirements including, but not limited to, the National Electrician Rule requirements and Connection Agreement prior to permanent disconnection from the network.

The physical decommissioning of the WTG's will require a risk assessment that will incorporate environmental issues.

As a part of the planning process of any decommissioning exercise, a full review of the applicable regulations, standards and codes of practice will be required.

4.6 Service Planning

It is a critical element of this SRMTMP that work undertaken is appropriately planned. The regular servicing of the WTG's is planned such that the work activities are identified and the most appropriate work methods and resources are adopted to provide a well-coordinated, planned and safe working environment.

The objective of the scheduled service activities is to ensure a reliable and safe operation of the electrical and mechanical installations.

Planning for maintenance and service work to be undertaken by Senvion includes:

- review of all relevant documentation including Technical Specifications
- liaison with the Clients' representatives
- evaluation of site conditions and environment
- evaluation of required work activities and impacts, including preparation of JSA/SWMS
- identifying relevant specific site hazards and environmental aspects, and formulating control mechanisms
- undertaking a consistent and uniform approach to monitoring of site hazards and environmental aspects on-site.

Work processes are planned and developed with the intention of meeting the requirements of the OMS Agreement and applicable standards, codes, legislation and regulations.

Activities are controlled by using procedures, forms and records, a daily diary, work instructions, SMMS and checklists as developed by Senvion.

Process planning, development and control activities may also include work undertaken by Subcontractors.

4.7 Service Program and Milestones

A service schedule will be maintained by Senvion to plan all scheduled service and maintenance activities both on and off site.

This will be undertaken in compliance with the SMMS.

4.8 Service Delivery

Maintenance and service delivery will be assessed by a number of means including, minutes of meetings, items of communication with the Client, verbal confirmation with the Client, and time progress scheduling reporting in SMMS. See also Section 5.11 of this SRMTMP.

4.9 Service Schedule

The Service schedule provides a base timeline for the six month and twelve month planned services. The service timeline will be maintained throughout the duration of the Maintenance Services Agreement.

The Senvion Lead Service Technician is responsible for the implementation of the schedule at the Snowtown Wind Farm. A copy of the Service Schedule will be maintained at the Senvion Site Office building.

The client's representative will be notified of any delays to the scheduled services.

Reference:

Service Schedule: Snowtown Wind Farm – Service Schedule

4.10 Inspection and Testing

Service Management requires that critical elements of work are inspected, tested, checked and verified to ensure that all items comply with specifications and/or work practices.

Technical documents such as manuals, procedures, work instructions and checklists that relate to service provisions, monitoring, inspection, testing and measurement are downloaded from the Suzlon Technical site in Germany and/or Suzlon Technical Support.

The Servion Service Manager is responsible for ensuring that where necessary, these documents are adapted for use at the Snowtown Wind Farm.

The Procedures and checklists will be used to ensure proper maintenance and service of processes and equipment.

The following Technical Documents are used as the basis for preparing service checklists.

Reference:

Technical Manual: WD00297 Maintenance – S88-2.1

Technical Manual: WD00382 Maintenance – S95-2.1

Technical Manual: WD00060 Safety Manual

Technical Manual: WD00169 Operation Manual – S88-2.1

Technical Manual: WD00342 Operation Manual – S95-2.1

Technical Manual: WD00232 Troubleshooting Manual

Technical Chart: WD00050 Lubrication Chart – S88-2.1

Technical Chart: WD00407 Lubrication Chart – S95-2.1

Technical List: WD00175 Torque List – S88-2.1

Technical List: WD00404 Torque List – S95-2.1

Technical Manual: WD00286 Illustration of Main Connection

4.11 Service Checklists

Service checklists identify the records of inspections, tests and verifications that are required and must be retained to verify that the quality of the work meets specifications and requirements.

Where acceptance criteria are not met the item/issue is identified and deficiencies rectified before progress continues.

The service checklist used for the 6 month or 12 month service has been structured to correspond with the chapters from the WD00297 Maintenance – S88-2.1 Manual.

Separate checklists are used for the single S95-2.1 machine based on the chapters from the WD00382 Maintenance – S95-2.1 manual.

The checklist lists all tasks and subtasks, requiring each item to be verified against an acceptable value that is shown on the checklist, or identified in a reference Technical Manual.

The following sections are the main sections of the service checklist, each section has numerous subtasks:

1. Operational Check
2. Safety and Control System
3. Tower
4. Nacelle
5. Rotor

Reference:

Checklist: Maintenance Checklist – Half Yearly & Yearly S88

Checklist: Maintenance Checklist – Half Yearly S95

Checklist: Maintenance Checklist – Yearly S95

4.12 Storage and Handling of Materials

Throughout the life of the service contract, there is a need to handle and store materials associated with the respective tasks occurring on-site.

Delivery of goods and materials is normally from the supplier's premises direct to site or via the Senvion warehouse at Jamestown, South Australia.

Materials may include items such as chemicals, tools, cabling, etc. Goods and materials are to be handled and stored in such a way as to ensure that no injuries are sustained to personnel and materials are not damaged, lost or subject to deterioration, nor is there any threat to the environment.

Goods and materials are inspected prior to and while in storage to detect any deterioration or damage, expiry of shelf life, or risk to health, safety or the environment. Any damage or deterioration noted is referred to the Lead Technician or delegate for resolution.

Goods and materials are appropriately identified to prevent inadvertent use, and labels checked to ensure they are clear, visible and undamaged.

Defect Tags will be attached to faulty or unserviceable goods or materials.

Goods and materials are stored in designated areas to prevent damage, loss, deterioration, environmental damage or injury, and to maintain manufacturer's warranty.

Storage of dangerous goods or hazardous substances will be recorded and Material Safety Data Sheets will be available where dangerous goods or hazardous substances are stored.

Goods and materials will be stored in original packaging where possible.

4.13 Identification

The Service Manager or his delegated representative will ensure that each major item of equipment purchased is identifiable with a unique number.

All equipment whether sourced from overseas or Australia shall have a unique numbering system for identification purposes.

5 Quality

5.1 Document and Data Control

Senvion systems for document and data control ensure that the processes associated with document and data control, such as review and approval, revisions, issue, control, transmittals and receipts are developed and documented.

The Senvion Procedure, Document and Record Control is the principal Senvion procedure referenced throughout this SRMTMP relating to the control of documents and data.

Reference:

Procedure: Document and Record Control

5.2 Service Communication

The Senvion procedure for Document and Record Control is designed to ensure that all correspondence is uniquely identified, registered and maintained.

Originals shall be maintained on file. All outgoing correspondence to the Client shall be signed by either the Senvion General Manager - OMS or the Senvion Service Manager.

Reference:

Procedure: Document and Record Control

5.3 Technical Documents

Technical documents such as manuals, work instructions and checklists that relate to service provisions, monitoring and measurement are downloaded from the Senvion Technical site in Germany and/or Senvion Technical Support.

The Senvion Service Manager is responsible for ensuring that where necessary, these documents are adapted for use at the Snowtown Wind Farm.

5.4 Record Control

Compliance with Senvion Procedure, Document and Record Control ensures that quality records are comprehensive, authorised, maintained and accessible.

Details that relate to specification, verification (inspections), certification and traceability shall be clearly defined.

Reference:

Procedure: Document and Record Control

5.5 Process Control

It is the Senvion Service Manager's responsibility to ensure that all quality, safety and workmanship requirements are included in relevant implementation documents; this includes the operating procedure, maintenance procedures and safe work method statements and checklists.

When planned outcomes are not achieved, correction and corrective action shall be taken; refer to Section 5.9 of this SRMTMP.

Process control requirements from contractual documents have been included in all subcontract documents where relevant.

5.6 Supplier Evaluation

Major suppliers' capabilities to meet the Maintenance & Service Agreement requirements will be evaluated in accordance with Procedure Purchaser Supplier Management.

The Servion Service Manager is responsible for ascertaining and ensuring additional surveillance requirements are identified and actioned as necessary.

5.7 Subcontractor and Supplier Management

Compliance with Procedure Purchaser Supplier Management is designed to ensure that suppliers and contracted services conform to all specified quality, safety and environmental requirements and meet the overall service requirements, and that the procurement of goods or services is carried out in a controlled manner with the requirements clearly defined.

Subcontractors and suppliers are evaluated and selected on their ability to meet these requirements. Past performance, reputation, reliability, price and availability, as well as having a management system with safety and environmental plans in place, are considered in the evaluation.

Subcontractors are selected on the basis of their experience and their capacity to meet the job program.

The extent of control over Subcontractors is dependent upon the complexity of the work task, their known capability, and their quality, safety and environmental performance history.

Approval and sign off of purchases is undertaken by the Servion Service Manager.

Prior to commencement of work by subcontractors on-site, all personnel undertake a formal site induction and verification of their current qualifications.

Reference:

Procedure: Purchaser Supplier Management

5.8 Audits

Formal safety, technical, quality and environmental audits will occur annually. Audits will be conducted in accordance with Procedure Internal Audits.

The Snowtown Wind Farm Audit Schedule outlines the annual audit schedule and responsible persons. The audit schedule is maintained by Servion Quality Manager and Servion Service Administrators.

Each audit report will include corrective and preventive action reports with an outline of agreed recommendations and observations.

Nonconformance Reports will be issued for any serious breaches of this SRMTMP or non-compliance to established systems.

Procedure Corrective Action Register will be utilised to record and then track required corrective actions.

An approved audit protocol will form the basis of audits performed against this SRMTMP.

Audits will assess and report on the level of compliance with this approved SRMTMP and assess the health, safety and environmental systems, policy, procedures and documentation, operational readiness and progress on improvements recommended from previous audit reports.

A suitably qualified person, who is independent of the daily operations of the wind farm, will be involved in the annual auditing of this SRMTMP.

References:

Audit Schedule: Snowtown Wind Farm Audit Schedule

Procedure: Internal Audits.

Procedure: Corrective Action Register

Register: Snowtown Wind Farm – Corrective Action Register

5.9 Nonconformance

Any product that has been identified as nonconforming through the inspection, testing or monitoring program shall be identified and controlled.

The measures of control include use by approval, repair, scrap, rework or return to supplier.

Senvion utilises an “on-line” system of raising and recording corrective actions to address nonconforming products; maintained by Senvion Technical Support Department. This includes reviews of causes, actions and records, plus notifications to suppliers.

5.10 Training and Competency

Job-specific training is provided to employees with a special responsibility for quality, safety and the environment. As a minimum Senvion provide the following training for Service Technicians;

- Working at Heights
- Rescue at Heights
- Level 2 First Aid

Where High Risk work is required (as defined by State legislation), the appropriate class licence will be required. Relevant examples at the Snowtown Wind Farm may include:

- Rigging works
- Crane and Hoist operation
- Fork lift operation

Where Electrical Works are undertaken that require the issue of an Electrical Certificate of Compliance, registered Electrical Workers will undertake such work. Refer also Section 6.4 – Work on or Near Energised Electrical Installations and Services.

It is the responsibility of the Senvion Service Manager to ensure that where necessary the department trains employees to the necessary and required qualification/skills level.

Refresher courses are provided in accordance with regulatory requirements.

A record of job related training is recorded and maintained in the Senvion “preceda” database. These records can be accessed by the Site Administrator.

Contractors who are engaged to undertake work that require a licence as above, will have their licence verified at the time of induction with a record held at site.

Reference:

Regulation: Work Health and Safety Regulations, 2012, Part 5, Division 1 – Licencing of High Risk Work.

National Standard: National Standard for Licencing Persons Performing High Risk Work.

Regulation: Plumbers, Gas Fitters and Electricians Act, 1995

5.11 SRMTMP Review

Senvion and the Client shall annually review the SRMTMP to discuss the effectiveness of the SRMTMP system.

Where possible, steps shall be undertaken to continuously improve the SRMTMP.

This process takes into consideration:

- audit findings
- customer and employee feedback
- accident and incident reports
- non-conformances
- corrective and preventive actions
- OH&S and environmental issues
- training needs
- compliance with industry and legislative requirements, and the
- Company policies, objectives and targets.

Annual SRMTMP reviews will be minuted.

5.11.1 OMS Agreement reviews

The Senvion Service Manager, or the Client, will chair monthly OMS Agreement review meetings.

OMS Agreement review meeting minutes will be maintained by the owner.

6 Health and Safety

6.1 Introduction

Senvion has developed the Health and Safety risk management programme contained in this plan to manage risks that have been identified by a qualitative risk assessment process.

Effective management of these risks will allow Senvion to achieve the objectives that have been set for the Wind Farm.

A HSE Service Risk Register has been developed for the Wind Farm activities.

The Risk Register is reviewed and updated continually during the course of the Wind Farm such that it always reflects the most current assessment of the risks associated with the works.

6.2 The Snowtown Wind Farm Risk Register

A Wind Farm HSE Service Risk Register has been developed for the Wind Farm activities; Service HSE Risk Register. This is maintained by Service Administrators and Lead Technician.

Senvion procedure Risk Assessment and Control was applied when developing the Wind Farm risk register described below.

The Risk Register identifies hazards associated with wind farm activities. The Risk Register assesses each risk in terms of consequence and likelihood and has recommended mitigating control measures for each risk.

The Wind Farm Risk Register can be updated at any time; for reasons that may include significant incidents or new identified hazards. As a minimum the Risk Register will be reviewed annually.

Records of the review and identification of any significant changes will be recorded on the document status page of the register.

Reference:

Procedure: Risk Assessment and Control

Register: Service HSE Risk Register

6.3 Working at Height

The main high risk exposure on the Wind Farm relates to work on the WTGs. In the majority of cases this involves working at a height of up to 80 metres.

Other exposures include access to plant and equipment for service or assembly activities that may be up to 2 metres from the ground.

All working at heights is subject to the preparation and review of a JSA/SWMS as follows;

For Senvion service activities requiring working at height a JSA/SWMS shall be prepared and reviewed according to the control measure criteria documented on the Senvion Risk Register.

References:

Procedure: Work at Height

Procedure: WTG Evacuation and Rescue Training

Regulation: Work Health and Safety Regulations 2012 – Chapter 4, Part 4, Falls.

6.4 Working on or near energised electrical installations and services

HV / LV training and work procedures are provided to ensure all isolations and de-isolations are undertaken in accordance with South Australian regulatory requirements. This includes compliance with all switching and isolation lock out procedures.

The Senvion High Voltage Operating Authority is responsible for the safe control and operation of High Voltage and Low Voltage electrical safety.

All work will be undertaken in accordance with Senvion documents including:

- High Voltage and Low Voltage Electrical Safety and Switching Manual and the ;
- Lockout Procedures for Low Voltage used by Service Technicians working in turbines.

Where it is identified that a generic procedure does not fully cover the proposed work, a new JSA/SWMS will be developed to identify and mitigate risks.

Electrical work on site buildings will be covered by Electrical Certificates of Compliance issued by registered Electrical Workers, with records maintained onsite.

Records to verify licencing of Registered Electrical Workers are maintained on the Senvion 'Preceda' database system that is used to record all training and competency data for Senvion. Contractor licencing will be verified at the time of induction, with a record kept on site.

All High Voltage activities are carried out under the management of the High Voltage and Low Voltage Electrical Safety and Switching Manual. The manual documents the requirements for:

- Training and Authorisations
- Roles and responsibilities for authorised personnel
- Authorisation levels for entry into high voltage or low voltage installations.
- Work in the vicinity of live apparatus.
- Operation and switching of HV electrical equipment.
- High voltage switching and isolation
- Earthing of High Voltage apparatus
- Access to HV electrical apparatus
- Lock and Tag procedures.
- HV Electrical Access permit procedures.

The following Statutory requirement applies:

Regulation: Work Health and Safety Regulations 2012 – Part 7, General electrical safety in the workplace and energised electrical work.

Standard: AS3000-2007 Wiring Rules.

Act: Electricity Act 1996

Procedure: High Voltage and Low Voltage Electrical Safety and Switching Manual

6.5 Lock Out Tag Out

Senvion Lock out Tagout (LOTO) procedure shall be used for isolation of LV and HV equipment including working on turbines.

Lock and Tag requirements are documented in the High Voltage and Low Voltage Electrical Safety and Switching Manual.

Also a separate procedure, the Lockout Procedure for Low Voltage, has been adapted from that Manual to document the Lockout requirements relating to Low Voltage work in turbines.

The procedures document the following main requirements:

- Notifications required to work on Electrical Apparatus
- Access requirements to Electrical Apparatus
- Work on de-energised Electrical Apparatus – including restoration of power supply to electrical equipment.
- Work on live Low Voltage Electrical Apparatus
- PPE requirements
- Tools and Equipment
- Lock-out procedures
- Personal isolations
- Lockout Box Isolations

Reference:

Procedure: High Voltage and Low Voltage Electrical Safety and Switching Manual

Procedure: Lockout Procedures for Low Voltage

6.6 Work using power mobile plant

All mobile plant and equipment will be subject to regular inspections recorded in the log book for that piece of plant.

Details of the training and certification of plant operators will be collected at their Wind Farm induction and copies maintained with their induction record.

The following Statutory requirement applies:

Regulation: Work Health and Safety Regulations 2012 – Chapter 5, Plant and Structures

Procedure: Plant and Equipment

6.7 Equipment, Plant and Tools

Equipment used by Senvion (or its Subcontractors) for work, safety, inspection, measurement or testing must be maintained and capable of working to its potential and operated by trained and/or licensed personnel, where applicable.

Before any equipment is used, it must be checked to ensure it is operating satisfactorily for the purpose of the work.

Where equipment is found to be damaged or out of calibration, the equipment shall be labelled as defective and quarantined before being repaired or recalibrated.

Tools and equipment will be recalibrated, tested and tagged as required by the manufacturer or other relevant standard; or more frequently due to damage being identified during pre-use inspections.

All torque wrenches will be calibrated annually by a certified provider and records of these calibrations maintained at the site.

Portable electric hand tools will be inspected, tested and tagged as required by AS3760, In Service Safety Inspection and Testing of Electrical Equipment.

For subcontracted works that involve measuring or testing, the subcontractor is required to provide the appropriate measuring and/or test equipment.

Reference:

Standard: AS3760, In Service Safety Inspection and Testing of Electrical Equipment

Procedure: Plant and Equipment

6.8 Job Safety Analysis (JSA) and Safe Work Method Statements (SWMS)

A JSA/SWMS will be required for most activities on the wind farm, prepared either by Senvion or by sub-contractors. Specifically a JSA/SWMS is required for:

- Any high risk activity.
- Tasks that have a history of (or the potential for) injury.
- Safety critical tasks.
- Tasks performed under a permit to work system.

A JSA/SWMS may be generic for the task being performed, but must be made site specific to take into account the site characteristics and their effect on the task. Site characteristics that may need to be addressed in a JSA/SWMS include, but are not limited to:

- The site terrain
- Public safety issues, including potential impacts on local traffic using site roads.
- Local farming activities, including the presence of livestock.
- Weather conditions that may include dust, storms, extremes of temperature and lightning.
- Fatigue issues that may relate from working outside normal hours.

Preparation of Senvion JSA/SWMSs will be done in consultation with the appropriate work groups. Work groups will review the JSA/SWMS and hazards for their work each day prior to commencing work. Any new hazards will be documented on the JSA/SWMS.

Reference:

Form: Job Safety Analysis/Safe Work Method Statement.

Procedure: Job Safety Analysis/Safe Work Method Statement

6.9 Inspections

The Lead Service Technician and/or delegate is responsible for conducting six monthly Safety Inspections.

Form, Inspection Checklist - Service Health and Safety will be used in conducting these inspections.

Actions requiring correction will be recorded in the site HAZOB log (refer section 6.18 of this plan)

Reference:

Form: Inspection Checklist - Service Health and Safety

6.10 Wind Farm Site Inductions

All personnel attending the Snowtown Wind Farm that will carry out works will attend the site-specific induction. This will normally be presented by Senvion Lead Technician or his/her delegate and consist of the following:

- Explanation of the emergency procedures
- Cover all elements of the Site Induction Handbook

- Issuing the site induction handbook – including emergency contact numbers and acknowledgement signature of employee

The Senvion Lead Technician/Service Administrator will maintain a register of all inductions carried out.

Copies of relevant technical certifications will be copied at the time of induction.

Reference:

Form: Site Induction and Personal Details

Regulation: Work Health and Safety Regulations 2012 –Part 2, Division 1, Regulation 39 – Information, instruction and training.

6.11 Management of Visitors

The Site is a restricted area with appropriate signage. Senvion Personnel and Subcontractors shall be responsible for security whilst on-site to ensure that unauthorised persons do not enter the site.

Any tourist or unauthorised person found on-site will be directed to vacate the site and contact the appropriate TrustPower representative to discuss visiting the Site

Visitors to the site will be required to attend the Senvion Wind Farm site office and sign the visitor's book.

Visitors will be given a visitors induction and must be accompanied at all times by a person who has received the full Wind Farm induction as described above in 6.10.

6.12 Operation of Motor Vehicles

A speed limit will be restricted to a maximum 40kph for vehicles travelling on the site.

All personnel and Subcontractors shall be reminded during the site induction that all road rules on the site and leading from the site shall be adhered to.

All vehicles and equipment shall be restricted to designated tracks and roads as defined by the Client.

The volume of traffic will be kept to the absolute minimum necessary to undertake the activities required under the OMS Agreement.

All vehicles used during operation will be driven in a manner and at a speed compatible with the conditions.

Gates are to be left as they are found. In general, gates shall be presumed to be closed unless directed otherwise. All site entry gates on public roadways shall be closed.

Senvion vehicles will be subject to weekly inspections to confirm their safe operating condition.

Reference:

Form: Vehicle Inspection Checklist

6.13 Permit Systems

A permit to work system will operate on the Wind Farm in accordance with the arrangements described in Senvion Procedure Permits to Work.

Copies of all permits along with supporting JSA/SWMSs will be maintained in the Wind Farm filing system.

The names of those persons authorised by the Lead Service Technician or delegate to issue permits in each category will be made available on site.

Specific permits to be used include:

- Hot work permits.
- Excavation permits
- High voltage electrical work.

Reference:

Procedure: Permits to Work

Form: Hot Work Permit

Form: Excavation permit

6.14 Manual Handling

The risk of manual handling injuries has been identified a number of times during the development of the Wind Farm risk register.

Where relevant, identification of hazardous manual handling threat will be documented in the task JSA/SWMS and appropriate controls implemented.

The following Statutory requirement applies:

Regulation: Work Health and Safety Regulations 2012 – Chapter 4, Part 2, Hazardous Manual Tasks

6.15 Occupational Noise

Plans and arrangements need to ensure that personnel are not exposed to unsafe levels of noise and that relevant exposure standards are adhered to.

Where appropriate noise hazards will be identified in JSA/SWMSs and mitigating actions implemented.

The following Statutory requirement applies:

Regulation: Work Health and Safety Regulations 2012 – Chapter 4 Part 1, Noise.

6.16 Fatigue Management

Management of fatigue related risks will be addressed during the development of a JSA/SWMS for tasks where the duration or timing of the task introduces the risk of fatigue related injuries.

The Senvion Policy, Fatigue Management sets the minimum standard that will apply when managing fatigue related risks.

Reference:

Policy: Fatigue Management

6.17 Personal, Protective Equipment (PPE)

Senvion is responsible for ensuring that all personnel use the appropriate Personal Protective Equipment (PPE) whenever it is required and to ensure that the equipment is of the appropriate type. Contractors are required to provide PPE for their own employees.

The equipment issued should conform to legislative requirements and the relevant Australian Standards, be stored correctly, worn correctly, be in good working order and within the designated inspection date.

The Site Specific Induction provided by Senvion will include the general site PPE requirements. This will include the following as a minimum:

- Closed safety footwear; and
- High visibility vest/clothing

Senvion employees, contractors, subcontractors and visitors to Wind Farm site are all required to wear the appropriate items of PPE and clothing for the site area or the work being performed.

All PPE identified as required in each JSA/SWMS shall be provided by Senvion or the contractor or subcontractor and its use enforced.

Reference:

Procedure: Personal Protective Equipment

Regulation: Work Health and Safety Regulations 2012 – Part 2, Division 5, Personal Protective Equipment.

6.18 Hazard recording log – (HAZOB Log)

During the life of the Wind Farm there will be a focus on identifying and correcting hazardous conditions before they cause an incident.

A HAZOB log will be used that can log issues and other related data so that trends can be reviewed and consolidated corrective actions and improvements can be undertaken on a Wind Farm wide basis.

To achieve these improvements the following will occur:

- Hazardous conditions noted either informally by observation or by formal inspection will be recorded onto a Wind Farm HAZOB Register.
- Other related details relating to the hazard will also be recorded – such as location, contractor etc.
- Corrective actions will be documented, and persons assigned the task of taking the required actions.

The Senvion Lead Service Technician and Service Administrator are responsible for maintaining the hazard observation register which is located on SharePoint, to ensure hazobs are closed out within seven days or moved to the corrective action register.

Reference:

Form: Hazard Observation Card (HAZOB)

Procedure: Hazard Observation Card (HAZOB)

Register: Snowtown Wind Farm – HAZOB Register

7 Environmental Management

7.1 General

The Environmental Management System aims to:

- satisfy Senvion's internal needs and those of interested parties including clients, regulatory authorities, etc. in regards to environmental performance
- increase employee and subcontractors awareness of environmental issues by updating information on the environmental status as diagnosed via regular environmental checks being conducted
- comply with environmental legislation and regulations; and
- document environmental performance.

7.2 Environmental Aspect and Impacts Assessment

The environmental aspects for the Snowtown Wind Farm have been identified, evaluated and the appropriate control measures assigned in the Environmental Aspects and Impacts Register.

Reference:

Register: Environmental Aspects and Impacts Register

Procedure: Environmental Aspects and Impacts

7.3 Environmental Monitoring

A monitoring program has been developed for the planned servicing tasks at the site.

Environmental inspections will be conducted every six (6) months, or after a significant rainfall event (25mm of rain in one event).

The inspections will monitor:

- Soil and Water management
- Flora, Fauna and Cultural Heritage management
- Bushfire Risk management
- Hazardous Substances management
- Waste management

Form, Inspection Checklist – Environmental Compliance will be used.

Reference:

Form: Inspection Checklist – Environmental Compliance

7.4 Air Quality

Minimal traffic is expected and speeds shall be kept as low as possible to prevent dust, (a maximum speed limit of 40kph will be adhered to at all times.) Dust control shall be monitored during the course of maintenance and servicing activities. Control measures such as wetting down the work areas may be adopted if deemed to be required.

7.5 Water Management, Drainage and Erosion Control

Where water is discharged from the site, all water discharged shall be discharged in a manner that will not cause environmental harm (including erosion).

Senvion shall provide on-site, hydrocarbon spill kit sets including bio-organic oil absorbent material, socks and the like.

Additional equipment may be provided if identified in the JSA/SWMS for a specific task.

7.6 Flora, Weeds and Diseases

All vehicles, equipment and work activities shall be restricted to designated tracks and roads.

As practical, machinery and vehicles shall be inspected and cleaned to remove any soil or plant material prior to entry to any part of the wind farm, movement throughout the wind farm and departing from the wind farm.

7.7 Fauna and Land Use

Work shall be limited to existing roads and hardstand areas. Vehicle speeds will be restricted to a maximum speed limit of 40kph on these designated areas. Vigilance will be undertaken to observe the site for fauna while undertaking site activities.

7.8 Noise

Works will generally be during daylight hours, Monday to Saturday. Some variation to this may be required for the servicing and maintenance of the turbines, so as to take advantage of low wind speeds.

Machinery and vehicles will be maintained in accordance with manufacturer's specifications. Machinery and vehicles will be in good repair and, where appropriate, be fitted with noise suppressors.

A log of complaints will be maintained. Any noise related complaints will be documented in the complaints register and forwarded to the Service Manager.

Reference:

Register: Snowtown Wind Farm – Complaints Register

7.9 Landowner Activities

All site personnel shall be made aware of the surrounding landowner activities. The spraying of herbicides, pesticides or insecticides can be harmful to health, therefore dates of these activities must be provided to the lead technician by the landowners. The Lead Service Technician will ensure that all personnel are aware of the spraying activities.

7.10 Hazardous Materials

Any material or substances that are or may be considered hazardous or dangerous to personnel or the environment shall be handled, stored, transported, used or applied according to the manufacturer's recommendations and all statutory requirements.

Only minor quantities of materials such as fuels, oils and grease will be required to be used on the site.

The Senvion Procedure Hazardous Chemicals will be utilised to ensure effective management of hazardous and dangerous substances.

Hydrocarbon spill kits shall be provided by Senvion and placed on the site to clean up any spills that may occur.

A register of hazardous materials used during the period of the service contract, accompanied by SDS information, will be kept by the relevant personnel.

Reference:

Procedure: Hazardous Chemicals

Register: Snowtown Wind Farm SDS Register

Regulation: Work Health and Safety Regulations 2012 – Chapter 7, Hazardous Chemicals

7.11 Waste Management

The objective is to ensure the safe storage, handling and disposal of all wastes (liquid and solid) generated during the operation of the wind turbine towers and nacelles. No waste is to be left on-site, no waste is to be burnt or buried on-site and all recyclable materials are to be recycled.

Senvion procedure Waste Management is to be followed for waste management practices at the Wind Farm.

Waste materials shall be controlled and placed in contained waste disposal facilities.

Waste disposal companies are contracted to arrange for the disposal of waste materials according to the local council requirements and Environment Protection Authority (EPA). Disposal records for wastes prescribed by the EPA are to be obtained from the disposal contractors and the records shall be kept as per the documentation requirements set by the regulations.

Wastes shall be managed in the following hierarchical manner:

- Generation of waste shall be reduced to the minimum extent that is reasonable and practical having regard to best practice environmental management
- waste shall be re-used or recycled to the maximum extent that is reasonable and practicable
- any remaining waste shall be disposed of only in a manner and at a site permitted by the local authorities for the purpose of disposal of the relevant waste.

Reference:

Procedure: Waste Management

8 Incident Reporting

8.1 Introduction

The reporting of incidents on the Wind Farm will be done in accordance with the arrangements described in Senvion procedure Incident Reporting.

A chart that shows the Incident Reporting Protocol for the Wind Farm must be displayed on the notice board. The chart documents the various responsibilities in reporting incidents at the Wind Farm.

Reference:

Procedure: Incident Reporting

Form: Incident Report

Form: Incident Report Communication Protocol

8.2 Incident Classification

To ensure that the appropriate level of notification and reporting of incidents is made, incidents will be classified using the Table 8.1 below, and notifications and reporting requirements completed in accordance with the table in 8.2.

Minor	Medium	Major
An accident with an actual or potential outcome, or a near miss with the potential to cause:	An accident with an actual or potential outcome, or a near miss with the potential to cause:	An accident with an actual or potential outcome, or a near miss with the potential to cause:
<ul style="list-style-type: none"> One injury requiring no more than First Aid treatment Property damage with a value less than \$500 Fuel or other spill taking less than 1 hour to clear. Non-fatal injury to fauna or damage to flora 	<ul style="list-style-type: none"> Medical Treatment Injury, Restricted Work Injury or Multiple First Aid Treatment Property damage with a value greater than \$500 and less than \$5000 Fuel or other spill that requires less than 4 hours to clear. Fatal injury or multiple injuries to fauna or destruction to flora 	<ul style="list-style-type: none"> An incident that requires reporting to the relevant Statutory Authority. Lost Time Injury or greater, multiple Medical Treatment Injuries or Restricted Work Injuries Property damage with a value greater than \$5000 Fuel or other spill that will be cleared in a time greater than 4 hours. Multiple fatal injuries to fauna

Table 8.1 – Incident Classification

8.3 Immediate Response to Incidents

Senvion will have sufficient trained personnel and equipment to provide immediate response to an incident and treatment of any injured person. Any Wind Farm team member who is required to respond to an incident should follow these basic steps:

- Approach immediate scene of incident/near miss with caution, ensuring it is safe to treat any injured persons without risk of further personal injury.

- Secure/make safe the immediate area, evaluate the scene, contact Senvion site supervision.
- Attend to and treat any injured personnel only if qualified to do so.
- Contact emergency services if required to do so.

8.4 Notification/Reporting timeline requirements

Notification of Senvion staff is essential in the event of an incident or near miss.

The following table outlines the notification and reporting timelines, and those personnel required to be involved based up to the severity of the incident.

In the event of an incident, Senvion will ensure that the client is notified within the specified timeframe.

	Minor	Medium	Major
Verbal Notification	To Senvion Lead Service Technician	To Senvion and client immediately	To Senvion and client immediately
Written (Preliminary) Incident/Accident Report	Reported in routine client reports	To Senvion and client within 48 hours – preliminarily report	To Senvion and client within 24 hours – preliminarily report
Completed Incident/Accident Investigation report	If required	Within 14 days	Within 14 days

Table 8.2 - Reporting Requirements

8.5 Incident Investigation

All incidents will require some form of investigation to determine root cause and allow the implementation of corrective actions that ensure there is no recurrence.

Senvion procedure Incident Investigation will be followed when conducting investigations.

Reference:

Procedure: Incident Investigation

8.6 SafeWork Notification

In addition to the notification requirements shown above, Senvion (and sub-contractors through Senvion) have an obligation to ensure that all SafeWork notifiable incidents are reported to the regulatory body in a timely manner.

A notifiable incident will also require the site to remain undisturbed until advised by a SafeWork inspector otherwise.

Reference:

Regulation: Work Health & Safety Act 2012 – Part 3, Incident Notification

8.7 EPA Notification

In addition to the notification requirements shown above, Servion (and sub-contractors through Servion) have an obligation to ensure that all incidents that cause serious environmental harm are reported to the regulatory body in a timely manner.

Reference:

Act: Environment Protection Act 1993 – Part 9, Section 83, Notification where serious or material environmental harm caused or threatened.

8.8 Reporting of Electrical Incidents

Any incident that involves electrical shock or electrical burns caused by the operation or condition of electricity infrastructure or an electrical installation must be reported to the Technical Regulator. Specifically:

- In the case of a death resulting from the incident – immediately by telephone.
- In the case of injury requiring medical assistance resulting from the incident – within 1 working day of the incident.
- In any other case – within 10 working days of the incident.

Reference:

Regulation: Electricity (General) Regulations 2012 – Division 4, Regulation 70, Reporting of Incidents.

8.9 Records of Incidents

Servion will maintain records of all reported incidents and subsequent investigations on the Wind Farm, related to the works.

Summary details of incidents and near misses shall be recorded on the Snowtown Wind Farm Incident Register.

Any corrective actions raised following investigation will be logged on the Corrective Action Register.

Reference:

Register: Snowtown Wind Farm – Incident Register

Register: Snowtown Wind Farm - Corrective Action Register

9 Injury Management

Injury management is about ensuring the prompt, safe and durable return to work of an injured worker. It includes:

- treatment of the injury
- rehabilitation back to work
- retraining into a new skill or new job
- management of the workers compensation claim
- the employment practices of the employer

Everyone involved is required to cooperate and participate in injury management, including the employer, injured worker, insurer, treating doctor and all treating practitioners.

Senvion document Return to Work Policy, provides guidance on the Injury management requirements. A copy of this policy will be displayed at the Snowtown Wind Farm OMS building.

Reference:

Policy: Return to Work Policy

9.1 First Aid

All Service Technicians will have a minimum of Level 2 First Aid qualification. This will allow them to be a Primary First Aider in case of an incident on Site.

First Aid treatment given at the Wind Farm will be recorded in the First Aid Log.

Reference:

Register: Snowtown Wind Farm - First Aid Register

Regulation: Work Health and Safety Regulations 2012 – Part 2, Division 3, First Aid.

9.2 Medical Services

Nominated medical services shall be used for all work injuries requiring treatment beyond First Aid.

A suitably independent Medical Practitioner shall be fully briefed on the work location, the tasks being completed and the potential alternative duties that may be assigned in the event an injury is sustained.

The contact details for the nominated medical services shall be displayed on the Emergency Instruction Poster located on the site safety board within the O&M building.

10 Emergency Response

10.1 Emergency Response Plan

An Emergency Response Plan has been prepared for the Snowtown Wind Farm.

Key elements of the plan shall be communicated to all Senvion personnel and subcontractors during the Site Induction. Response to incidents will be carried out in compliance with the Emergency Response Plan.

The Emergency Response Plan considers the following possible emergency situations; (or a combination of all) that site personnel may be confronted with when working on site:

- Runaway operation of a WTG.
- Emergency descent or rescue of an injured person.
- Serious medical emergency, injury or fatality
- Significant property damage
- Fire, including bush fire events.
- Extreme weather conditions
- Significant Environmental Damage
- Threats – bomb or suspicious parcel

The Lead Technician or delegate shall ensure the ERP is implemented on-site.

Reference:

Plan: Snowtown Wind Farm – Emergency Response Plan

Regulation: Work Health and Safety Regulations 2012 – Part 2, Division 4, Emergency Plans.

11 Communications

Senvion recognises the importance of accurate and continued communication and consultation with all contractors and other personnel involved in the Wind Farm.

To enable this to be achieved the following methods will be implemented as appropriate to ensure that employees and contractors are aware of their obligations and any stipulated requirements.

Reference:

Procedure: Communication, Participation and Consultation

11.1 Weekly Toolbox Talks

The Lead Service Technician or delegate is responsible for ensuring that Toolbox Meetings are held weekly or upon request by a worker and/or Subcontractor.

The Toolbox Meetings shall incorporate issues from the site and shall be a means of distribution of information to site personnel on all matters including HSE, and conversely a means for personnel to raise similar issues.

These meetings are intended to be informal and open discussions about relevant work, safety and environmental issues etc. between the Lead Service Technician and the employees (including subcontractors). The Lead Service Technician or delegate is responsible for keeping employees informed of maintenance and service conditions and changes that may affect the employee's health and/or safety.

A record of the toolbox meeting shall be maintained by the Lead Service Technician or delegate.

Reference:

Form: Safety Toolbox Meeting Minutes

11.2 Site Notice Board

A site Safety Board is located in the O & M building and shall include relevant safety and emergency notices.

The Safety Board shall include but is not limited to the following:

- Emergency Instruction Poster
- Emergency Assembly Points
- Incident Report Communication Protocol
- Health and Safety Issue Resolution and Consultation flowchart
- Safety Alerts Monthly Toolbox Topic Work Cover Poster – What to do if injured at work

11.3 HSE Issues – Dispute Resolution

Senvion Procedure Health and Safety Issue Resolution and Consultation provides the overall guidance for the resolution of HSE issues on the Wind Farm.

Senvion would normally expect that disputes arising from HSE issues between any Sub Contractor and their employees will be resolved according to the Sub Contractors own dispute resolution procedures.

The Contractor must notify Senvion if their works have become affected due to a dispute arising from HSE issue.

Senvion should only be involved if the dispute concerns a service or function provided by Senvion, or if the dispute, initially involving only one Sub Contractor, has spread to affect all work on the Wind Farm.

Reference:

Procedure: Health and Safety Issue Resolution and Consultation

Regulation: Work Health and Safety Act, 2012, Division 5– Issue Resolution

11.4 Public Communications

The Client has a close relationship with the landowners and lessees on the wind farm. Regular correspondence and updates are sent to the landowners as well as telephone communication for specific issues.

The community is notified of dangers on-site by warning signs at the main gate entrances for each property. Cable markers are located above the buried high voltage cable.

The entrance gates are to remain closed at all times, to stop public access to wind turbine sites and are to possess a sign stating

“Danger – Restricted Access - Authorised Personnel Only” (or words to that effect).

Complaints received from the public will be recorded in the Complaints Register.

Reference:

Register: Snowtown Wind Farm – Complaints Register

11.5 Communication with Stakeholders

The list of the Snowtown Wind Farm stake holders are as follows:

- TrustPower Ltd
- TrustPower Ltd Control Centre
- ElectraNet
- AEMO
- Senvion Australia
- Land Owners

11.6 Lines of Communication

Lines of communications of Senvion with other stakeholders will be as follows:

- Senvion’s major line of communication will be with TrustPower Ltd, Deion Campbell (client’s representative).
 - TrustPower Ltd will be responsible for all communication with, ElectraNet and AEMO
- TrustPower’s main line of communication will be with the Senvion Service Manager
- TrustPower will communicate with Senvion Site Lead Service Technician to obtain updates on Wind farm status.
- Senvion will liaise with TrustPower Control Centre on an as required basis using the TrustPower Ltd agreed protocol QTO/3.001 C24 version 2 TrustPower LTD and Senvion Operating protocol.
- Senvion will communicate with landowners for day to day coordination of activities. Land-owner lease issues will be referred to TrustPower Ltd.

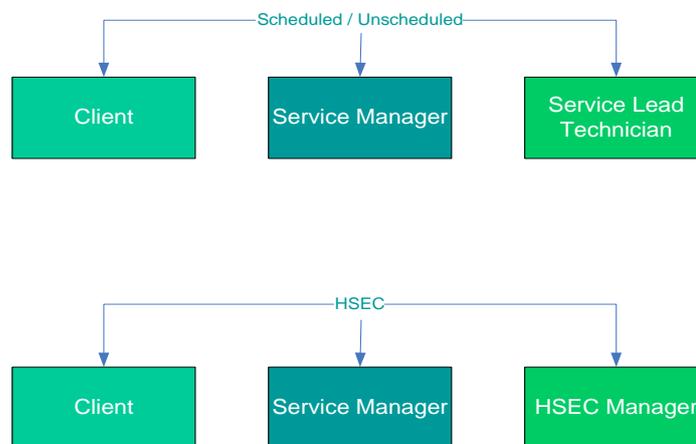
11.7 Reporting and Dissemination

To ensure all stakeholders are kept informed and appropriate approvals sort in relation to all matters associated with the Snowtown Wind farm the following list of reports and methods of communication will be adopted;

- Internal Senvion Newsletters – electronic copy to be conveyed to TrustPower Ltd.
- Senvion Monthly wind farm reports – conveyed to TrustPower Ltd. electronically.
- Senvion and TrustPower Ltd. Monthly client meetings – TrustPower Ltd. to provide electronic copy of minutes and send to Senvion
- Reporting to TrustPower Ltd. Incidents within pre agreed time frames.
- Reporting of defects in accordance with Maintenance Service Agreement
- Communication meeting with land owners
- Site Tool Box meetings
- Client weekly phone calls to site to review Wind Farm status
- Weekly availability forecast to allow the TrustPower Ltd. Control Centre to update AEMO on Wind Farm availability, to be submitted to TrustPower Ltd Control Centre each Wednesday.

11.8 Communication Diagram

Client Communication Block Diagram



Appendix A - Referenced Documents

Occupational Health and Safety Legislation

- Work Health and Safety Act, 2012
- Work Health and Safety Regulations, 2012
- Dangerous Substances Act, 1979
- Dangerous Substances Regulations, 2002
- WorkCover Rehabilitation and Compensation Act 1986
- WorkCover Rehabilitation and Compensation (General) Regulations 1999

Environmental Legislation

- Aboriginal Heritage Act 1988
- Crown Land Management Act 2009
- Environment Protection Act 1993
- Heritage Places Act 1993
- National Parks & Wildlife Act 1972
- Native Vegetation Act 1991
- Water Conservation Act 1936
- Crown Land Management Regulations 2010
- Environment Protection Regulations 2009
- Heritage Places Regulations 2005
- National Parks and Wildlife (National Parks) Regulations 2001
- Native Vegetation Regulations 2003

Other Legislation

- National Electricity (South Australia) Act 1996
- National Electricity (South Australia) Regulations
- Electricity Act, 1996
- Electricity (General) Regulations 2012

Senvion Policies

- Health and Safety Policy
- Environmental Policy
- Quality Policy
- Return to Work Policy
- Fatigue Management Policy

Senvion Technical Manuals

- WD00297 Maintenance – S88-2.1
- WD00382 Maintenance – S95-2.1
- WD00060 Safety Manual
- WD00169 Operation Manual – S88-2.1
- WD00342 Operation Manual – S95-2.1
- WD00232 Troubleshooting Manual
- WD00050 Lubrication Chart – S88-2.1
- WD00407 Lubrication Chart – S95-2.1
- WD00175 Torque List – S88-2.1
- WD00404 Torque List – S95-2.1
- WD00286 Illustration of Main Connection

Senvion Procedures

- Health and Safety Issue Resolution.
- Communication, Participation and Consultation.
- Hazardous Chemicals.
- Risk Assessment and Control
- Incident Reporting
- Permits to Work
- Incident Investigation
- Work at Height
- Personal Protective Equipment
- Hazard Observation Card
- WTG Evacuation and Rescue Training
- Job Safety Analysis/Safe Work Method Statement
- Waste Management
- Document and Record Control
- Purchaser Supplier Management
- Plant and Equipment
- Internal Audits
- Corrective Action Register
- Lockout Procedures for Low Voltage.
- High Voltage and Low Voltage Electrical Safety and Switching Manual

Australian Standards

- AS3000-2007, Wiring Rules
- AS3760-2003, In Service Safety Inspection and Testing of Electrical Equipment.

Senvion Forms

- JSA/SWMS
- Incident Report Form
- Hot Work permit
- Incident Reporting Communication Protocol
- Vehicle Inspection Checklist
- Excavation permit
- HAZOB Card
- Site Induction and personal details form
- Safety Toolbox Meeting Minutes
- Inspection checklist - Service Health and Safety
- Inspection checklist – Environmental Compliance

Other Snowtown Wind Farm Plans and Documents

- Snowtown Wind Farm Emergency Response Plan
- Service HSE Risk Register
- Environmental Aspects and Impacts Register.
- Snowtown Wind Farm HAZOB Register
- Snowtown Wind Farm Incident Register
- Snowtown Wind Farm First Aid Register

- Snowtown Wind Farm Corrective Action Register
- Snowtown Wind Farm Audit Schedule
- Snowtown Wind Farm Complaints Register
- SDS Register

