

**PLANNING and ENVIRONMENT ACT
MOYNE PLANNING SCHEME**

PERMIT NO. 2006-0222-2

Condition 17

ENDORSED PLAN

Sheet 1 of 500

Signed:  for

MINISTER FOR PLANNING

Date: 04/05/2022

ENVIRONMENTAL MANAGEMENT PLAN RYAN CORNER WIND FARM

For Ryan Corner Development Pty Ltd

May 2022

Report

Revision Table			
Revision	Date	Description	Reviewed
1.0	21 June 2010	Final Report	Allan Wyatt (ERM)
2.0	11 January 2012	Final Report	Allan Wyatt (ERM)
3.0	9 February 2012	Final Report for endorsement	Allan Wyatt (ERM)
4.0	20 November 2020	Final Report	Christine Hartley (ERM)
5.0	08 June 2021	Draft Report	Christine Hartley (ERM)
6.0	23 July 2021	Draft Report	Grace Abou Abdallah (Umwelt)
7.0	1 September 2021	Final Draft Report	Grace Abou Abdallah (Umwelt) and Daniel Cullen (GPG)
8.0	10 November 2021	Final Report	Grace Abou Abdallah (Umwelt)
9.0	28 March 2022	Final Draft Report	Grace Abou Abdallah (Umwelt), Daniel Cullen (GPG), Michael Kerr (GPG).
10.0	02 May 2022	Final Report	Grace Abou Abdallah (Umwelt) to address all DELWP feedback.

This Environmental Management Plan (EMP) is considered a dynamic document and must be able to be reviewed, as necessary in consultation with the Moyne Shire Council and Department of Sustainability and Environment to the satisfaction of the Minister for Planning every 5 years to reflect operational experience and changes in environmental standards and techniques and must be submitted to the Minister for Planning for re-endorsement.



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Glossary

Term	Definition
Audit	Systematic and documented process for obtaining evidence and objectively evaluating the extent to which environmental management meets legislative, regulatory and permitting requirements.
Auditor	Person with appropriate training and competence who performs the audit.
Australian Height Datum (AHD)	Adopted by the National Mapping Council as the datum to which all vertical control for mapping (and other surveying functions) is referred.
BOP	Balance of Plant
Commencement of Construction/Development	Construction and development are used interchangeably. As defined in S.3(1) of the <i>Planning and Environment Act 1987</i>, development includes: (a) The construction or exterior alteration or exterior decoration of a building; and (b) The demolition or removal of a building or works; and (c) The construction or carrying out of works; and (d) The placing or relocation of a building or works on land; and (e) The construction or putting up for display of signs or hoardings. Works includes <i>any change to the natural or existing condition or topography of land including the removal, destruction or lopping of trees and the removal of vegetation or topsoil.</i>
Construction contractor	Prime Contractor engaged by Ryan Corner Development Pty Ltd (RCDP) to undertake construction activities associated with the Project.
Continual improvement	Ongoing process of enhancing the EMP in order to achieve improvements in environmental performance.
Corrective action	Action to eliminate the cause of non-conformance.
EBIT	Earnings Before Interest and Taxes
EMP	Environmental Management Plan.
Environment	Surroundings in which the Contractor operates including: air; water, land, natural resources, flora, fauna, humans, heritage and their interrelation.
Environmental aspect	Element of organisational activities or products that can interact with the environment.
Environmental assessment	Process of investigating the potential environmental impacts or effects of a proposed development, according to the Environment Effects Act 1978; enables informed decisions on whether a project with potentially significant environmental effects should proceed.
Environmental Control Plan (ECP)	A work instruction, which details the environmental protection or control methodology for a particular activity.
Environmental Effects Statement (EES)	Document describing the proposed development; the existing environment that may be affected; potentially significant environmental effects of the proposal; proposed measures to avoid, minimise or manage adverse environmental effects; and measures for monitoring and managing environmental effects. Project proponent is responsible for preparing an EES if the Minister for Planning decides that it is required. After the EES is completed and released for public comment, the Minister provides an assessment to the relevant decision-makers.
Environmental impact	Any changes to the environment, whether adverse or beneficial, wholly or partially resulting from the proposed construction activity.
Environmental management	The management system used to develop and implement the environment system policy and manage environmental aspects.



Term	Definition
Environmental objective	Overall environmental goal, consistent with the environment policy that the project aims to achieve.
Environmental performance	Measurable results of an organisation's management of environmental aspects.
Environmental policy	Overall statement of intent and direction relating to environmental performance as expressed by project management.
Environmental target	Detailed performance requirement that arises from the environmental objectives and are set in order to achieve those objectives.
IR	Industrial Relations
Lagging indicator	A measurable factor that changes after the environment has changed; indicates change in the environment.
Leading indicator	A measurable factor that changes before the environment starts to follow a particular pattern or trend; may be used to predict changes in the environment.
Low-noise Impact Works	<i>These are inherently quiet or unobtrusive, for example, manual painting, internal fitouts, and cabling. Low-noise works do not have intrusive characteristics such as impulsive noise or tonal movement alarms. The relevant authority must be contacted, and any necessary approvals sought (EPA Publication 1834, 2020)</i>
LTI	Lost Time Injury
Managed impact works	<i>Works where the noise emissions are managed through actions specified in a noise and vibration management plan (may be part of a broader environmental management plan), to minimise impacts on sensitive receivers. Managed-impact works do not have intrusive characteristics such as impulsive noise or tonal movement alarms (EPA Publication 1834, 2020)</i>
Mobilisation	Mobilisation refers to activities carried out by the principal contractor upon being granted access to site. It refers to activities relating to enabling the commencement of construction.
NHVR	National Heavy Vehicle Register
Non conformance	Non fulfilment of a requirement.
OSOM	Over Size Over Mass
Performance indicators	Indicators that have been developed as leading or lagging to monitor and assess performance.
Pollution prevention measure	Method employed to avoid, reduce or control the creation, emission or discharge of any type of pollutant or waste, in order to reduce adverse environmental impacts.
Preventive action	The action required to eliminate the cause of a possible non-conformance.
Procedure	Specified way to carry out an activity or a process.
Project environmental alert	Notice to provide important environmental information to the construction team; information may be triggered by a recent incident (not necessarily within the Project site but a similar project in Australia or another project being developed by the Proponent), infringement notice, change in acceptable work practices, significant weather changes, etc.
Record document	Document stating results achieved or providing evidence of activities performed.
RCDP	Ryan Corner Development Pty Ltd ABN: 75 130 542 915
Safe Method Work	Work procedure for all activities identified as high environment risk, describing actions to be



Term	Definition
Statement (SWMS)	taken to mitigate and minimise risk.
Sub-contractor	Any company, body or person who is contracted to the Contractor for the purpose of supplying services or goods.
Unavoidable works	Works which pose an unacceptable risk to life or property or a major traffic hazard and can be justified. Includes an activity which has commenced but cannot be stopped. You will need to demonstrate that planned unavoidable works cannot be reasonably moved to normal work hours. This requires additional consideration of potential noise and vibration generating activities and controls to minimise noise and vibration. These can be recorded within the noise and vibration management plan (may be part of a broader environmental management plan). (EPA Publication 1834, 2020)



PART A

ENVIRONMENTAL MANAGEMENT FRAMEWORK



1. INTRODUCTION

The Ryan Corner Wind Farm Project (the Project) will involve the construction, commissioning and operation of up to 52 turbines, with a capacity of up to 796,691 MWh to 224MW. The proponent is Ryan Corner Development Pty Ltd (RCDP), a wholly owned subsidiary of Global Power Generation Australia Pty Ltd (GPGA). GPGA is the Australian subsidiary of Global Power Generation, the international generation arm of Naturgy Group. Construction of the Project will be undertaken on behalf of RCDP by the construction contractor. The Project will make a substantial contribution towards meeting Victorian and Commonwealth Government renewable energy targets and reducing greenhouse gas emissions.

In August 2008 the Minister for Planning granted Planning Permit No. 20060222 for the Project. On 21 December 2017 the Minister issued an amended Planning Permit No. 20060222-A. On 2 November 2020, the Minister approved an extension of time request and the development must now be completed by 29 August 2023. On 9 March 2022, the Minister issued an amended Planning Permit No. 20060222-2 (the Planning Permit)

The Planning Permit allows the use and development of land for a Wind Energy Facility and the removal of native vegetation, and outlines conditional requirements, including the preparation of an Environmental Management Plan (EMP) (Condition 17), which must be approved before development starts and is applicable during the life of the Project.

An EMP (Ref. 0105123 Rev. 3.0 dated 09 February 2012) pursuant to (the ‘former’) Condition 13 of Permit No. 20060222 was endorsed by the Minister for Planning on 23 February 2012.

This particular EMP updates the EMP endorsed on 23 February 2012, taking into account current relevant legislation and the approved amendments to Permit No. 20060222 since this time. It also responds directly to the specific requirements of Condition 17 of the Planning Permit only. Any other environmental management requirements outside those referenced in Condition 17 are appropriately addressed via other relevant Planning Permit Condition requirements.

1.1. PURPOSE OF THE EMP

This EMP establishes the management system and framework to guide proposed activities associated with the construction and operation of the Project and ensures that appropriate measures and processes are in place to manage identified environmental risks and provide for ongoing continual improvement. The use and development of Ryan Corner Wind Farm will be carried out in accordance with the endorsed EMP, in accordance with Condition 19 of the Planning Permit.

This EMP is based on relevant State and Commonwealth legislation. The most up to date legislation applies at the time of implementation of the EMP.

This EMP has also been prepared in accordance with the requirements of Condition 17, 18 and 19 of the Planning Permit and addresses both construction and operational phases of the Project. Condition 17, 18 and 19 and where the various requirements of the Condition are addressed in this EMP are detailed in **Table 1.1**.



Table 1.1 Permit Condition Requirements

<i>17 (a) Construction and Work Site Management Plan</i>		
Condition Requirement	EMP Reference	Comment
(i) procedures for access, noise control, dust emissions, spills and leaks from the handling of fuels and pollution management. Such procedures are to be undertaken in accordance with EPA Publication 480 Environmental Guidelines for Major Construction Sites and EPA Publication 275 Construction Techniques for Sediment Pollution Control;	Confirmation at the introduction of <i>Section 11 Construction and Worksite Management Plan</i> that the plan has particular consideration to the relevant EPA publications required by the planning permit condition. EPA publications are also referenced as relevant in <i>Table 11.1 Construction and Worksite Mitigation Measures</i>. Procedures for: Access: <i>Section 11.2 Site Access</i> and <i>Table 11.1</i> – refer to ‘Site Access’ Noise Control: <i>Section 11.8 Construction Noise Objectives</i> Dust Emissions: <i>Table 11.1</i> – refer to ‘Dust Management Procedure’. Spills and Leaks from the Handling of Fuels: <i>Table 11.1</i> – refer to ‘Spills and Leaks’. Pollution Management: <i>Table 11.1</i> – refer to ‘Air Quality’, ‘Waste’, and ‘Contamination’. Also refer to <i>Section 11.7 Contamination</i>	Spills and leaks from the handling of fuels: Note that <i>Table 11.1</i> references the <i>Hydrocarbon and Hazardous Substances Plan</i>. Also note that this plan references the EPA publications as relevant. EPA Publication 480 has been superseded by EPA Publication 1834. It is noted that Publication 1834 also supersedes Publication 960 (September 2004), Publication 981 (May 2005), Section 2 of Publication 1254 (October 2008) and Publication 1264 (November 2008).
(ii) the identification of all potential contaminants stored on site	<i>Section 11.5 Contamination Background</i> <i>Table 11.1 Construction and Worksite Mitigation Measures</i> – refer to ‘Contamination’. <i>Section 11.7.2 Unexpected Contamination Find Protocol</i>	
(iii) the identification of all construction and operational processes that could potentially lead to water contamination;	<i>Section 11.7.1 Construction and Operational Processes that could lead to Water Contamination</i>	
(iv) the identification of appropriate storage, construction and operational methods to control any identified contamination risks;	<i>Section 11.7 Contamination</i>	
(v) the identification of waste re-use, recycling and disposal procedures;	<i>Table 11.1</i> – refer to ‘Waste’, particularly ‘Avoidance and reuse’	



17 (a) Construction and Work Site Management Plan		
Condition Requirement	EMP Reference	Comment
(vi) appropriate sanitary facilities for construction and maintenance staff in accordance with the EPA Publication 891 Septic Tanks Code of Practice;	Table 11.1 – refer to ‘Waste’, particularly ‘Provision and disposal of sanitary facilities’	
(vii) procedures for construction vehicles and equipment to use designated tracks and works areas to avoid impacts on native vegetation;	Table 11.1 – refer to ‘Site Access’	
(viii) procedures to cover trenches and holes at night time and to fill trenches as soon as practical after excavation, to protect native fauna; and	Table 11.1 – refer to ‘Flora and Fauna’, particularly ‘Trenching’	
(ix) procedures for the removal of works, buildings and staging area on completion of construction of the project.	Section 11.4 Post-Construction Rehabilitation	

17 (b) Sediment, Erosion and Water Quality Management Plan		
<i>This plan must be prepared in consultation with the Glenelg-Hopkins Catchment Management Authority and other authorities as may be directed by the Minister for Planning. The plan must include:</i>		
Condition Requirement	EMP Reference	Comment
(i) procedure to ensure that silt from batters, cut-off drains, table drains and road works is retained on the site during and after the construction stage of the project. To this end: - all land disturbances must be confined to a minimum practical working area and to the vicinity of the identified works areas; - soil to be removed must be stockpiled and separate soil horizons must be retained in separate stockpiles and not mixed; and - stockpiles must be located away from drainage lines;	Annex C Procedures for silt management: Section 4.7 ‘Sediment Control’ Land disturbances: Section 4.4 ‘Erosion Control’ Soil Stockpiling: Section 4.4 ‘Erosion Control’ Stockpiles and drainage lines: Section 4.4 ‘Erosion Control’	



17 (b) Sediment, Erosion and Water Quality Management Plan		
<i>This plan must be prepared in consultation with the Glenelg-Hopkins Catchment Management Authority and other authorities as may be directed by the Minister for Planning. The plan must include:</i>		
Condition Requirement	EMP Reference	Comment
(ii) arrangements for the storage of fuel and chemicals in securely bunded areas during and after construction away from waterways and vegetation;	Annex C Section 6 'Other Pollution Control and Waste Management Measures'	
(iii) criteria for the siting of any temporary concrete batching plant associated with the development of the wind energy facility and the procedure for its removal and reinstatement of the site once its use finishes. The establishment and operation of any such temporary concrete batching plant must be designed and operated in accordance with the Environment Protection Authority Publication 628 Environmental Guidelines for the Concrete Batching Industry;	Annex C Section 6.2 'Concrete Batching Plant'	
(iv) the installation of geo-textile silt fences (with sedimentation basins where appropriate) on all drainage lines from the site which are likely to receive run-off from disturbed areas;	Annex C Section 4.3 'Staging of Works' and Section 4.7 'Sediment Control'	
(v) procedures to suppress dust from construction-related activities. Note: appropriate measures may include water spraying of roads and stockpiles, stabilising surfaces, temporary screening and/or wind fences, modifying construction activities during periods of heightened winds and revegetating exposed areas as soon as practicable;	Annex C Section 5 'Dust Management' Section 6.2 'Concrete Batching Plant' -- for procedures relating to the concrete batching plant	
(vi) procedures to ensure that steep batters are treated in accordance with Environmental Protection Authority Publication 275 Construction Techniques for Sediment Pollution Control;	Annex C Section 4.4 'Erosion control'	



17 (b) Sediment, Erosion and Water Quality Management Plan		
<i>This plan must be prepared in consultation with the Glenelg-Hopkins Catchment Management Authority and other authorities as may be directed by the Minister for Planning. The plan must include:</i>		
Condition Requirement	EMP Reference	Comment
(vii) procedures for waste water discharge management;	Annex C Section 6.2 'Concrete Batching Plant' as it relates to concrete batching plant Section 4.6 'Wastewater Management'	
(viii) a process for overland flow management to prevent the concentration and diversion of waters onto steep or erosion prone slopes;	Annex C Section 4.3 'Staging of Work'	
(ix) pollution management measures for stored and stockpiled materials including waste materials, litter and any other potential source of water pollution;	Annex C Section 6 'Other Pollution Control and Waste Management Measures' Section 4.5 'Stormwater Management' Section 4.6 'Wastewater Management'	
(x) incorporation of pollution control measures outlined in EPA Publication 480 Environmental Guidelines for Major Construction Sites;	Annex C Section 6 'Other Pollution Control and Waste Management Measures'	EPA Publication 480 has been superseded by EPA Publication 1834.
(xi) siting of concrete batching plant and any on-site wastewater and disposal and disposal treatment fields at least 100 metres from any watercourse;	Annex C Section 6.2 'Concrete Batching Plant'	
(xii) appropriate capacity and an agreed program for annual inspection and regular maintenance of any on-site wastewater management system constructed to service staff, contractors or visitors; and	Annex C Section 4.6 'Wastewater Management'	
(xiii) immediate remediation of localised erosion with a specified response time.	Annex C 8.1 'During Construction' 8.2 'Post Construction'	



17 (c) Blasting Plan		
<i>This plan is only required if blasting is proposed to be undertaken at the site as part of the construction of the wind energy facility. The plan must include the following:</i>		
Condition Requirement	EMP Reference	Comment
(i) Name and qualification of the person responsible for blasting;	<i>Section 13.4 Blasting Responsibility</i>	
(ii) A description of the location of where the explosives will be used, and the location of every licensed bore on any property with an adjoining boundary within 1km of the location of the blasting;	<i>Table 13.1 Blasting Mitigation Measures</i>	
(iii) A requirement for the identification and assessment of any potentially sensitive site within 1km of the location of the blasting, including the procedure for pre-blast and post-blast qualitative measurement or monitoring at such site;	<i>Section 13.2 Sensitive Receivers and Buffer Distances</i> <i>Table 13.1 Blasting Mitigation Measures</i>	
(iv) The procedure for site clearance and post blast reoccupation;	<i>Section 13.6 Site Clearance and Post-Blast Reoccupation Protocol</i>	
(v) The procedure for the storage and handling of explosives;	<i>Table 13.1 Blasting Mitigation Measures</i>	
(vi) A requirement that blasting only occur after at least 24 hours prior notification in writing of the intention to undertake blasting has been given to all adjoining neighbours of the proposal with a property boundary within 1km of the location of the proposed blasting; and	<i>Table 13.1 Blasting Mitigation Measures</i>	
(vii) A requirement that blasting only be undertaken between the hours of 8am and 4pm.	<i>Section 13.3.3 Time of Blasting</i>	

17 (d) Hydrocarbon and Hazardous Substances Plan		
<i>The plan must include:</i>		
Condition Requirement	EMP Reference	Comment
(i) procedures for any on-site storage of fuels, lubricants or waste oil to be in bunded areas; and	<i>Table 12.1 Hydrocarbon and Hazardous Substance Mitigation Measures – refer to Hydrocarbon and Hazardous Substance Use and Prevention of Hydrocarbon and Hazardous Substance Spillages</i>	
(ii) contingency measures to ensure that any chemical or oil spills are contained on-site and cleaned up in accordance with Environment Protection Authority requirements.	<i>Section 12.3 Hydrocarbon/Chemical Spill Response Process</i>	



17 (e) Bushfire Prevention and Emergency Response Plan		
<i>Prepared in consultation with the Country Fire Authority and Moyne Shire to the satisfaction of the Minister for Planning. This Plan must include</i>		
Condition Requirement	EMP Reference	Comment
(i) criteria for the provision of static water supply tanks solely for fire fighting purposes, including minimum capacities, appropriate connections and signage,	Annex I Point 16 (Page 9) Point 17, 18 (Page 10)	
(ii) criteria for access to static water supply tanks for fire fighting vehicles;	Annex I Point 12 - 15 (Page 9)	
(iii) procedure s for vegetation management, fuel control and the provision of fire fighting equipment during declared fire danger periods;	Annex I Point 1 – 3 (Page 8) Point 8 – 9 (Page 8) Point 10 - 11 (Page 9) Point 19 – 21 (Page 10)	
(iv) minimum standards for access roads and tracks to allow access for fire fighting vehicles;	Annex I Point 4 - 8 (Page 8)	
(v) the facilitation by the operator, before or within 3 months after the commencement of the operation of the wind energy facility, of a familiarisation visit to the site and explanation of emergency services procedures for the Country Fire Authority, Rural Ambulance Victoria, Moyne Shire Council's Municipal Emergency Management Committee and Victoria Police;	Annex I Point 43 (Page 12)	
(vi) subsequent familiarization sessions for new personnel of those organisations on a regular basis and/or as required ; and	Annex I Point 44 (Page 12)	
(vii) if requested, training of authority personnel in relation to suppression of wind energy facility fires.	Annex I Point 45 (Page 12)	



17 (f) Archaeological Management Plan		
<i>This plan must include:</i>		
Condition Requirement	EMP Reference	Comment
(i) procedures to ensure that before any buildings or works commence in association with the development, the identified non-Aboriginal heritage locations identified in the Archaeological/ Cultural Heritage Assessment undertaken by ERM, August 2006 in Supplementary Reports, Volume 2 of the Ryan Corner Wind Farm Environment Effects Statement and Application for Planning Permit (Gamesa Australia/TME Australia, October 2006), are protected from any buildings and works in accordance with the recommendations contained in the Cultural Heritage Assessment; and	Annex F Section 6.1.2 'Recommendations to Avoid Harming Aboriginal Cultural Heritage' Section 6.1.3 'Recommendations to Minimise Harming Aboriginal Cultural Heritage'	The Archaeological Management Plan is referred to as the Cultural Heritage Management Plan which has been endorsed and remains unchanged.
(ii) protocols for the activities of construction contractors on site, which have been identified to have potential effects on sites of cultural significance.	Annex F Section 6.1.7 'Recommendations for Cultural Heritage Awareness Training'	The Archaeological Management Plan is referred to as the Cultural Heritage Management Plan which has been endorsed and remains unchanged.

17 (g) Pest Animal Management Plan		
<i>To be prepared in consultation with the Department of Economic Development, Jobs, Transport and Resources. This plan must include:</i>		
Condition Requirement	EMP Reference	Comment
(i) procedures for the control of pest animals, particularly by negating opportunities for the sheltering of pests; and	Annex G Section 6 'Management Actions'	
(ii) follow-up pest animal control for all areas disturbed by the wind energy facility construction works for a period of two years following the completion of the wind energy facility	Annex G Section 7 'Monitoring and Reporting'	

17 (h) Pest Plant Management Plan		
<i>including</i>		
Condition Requirement	EMP Reference	Comment
(i) procedures to prevent the spread of weeds and pathogens from earth moving equipment and associated machinery including the cleaning of all plant and equipment before transporting to the site and the use of road making material comprising clean fill that is free of weeds;	Annex H Section 6 'Weed Management Plan'	



17 (h) Pest Plant Management Plan		
including		
Condition Requirement	EMP Reference	Comment
(ii) sowing of disturbed areas with perennial grasses; and	Annex H Section 6.4.1 'Management Actions'	
(iii) a protocol to ensure follow-up weed control is undertaken on all areas disturbed through construction of the wind energy facility for a minimum period of 2 years following completion of the works.	Annex H Section 7 'Monitoring and Reporting'	

Condition Requirement	EMP Reference	Comment
17 (i) A training program for construction workers and permanent employees or contractors at the wind energy facility site including a site induction program relating to the range of issues addressed by the Environmental Management Plan.	<i>Section 5 Training, Competency and Awareness</i>	
17 (j) A program for reporting including a register of environmental incidents, non-conformances, complaints and corrective actions.	<i>Section 7 Performance Evaluation and Reporting</i>	
17 (k) A timetable for implementation of all programs and works identified in a plan referred to in conditions 13 (a) to (j) above.	<i>Section 2.2.1 Timetable for Implementation</i>	
18 The Environmental Management Plan must be reviewed and if necessary amended, in relation to matters pertaining to the continued operation of the wind energy facility, in consultation with the Moyne Shire Council and where relevant DELWP Environment Portfolio to the satisfaction of the Minister for Planning every 5 years to reflect operational experience and changes in environmental management standards and techniques and must be submitted to the Minister for Planning for re-endorsement.	<i>Section 10 Review and Improvement of the EMP</i>	
19 The use and development must be carried out in accordance with the endorsed Environmental Management Plan.	<i>Section 1.1 Purpose of the EMP</i>	



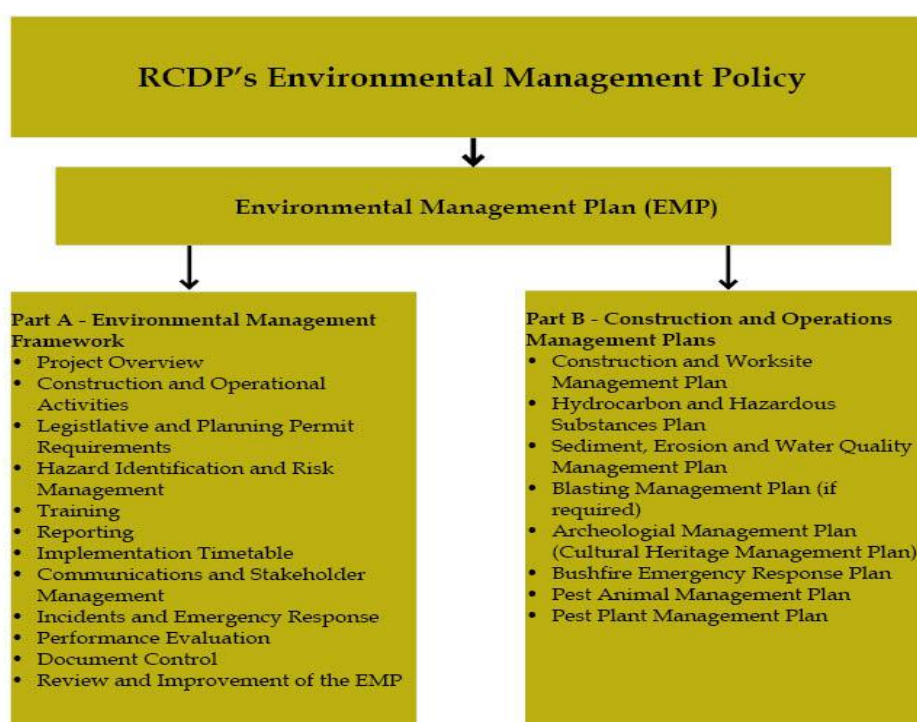
In accordance with Condition 18 of the Planning Permit, the EMP will be reviewed and if necessary amended, in relation to matters pertaining to the continued operation of Ryan Corner Wind Farm, in consultation with the Moyne Shire Council and where relevant Department of Environment, Land, Water and Planning (DELWP) Environment Portfolio to the satisfaction of the Minister for Planning every 5 years to reflect operational experience and changes in environmental management standards and techniques. The reviewed and amended EMP will be submitted to the Minister for Planning for re-endorsement.

Evidence of consultation with the relevant stakeholders as per the wording of Condition 17 will be made available to DELWP upon lodgement of this document for endorsement..

1.2. THE STRUCTURE OF THE EMP

This EMP has been prepared to address Project related environmental risks. The EMP establishes a framework to implement an integrated set of management plans prepared for the construction and operational phases of the Project (refer to **Figure 1.1**).

Figure 1.1 Framework for Environmental Management



This EMP has two parts. Part A sets out the environmental management framework that applies to both operation and construction phases of the Project. It details approaches and procedures for:

- project overview;
- construction and operational activities;
- legislative and planning permit requirements;
- hazard identification and risk management;
- training;



- reporting;
- implementation timetable;
- communications and stakeholder management;
- incidents and emergency response;
- performance evaluation;
- document control; and
- review and improvement of the EMP.

Part B incorporates the Construction and Operational Management Plans, also referred to as the EMP sub-plans, to be implemented during construction and operation of the Project. Part B addresses the specific requirements of the Planning Permit, other legislative obligations and environmental mitigation measures established in the EES and from the Project risk assessment. The Construction and Operational Management Plans include:

- Construction and Worksite Management Plan;
- Hydrocarbon and Hazardous Substances Plan;
- Sediment, Erosion and Water Quality Management Plan;
- Blasting Management Plan (if blasting is to be undertaken as part of the Project);
- Bushfire Preparedness and Emergency Response Plan;
- Archaeological Management Plan (Cultural Heritage Management Plan);
- Pest Animal Management Plan; and
- Pest Plant Management Plan.

All the management plans have been prepared giving consideration to relevant legislative obligations and the outcomes of the Project risk assessment.

1.3. CONTRACTOR ENVIRONMENTAL MANAGEMENT PLAN

The appointed Principal construction contractor will prepare their own Contractor Environmental Management Plan (CEMP) to comply with the requirements of this EMP. The plan will extract the relevant parts of this EMP specific to the Balance Of Plant (BOP) contractor and Supply and Install contractor respectively during the phases of the project where they are each Principal Contractor. The plan will be reviewed and accepted by RCDP for use in terms of compliance with the Management Plan and the Planning Permit.

1.4. ORGANISATIONAL RESOURCES, ACCOUNTABILITIES AND RESPONSIBILITIES – CONSTRUCTION PHASE

RCDP is accountable for implementation of the EMP during construction. Both RCDP and the appointed Principal Contractor will share some responsibilities for the implementation of the EMP during the construction phase.



All site staff have responsibilities and authorities in relation to environmental management including:

- the right and authority to stop work or refuse to work in a situation that may cause environmental harm;
- duties and responsibilities to prevent pollution; and
- obligations to respond to environmental incidents, including their prevention, clean-up and reporting.

These, and other general obligations, are included in the site induction (see **Section 5.1**). Persons with specific environmental responsibility are detailed in **Figure 1.2** and **Table 1.2**.

Environmental consultants may be commissioned by RCDP as required to provide specialist input and advice on environmental matters, undertake surveys, inspections and monitoring. Consultants may also be required to prepare environmental reports in consultation with the Principal Contractor.

All contractors, sub-contractors and personnel are accountable through conditions of employment or contractual arrangements for ensuring that their work complies with the stated EMP framework and procedures.

The position duties and responsibilities of key staff will be defined in position descriptions, a copy of which is held by the RCDP Construction Project Manager.

Figure 1.2 Organisations Structure – Construction Phase

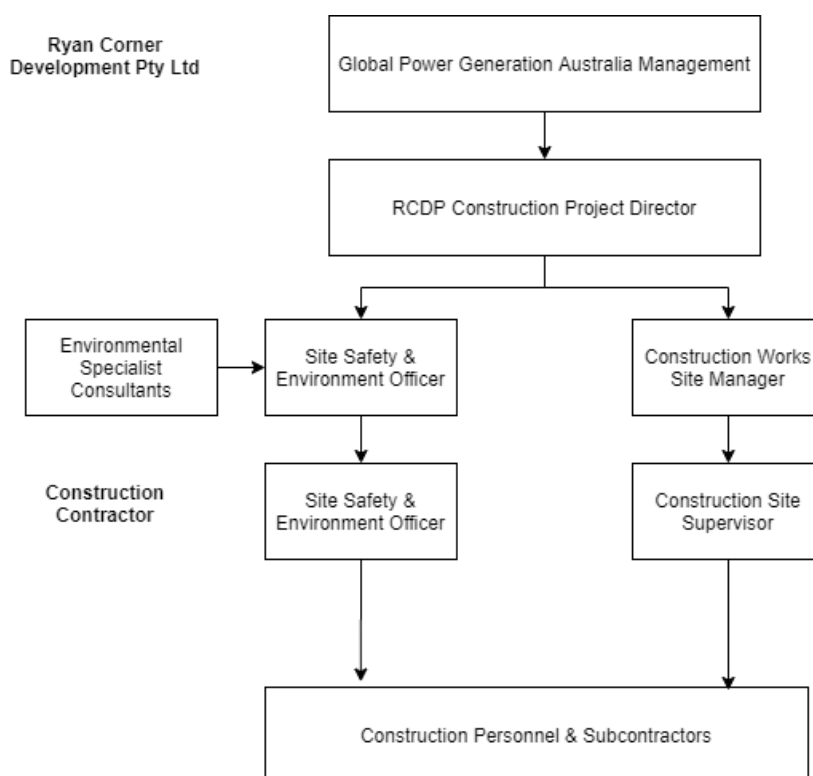




Table 1.2 Roles and Responsibilities – Construction Phase

Role	Responsibilities
RCDP Group Management	Group management is accountable for the management of all risk (including environment) during the delivery of the Project. Group management is responsible for adequately allocating sufficient resources (personnel, financial and technical) to manage environmental risks.
RCDP Construction Project Director	The Principal Contractor's Construction Director is responsible for: - ensuring adequate environmental resources and budget is allocated to the Project; - ensuring that the Environmental Management Plan (EMP) has been implemented and all hazards and risks associated with construction works to be carried out have been identified and effective control measures implemented throughout the Project. The Construction Director has overall responsibility to ensure corrective actions are implemented for issues raised and all community complaints are closed out. Authority must be given for: - internal approval of any updates to the EMP prior to any resubmission to the responsible authority for endorsement; and - dismissal of personnel if required for safety and environmental non-compliance.
RCDP Site Safety & Environment Officer	The Site Safety and Environment Officer is responsible for ensuring the project proceeds without health, safety and environmental risk to the persons, environment and property involved in the completion of the works. Authority might be given for stopping work if unacceptable impact is likely, or has occurred. The Site Safety and Environment Officer will be responsible for the management of all complaints received. This includes: - responding to the calls of the 1800 phone number and following up any messages left with community members; - responding to any email or postal complaints received; - coordination of appropriate corrective actions in response to the complaint; and - completion of the Community Complaints Form and updating of the Complaints Register. The Site Safety and Environment Officer will also: - ensure that all Project environmental obligations are met; - ensure no work requiring a licence or permit is undertaken without the (up to date) licence or permit required; - complete environmental inspections and checklists; - provide input and advice to engineers on work method statements; - provide environmental induction and training; - identify and prepare environmental induction and training materials; - liaise with government agencies and relevant stakeholders; - provide a regular construction program identifying critical construction activities to the EMR; - manage the environmental budget; - respond to environmental incidents; - manage environmental sub-consultants; - oversee the maintenance of environmental documents; - prepare reports on compliance; and - monitor the revegetation activities along the Project route.
RCDP Construction Works Site Manager	The Construction Works Site Manager is responsible for ensuring the implementation of relevant CEMP plans and associated environmental controls.
Contractor Site Safety & Environmental Officer	The Contractor Site Safety and Environment Officer is responsible for ensuring that all works are performed safely and in an environmentally sound manner. The key responsibilities are to:



Role	Responsibilities
	- liaise with designers and the construction manager with regard to construction program and activities on-site; - provide input to the CEMP and plans prior to the start of construction; - implement the Project environmental management plan; and - maintain, assess and monitor the effectiveness of EMP for controlling environmental risk. - secure the workplace and restrict unauthorised access to site.
Contractor Construction Site Supervisor	The Contractor Construction Site Supervisor is responsible for ensuring the implementation of all plans and associated environmental controls.
Personnel	All construction employees are equally responsible for safety and environment management at the work sites. Specifically, they will support the hazard identification and risk management process by: - identifying the hazards; - evaluating the risks; - implementing the control measures; and - evaluating and monitoring the controls.

1.5. ORGANISATIONAL RESOURCES, ACCOUNTABILITIES AND RESPONSIBILITIES – OPERATIONAL PHASE

A range of personnel will be involved in the environmental management of the operation of the RCWF. All site staff have responsibilities and authorities in relation to environmental management including:

- The right to stop work or refuse to work in a situation that may cause environmental harm
- Duties and responsibilities to prevent pollution
- Obligations to respond to environmental incidents, including their prevention, clean-up and reporting.

Persons with specific environmental responsibility are detailed in **Table 1.3**.

Table 1.3 Roles and Responsibilities – Operational Phase

Personnel	Responsibilities	Authority to
Plant Manager (Located onsite and remotely)	- Ensure Environmental Policy is communicated throughout business. - Responsible for providing the required resources to complete the required tasks and to facilitate company corporate support. (Resources financial, technical and management external resources). - Develop and implement objectives and targets for environmental and safety management. - Maintain Management Systems. - Oversee the implementation of all environmental management plans and monitoring programs required under the planning approval - Determining sequence and interaction of staff, resources and processes - Ensure communications and reporting framework in place - Ensure the goals of the EMP (and sub-plans) are achieved and maintained	All aspects of the environmental performance of the project. To update EMP and implement upon Department/Agency Approval Stop Work orders



Personnel	Responsibilities	Authority to
	- Report incidents to agencies - Ensure mitigation plans are appropriate and resourced - Reviews EMP and, if it is necessary, make changes to EMP and communicate to relevant stakeholders - Communication with stakeholders including agencies, public and other identified stakeholders - Manages environmental compliance obligations and any consultants required in relation to this work - Designs and Implements environmental induction - Approves SWMS & JSEA's - Delegates to Site Manager	
Site manager (located on site full time)	- Responsible for delivery of operational and maintenance activities, including routine and non-routine maintenance works. - Responsible for implementing the EMP in relation to operate and maintenance activities - Ensure all activities on site are undertaken in accordance with the EMP, sub-plans and Safety Management Plan - Reporting of environmental incidents - Ensure management measures relating to wind farm performance are maintained - Responsible for ensuring any subcontractors engaged in relation to this project are inducted and the EMP (and sub-plans) are implemented. - Identifies all environmental and safety risks associated with operate and maintenance works - Creates /reviews SWMS and JSEAs for operational staff and contractors - Reports incidents to agencies. - Maintains site records - Ensure inductions and training are completed in accordance with the EMP and sub-plans - Ensure environmental impacts are minimised and environmental obligations set out in the EMP and sub-plans are met - Ensure that environmental auditing is undertaken in accordance with all relevant project Environmental Management Systems and Safety Management System and their associated ISO standards (where applicable).	Limit and stop works
Environmental Auditor (Located remotely with periodic site visits)	- Audit the implementation of all environmental management plans and monitoring programs required under the planning approval, in accordance with the auditing program - Consider and advise the Proponent on its compliance obligations against all matters	Require environmental actions to be undertaken



Personnel	Responsibilities	Authority to
	specified in the conditions of the planning approval and all other licenses and approvals related to the environmental performance and impacts of the project, including General Environmental Duty under the EP Act • Ensure that environmental auditing is undertaken in accordance with all relevant project Environmental Management Systems • Be given the authority and independence to require reasonable steps be taken to avoid or minimize unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.	



2. PROJECT OVERVIEW

The Project is located in south-west Victoria approximately 12 km north-west of Port Fairy. The site is bounded by Youls Road to the west, Shaw River and Riverside Road to the north, Hamilton-Port Fairy Road to the east and Fingerboard Road and Smittens Road to the south.

2.1. THE RYAN CORNER WIND FARM PROJECT

The Project will involve the installation of up to 52 turbines, capable of generating up to 796,691 MWh of electricity per annum.

The main components of the Project are:

- 52 Wind Turbine Generators (WTGs);
- a 33/132 kV on-site substation;
- underground/overhead electrical cable network, linking each turbine to the substation;
- external connection to the national electricity grid, through on-site and off-site electrical substations and associated power line connection;
- a control room/facilities building;
- two site access points (Youls Road and Hamilton-Port Fairy Road);
- a network of internal access tracks; and
- wind monitoring towers (temporary).

Annex A shows the location of the Ryan Corner Wind Farm.

Annex B shows the layout of the proposed 52 wind turbines, nearby houses, surrounding roads and waterways.

2.2. CONSTRUCTION PHASE (ACTIVITIES AND TIMETABLE)

The construction activities of the Project are set out in **Table 2.1**.

Table 2.1 Construction Activities

Activity	Works Required
Site Establishment	Clearing of work areas, levelling and compaction, installation of portable buildings and installation, any remaining topographical/feature site survey, connection of utility services, implement control of native vegetation and habitat protection no-go zones, and cultural heritage sites no-go zones as per respective management plans.
Internal Road Works (access roads)	Removal of topsoil, levelling, sub-base compaction, gravel and drainage.
External Road Works	Upgrade existing roads as per the Traffic Management Plan. Provide access upgrades to the site (for over dimension vehicles).
Foundations	Removal of topsoil, excavation, screed concrete, reinforcement steel bottom, installation of foundation ring, reinforcement steel top, concreting, concrete ring and conduits and backfilling.
Concrete Batching Plant	Removal of topsoil, levelling, installation of plant, hardstand, bunding and wastewater recycling facility.
Crane Pad Establishment	Removal of topsoil, base compaction and rock/gravel compaction.



Activity	Works Required
Trenches	Excavation, sand infill, conduit installation, backfilling and compacting and installation of cable route markers.
Substation Civil Works	Site survey, site clearing and levelling/compaction. Building foundations including excavation, formwork and concrete. Installation of columns, walls, roof, gutters, doors and floors. Installation of building services including plumbing, electrical, fire protection and security.
Control Building	Foundation works including excavation, formwork, reinforcement and concreting. Installation of columns, walls, carpentry, roof, floors and doors. Installation of services including plumbing, electrical, fire protection, air conditioning and security.
Switchyard Works	Site survey, site clearing and levelling/compaction. Equipment foundations including excavation, formwork, reinforcement steel, concrete and grouting. Oil containment and separation system including excavation, formwork, concrete, ladders, hatches, pipes and bund walls. Security fencing.
Electrical Works	Control building switchboards, communications and supervisory control and data acquisition (SCADA) systems. Installation of cabling, switchgear, turbine control panels.
Turbine Supply	Transport of towers, nacelles, hubs and blades to site.
Turbine Erection	Erection of towers, nacelle, blades and installation of cabling.
Substation Electrical Works	Installation of steel structures, busbars, transformers, equipment, earthing system and metering system.
Transmission Line Works	Surveying, site establishment, clearing, installation of foundations, poles / towers, conductors and fittings.
Wind Farm Commissioning	Pre-commissioning of turbines, SCADA, cables testing and optical fibre. Testing and commissioning of turbines, switchgear and SCADA.
Substation Commissioning	Testing and commissioning of transformers, equipment, earthing, cabling and wiring checks, protection relays, SCADA, communications and security systems.
Connection to the existing grid connection point (Tarrone)	Site establishment, clearing and levelling/compaction. Installation of 132/500kv power transformer, 132kv busbar and connection to existing bay at Tarrone terminal station
Construction Closure	Site cleanup, revegetation and landscaping.

2.2.1. TIMETABLE FOR IMPLEMENTATION

It is estimated that the whole construction period including preparatory works and site rehabilitation will take approximately 17 months from site preparation to completion. The typical timelines for construction of the principal elements of the wind farm are as follows:

- access roads – 18 weeks;
- foundations – 24 weeks;
- hardstands – 24 weeks
- wind turbine erection – 24 weeks;
- electrical works (cabling & substation) – 40 weeks; and
- commissioning and rehabilitation – 18 weeks.



Moyne Shire Council will be provided with the construction schedule and any revisions to it should any significant changes occur to it. Significant changes would comprise delays in achieving planning approvals and therefore commencement of development, delays (minimum 1 month) in achieving a construction milestone or delays (minimum 1 month) in commencing a construction stage.

A timetable for implementation of all programs and works identified in the EMP (and its sub-plans) is provided in Annex J. The timetable has been prepared on the assumption that construction on site will commence on 26 April 2022. This timetable has been provided as at 21 April 2022 and will be a live document, continuously updated by RCD based on progress made on site.

2.2.2. HOURS OF WORK

According to EPA Victoria Publication 1834, November 2020 “Civil Construction Building and Demolition Guide,” **normal working hours** for construction of major projects, including power facilities, are:

- Normal Working Hours:
 - Monday to Friday: 7am to 6pm
 - Saturday: 7am to 1pm
- Outside of normal working hours:
 - Monday to Friday: 6pm to 10pm
 - Saturday: 1pm to 10pm
 - Sunday (& public holidays): 7am to 10pm

To significantly reduce the overall duration of the construction period of RCWF, it will be necessary to work both **normal working hours** and some periods of outside of normal work hours. Undertaking civil works on Sunday has been calculated to reduce the overall construction period by approximately 3 to 5 months.

The **work hours** for RCWF are approved by Moyne Shire Council in the Traffic Management Plan and are as follows:

- Proposed RCWF Work Hours:
 - Monday to Friday: 7am to 6pm
 - Saturday: 7am to 4pm (noting 1pm to 4pm is outside of normal working hours)
 - Sunday: 7am to 1pm (noting 7am to 1pm is outside of normal working hours)

Works occurring outside of normal working hours as defined by EPA guidelines will be restricted to **managed impact works** or **low noise impact works** as defined in the EPA guidelines.

Undertaking civil works on Sundays will be required for a 6-month period following site establishment. External Roads upgrades will not occur on Sundays.

Controls for **outside of normal working hours** activities will include:

- No heavy vehicle delivery of materials to site
- Works restricted to within the site, and away from residential dwellings
- No inherently noisy works (blasting, rock breaking, concrete pours, etc) during out of normal working hours
- Access to the wind farm on Sundays to occur only via Hamilton-Port Fairy Road
- Compliance with a noise and vibration management plan..



Measurable objectives and targets have been established (refer to **Table 11.2 and Section 11.8**) and a thorough Noise and Vibration Management Plan has been developed.

2.2.2.1. Exceptions to Proposed RCWF Work Hours

It is acknowledged that some activities will be required to occur outside of RCWF general work hours outlined above. These works will include:

- Wind turbine foundations concrete pours
- Civil works during summer months
- Delivery of Over Size Over Mass (OSOM) components
- Installation of wind turbines

2.2.2.2. Foundation Concrete Pours

The proposed extended construction hours relating to foundation concrete pours will occur between 5am – 9pm, up to 3 days a week, for a period of 6 months.

Foundation concrete pours will not occur on the weekends.

Refer to the Construction and Worksite Management Plan included in **Section 11** for more detail on concrete pouring and the associated requirements for extended construction hours.

2.2.2.3. Civil Works during summer months

It is anticipated that the bulk of the civil works will be completed during the summer daylight saving time months. To take full advantage of the good weather and longer days, it is proposed that Monday to Friday construction work hours may be extended up until 10pm on occasion to accelerate works and reduce the overall construction duration of the project. Works after 6pm would be subject to outside of normal working hours restrictions with only managed impact works or low noise impact works able to be performed.

2.2.2.4. Delivery of OSOM Equipment

The timing of delivery of OSOM equipment will depend on the conditions placed on the National Heavy Vehicle Register (NVHR) Permit. NHVR Permit is expected to require delivery of OSOM equipment to site before sunrise. OSOM equipment will be delivered to site under escort and be parked up until Normal Working Hours to be unloaded on site. This can be done on Monday to Saturday, with no deliveries on Sunday. Component deliveries depend on installation activities and are expected to occur over a period of 6 months.

Construction activities will generally occur during the hours of 7:00am and 6:00pm Monday to Friday, 7:00am to 4:00pm Saturdays and 7:00am to 1:00pm Sundays and no time on public holidays. Extended working hours on Mondays to Fridays may be required for certain activities. Refer to **Section 11.1** of the EMP for more detail.

2.2.3. PROPERTY ACCESS

RCDP and the Construction Contractor will, prior to the commencement of construction, consult with each landholder whose property is directly impacted by the Project regarding the terms and conditions relating to access arrangements for construction activities on their land.

Primary access routes to and from properties will be kept open for the duration of construction works or alternative access will be provided to landholders.



2.3. OPERATION PHASE (ACTIVITIES AND TIMETABLE)

The Ryan Corner Wind Farm is designed to operate automatically using a computerised (SCADA) system. Notwithstanding, the SCADA will be supervised by between four and ten operating staff during normal week-day business hours. Once normal operational conditions are achieved, one staff member will attend the site permanently. In addition, the wind farm will be supported by continuous out-of hours monitoring with local 'on-call' staff available to respond to operational problems and alarms from computerised systems.

The SCADA system will monitor and control all functions of the turbines to ensure that they are operating at optimum performance within the wind speed design envelope. The nature of wind energy is that it is not always suitable for operation of a wind farm. The wind speed may be too low to turn the blades at sufficient speed to generate power, or too strong for safe operation. Hence, the rotational speed and the angle of the wind-turbines will be automatically modified to maximise overall efficiency.

Maintenance requirements depend on the number and design of the turbines as well as the turbine supplier. Typical maintenance activities will include:

- monthly maintenance of each turbine generator and electrical infrastructure;
- routine scheduled maintenance every six months, involving inspection of all machinery, greasing of bearings and checking of hydraulic oil etc.;
- replacement of gearboxes after approximately 10 years;
- periodic painting of the tower structure (the fibreglass nacelle and blades are not expected to require repainting within the lifetime of the Project);
- minor maintenance including the replacement of electronic and electrical components;
- maintenance of tracks and parking areas, and other site infrastructure such as drainage and erosion control structures, to ensure that access is available to all structures; and
- routine maintenance of the substation, such as insulator cleaning, removal of debris from the switchyard and greasing of contacts.



3. LEGISLATIVE AND PLANNING PERMIT REQUIREMENTS

The overarching legislation for the planning and environmental approvals associated with the Project was determined by the Victorian Government under the *Environment Effects Act 1978*, the *Planning and Environment Act 1987*, and the Moyne Shire Planning Scheme. The responsible authority for the administration and enforcement of the Planning Permit is Moyne Shire Council.

3.1. LEGISLATIVE FRAMEWORK

In identifying, understanding and complying with the legislative requirements, RCDP and the future construction contractor and operations staff will initially refer to the legislative requirements outlined below in **Table 3.1**. The general environmental legislative framework relevant to the Project has been outlined along with the associated agencies responsible for the administration of the legislation.

Table 3.1 Legislative Framework

Legislation	Applicability to Project	Administrative Authority
<i>Environment Protection and Biodiversity Conservation Act 1999</i>	Provides for the protection of the environment, especially those aspects of the environment that are matters of national environmental significance. The Project was determined as a <i>not controlled</i> action.	Department of Agriculture, Water and the Environment
<i>Environment Effects Act 1978</i>	The Victorian <i>Environment Effects Act 1978</i> provides for the environmental impact assessment of proposals with potentially significant effects. The Act sets up a procedure for the potential environmental impacts of a proposed development to be carefully assessed before any decision is made on the development. The Minister for Planning has sole discretion for determining whether a project requires an EES, the mechanism by which the Act is implemented. The EES for the Project has been endorsed by the Minister for Planning.	The Minister for Planning
<i>Planning and Environment Act 1987</i> and Moyne Planning Scheme	The purpose of the <i>Planning and Environment Act 1987</i> is to establish a framework for planning the use, development and protection of land in Victoria in the present and long-term interests of all Victorians. The <i>Planning and Environment Act 1987</i> requires that a planning framework, termed a Planning Scheme, be established for all land within Victoria. A planning scheme is a statutory document which sets out objectives, policies and provisions relating to the use, development, protection and conservation in the area to which it applies, which in this case is the Moyne Shire Council. The Minister for Planning granted Planning Permit No. 20060222 for the Project in August 2008 and an amended Planning Permit No. 20060222-A on 21 December 2017.	Minister for Planning, Moyne Shire Council



Legislation	Applicability to Project	Administrative Authority
<i>Flora and Fauna Guarantee Act 1988</i>	The <i>Flora and Fauna Guarantee Act 1988</i> is designed to protect flora and fauna on Crown land. A permit is required from DELWP for activities on public land which might kill, injure or disturb protected native plants and animals. A permit will be required where native vegetation is proposed to be removed on Crown lands at the site, potentially in areas where existing roads are to be widened/ improved at the access points onto the site, and at the track crossing of Harris Road. A permit under the <i>Flora and Fauna Guarantee Act 1988</i> will be obtained prior to works commencing.	Department of Environment, Land, Water and Planning
<i>Wildlife Act 1975</i>	The <i>Wildlife Act 1975</i> is the primary legislation in Victoria providing for protection and management of wildlife. Approval under the Act is required to remove or destroy wildlife which is in a prescribed category under the <i>Flora and Fauna Guarantee Act 1988</i>.	Department of Environment, Land, Water and Planning
<i>Environment Protection Act 2017</i> <i>Environment Protection Regulations 2021</i> - Environment Reference Standard	The <i>Environment Protection Act 2017</i> (EP Act 2017) requires that a Permission be obtained from the Environment Protection Authority (EPA) to establish scheduled premises. Such premises are specified in the <i>Environment Protection Regulations 2021</i>. The development does not require a permission under the regulations, but the proponent must comply with a General Environmental Duty to conduct operations in a manner that minimises risk of environmental harm as far as reasonably practicable. The Environment Reference Standard (ERS) is a tool made under the EP Act 2017. The ERS identifies environmental values that the Victorian community want to achieve and maintain and provides a way to assess those environmental values in locations across Victoria. The ERS is a reference tool and does not: - Create specific obligations to be followed - Set out enforceable compliance limits - Describe levels that is okay to pollute up to. Instead of using standards to create obligations or set limits, the EP Act 2017 requires everyone to adopt a General Environmental Duty, explained in Section 3.2 below. The ERS will be used as a reference standard to report on environmental conditions during construction.	Environment Protection Authority
<i>Water Act 1989</i>	The <i>Water Act 1989</i> provides Water Authorities with a range of enforcement powers and imposes obligations on persons and organisations not to interfere with assets of Water Authorities, waterways and water. A permit is required for construction activities interacting with waterways.	Glenelg Hopkins Catchment Management Authority



Legislation	Applicability to Project	Administrative Authority
<i>Catchment and Land Protection Act 1994</i>	The purpose of the <i>Catchment and Land Protection Act 1994</i> includes to set-up a framework for the integrated management and protection of catchments, to encourage community participation in the management of land and water resources and to set up a system of controls on noxious weeds and pest animals.	Department of Jobs, Precincts, and Regions
<i>Heritage Act 2017</i>	The <i>Heritage Act 2017</i> establishes a legislative framework for heritage protection in Victoria.	Heritage Victoria
<i>Crown Land (Reserves) Act 1978</i>	The <i>Crown Land (Reserves) Act 1978</i> covers a range of government owned land which includes National and other parks, State forests, and public purpose reserves. Approval will be required from the Moyne Shire Council to undertake all road construction works. Similar approvals will also be required for other road improvement works (e.g. Youls Road and Hamilton–Port Fairy Road).	Department of Environment, Land, Water and Planning and Moyne Shire Council
<i>Aboriginal Heritage Act 2006</i> (as amended 2016)	The <i>Aboriginal Heritage Act 2006</i> replaces Part IIA of the <i>Aboriginal and Torres Strait Islander Heritage Protection Act 1984</i> (Comm.) and the <i>Archaeological and Aboriginal Relics Preservation Act 1972</i> (Vic.). The new Act allows for greater protection of Aboriginal cultural heritage and permits increased Aboriginal community involvement in the decision making process. In accordance with the Act, a Cultural Heritage Management Plan has been prepared and approved for the Project. In the event that any Aboriginal sites are discovered, consent will be required to disturb such sites in accordance with the <i>Aboriginal Heritage Act 2006</i> .	Department of Premier and Cabinet
<i>Renewable Energy (Jobs and Investment) Act 2017</i> (Vic)	The <i>Renewable Energy (Jobs and Investment) Act 2017</i> (Vic) promotes the development of renewable energy generation. This Act established a scheme that provides for the creation and acquisition of renewable energy certificates by large electricity consumers or retailers and requires the surrender of these certificates to demonstrate that renewable energy has been generated.	Department of Environment, Land, Water and Planning
1. Applicable legislation will be reviewed and confirmed, and any necessary approvals sought prior to commencement of construction and operation. 2. A range of other legislative obligations may be applicable to the construction/operation phases of the Project. This table intends to highlight those key legislative obligations relevant to the Project.		



3.2. GENERAL ENVIRONMENTAL DUTY (GED)

Businesses are responsible for protecting the environment and human health. As stated by the EPA:

Activities at businesses in different locations can cause pollution and waste. The combined effect can have an impact on human health and the environment.

The general environmental duty (GED) is at the centre of the Environment Protection Act 2017 and it applies to all Victorians. You must reduce the risk of harm from your activities:

- to human health and the environment
- from pollution or waste.

This means the approach to protection of human health and the environment has changed. The expectation is that you will manage your activities to avoid the risk of environmental damage. You must also respond if pollution does occur.

RCDP is fully aware that under the GED, the onus for the protection of human health and the environment is on the business itself i.e. in this case the Project and its employees/contractors. Collectively it has given due regard to Project risks and the degree of potential harm, and has actual and reasonable knowledge of those risks of harm and suitable ways to eliminate/reduce the risk of harm.

In preparing this EMP an iterative approach was taken following an 'As Low As Reasonably Practicable' (ALARP) process to assist in identifying potential sources of harm, evaluate these and then identify harm avoidance, reduction and management measures. This approach occurred over a period of 12 months (in revising the EMP endorsed in 2012) and was informed by:

- a) RCDP's existing knowledge of wind farm management,
- b) inputs from technical experts,
- c) inputs from environmental consultants, and
- d) consultation with relevant stakeholders.

In finalising the EMP, regard has been given to EPA Publication 1741 *Industry guidance: supporting you to comply with the general environmental duty* (October 2020). By implementing the EMP during the wind farm's construction and operational phases the intent of the GED will be met, such that risks are minimised and harm is avoided, or where harm does occur a response is provided.

The GED is general in nature, however this EMP identifies objectives, targets and key performance indicators (KPIs) that will be used to evaluate the Project's performance against achieving the intent of the GED. This will be confirmed via regular inspection, measurement, monitoring and audit activities.

3.2.1. REASONABLE AND PRACTICABLE

To provide clarity and commitment regarding the Project's performance, this EMP was prepared such that the measures identified are largely considered 'reasonably practicable' to implement, in accordance with EPA Publication 1856 *Reasonably practicable guide* (September 2020) (EPA Publication 1856). There are circumstances where select measures would be implemented "where reasonably practicable to do so" however these circumstances are limited and explained in the EMP, with regard to EPA Publication 1856.

To determine what is reasonably practicable the following six factors were considered together:

- Eliminate first: Can the Project eliminate the risk?



- Likelihood: What's the chance that harm will occur?
- Degree (consequence): How severe could the harm be on human health or the environment?
- Your knowledge about the risks: What do we know, or what can we find out, about the risks the Project's activities pose?
- Availability and suitability: What technology, processes or equipment are available to the Project to control the risk? What controls are suitable for use in our circumstances?
- Cost: How much does the control cost to put in place compared to how effective it would be in reducing the risk?

Further detail regarding these six factors is provided in EPA Publication 1856.

3.3. PLANNING PERMIT CONDITIONS

The use and development of the land for the Project is granted under the Planning Permit (Permit No. 20060222-A). This EMP has been prepared primarily to meet Conditions 17, 18, and 19 of the Planning Permit requiring that before the commencement of development, an EMP be prepared for the Project.

The Planning Permit requirements for the EMP are outlined below in **Table 3.2**, which includes the preparation of a number of management plans.

Table 3.2 Relevant Planning Permit Conditions

Condition	Detail	EMP Response
Condition 17a	Construction and Work Site Management Plan	Section 11
Condition 17b	Sediment, Erosion and Water Quality Management Plan	Annex C
Condition 17c	Blasting Plan	Section 13
Condition 17d	Hydrocarbon and Hazardous Substances Plan	Section 12
Condition 17e	Bushfire Prevention and Emergency Response plan	Annex I
Condition 17f	Archaeological Management Plan (Cultural Heritage Management Plan)	Annex F
Condition 17g	Pest Animal Management Plan	Included in Annex G
Condition 17h	Pest Plant Management Plan	Included in Annex H
Condition 17i	Training Program	Section 5
Condition 17j	A program for reporting	Section 7
Condition 17k	Implementation Timetable	Section 2

Note: A number of other management plans were endorsed as part of the EMP. These have been removed from the proposed EMP as they are required under separate conditions of the Planning Permit, or not required by the Planning Permit at all:

- Television and Radio Reception Management Sub-Plan (not required by the Planning Permit)
- Traffic Management Sub-Plan (required by Condition 11 of the Planning Permit)
- Noise & Vibration Management Sub-Plan/Noise Management Sub-Plan (not required by Planning Permit – Operational noise is covered under Conditions 31-34). The sub-plan endorsed in 2012 has been removed. A separate Noise and Vibration Management Plan written in accordance with EPA Publication 1834 will be provided to the Principal Contractor to comply with
- Bats and Avifauna Management Sub-Plan (required by Condition 11 of the Planning Permit).



3.4. SECONDARY APPROVALS, LICENCES & PERMITS

The likely secondary approvals, licences and permits required for the Project are set out in **Table 3.3**.

RCDP and the construction contractor will ensure that each necessary approval, licence and permit is obtained prior to the commencement of any work that requires such consent.



Table 3.3 Secondary Approvals, Licences and Permits

Legislation / Policy	Applicability to Project	Approval Potentially Required	Administrative Authority
<i>Planning and Environment Act 1987</i> and Moyne Planning Scheme	Removal of Native Vegetation Business Signage	Permit/consent to clear additional native vegetation on road reserves to facilitate construction access. Removal of native vegetation forms part of the Planning Permit.	Department of Environment, Land, Water and Planning Moyne Shire Council
<i>Flora and Fauna Guarantee Act 1988</i>	Removal of Native Vegetation	A permit will be required where protected native vegetation is proposed to be removed on Crown lands at the site, potentially at areas where existing roads are to be widened/improved, at the access points onto the site, and at the track crossing of Harris Road. This includes removal of any Black Wattle trees, and removal of Plains Grassland. A permit under the Flora and Fauna Guarantee Act will be obtained prior to works commencing.	Department of Environment, Land, Water and Planning
<i>Wildlife Act 1975</i>	Removal of Native Vegetation	A permit is required to remove or destroy wildlife which is in a prescribed category under the <i>Flora and Fauna Guarantee Act</i> .	Department of Environment, Land, Water and Planning
<i>Environment Protection Act 1970</i>	EPA and Council approval for onsite wastewater treatment systems	The <i>Environment Protection Act 1970</i> defines on-site wastewater systems treating no more than 5,000 litres per day of wastewater of domestic origin as 'septic tank systems', which are subject to a two-stage approval process: - EPA Victoria approves the types of on-site systems that may be installed in Victoria; - Municipal councils administer a permit system which regulates the installation, maintenance and monitoring of individual units at specific sites.	Environment Protection Authority Moyne Shire Council
<i>Crown Land (Reserves) Act 1978</i>	Proposed works on Government owned land	Approval will be required to undertake all road construction works.	Moyne Shire Council
<i>Aboriginal Heritage Act 2006</i>	Protection of Aboriginal cultural heritage values	In the event that any Aboriginal sites are discovered, consent will be required to disturb such sites.	Aboriginal Affairs Victoria
<i>Road Management Act 2004</i>	Movement of Over Dimension loads	Approval will be required from Regional Roads Victoria if the movement of Over Dimensional loads is required.	Regional Roads Victoria
<i>Road Management Act 2004</i>	Construction of transmission lines	Approval will be required from Regional Roads Victoria if any proposed transmission lines are located within an Arterial Road under the <i>Road Management Act 2004</i> .	Regional Roads Victoria
<i>Water Act 1989</i>	Works on waterways	A permit will be required for the construction of all waterways crossings for access tracks and utilities conduits prior to works commencing.	Glenelg-Hopkins Catchment Management Authority



3.5. OTHER RELEVANT GUIDELINES

Other applicable guidelines include:

- EPA, Civil construction, building and demolition guide, Publication 1834, November 2020.
- EPA, Bunding Guidelines, 2015.
- EPA, Liquid Storage and Handling Guidelines, Publication 1698, 2018.
- EPA, Construction Techniques for Sediment Pollution Control, Publication 275, 1991.
- EPA, Works Approval Application Guideline, Publication 1658, 2017.
- EPA, Guidance on Applying for EPA Approval of an On-site Wastewater System, Publication 935, 2004.
- EPA, Guidelines for Environmental Management Code of Practice – On-site wastewater Management, Publication 891.2, 2016.
- EPA, Environmental Guidelines for the Concrete Batching Industry.
- EPA, A Guide to the Sampling and Analysis of Waters, Wastewaters, Soils and Wastes, Publication 441.
- EPA, Solid Industrial Waste Hazard Categorisation and Management, Industrial Waste Resource Guidelines (IWRG) Publication 631.
- EPA, Soil hazard categorisation and management, IWRG621, 2009.
- EPA, Recommended Separation Distances for Industrial Air Emissions 1518, 2013.
- WorkSafe Victoria, Safe Distances when using Explosives, 2019
- Precincts and Regions (DJPR) Guidelines for Ground Vibration and Airblast Limits for Mines and Quarries, 2020
- CSIRO, Urban Stormwater Best Practice Environmental Management Guidelines, 1999.
- EPA, Reasonably practicable guide, Publication 1856, September 2020.
- EPA, Industry guidance: supporting you to comply with the general environmental duty, Publication 1741, October 2020.



4. HAZARD IDENTIFICATION AND RISK MANAGEMENT

The identification of the significant environmental aspects and impacts that could eventuate during construction of the Project is central to the selection of appropriate environmental safeguards.

The environmental aspects are those operations that may result in an environmental impact (a risk event). The relationship of aspects and impacts is one of cause and effect. The process of identifying risk events and associated impacts is one of progressively breaking down each activity into its environmental aspects.

4.1. RISK PROCESSES

The environmental hazards and risks associated with the proposed construction and operational activities have been identified and assessed by RCDP and the construction contractor in preparation of this plan. Ongoing risk assessment will be undertaken throughout the construction and operational phases to control emergent risks and adapt to any changes in severity.

The risk management process follows the following steps:

- Step 1: Identify the hazard – does the work activity contain potential hazards?
- Step 2: Put immediate, temporary controls in place.
- Step 3: Conduct a risk assessment, based on the principle Risk = Likelihood x Consequence.
- Step 4: Put permanent controls in place to reduce the risk to As Low As Reasonably Practicable (ALARP).

All activities identified in the risk assessment process as being of high or very high environmental risk are to be associated specifically to individual tasks within the contractor's Safe Work Method Statements (SWMS). The SWMS will state the actions to be taken to mitigate and minimise the environmental risks.

Examples of risks include construction and operational activities that have the potential to:

- cause the discharge or release of pollutants to water, air, or land;
- damage flora, fauna or heritage;
- create change to the environment, including noise; and
- generate wastes.

4.2. QUALITATIVE RISK ASSESSMENT

The qualitative risk analysis matrix in **Table 4.1** provides a guide to predicting the potential level of risk of project activities. This qualitative approach will be adopted throughout the Project lifecycle for the assessment of risk.

The potential environmental/community consequences or impacts of the activity, and the likelihood of an incident occurring when undertaking activities, will be rated as Very High, High, Medium or Low.

**Table 4.1 Qualitative Risk Analysis Matrix**

	CONSEQUENCE				
LIKELIHOOD	Insignificant	Minor	Moderate	Major	Critical
Almost Certain	Medium	High	High	Very High	Very High
Likely	Medium	Medium	High	High	Very High
Possible	Low	Medium	High	High	High
Unlikely	Low	Low	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Risks assessed as either Very High or High are considered ‘significant’ and therefore require either treatment measures to be implemented or are considered unacceptable.

Table 4.2 provides a guide to the assessment of likelihood.

Table 4.2 Risk Likelihood Descriptors

Likelihood	Descriptor
Almost certain	Almost inevitable outcome, the event is expected to occur in most circumstances.
Likely	Not a certainty but such an event is known to have occurred and represents a creditable scenario. There is a good chance the event will occur.
Possible	Could happen, easy to imagine a feasible scenario where the situation could exist but it would be unusual for the event to occur.
Unlikely	Conceivable, occurrence would require multiple failures of systems and controls, but it would be remotely possible for the event to occur.
Rare	Little or no chance of occurrence. Would require a combination of factors for the situation to result. The event has not known to have happened, but it is possible given the wrong circumstances.

Table 4.3 provides a guide to the assessment of consequence.



Table 4.2 Risk Consequence Descriptors

	People/Industrial Relations/Society	Earnings Before Interest and Taxes (EBIT)/Contribution	Plant	Environment	Tendering/Contractual	Reputation
Critical	Single or multiple fatalities Industrial relations (IR) dispute targeting multiple sites	EBIT impact greater than \$10M	Unavailability of key resources (assets, people or consumables) for an extended period of time	Irreparable/long term damage to a large or critical aspect of the natural environment	Serious non-performance on contract Major client insolvency	Negative national media event Intervention by government agency and licence to operate is revoked
Major	Life threatening incident resulting in serious Lost Time Injury (LTI) or ongoing illness/health effects Inability to attract/retain key staff to meet contract Protracted IR dispute at one site	EBIT impact of between \$2M and \$10M	Unavailability of key resources (assets, people or consumables)	Major damage with medium term impact on the natural environment, remediation with six to twelve months	Non-performance against contract schedule Critical sub-contractor non-performance	Employee's actions impact reputation on a specific site Investigation by government agency
Moderate	Incident that requires medical treatment by a qualified medical practitioner Loss of key individuals A single IR event at a single site	EBIT impact of between \$0.5M and \$2M	Equipment performance below contract tender rates for less than 3 months	Localised short-term controllable impact on the natural environment, remediation expected within one month	Rework requiring additional resources Moderate sub-contractor non-performance	Employee's actions impact on a specific site Investigation by government agency
Minor	Injury requiring first aid treatment only Delays in filling vacancies Isolated IR issue handled at site	EBIT impact of between \$50K and \$0.5M	Equipment performance below contract tender rates for less than 1 month	Localised impact on the natural environment, remediation expected within one day.	Rework using existing resources	Employee's actions cause no impact on a specific site
Insignificant	No injuries	EBIT impact less than \$50K	Equipment performance below contract tender rates for less than 1 week	Negligible impact on the environment which is difficult to notice and does not require remedial action.	Insignificant rework using existing resources	Trivial unsubstantiated community complaints



Table 4.3 provides a guide to the control actions required according to the risk classification.

Table 4.3 Control Action Rating

Rating	Overview/Guide
Very high	Extreme risk, immediate action required
High	High risk, senior management attention needed
Moderate	Moderate risk, management responsibility must be specified
Low	Low risk, manage with routine procedures

4.3. RISK REGISTER

On the basis of the hazard identification and risk management processes described above, a risk assessment has been prepared for construction and operation phases for the Project. The outcomes of the risk assessment are documented in a risk register, enclosed at Annex D.

A further risk workshop will be undertaken prior to site mobilisation to allow relevant personnel to discuss and formulate the controls required to reduce the identified risks to acceptable levels. The risk register may be revised at this point if controls differ from those already implemented.

If the risk register is updated as a result of the risk workshop, the updated version of this risk register will be provided to Moyne Shire Council for information.

4.4. OBJECTIVES, TARGETS AND KEY PERFORMANCE INDICATORS

Table 4.5 describes the key environmental factors identified in the risk assessment, EES and approval documentation. The table also identifies objectives, targets and key performance indicators (KPIs) for each of these issues. Assessing whether the identified objectives and targets have been achieved requires regular inspection, measurement, monitoring and audit activities.

KPIs include areas such as:

- regulatory compliance;
- compliance with EMP processes;
- demonstration of continuous improvement;
- reportable environmental incidents or offences; and
- minimising environmental impacts and meeting objectives.

Table 4.4 outlines the EMP objectives, targets, and key performance indicators for the Project.



Table 4.4 EMP Objectives and Targets

Issue	Objective	Target	Key Performance Indicator
Construction and Worksite Management	To protect local amenity, assets and the environment during construction and operation.	No particulate air pollution resulting from construction and operations and associated activities (including dust) is to be visibly discharged beyond site boundaries. All site vehicles to have functioning emissions control devices as per EPA requirements. No breaches of the EP Act 2017 associated with the generation, storage, transport or disposal of waste materials. Minimise waste to landfill and maximise re-use and recovery rates.	Zero air quality related complaints from the community. Site plant and vehicle induction inspections compliance. No notifiable pollution events, in accordance with EPA notification requirements No regulatory action taken. No usable surplus material to be sent to landfill. Waste records from resource recovery centres. Satisfactory weekly environmental inspection results. No contamination of land or water caused by release of chemical contaminants due to site activities. Any unexpected finds of existed soil contaminants treated and/or disposed of in accordance with regulatory requirements.
Noise and Vibration	To protect local noise amenity during construction.	Noise related impacts resulting from construction, and associated activities are to be compliant with the EPA guidelines (publication 1834). The Noise and Vibration Management Plan prepared for the project is to be complied with to fulfill the General Environmental Duty.	Zero noise related complaints from community.
Hydrocarbon and Hazardous Substances	Protect human health and the environment through management of any contamination and use of hazardous substances and dangerous goods. Protect the quantity and quality of groundwater consistent with the relevant State water policies.	Compliance with specified regulatory requirements including conditions of approval related to the treatment, storage and disposal of contaminated soils. No contamination of land or water caused by release of chemical contaminants due to site activities. Any unexpected finds of existing soil contaminants treated and/or disposed of in accordance with regulatory requirements.	Zero reportable spill events. No regulatory action taken.



Issue	Objective	Target	Key Performance Indicator
Sediment, Erosion and Water Quality	To manage sediment, erosion and water quality consistent with relevant State waste policies and guidelines.	No material transported off-site by wind or water vectors. No material increase to land degradation. No material increase to eutrophication of local waterways.	No regulatory action or complaints regarding sedimentation of local waterways. No regulatory action or complaints from landowners regarding land degradation. No reports of increase in algal blooms or fish kills in local waterways.
Blasting (if required)	The objective is to ensure all blasts are planned and implemented to ensure compliance with regulatory requirements and conditions of consent.	Ground vibration and air blast do not cause negative impacts on local amenity. No flyrock is emitted beyond the zone of exclusion. No visible emissions of dust/fumes from site.	No complaints from local community, or property damage caused by blasts.
Aboriginal/ Cultural Heritage	To minimise the impacts on Aboriginal archaeological sites, heritage sites and cultural values.	No disturbance to known Aboriginal or European heritage sites or artefacts without all required permits and approvals. Immediate reporting of any unexpected finds of artefacts, and associated stop-work in the vicinity.	No regulatory action. 100% rates of training and induction of site personnel.
Pest Animal	To ensure that the activities of the project do not exacerbate existing pest animal impacts so as to cause economic or environmental impacts to landholders.	Control the population of rabbits and foxes within the site to meet the requirements under the <i>Catchment and Land Protection Act 1994</i> (CALP Act) for established pest animals. No net increase in the impacts of foxes and rabbits on agricultural and environmental values within the site.	Seasonal Pest Animal inspections results.
Pest Plant	To ensure that the activities of the project do not exacerbate existing weed impacts so as to cause economic or environmental impacts to landholders.	Meeting the requirements of the CALP Act in relation to control of listed noxious weeds within the study area. Achieving control and eradication of key (noxious) weed species within the construction phases (for the duration of the project). No net increase in the cover of environmental weeds.	Seasonal Pest Plant inspections results.
Bushfire Prevention and Emergency Response	To manage wildfire and emergency events to prevent injury, damage to property and assets and protect the environment.	Prevent, mitigate and suppress bush and other fires at the Project site. Co-ordinate bushfire fighting and bushfire prevention at the site. Protect people from injury or death and property from damage as a result of bush fires. Protect the environment.	No damage to people, property or the environment due to any fire caused by site activities. Emergency drill frequency and effectiveness.



4.5. SUB-CONTRACTOR MANAGEMENT

Some construction activities and services will be performed by sub-contractors. Sub-contractors are to demonstrate their ability to comply with this EMP. Sub-contractor workers will be trained in this EMP via site induction and daily pre-start talks. Sub-contractors will develop task-specific SWMS that will be reviewed and accepted in compliance with this Plan.

Sub-contractors working on the Project will be required to:

- observe sub-contract and statutory requirements relating to environmental protection and all relevant environmental law and to follow instructions issued by the Project management and supervisory personnel;
- nominate site representatives to liaise with the contractor or RCDP with respect to environmental requirements for site activities;
- co-operate fully with site emergency incident procedures and consultative arrangements; and
- follow procedures, mitigation measures and relevant reporting requirements identified in the EMP and associated management plans.

RCDP and the Construction Contractor will ensure that work undertaken by sub-contractors is monitored through the site inspection process. The Superintendents/Supervisors and the Site Safety and Environment Officers will conduct weekly site surveillance (including inspections and audits) of sub-contractors as described in Section 7.1, 7.2, and 7.3 to assess the effectiveness of environmental protection measures being used by the sub-contractor and to determine compliance with the requirements of the EMP and their General Environmental Duty under the EP Act 2017.

Internal audits will also be undertaken to assess:

- compliance with contractual requirements;
- knowledge of and compliance with the EMP; and
- work procedures and environmental management controls used on-site as identified in the EMP and associated plans.

4.6. JOB HAZARD ANALYSIS

The environmental risk register has documented key risks requiring management during construction and operation of the Project. This EMP and associated management plans provide processes and procedures for the control of those identified risks.

In addition, the future construction contractor will prepare Work Method Statements (WMS) and Inspection and Test Plans (ITPs) which will provide more specific activity-based controls comprising sets of instructions to be followed out in the field (in a step-by-step format) so that each step can be ticked off as it is completed. ITPs have associated checklists to ensure that a record is kept of this process.

Finally, in order to evaluate the changing environmental needs through different areas of work, a Job Hazard Analysis (JHA) (a form of qualitative risk assessment) will be conducted at the work area to assess the types of environmental hazards possible throughout the activity taking into account current local conditions. The risk will then be assessed, and risk controls will be identified to reduce the risks for that activity. An example JHA form is provided overleaf as **Figure 4.1**.

All supervisory personnel are:

- responsible for carrying out a risk assessment and ensuring JHAs for activities and goods supplied and used on-site reflect the higher risk assessments;

- to ensure the risk assessment is kept up to date;
- to communicate to sub-contractors, suppliers and supervisors; and
- responsible for communication to sub-contractors and to receive their JHAs.

Supervisors are to ensure that environmental risks are managed effectively in accordance with this EMP and relevant JHA for that activity. All personnel will be made aware of the necessity for including an analysis of environmental hazards in their JHAs at inductions and toolbox talks, including sub-contractors.

Figure 4.1 **Example JHA Form**

Form Ref:	PSF 001	JOH HAZARD ANALYSIS (JHA) CONSTRUCTION
Revision:	1	
Date:	27-Apr-2009	

Plant and Equipment Required: (If you tick any of the boxes below then personnel must be made aware of site requirements)

☐ Power Leads ☐ Power Tools ☐ Air Operated Tools ☐ Scaffolds ☐ Cranes ☐ Forklift ☐ Elev. Work Platform
☐ Ladders ☐ Oxy/Acetylene ☐ Welding Machine ☐ Manual Handling ☐ Working at Heights ☐ Working over water

Permits Required:

☐ Excavation ☐ Hot Work ☐ Site/Area Access ☐ Electrical Isolation ☐ Mechanical Isolation
☐ Confined Space ☐ High Voltage ☐ Other: _____

Never use plant and equipment that is not in good condition or that has been modified without proper authorisation

Potential Risks/Hazards to be Considered: ☐ Dust ☐ Noise ☐ Congested Work Areas ☐ Weather conditions

Have Pre-start Inspections/Meetings been conducted? ☐ Yes ☐ No

All sources of energy must be isolated before any maintenance work is attempted
Breach of isolation procedures will incur formal disciplinary action

Persons Involved in JHA preparation (list):	Name	Company	Signature	Date
1				
2				
3				
4				
Supervisor:				

Has this activity been captured in the Project Risk Register? ☐ Yes ☐ No. If 'Yes', what line number? _____

TRAINING / QUALIFICATIONS IDENTIFIED AS BEING NECESSARY FOR THE ACTIVITY

CODES OF PRACTICE, LEGISLATION, AUSTRALIAN STANDARDS THAT APPLY TO THIS ACTIVITY Documentation must be able to be accessed on the Site

[illegible]



5. TRAINING, COMPETENCY AND AWARENESS

A training programme has been specified and will be delivered in a “multi-tier” manner, which will range from visitor to general awareness training (e.g. basic induction material, through to highly specialised competency-based training). Specific competency-based training may be identified for employees and contractors undertaking activities that are associated with controlling significant environmental risks (e.g. hazard identification and risk assessment).

Environmental training will be provided to all employees involved in the construction and ongoing operation of the Project. The training will give participants a base level understanding of their individual roles in the implementation of this EMP. Training will also be provided for specific tasks to ensure employees are competent to perform their required duties.

RCDP and the Construction contractor will identify environmental training requirements throughout the project and maintain a staff training register. The Site Safety and Environment Officer will assist in identifying training needs, preparing training materials and running training sessions where appropriate.

The main forms of training to be provided on-site include:

- site induction, including communication of roles and responsibilities for visitors, staff and contractors;
- regular “toolbox” training;
- re-training which is to occur when a non-compliance is identified (in this case, the date on which the non-compliance is identified will be recorded in addition to a scheduled re-training session), and
- specialised training (vegetation/weed identification for example) as required.

5.1. INDUCTION

Records of induction and training will be kept in a training register, including the training carried out, dates, names and trainer details. Inductees will be required to sign-off that they have been informed of the environmental issues and understand their responsibilities. The Site Safety and Environment Officer will review the program 6 monthly or upon any material change in conditions, and monitor its implementation.

All personnel, including RCDP employees, contractors and sub-contractors, will be required to attend a compulsory project induction before commencing any work on the Project. Site visitors will be required to attend a shorter induction presentation.

The environmental component of the induction will be delivered by RCDP or the contractor’s Site Safety and Environment Officer (or delegate) and include the following items:

- EMP overview;
- environmental policy;
- environmental and sustainability objectives and targets;
- environmental responsibilities under the EMP in relation to implementing mitigation measures, monitoring, reporting and implementing corrective actions;
- key environmental issues and controls as identified in the EMP and associated management plans;
- consequences of departure from specified procedures or other controls;



- community awareness and sensitivities, and cultural perspectives and expectations;
- the identification of Aboriginal cultural heritage artefacts;
- emergency/environmental incident response requirements; and
- internal and external communication processes.

5.2. TOOLBOX TRAINING

“Toolbox” training will help to ensure that relevant information is communicated to the workforce and updates provided on issues of interest or concern.

“Toolbox” training will generally be prepared by the Site Safety and Environment Officer and delivered by the Project Engineers or Site Foreman. “Toolbox” training topics may include:

- waste management, minimisation and recycling;
- noise and vibration minimisation;
- flora and fauna protection;
- dust control;
- protecting waterways;
- wastewater control/dewatering;
- work methods, general site issues;
- storage of liquids;
- soil erosion and sediment control, particularly sediment basins, dewatering and spill response;
- identification of Aboriginal cultural heritage artefacts
- plant and equipment maintenance; and
- truck and plant wash down.



6. COMMUNICATIONS AND STAKEHOLDER MANAGEMENT

This section describes how RCDP and the construction contractor will communicate internally and externally, to ensure that the Project's environmental management requirements in terms of this EMP are met.

A guide to communications protocols is provided in **Table 6.1**.

6.1. INTERNAL COMMUNICATION

Communications with contractors and other key stakeholders may be by telephone, email and/or face-to-face correspondence for general environmental issues and/or specific feedback on a particular issue or plan (i.e. review of this EMP).

Records will be maintained to demonstrate conformance with environmental requirements. These records will include, but are not limited to:

- important email and telephone correspondence;
- meeting minutes;
- monthly performance reports;
- monitoring and testing records;
- training records;
- audit records;
- construction method statements;
- emergency procedures; and
- incident reports and investigations.

In addition to the toolbox training, the Project team will meet monthly to discuss project-wide lessons and current issues. Team members will also have the opportunity to table issues and seek feedback from others on proposed methods of construction and appropriate environmental management measures.

Typical meeting agenda will include:

- administration and resources;
- incidents and monthly reporting;
- environmental awareness (alerts, procedures, response flowcharts);
- environmental aspects/project specific tasks; and
- new business.

Meetings will be minuted with any actions noted. Minutes will be distributed to all attendees, and personnel in the wider construction team on an as-needs basis.



Table 6.1 Internal Communications Protocols

Method/Medium	Frequency	Participants	Record
Induction	Upon commencement of employment (refreshed annually)	All staff, contractors and sub-contractors	Formal Record or Form
Tool Box meeting and/or Daily Pre-start Talks	Weekly Tool Box meeting Daily Pre-start talks	Relevant project personnel and sub-contractors	Formal Record and/or Site Diary
Site meeting	Monthly	Relevant project personnel and sub-contractors	Minutes
Interested party/Community Group meeting	As agreed with Council and Community Engagement Committee	Project Manager/ Site Safety and Environment Officer	Minutes
Management Review (internal)	3 months and 9 months after commencement of construction; annually thereafter.	Project Manager/Site Safety and Environment Officer/ Construction Works Superintendent	Minutes

6.2. EXTERNAL COMMUNICATION

External communications with the Community may be by telephone, email and/or face-to-face correspondence for general environmental issues and/or specific feedback.

Contact details are set out in **Table 6.2**.

Table 6.2 Contact Details

Method	Details
Telephone 1	1800 457 181 (Free Call)
Telephone 2	0428 867 646 (Debra Dumesny)
Postal	Ryan Corner Development Pty Ltd (RCDP) Suite 4, Level 3, 24 Marcus Clarke Street, Canberra, ACT 2600
Email	info@globalpower-generation.com.au
This number may be directed to a message bank system if the project team is not able to take the call.	

These contact details may change through the life of the Project, in which case RCDP will ensure that the community is advised of the new contact details. The community will be advised of the contact details changes as set out in **Table 6.3**.



Table 6.3 Distribution of Contact Details

Method	Frequency
Construction site signage	Throughout construction period
Advertisement in local newspaper	Two weeks prior to construction
Community newsletter	Monthly during construction
In the event that the contact details change, an additional advertisement would be made within one week of the change occurring.	

Communication to stakeholders external to RCDP, the construction contractor or sub-contractors, will be conducted via written correspondence on an appropriately marked letter or email.

6.2.1. COMMUNICATION CHANNELS

RCDP is committed to keeping the community informed by ensuring the community has timely access to relevant information through a range of channels:

Table 6.4 Communications Channel

INITIATIVES	DESCRIPTION
One on one briefings	Regular briefings held with landowners, neighbours, Moyne Shire Council and community members including Community Engagement Committee in order to expand understanding of the concerns and aspirations of existing and new stakeholder groups.
Newsletters	Regular newsletter distributed via post and/or email and available at community outlets.
Project website	New project website specifically dedicated to Ryan Corner. Development that provides opportunities for interactions with community, establishes open and proactive dialogue on questions arising about the Project and let the community access information about it at any time, including: - contact details - project relevant information - construction updates - Complaints Investigation and Response Plan - Community Engagement Initiatives - a subscribe functionality for people to stay informed (newsletters)
Media releases and local print media ads	Media releases, project updates and advertisements in local newspapers throughout the Moyne Shire with key project updates.
Fact sheets	Project fact sheets developed and available online and by request.
Weekly construction reports	Weekly updates on the progress of the works during construction.
Specific community outlets	Project information placed in community newsletters and noticeboards.
Information sessions/open days/Project presentations/stalls at community events	Information sessions and Project presentations related to the construction of the wind farm to local clubs, schools and societies as well as host stalls at local community markets/events, that will be arranged and advertised in the local papers and newsletters.



6.3. COMPLAINTS MANAGEMENT

A Complaints Investigation and Response Plan (CIRP) will be prepared pursuant to Condition 35 of the Planning Permit, for endorsement by the Minister for Planning.

The endorsed CIRP will be the key document for protocols on external stakeholder and community communication and engagement during the Project, and will include a process to investigate and resolve complaints.

As such, the endorsed CIRP will be adhered to by the project team in undertaking external communications.



7. PERFORMANCE EVALUATION AND REPORTING

The requirements for performance evaluation and monitoring are set out below.

7.1. SITE INSPECTIONS

The Site Safety and Environment Officer will conduct weekly routine inspections of civil construction work areas during the civil construction phase to monitor work practices and identify non-conforming areas and activities or work practices which could lead to potential environmental harm. After civil works are completed in a particular area of the wind farm, and during wind turbine installation activities the inspections will be conducted monthly in that particular area due to reduced risk of environmentally hazardous activities. A Site Conditions Checklist will be used to record and report any improvements required.

The purpose of the inspections is to:

- ensure that safeguards are being implemented;
- identify where problems might be occurring (or have the potential to occur);
- identify where sound environmental practices are not being implemented; and
- facilitate the identification and early resolution of problems.

These inspections also provide an opportunity for the Site Safety and Environment Officer to address issues raised by construction superintendents/supervisors/project engineers etc. and assist in the implementation of environmental controls. Often this continued support leads to better ownership of environmental management and becomes a valuable coaching exercise for field personnel to improve their skills in this discipline.

Works Improvement Notices will be used to ensure environmental issues, non-conformances and incidents are recorded and appropriate actions taken. Refer to Section 7.6 for more detail.

7.2. ENVIRONMENTAL MONITORING

Monitoring and measurement procedures will be implemented as per **Table 7.1** to ensure that all project construction and operations activities comply with relevant limits and standards, and that RCDP and the construction contractor are performing in accordance with stated EMP requirements.

The timing, frequency, applicable sampling standards, comparison criteria, locations and responsibilities for environmental monitoring programs are specified in the respective construction and operational management plans forming part of this EMP. A summary of environmental monitoring requirements is provided in **Table 7.1**.

Monitoring programs range from those involving formal sample collection, analysis and measurement to those involving a qualitative assessment. All environmental monitoring equipment such as noise meters will be calibrated and maintained according to manufacturer's specifications.

The results of all monitoring conducted will be used to identify potential or actual problems arising from construction processes. Where a non-compliance with nominated performance goals is detected, the following will be undertaken as appropriate:

- a Works Improvement Notice (or similar) will be raised by the Site Safety and Environment Officer;
- notification to the relevant regulatory agencies (e.g. DELWP, Moyne Shire Council);



- the results will be analysed by the Construction Project Manager and Site Safety and Environment Officer in more detail to determine possible causes of the non-conformance;
- relevant personnel will be contacted and advised of the problem;
- a site inspection will be undertaken by the Site Safety and Environment Officer;
- an agreed action will be identified (including planned completion date);
- action will be implemented to rectify the problem; and
- the Works Improvement Notice will be closed out.

Where monitoring methods permit, results will be obtained at the time of the assessment and analysed by the Site Safety and Environment Officer (or relevant consultant). This will allow a prompt response to be initiated should a non-conformance of accepted goals/criteria be identified.

Table 7.1 Summary of Monitoring Requirements

Environmental Factor	Frequency	Process	Responsibility
<i>Construction</i>			
Noise	As required by the Construction Noise and Vibration Management Plan prepared for the project.	As detailed in the Construction Noise and Vibration Management Plan prepared for the project.	RCDP / Construction Contractor
Archaeological	In response to a discovery of an unknown site or artefact. As specified in the CHMP included in Annex F.	Works on-site to be suspended and a Cultural Heritage Advisor to be appointed to advise on management strategies As specified in the CHMP included in Annex F.	RCDP / Construction Contractor and as specified in the CHMP included in Annex F.
Sediment and Erosion	In response to localised erosion In response to construction activities occurring adjoining to or crossing surface waters As recommended in Table 4.2 <i>Recommended Inspection Guideline</i> of the Sediment, Erosion and Water Quality Management Plan included in Annex C.	Monitoring of surface water to assess if beneficial uses are being protected As recommended in Section 4.15 <i>Site Monitoring and Maintenance</i> of the SEWQMP included in Annex C.	As relevant and as specified by the SEWQMP included in Annex C.



Environmental Factor	Frequency	Process	Responsibility
Contamination due to hydrocarbon or hazardous substance	Weekly inspections to ensure that appropriate hydrocarbon and hazardous substance controls are being implemented and are effective and to observe whether spills have occurred	The outcomes of these inspections will be reported in weekly checklists and monthly construction project reports as per the Hydrocarbon and Hazardous Substances Plan. A register of Safety Data Sheets for all hydrocarbons and hazardous substances onsite will be maintained at all times during the Project construction and available for inspection by the relevant Government agencies at any time.	Site Safety and Environment Officer and the Contractors Site Safety and Environment Officer.



Environmental Factor	Frequency	Process	Responsibility
<i>Post Construction and Operations</i>			
Bushfire	Before commencement of operations and at the start of each fire danger period during construction.	Familiarisation visit by CFA, Moyne Shire Council Municipal Emergency Management Committee, Rural Ambulance Victoria and Victoria Police as per Bushfire Emergency Response Management Plan included in Annex I	RCDP
Pest plant	Weed monitoring four times annually in the first year and bi-annually in the second year from the completion of construction	Observe presence and eradicate/contain weeds if necessary as per Pest Plant Management Plan included in Annex H. After the monitoring period, pest plant monitoring and control will be handed over to the landowners as part of their general farm management regime.	RCDP
Pest animal	Pest animal monitoring four times annually for at least 2 years post-construction	Observe presence/damage as per Pest Animal Management Plan included in Annex G and implement long-term habitat modification if necessary. After the monitoring period, pest animal monitoring and control will be handed over to the landowners as part of their general farm management regime.	RCDP

7.3. ENVIRONMENTAL AUDIT SCHEDULE

RCDP has developed an audit schedule to ensure continuous improvement and alignment with this EMP. The overall objectives of the audit program; the methodology and processes to be implemented; the frequency of audits; and processes are set out in **Table 7.2**.

The audit process and schedule will be reviewed annually to ensure its continuing effectiveness and applicability to RCDP's environmental objectives.

External and internal audits will include recommendations for improvement and timeframes by which corrective actions should be adopted. RCDP personnel, the site safety and environment officer, and external consultants will be responsible for implementing the recommendations. Respective responsibilities will be assigned to each corrective action as relevant to the roles and recommendations made.



Table 7.2 EMP Audit Schedule

Audit Type	Location	Frequency	Audit Objectives	Audit process	Responsibility
EMP Audit (External)	On-Site	Within the first 6 months of construction, then annually (if required) thereafter during construction and the first two years of operation	• monitor compliance and alignment with legislation, permits, objectives, targets and KPIs within the EMP • monitor compliance with RCDP requirements and progress with any action plans • gauge effectiveness and adequacy of the EMP system • monitor and evaluate effectiveness of risk mitigation measures • identify areas of improvement and opportunities to address	Document review and site walk-over including: • site inspection, visual assessment • interviews with contractor • incident reports and investigations • risk assessments (see below) • management plans • objectives and targets	Relevant RCDP personnel Site Safety and Environment Officer External Consultant
EMP Audit (Internal)	On-Site	Annually after external auditing period	• monitor compliance and alignment with legislation, permits, objectives, targets and KPIs within the EMP • monitor compliance with RCDP requirements and progress with any action plans • gauge effectiveness and adequacy of the EMP system • monitor and evaluate effectiveness of risk mitigation measures • identify areas of improvement and opportunities to address	Document review and site walk-over including: • site inspection, visual assessment • interviews with contractor • incident reports and investigations • risk assessments (see below) • management plans • objectives and targets	Relevant RCDP personnel Site Safety and Environment Officer
Environmental Risk Assessments Internal	On-Site	Annually, or as a result of changes to the scope of works, legal and other requirements, or significant incidents or non-conformances.	• identify changes in conditions and address risks associated with construction activities. • monitor and evaluate effectiveness of risk mitigation measures	• review of documents including EMP, incident reports and action requests • site based audits (see below)	Site Safety and Environment Officer RCDP input may be required



Audit Type	Location	Frequency	Audit Objectives	Audit process	Responsibility
Site based Audits	Substation/turbine/ transmission line construction sites	Monthly Internal during Construction	• assess implementation of the EMP • assess compliance with permits and contract conditions • assess sub-contractor management and compliance with RCDP procedures • assess non-conformance reporting and action request sign-off • assess incident reporting and investigation • monitor and evaluate effectiveness of risk mitigation measures. • monitoring of sub-contractor performance in managing their environmental impact and compliance with the EMP	• site inspection, visual assessment • interviews with contractor • document review of sample procedures and records • incident reports, action requests and reporting • interviews with construction, project, maintenance and area managers • review of previous inspections • licensing • document review • contract (if required).	Site Safety and Environment Officer



7.4. INTERNAL AUDITING

Internal audits will be undertaken as per **Table 7.2**. The audits will assess the effectiveness of the EMP, associated management plans and training in achieving the Project's environmental objectives and performance goals.

The scope for each audit will be determined by the Site Safety and Environment Officer in consultation with the Construction Project Manager.

Audit reports will, in conjunction with monitoring reports, be used to evaluate the project environmental performance and to provide a basis for continual improvement through the EMP after review in the monthly Site meetings, and the Management Reviews.

7.5. EXTERNAL AUDITING

Within six months of the start of construction, an external audit of the site will be undertaken by a suitably qualified environmental professional. The external audit will assess whether work practices:

- Comply with monitoring requirements listed within each management plan and the Planning Permit Conditions.
- Documentation and reporting structures required by the EMP are being successfully maintained.
- Environmental impacts on the Ryan Corner Wind Farm site are being effectively managed.

At the conclusion of the audit, the auditors will prepare an audit report for RCDP management for its consideration and action. They will also prepare a summary document highlighting positive practices and, if observed, deficiencies to be addressed, including any non-conformances requiring Works Improvement Notices (WINs). Non-conformances will be addressed within nominated timeframes.

Depending on the results of the first external audit (i.e. if there were significant deficiencies), a second external audit during the construction phase may be necessary.

External audits during operation will occur annually for the first two years. Depending on the results of the second audit, a final audit in the third year may be necessary.

The external audit reports, inclusive of their recommendations, will be submitted to Moyne Shire Council upon completion of each report.

7.6. OPPORTUNITIES FOR IMPROVEMENT, NON-CONFORMANCE, CORRECTIVE AND PREVENTATIVE ACTION

RCDP Works Improvement Notices will be used to ensure environmental issues, non-conformances and incidents are recorded and appropriate actions taken.

Non-conformances, Works Improvement Notices and corrective actions will be registered in a Corrective and Preventative Actions Register (CPAR) to identify and correct non-conformance, to take action to control environmental impacts, and prevent future reoccurrence. An example of a CPAR which can be utilised is attached in Annex E. A CPAR commonly used by the Principal Contractor could also be used. Non-conformances may be identified by anyone involved with the site construction and operation including the public, construction management personnel, employees, visitors, sub-contractors and external auditors. The underlying cause or the system failure that gave rise to the non-conformance will be evaluated and registered in the CPAR in order to avoid recurrences.



7.7. INTERNAL REPORTING

RCDP will maintain an auditable records system in accordance with the Project EMP. Environmental reporting will be conducted in accordance with licence and permit conditions. Environmental reporting information may include, but not necessarily be limited to:

- monthly Project reports (including environmental performance);
- non-conformance reports (WINs);
- quantitative records of discharges to the environment that are accurate and can be audited;
- detail on fauna capture and release;
- inspection reports;
- training and induction attendance;
- consultation records and meeting notes;
- complaints management and resolution;
- internal and external audit reports; and
- monitoring results.

These reports will be revised in the monthly Site meetings and the Management Reviews. The results will be measured against the KPIs and any opportunities for improvement identified. The CPAR will be maintained to track any remedial actions and the timeline for achievement.

7.8. EXTERNAL REPORTING

All external reporting required by the Planning Permit or other obligations for the Project will be approved by the Construction Project Manager. This includes management planning documentation associated with this EMP and responding to complaints.

All non-compliances will be reported to the Moyne Shire Council as the responsible authority for administration and enforcement of this permit, within legally required timeframes, or within 5 days, whichever is sooner. It will be the responsibility of Moyne Shire Council to advise other authorities and other relevant stakeholders (e.g. DELWP and adjoining landowners). Any non-compliance with other environmental laws will be reported to the Regulatory Authority within legally required timeframes.

The monthly Project reports (including environmental performance) (see **Section 7.7**) will also be forwarded to the Moyne Shire Council as the responsible authority within 5 days of completion. The monthly project report will provide a summary letter of the EMP audit results and any corrective actions implemented and timeframes for achievement, with the following month/s reports tracking the status.

7.9. NOTIFICATION OF ENVIRONMENTAL RELATED INCIDENT

The Construction Project Manager (or delegate/incident response controller) will notify the appropriate regulatory authorities including Moyne Shire Council and the EPA (or EPA Pollution Hotline) if a notifiable environmental incident occurs on or off-site. Incidents will be reported in the following circumstances as appropriate:

- if there has been a non-compliance with approval conditions;
- if the actual or potential harm to the health or safety of human beings or ecosystems is not minor; or
- if actual or potential loss or property damage (including clean-up costs) associated with a pollution incident exceeds \$10,000.



RCDP's Group Management will be notified within four hours of any pollution incidents requiring notification of Moyne Shire Council, the EPA or any other external Government Body. Following the initial report to the relevant agency, the results of the incident investigation will be provided within one month (where possible) of the incident. Where the investigation period is longer than this, an interim report will be submitted, and then finalised once all details are available. The following details will be provided as appropriate:

- the nature of the incident (including conditions, goals or environmental requirements that were breached or had the potential to be breached);
- the extent of the harm;
- the cause;
- corrective actions undertaken; and
- preventive actions to minimise the potential for a recurrence of such an incident.

The Incident Investigation Report will be forwarded to the Responsible Authority.



8. DOCUMENT CONTROL AND RECORDS

8.1. AMENDMENTS TO THE EMP

Amendments to this EMP will be prepared in response to the EMP audit and review process in consultation with the RCDP Site team and to the satisfaction of the RCDP Project Manager. Amendments to the EMP will also occur in consultation with Moyne Shire Council and other authorities as required by the Planning Permit, prior to lodgement to DELWP for endorsement. A copy of the updated endorsed version will be provided to relevant authorities. Redundant copies will be removed and archived for future reference.

The EMP will be reviewed and if necessary amended in consultation with Moyne Shire Council and where relevant DELWP Environment Portfolio to the satisfaction of the Minister for Planning every 5 years to reflect operational experience and changes in environmental management standards and techniques and will be submitted to the Minister for Planning for re-endorsement, as required by Condition 18 of the Planning Permit.

8.1.1. CONTROLLED COPY

The electronic EMP is the controlled copy and is available on the RCDP information management system. The RCDP Site Safety and Environment Officer is responsible for the distribution of updates to this document.

8.1.2. UNCONTROLLED COPIES

Any additional copies (hard copy) of the EMP are uncontrolled copies and are not controlled by RCDP. Uncontrolled copies of the EMP are not subject to automatic amendment and the holder of an uncontrolled copy is responsible for verifying its currency against the controlled copy.

8.1.3. SUPERSEDED DOCUMENTS

Where superseded versions of controlled documents are retained for any purposes, such documents are to be identified 'Superseded' to prevent the unintended use of obsolete information.

8.2. RECORDS

Records will be kept during the implementation and review of this EMP. A copy will be kept at the Project site or in a suitable location for the lifetime of the project.

8.2.1. ARCHIVING OF RECORDS

Project environmental records shall be archived for a minimum period of 7 years.

The originator is to complete an Archive Record Form identifying contents of records in each box. A destroy by date is to be included on the form taking account of the minimum retention periods stated in the procedure.

8.2.2. CORRESPONDENCE AND FILING

A filing index and correspondence register system is to be set up at the commencement of a project, which is appropriate to control all correspondence and project records.

The Document Controller, in liaison with the Construction Project Manager, establishes a hard-copy project filing index to ensure that records are indexed and filed in a manner to facilitate easy retrieval of information.

The Construction Project Manager informs RCDP, suppliers, sub-contractors etc., of where project-related correspondence is to be addressed.



All inward correspondence is to be stamped with a 'Received' stamp showing the receipt date, registered and then distributed to relevant staff as directed by the Construction Project Manager. Correspondence is to be filed in chronological order.

Where changes are required to project documentation, the Construction Project Manager or the delegate shall co-ordinate all amendments/revisions to the documents and implement the necessary changes required.

Unless otherwise specified by the Construction Project Manager, contract/shop drawings are to be transmitted to external parties using a Document Transmittal. All other documents may be transmitted using suitable correspondence. Transmittal records shall be maintained.

8.3. AMENDMENTS TO OTHER CONTROLLED DOCUMENTS

The following documents, as a minimum, shall be subject to control:

- Group procedures & forms;
- Standards/Codes/Acts/Regulations;
- project procedures and forms; and
- drawings.

Project records, including pertinent sub-contractor project records, shall be maintained to provide evidence of conformity and of the effective operation of the environmental management system. Such records may include, but are not necessarily limited to:

- details of qualifications held by individuals primarily responsible for environmental monitoring;
- correspondence to/from RCDP and interested parties;
- permits, licenses and approvals;
- induction training records;
- inspection and test documentation (including calibration);
- non-conformance and corrective action/complaints;
- environmental incidents;
- minutes of management review meetings;
- evidence of action taken as a result of such meetings/events;
- audits (internal and external) and inspections; and
- monitoring records.



9. INCIDENT AND EMERGENCY PLANNING, PREPAREDNESS AND RESPONSE

RCDP and the construction contractor will ensure that all environmental incidents are promptly and effectively managed to minimise environmental impacts during the Project.

An environmental incident is an event that has the potential to harm the environment. Examples of environmental incidents include fuel spillage, failure of erosion or sediment controls and excessive noise or dust generation.

All environmental incidents will be handled according to the RCDP incident management process.

Procedures for handling an environmental incident include:

- stop action(s) causing the incident (e.g. switch-off equipment);
- stop all work in the immediate vicinity of the incident until advised to continue work by the Project Manager – inform nearby workers if required;
- notify Project Manager/site supervisor;
- if there is a fuel spill – block flow paths or install temporary barriers or controls as necessary. Dispose any contaminated spill containment materials to appropriately licensed landfill facility;
- Site Superintendent is to ensure the incident area is controlled, cleaned up, the problem rectified and prevention measures put in place;
- if there is a hydrocarbon/chemical spill, the spill response protocol included in **Section 12.3** of this EMP, as part of the Hydrocarbon and Hazardous Substance Management Plan;
- vehicles likely to be driven near or in contact with any vegetation will carry a 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A;
- The site will use a Maintenance Management System to provide computerised maintenance designed to manage plant and equipment. This will include all maintenance requirements, preventative maintenance, safety inspection schedules and training;
- Site Conditions Checklist to be completed regularly (daily); and
- immediate reporting of an incident causing or threatening harm to the environment.

All site staff have a duty of care for their own actions in preventing incidents from occurring. The Project Manager is responsible for investigation of incidents, notification and written reports to regulatory authorities as required, as well as declaring an area safe after an incident.

The incident reporting process is a valuable method of addressing shortcomings in procedures, training or equipment. Where lessons are learnt from the investigation or current procedures are identified as being ineffective, the EMP will be revised by the RCDP or the contractor's Site Safety and Environment Officer as appropriate to include the improved procedures or requirements.



10. REVIEW AND IMPROVEMENT OF THE EMP

Condition 18 of the Planning Permit states that “The Environmental Management Plan must be reviewed and if necessary amended in consultation with the Moyne Shire Council to the satisfaction of the Minister for Planning every five years to reflect operational experience and changes in environmental management standards and techniques and must be submitted to the Minister of Planning for re-endorsement.”

At the completion of construction, transitioning into the first year of operation and every 5 years subsequently, the review will be initiated in consultation with relevant senior managers of the Moyne Shire Council and DELWP Environment Portfolio as appropriate. The review will ensure that the system is meeting the requirements of relevant legislation, standards, policies, licences, permits, approvals and objectives. A report will be provided to the Project Manager with any recommendations for change to the system. The Project Manager will review and approve changes as required.

The review will reflect operations experience and changes in environmental standards and techniques. It will be submitted to the Minister for Planning for re-endorsement and an endorsed copy provided to Moyne Shire Council.

The review will consider (but not necessarily be limited to) the following as appropriate:

- site personnel comments;
- state agency/administering authorities comments;
- audit findings;
- environmental and community committee meeting recommendations/opportunities for improvement;
- environmental monitoring records;
- complaints;
- details of corrective and preventative actions taken;
- environmental non-conformances, environmental inspection notices, inspection reports, and non-conformance reports;
- incident reports;
- changes in organisation structures and responsibilities;
- the extent of compliance with objectives and targets;
- the effect of changes in standards and legislation; and
- co-ordination of environmental management of sub-contractors.

The EMP will also be reviewed internally as per **Table 6.1** (management review) and **Table 7.2**.

The Site Safety and Environment Officer will implement any changes arising from the review. Records of such reviews will be maintained.

Details of any significant changes made to the EMP and associated plans will be summarised in a table and forwarded in a memo to all relevant Project personnel.

The EMP will be revised when any of the following occurs (but not necessarily limited to the following):

- an inconsistency with environmental requirements is detected through monitoring and audits;
- improvement opportunities are identified;



- the EMP does not adequately reflect the environmental management requirements of the Planning Permit;
- a relevant amendment of the Project design, construction methods or operation method occurs;
- there are relevant changes to environmental conditions or generally accepted environmental management practices;
- previously unforeseen environmental risks are identified;
- previously unidentified areas of contamination or Indigenous heritage are discovered;
- there is a change in relevant legislation that impacts on either the design outputs or construction activities;
- there is a request made to RCDP, by the EPA or any other relevant Government agency; or
- there is a non-conformance relevant to the EMP (not of minor nature).

The Site Safety and Environment Officer will annually, at minimum, review the EMP and all related documentation to ensure compliance with Project policies and objectives.



PART B

CONSTRUCTION AND OPERATIONAL MANAGEMENT SUB-PLANS



11. CONSTRUCTION AND WORKSITE MANAGEMENT PLAN

The purpose and scope of this plan is to:

- describe how RCDP and the future construction contractor will manage and control construction and worksite risks associated with the construction of the project;
- outline the roles and responsibilities of those involved in the implementation of construction and worksite management controls;
- address the requirements of applicable legislation;
- meet the conditions of the Planning Permit;
- address the requirements of the Project Environmental Effects Statement (EES); and
- ensure compliance with *general environmental duties* for businesses in accordance with EP Act 2017.

The scope of this management plan addresses construction and worksite management in the terrestrial environment, and has particular consideration to relevant EPA Guidance as identified in **Section 3.4**.

To ensure the intent of the GED was achieved an iterative approach was taken following an ALARP process to assist in identifying potential sources of harm, evaluating these and then identifying harm avoidance, reduction and management measures. These measures are documented herein. Further guidance regarding reasonably practicable was taken from EPA Publication 1856 and Publication 1741 such that the measures identified are largely considered 'reasonably practicable' to implement or an explanation is provided where any uncertainty is known.

The following targets are applicable:

- no particulate air pollution resulting from construction and operations and associated activities (including dust) is to be visibly discharged beyond site boundaries;
- no breaches of the EP Act 2017 associated with the generation, storage, transport or disposal of waste materials;
- minimise waste to landfill and maximise re-use and recovery rates;
- zero air quality related complaints from community;
- prevent the risk of fire from construction activities by implementing wildfire prevention measures;
- compliance with specified regulatory requirements including conditions of approval related to the treatment, storage and disposal of contaminated soils;
- management and protection of fauna and native vegetation;
- avoid material harm to the environment relating to the disturbance of contaminated soils on the site; and
- noise related impacts resulting from construction and operations, and associated activities are minimised resulting in zero noise related complaints from community.

This Construction and Worksite Management Plan should be read in conjunction with the Pest Animal, Pest Plant, Bushfire Emergency Management Plan, Cultural Heritage, and Native Vegetation Management Plans for detailed protocols associated with each plan as they relate to construction.



11.1. HOURS OF WORK

11.1.1. CONSTRUCTION AND DELIVERY ACTIVITIES

According to EPA Victoria Publication 1834 (November 2020) “Civil Construction Building and Demolition Guide”, working hours for construction of major projects including power facilities are defined as follows:

Normal Working Hours:

- Monday to Friday: 7am to 6pm
- Saturday: 7am to 1pm

Outside of normal working hours:

- Monday to Friday: 6pm to 10pm
- Saturday: 1pm to 10pm
- Sunday: 7am to 10pm
- Public holidays: 7am to 10pm

To significantly reduce the overall duration of the construction period of RCWF, it will be necessary to work within normal working hours and at some periods outside of normal work hours. For example, undertaking civil works on Sundays would reduce the overall construction period by approximately 3 to 5 months.

Therefore, the proposed work hours for RCWF are generally as follows:

- Monday to Friday: 7am to 6pm (within normal working hours)*
- Saturday: 7am to 4pm (noting 1pm to 4pm is outside of normal working hours)
- Sunday: 7am to 1pm (noting 7am to 1pm is outside of normal working hours)

Works occurring outside of normal working hours as defined by EPA guidelines will be restricted to ‘managed impact works’ or ‘low noise impact works’ as defined in the EPA guidelines

As required by EPA guidelines, prior to construction, a Noise and Vibration Management Plan has been prepared to assess each work activity, identify sensitive receivers, and put appropriate controls in place to ensure that the community and sensitive receivers are not adversely impacted. This plan will be provided to Moyne Shire Council for information.

Undertaking civil works on Sundays will be required for a 6-month period following site establishment. External Roads upgrades will not occur on Sundays. Works on Sundays will be limited to ‘Managed impact works’ or ‘Low noise impact works’ as defined in the abovementioned EPA guidelines. Noise and Vibration Management Plans are applicable on Sundays. Works to be undertaken on Sundays will be within the Project boundaries, towards the centre of the site and away from dwellings.

*Extended construction hours may be required on Monday - Friday for the completion of particular activities defined by EPA guidelines (1834) as ‘low-noise impact works’, ‘managed-impact works’, and “unavoidable works”. These works are explained below.



1. Foundation Concrete Pours

Concrete pours are acknowledged by the EPA guidelines (1834) as “unavoidable works” as they are activities that once commenced, cannot be stopped. Foundation concrete pouring for the Project are planned unavoidable works, and cannot be reasonably restricted to the normal working hours due to the maximum volume of each pour, which will require an earlier start to the working day and a later finish.

There are a total of 52 wind turbine foundations to be constructed and are expected to be completed over a 6 month period with two to three concrete pours to be completed per week. 70% of the concrete pour volumes are expected to be approximately 700m³ and 30% comprising the smaller foundations are expected to be approximately 475m³.

With the largest concrete pour being 700m³, the longest work day is expected to be 18 hours, 14 hours of which would include the noisy works (batching and placing concrete). It is the intent to finish each pour and associated noisy activities by 6pm, but that may not be possible in some instances due to the volume of the pour and based on previous site experience.

Therefore, foundation concrete pours will require the following construction hours:

- 3 days a week, for a period of 6 months: 5:00am – 9:00pm (maximum extended hours for largest pour volumes)
- Foundation concrete pours will not occur on the weekends

As required in the EPA guidelines (1834), affected sensitive receptors will be notified of the intended work, its duration and times of occurrence. Sensitive receptors will be notified of scheduled concrete pouring 2 days prior to the commencement of concrete pouring and will be notified should any changes to timeframes occur.

A Noise and Vibration Management Plan has been prepared to consider necessary controls to minimise noise and vibration. These instances will be captured in the ongoing risk assessment process for the project, and included in work schedules/program, and SWMS/ITPs for tracking and compliance.

Any complaints made in relation to concrete pouring will be lodged in the Complaints Investigation and Response Plan forming part of the planning permit, and will be addressed in accordance with its required procedure for handling and closing out complaints.

2. Delivery of Oversize Overmass Equipment

Delivery of Oversize Overmass equipment is expected to be required by the NHVR Permit to occur prior to sunrise. This is based on the proponent’s previous experience in obtaining NHVR Permits. Delivery of this equipment is dependent on installation activities and will occur on Monday to Saturday for a period of approximately 6 months. No deliveries of Oversize Overmass equipment will occur on Sundays. Typically, Oversize Overmass equipment will be delivered to site under escort and be parked up until Normal Working Hours to be unloaded on site.

Noise from early morning deliveries has been assessed and managed as part of the Noise and Vibration Management Plan as required by EPA guidelines for works outside of normal working hours but is not expected to be disruptive to the community or sensitive receivers.

3. Installation of Wind Turbines

Installation of wind turbine equipment will need to be installed when weather/wind conditions allow. This will necessitate works outside of normal work hours (including Sundays) to take advantage of any favourable weather conditions. Installation of wind turbines is expected to occur over a 6-month period and is expected to be restricted to daylight hours.



Noise from wind turbine installation has been assessed and managed as part of the Noise and Vibration Management Plan prepared for the Project but is not expected to be disruptive to the community or sensitive receivers.

Traffic impacts occurring during all of the abovementioned working hours will be managed pursuant to the Project's Traffic Management Plan.

11.1.2. BLASTING ACTIVITIES

In addition, blasting activities (if required) are restricted to the following hours:

- Monday to Friday: 8:00am and 4:00pm
- Saturday: 8:00am and 1:00pm
- Sunday: Nil

Blasting will not occur outside these hours.

Prior to the commencement of any blasting activities, a letterbox drop will be undertaken notifying sensitive receptors of the work over the coming months. Each resident within 2km of the work area will be notified by email and/or phone call of each blast 48 hours prior to it occurring.

11.2. SITE ACCESS

Two points of access will be provided during construction activities. A western access will be located on Youls Road approximately 300m south of Davidson Road. An eastern access point will be provided on Hamilton-Port Fairy Road approximately 300m north of Spencer Road. Over dimensional vehicles will only be provided access via the western access on Youls Road.

Riverside Road and Harris Road will not be used for site access. The Traffic Management Plan details comprehensive traffic management protocols for the Project.

Access to the Project on Sundays is to only occur via the eastern access point (at Hamilton-Port Fairy Road) to minimise impacts to local roads on that day.

11.3. PRE-CONSTRUCTION WORKS

RCDP and the construction contractor will establish a temporary site compound and lay down area(s) for construction and turbine equipment. The site compound will include a number of demountable buildings, portable sanitary facilities, and an amenities block. These will be installed on-site for the duration of the construction work.

The site compound and lay down areas will be located in appropriate locations on the site as per the endorsed development plans, agreed to with the site landowners, and taking into account the nature of the ground and soils. The site compound and lay down areas will also be sited to avoid and minimise impacts on native vegetation and fauna. Systems and arrangements for provision of power, communications, and water will be established to service the compound.

No on-site accommodation is to be provided for construction staff.

11.4. POST-CONSTRUCTION REHABILITATION

Rehabilitation will be an ongoing practice throughout the lifetime of the Project. Prior to rehabilitation, all buildings and works and staging areas required during the construction phase will be removed upon completion of the construction of the project as per landowner lease agreements. Rehabilitation following construction will include revegetation of cabling trenches and general revegetation works. Weed control works will also be carried out post-construction and throughout the lifetime of the Project and for a minimum of 2 years following completion of the works, and in accordance with the Pest Plant Management Plan.



11.5. CONTAMINATION BACKGROUND

Contamination may be the result of:

- industrial/construction related processes performed on-site;
- materials/wastes stored or dumped on the site;
- some agricultural processes on the site, such as a sheep dip or where farm chemicals were mixed for application;
- contaminants in imported fill; or
- demolition.

The area surrounding the site is largely cleared agricultural farmland. To the east of the site is a blue gum plantation, however historically the site has always been agricultural farmland. Though the site is considered to be a greenfield site, there is still the potential for contaminated soils and groundwater to exist on-site. Potential contamination issues are related to the historic farming activities undertaken on-site, especially in locations where agricultural chemicals were used or disposed of.

According to the EPA Publication 1915 Contaminated Land Policy (February, 2021) the occupier of a site must ensure the land is managed to prevent or manage existing contamination. Occupiers of land which, due to its chemical or physical properties, has the potential to adversely impact on protected beneficial uses must manage the land in a manner that ensures adverse impacts on the beneficial uses of the site are avoided by taking into account the properties of the land when disturbing, developing or using the site.

A preliminary Environmental Site Assessment has not been undertaken at the site, however, there is the possibility that small localised areas, or hotspots, of contamination exist. These contamination hotspots could be disturbed during the excavation access tracks/roads and the foundation pads for the wind turbines. Sources of contamination are likely to be unknown buried wastes (i.e. animal carcasses) or areas of historical chemical impact.

Small quantities of diesel, unleaded petrol, oil, degreasers etc. will be stored on-site in appropriate hazardous substances storage containers. Spills of hazardous substances, hydraulic hose breaks on plant etc. may also present a risk to soil contamination (albeit minor).

11.6. MANAGEMENT AND MITIGATION MEASURES

Table 11.1 lists work practices that will be used to control worksite related risks during construction and mitigate the impacts of these risk events. Non-conformances will be corrected through the issuing of Works Improvement Notices as per the process described in 7.2-7.6.

The proposed construction worksite monitoring programme is outlined in **Table 11.1**.



Table 11.1 Construction and Worksite Mitigation Measures

Construction Phase	Management and Mitigation Measures	Responsibility
<i>Air Quality</i>		
Transport of materials	All vehicles carrying loads which may generate dust will be covered or enclosed at all times whilst on public roads. The load will not be uncovered except during loading or unloading activities. This will be monitored visually by site personnel for deliveries and on-site movements and any non-conformances reported to Construction Contractor's site Superintendent/Supervisor(foreman) who will then inform the Site Safety and Environment Officer.	Superintendent/ Supervisor/ Site Safety and Environment Officer
Site access and internal roads	Install equipment and machinery cleaning stations at site access/egress points upon mobilisation to site, to minimise off-site transport of material which could cause soil tracking onto public roads and dust emissions (establishment of a rumble grid or crushed concrete/rock pad or similar). In wet weather it may be necessary to hose mud off vehicle wheels as they traverse the grid/pad. Disturbance of surfaced areas will be minimised through appropriate staging of works. Tracking of soil on to roads will be checked during site inspections. Mechanical removal of any soil found to be tracked onto roads will occur.	Construction Contractor Manager/ Supervisor
	Water trucks may be utilised to minimise dust generation from internal roads due to construction vehicle movements. Roads which pass in close vicinity to residences will be more frequently wet down (if required). Use of water trucks will be optimised to ensure a balance between dust suppression, water conservation and prevention of water erosion/damage to the site roads. The decision and requirement for water suppression will be based upon visual inspection and prevailing meteorological conditions and be made by the Construction Contractor with input from the Site Safety and Environment Officer.	Construction Contractor /Site Safety and Environment Officer
	A speed limit of 40Kph will apply for all internal site traffic movements. This will initially be monitored visually, and if ongoing non conformances are suspected, speed measurements will be undertaken.	Construction Contractor Superintendent/ Supervisor
Stockpiled materials	Cover/protect areas susceptible to significant dust emissions from wind erosion. Use natural landforms to shield exposed areas and dust generating construction operations from prevailing strong winds blowing towards sensitive receptors. Dust emissions from stockpiles will be observed visually, and further controls such as wetting down stockpiles will be used to correct excessive dust.	Construction Contractor /Site Safety and Environment Officer
Rehabilitation	Exposed areas will be rehabilitated as soon as practicable following completion of construction works in the area, depending on season and ground conditions. The entire site should be fully rehabilitated within 2 years of completion of construction, in-parallel with weed-control efforts. Rehabilitation will include spray seeding/grassing with appropriate pasture species as determined in consultation with landowners.	Construction Contractor /Site Safety and Environment Officer
Construction activity (excavation, clearing, concrete batching etc.)	Restrict/cease activities with high dust generating potential (including heavy excavations) during periods when strong winds blowing towards sensitive receptors prevail causing nuisance dust. This will be managed by daily weather checks and visual monitoring.	Construction Contractor /Superintendent/ Supervisor



Construction Phase	Management and Mitigation Measures	Responsibility
Consultation	Engage with the community through actions including: • responding to queries regarding construction methodologies and responding to complaints/concerns by community members as per the Complaints Investigation and Response Plan; and • provide regular updates to community members to inform them of upcoming work that could result in any increased levels of emissions, as per Section 6.2 of the EMP. • Incorporate discussion on dust sources, impacts and mitigation measures into Site Induction.	Construction Contractor /Site Safety and Environment Officer
Dust Management Procedure	The following dust management procedure is written in accordance with Environment Protection Authority of Victoria, <i>“Civil construction, building and demolition guide”</i>, Publication No. 1834, dated November 2020. During operation water carts shall be used as required to spray water on access track and soil stockpiles to minimise dust generation. Water trucks may be utilised to minimise dust generation from internal roads due to construction vehicle movements. Roads which pass in close vicinity to residences will be more frequently wet down (if required). Use of water trucks will be optimised to ensure a balance between dust suppression, water conservation and prevention of water erosion/damage to the site roads. The decision and requirement for water suppression will be based upon visual inspection and prevailing meteorological conditions. Plant, equipment and materials storage will be restricted to constructed lay down areas. Any community complaints shall be promptly investigated and responded to, and any necessary corrective action initiated in accordance with Section 6.3 of this EMP. Sediment erosion and sediment pollution mitigation measures included in the Sediment, Erosion and Water Quality Management Plan are applicable to dust management as included in the EPA Publication No. 1834. The following controls are applicable to help to minimise the generation and transport of dust as per 1834: • Install sealed ground surfaces or use stabilised materials in high traffic areas. • Schedule dust generating activities by avoiding adverse weather conditions, such as during hot and dry periods, high winds, and days with poor air quality. • Manage stockpiles in a way that minimises dust generation. • Manage truck and vehicle movements to limit dust generation. • Minimise dust generation at sources by considering appropriate physical and engineering controls. • Suppress dust during concrete cutting and construction and demolition activities. • Suppress dust from construction activities such as rock breaking and drilling where appropriate with on-tool dust extraction and enclosure of activities. • Temporarily stop works if dust is visibly discharging or emitting nuisance airborne particles beyond site boundaries. Resume works only when effective controls can be implemented, or weather conditions and air quality improve. • Conduct post-installation maintenance of established controls (including dust monitoring equipment) and assess control effectiveness at regular intervals.	Construction Contractor /Site Health, Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
<i>Waste</i>		
Waste management approach	As set out in the <i>Environment Protection Act 2017</i>, all wastes will be managed in the following order of preference: • Avoidance; • Reuse; • Recycling; • Recovery of energy; • Treatment; • Containment; • Disposal.	Construction Contractor /Site Safety and Environment Officer
Avoidance and reuse	• Arrangements will be made with suppliers to return any unused construction materials. • Specify packaging minimisation requirements in contracts with suppliers. • Use low toxicity equivalents for all products, i.e. solvents, paints, sealers. • Promote awareness of recycling facilities and proper waste disposal practices to employees, including placement of instructional signage around work sites. • Implement good practice weed control prior to commencement of construction to ensure topsoil can be re-used later. Weed control will be undertaken as per the Pest Plant Management Plan, under the guidance of an appropriately experienced weed control contractor. • Stockpile weed-free topsoil for re-use where possible in landscaping, habitat restoration or similar. • Concrete formwork, reinforced steel structures, culverts, cabling and poles and similar infrastructure will be re-used throughout the project where available. • Waste concrete and pavements will be re-used during road construction (sub-base layer) or as hardstand areas in construction compounds.	Construction Contractor /Site Safety and Environment Officer
Waste tracking and reporting	Tracking and recording keeping will be implemented for applicable waste transport and disposal. This will include: • copies of all waste transfer dockets and manifests; • other waste streams as recorded by the waste tracking records;; • waste management improvements and resultant gains as measured against stated performance criteria; and • any other data or observations considered appropriate. Waste generation will be discussed in the monthly site meetings and options for reduction explored on a case by case basis.	Construction Contractor /Site Safety and Environment Officer
General wastes (putrescible waste)	Provide suitable collection receptacles (skip) and transfer to suitable landfill facility. Bin levels will be checked during the site inspections, and frequency of pick-ups will be increased if bins become overfull.	Construction Contractor/ Site Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
Cardboard, paper, glass, plastics, aluminium, toner cartridges	Provide suitable collection receptacles (skip) and transfer to suitable recycling facility. Recycling collection point to be provided for collection, re-fill and re-supply of toner cartridges, or cartridges will be returned by site personnel. Bin levels will be checked during the site inspections, and frequency of pick-ups will be increased if bins become overfull.	Construction Contractor/ Site Safety and Environment Officer
Prescribed industrial waste (lubricants, oils and greases and receptacles)	Storage, transport and disposal of prescribed industrial wastes will be in accordance with the <i>Environment Protection (Industrial Waste Resource) Regulations 2009</i> . All prescribed industrial wastes (PIWs) will have contaminant analysis to determine the appropriate hazard category prior to being accepted at landfills. The industrial waste threshold values will be obtained from the EPA guidelines for both soil and solid waste under: • Soil hazard categorisation and management. • Solid industrial waste hazard categorisation and management. • No disposal of Category A waste to landfill. • Disposal of hazard category B or C waste to a licensed site. • EPA transport certificates must be used. • Vehicles must hold EPA permit (unless exemption issued). Used oils generated during construction will be collected and recycled by a licensed contractor, as will the empty oil and fuel drums and containers. Appointment of a licensed contractor will be managed at the contractor procurement level. Storage and disposal of prescribed wastes will be observed during site inspections.	Construction Contractor/ Site Safety and Environment Officer
Excavated materials	Avoid and minimise areas of disturbance. Areas of disturbance to remain within areas covered by Native Vegetation Management Plan and landowner leases. To be checked against site plans during site inspections and reviewed in Management Reviews.	Construction Contractor Manager/ Supervisor /Site Safety and Environment Officer
	Re-use clean soil material on-site, or if not possible, another construction site. For example, re-use as fill for noise walls, or re-use of boulders/rocks for landscaping.	Construction Contractor Manager/ Supervisor /Site Safety and Environment Officer
Green waste	Mulch and/or compost only small quantities and use onsite, i.e. with landscaping/rehabilitation works. No green waste to be disposed of off-site unless required by farm biosecurity protocols. To be managed by site inspections and reviewed in monthly site meetings.	Construction Contractor/ Site Safety and Environment Officer
Excess or used construction materials e.g. packaging, formwork, pallets, etc.	Transfer to suitable recycling facilities.	Construction Contractor/ Site Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
Industrial waste / solid inert wastes (bitumen, concrete, asphalt and gravel)	Excess materials will be returned to the supplier where possible. Some excess material will also be used as coarse select layer for roads (concrete washout etc.). Where re-use is not possible, dispose at a licensed landfill by an approved and licensed contractor. Residual concrete from the batching plant and concrete truck pipes etc. will be placed on plastic to cure, prior to re-use or disposal to landfill. No spent concrete is to remain onsite. Concrete washout and excess will be observed during site inspections, and waste dockets checked for concrete disposal.	Construction Contractor/ Site Safety and Environment Officer
Provision and disposal of sanitary facilities	The site compound will have ablution facilities for both male and female personnel in accordance with <i>the Occupational Health and Safety Act 2004</i> (OHS Act) and <i>Occupational Health and Safety Regulations 2017</i> (OHS Regulations). The Act and Regulation stipulates the number and type of facilities required based on the workforce numbers and the gender ratio. A regular pump-out contract will be entered into with a licensed contractor for the temporary site facilities, and alarms/alerts on holding tank to prevent from becoming over-full. Management and use of sanitary facilities, particularly in relation to the permanent septic tanks, is to be undertaken in accordance with EPA Publication 891.4 Code of Practice — On-site wastewater management: Note: This Code replaces EPA publication 891, Septic tanks code of practice (March 2003) and subsequent publications. • Restrict the use of germicides (such as strong detergents, disinfectants, toilet cleaners and bleaches), as they will kill the microflora that make the septic system work. Only use unscented soap, vinegar or bi-carbonate of soda to clean toilets and other water fixtures and fittings. • Do not flush rubbish such as sanitary napkins, condoms, cotton buds or disposable nappies down the system. • Fill the septic tank with water to reduce odours on start-up and after de-sludging. Do not wash or disinfect the tank after de-sludging. • Check sludge level, pumps and alarms regularly. • Keep a record of the location of the tank and the trenches and all maintenance reports and ensure the service technician sends a copy of the maintenance report to the local Council. • Have the tank de-sludged when the combined depth of the scum and sludge is equal to the depth of the middle clarified layer.	Construction Contractor/ Site Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
<i>Contamination</i>		
Contaminated materials	Excavation areas will be inspected by supervisors and the site safety and environmental officer for unusual odours or staining within the soil. Excavation will avoid and minimise disturbance of potentially contaminated materials. Appropriate measures include: • Fill material that is generated from site works will be re-used on-site, where it is practicable and geotechnically and environmentally suitable, to avoid the potential for importing contaminated fill. • Avoid exposing or excavating contaminated soil until it is necessary to do so. • Stockpile contaminated soil separately to clean soil and erect temporary fencing and signage around contaminated soil to prevent unnecessary contact. • Should contaminated soil be encountered, the contamination will be classified according to the EPA's Industrial Waste Resource Guideline (IWRG), document IWRG621. This will be achieved by undertaking site sampling according to the EPA Victoria Publication 441, <i>A Guide to Sampling and Analysis of Waters, Wastewaters, Soils and Wastes</i>. Samples will be analysed by a National Association of Testing Authorities (NATA) approved laboratory. • Potentially contaminated materials will be segregated based upon the results of waste classification where practicable (e.g. Natural Material will be excavated and stockpiled separately from material which is fill or visibly impacted). • Soils or other materials suspected of being more heavily contaminated or otherwise significantly different to the materials encountered during the excavation and/or sampling works will be isolated and stockpiled/stored separately with appropriate bunding/containment to minimise the potential for cross contamination. • All site personnel will be inducted in identification of potentially contaminated material based on encountering materials of unusual colour, texture, odour or inclusions (e.g. asbestos, drums etc.). If, during excavation, significantly odorous contaminated materials are encountered works are to cease, the material is to be recovered and the Contractors Site Safety and Environmental Officer will be informed as soon as practicable, who will advise on appropriate classification and disposal options. • Work will only re-commence once appropriate actions have been developed to manage the issue appropriately. • Records of all contaminated material spoil movements will be tracked and reported. This includes spoil truck drivers submitting dockets to site personnel (dockets detail date, time, material, destination, truck number etc.), docket information being transferred to spreadsheets, monthly invoices supplied from the earthworks contractor, site personnel checking invoices against dockets and adjusting for actual weight where required, and collating of data for monthly reporting.	Construction Contractor /Construction Manager / Site Safety and Environment Officer
Dewatering	Dewatering will only be undertaken of recently excavated turbine foundations. The surrounding land-use and context is not conducive to chemical contamination of ponded water from surface runoff or groundwater drawdown. Dewatering will be undertaken as per controls in the SEWQMP.	Construction Contractor /Construction Manager / Site Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
Wastewater and Stormwater	The following wastewater management procedures should be implemented to prevent on site pollution in accordance with EPA Publication 891: • Minimise the quantities used, and use chemicals that pose the least potential risk to human health and the environment. • Maintain a manifest and a register of Safety Data Sheets (SDSs) for all chemicals being stored at the site. • All domestic wastewater (grey water and black water) generated from the maintenance building will flow to an underground septic system. The septic system shall be managed during the operation phase in accordance with EPA permits and requirements, including monitoring and maintenance requirements. • Spill kits shall be located at all work areas, particularly those in close proximity to surface waters. • Spills shall be cleaned up immediately, spill kit materials replenished, and waste from spill clean-up shall be disposed via a licensed prescribed waste contractor. • An agreed program for annual inspection shall be developed that will provide a maintenance schedule for the on-site management of the wastewater system. • Litter shall be managed to ensure it does not end up in wastewater or stormwater off site. The following controls relate to management of wastewater from cleaning of vehicles, equipment and roads: • Carry out washing of machinery and equipment in a designated area, designed to allow collection of the washdown water. • Cover the designated washdown area, where appropriate. • Locate the washdown area away from drainage lines, stormwater inlets, waterways, areas of significant flora and fauna and other sensitive areas identified onsite. • Contain wash out barrels in the designated washdown area for washing of tools and smaller equipment. • Install sediment control structures to prevent entry of sediment into drains and waterways. • Appropriately bund the washdown area to contain all washdown water. • Return concrete mixing and delivery trucks to the batching plant for washout, where possible. However, should this not be possible, designate an area onsite for washing out of concrete trucks, which: ○ is located near the site exit to encourage drivers to use it ○ is signed for easy identification ○ is lined with an impervious liner (plastic or geotextile), allowing the water to evaporate, for concrete residue to then be disposed of as solid waste (in a skip bin or collected and transported to a site that is lawfully able to receive it) or used as a road base. • Clean equipment off before washing to minimise use of water. Brush dirt and mud off equipment before you wash it. • Avoid using solvents for cleaning vehicles and use phosphate-free soaps and biodegradable soaps. Washdown water is to be recovered and treated to be free of biological contaminants and hydrocarbons and may be re-used for subsequent washdowns or as dust suppression or applied to non-sensitive areas..	Construction Contractor /Construction Manager / Site Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
	- For road cleaning: - Pave entry and exit roads with gravel and top dress these paths periodically. - Sweep roads whenever dirt is observed. - Install stabilised access points (typically crushed concrete, road base or rumble grids) at each of the major site entrance/exits to minimise the tracking of soil from the site onto roads during construction. - Install wheel washes at the site compound upon mobilisation to site and remove sediment from the wheel wash as required. - Designate a paved parking area. - Cover all loads of waste, including soil, being taken offsite to a site lawfully able to accept that waste. Stormwater and erosion will be managed in accordance with EPA Publication 1834, as per the SEWQMP. The following stormwater management controls should be implemented to prevent sediment entering stormwater drains and waterways in accordance with EPA Publication 1834 (which replaced 981): - Divert clean stormwater around the site, where possible. - Install sediment fences around stockpiles to contain coarse soil and sediment. - Minimise access by vehicles and people near waterways, restricting access to essential works only. - Manage truck and vehicle movements to limit the generation of sediment. - Direct the flow of turbid stormwater within a constructed lined channel or sediment basin where applicable to reduce the velocity of run-off water and encourage settling of coarse solids. - Install primary, secondary and tertiary treatment control measures based on the site-specific hazards and level of risk in your project or activities. Confirm that your controls are designed and installed to adequately capture sediment loads from your activities. A sequence of controls, commonly referred to as a 'treatment train', may be needed if pollutants such as nutrients and fine sediment are encountered. - Primary treatment controls include physical screening of sediment in grassed swales, sediment basins, portable sedimentation tank and litter traps. - Secondary treatment controls consist of fine particle sedimentation and filtration in swales, infiltration trenches, filter bags, and porous paving. - Tertiary treatment controls include removal of nutrients and dissolved heavy metals in wetlands and bio-retention systems. - Contain and remove concrete slurry from run-off in a suitable area and prevent it from entering stormwater networks and waterways. - Monitor surface water quality after high rainfall events upstream and downstream from the works area to confirm effectiveness of established controls and where additional controls may be required. - Conduct post-installation maintenance of established controls and assess control effectiveness at regular intervals while the established controls are in place.	



Construction Phase	Management and Mitigation Measures	Responsibility
Spills and Leaks	All spillages will be contained in accordance with the EP Act 2017. Should a notifiable spill occur on-site, the relevant Government agencies will be informed and the clean-up will be undertaken according to the relevant EPA guidelines, Liquid Storage and Handling Guidelines (June 2018) – Publication No. 1698. A hydrocarbon and hazardous chemical spill kit will be maintained and located in all active work areas. All project personnel will be trained in the hydrocarbon/hazardous substance spill response process, as illustrated in the flowchart in Figure 12.1, to ensure the most efficient deployment of the spill response. The spill response will commence immediately after identifying that a spill has occurred. Refer to the Hydrocarbon and Hazardous Substances Plan for more information regarding the prevention of hydrocarbon and hazardous substance spillages included in Section 12 below which details contingency measures to be applied should spills and leaks occur. All spills will be raised as a Work Improvement Notice.	Construction Contractor /Construction Manager / Site Safety and Environment Officer
Education	Training and orientation sessions will be conducted for Project personnel involved in the excavation, transport or handling of soils or other earthworks on the site. The training sessions will be integrated into the site induction and shall be conducted prior to the worker performing excavation of any soils on the site. The sessions shall be designed to ensure that staff are aware of potential contamination issues on the site, able to recognise contaminated materials on the site and are aware of their responsibilities in managing contaminated materials.	Construction Contractor /Construction Manager/ Construction Contractor's Site Safety and Environment Officer/ Site Safety and Environment Officer
<i>Site Access</i>		
Transport to and from site	Two vehicle site access points are approved for the RCWF site as outlined below: - Western site access – located via Youls Road, approximately 300 metres south of Davidson Road - Eastern site access – located via Hamilton Port Fairy Road, approximately 300 metres north of Spencer Road. Construction, operational and personnel vehicles not requiring special permits for public use roads (ie anything classified as an OD vehicle) will be permitted to enter the site via either access points. Over dimensional vehicles are only to access the site via the western access on Youls Road. The western access on Youls Road is not to be used on Sundays. To ensure this, all site access gates except for the main site entrance via Hamilton – Port Fairy Road will be locked on Sundays. Impact to native vegetation due to vehicular movements must be reported as part of the incident reporting process, and will be raised as a Works Improvement Notice and Regulatory Authority notified in accordance with legal requirements.	Construction Contractor /Construction Manager / Site Safety and Environment Officer
Internal site vehicle movements	Construction vehicles, plant and equipment are only to utilise designated access roads and tracks at all times. Access roads and tracks must be sited to avoid native vegetation outside of specific permitted removal areas.	Construction Contractor /Construction Manager / Supervisor / Site Safety and Environment Officer



Construction Phase	Management and Mitigation Measures	Responsibility
<i>Flora and Fauna</i>		
Minimising impacts on retained native vegetation	Will be managed as per Native Vegetation Management Plan, including: • Restriction of unauthorised access; • Provision of signage to deter prohibited activities will be implemented during site establishment prior to works; • Limiting of all machinery and vehicular traffic to defined and approved native vegetation impact (including restricting access/damage to impact areas during wet boggy weather); • Temporary fencing and signage of retained native vegetation within 30 m of defined impact areas; • Temporary clear perimeter flagging and signage of retained native vegetation beyond 30 m and within 50 m (approx.) of defined impact areas, wherever native vegetation is not immediately adjacent to impact area; • Induction of all contractors accessing the wind farm site into the prescriptions of this plan before accessing the wind farm site; • Manage all rubbish and construction waste during the construction phase of the project; and • Manage the threat of weed invasion throughout the construction phase of the project. • Impact to native vegetation due to vehicular movements must be reported as part of the incident reporting process and will be raised as a Works Improvement Notice. The Regulatory Authority will be notified in accordance with legal requirements. Work in that area will be suspended immediately.	Construction Contractor /Construction Manager / Supervisor / Site Safety and Environment Officer
Trenching	Cover trenches/pits/shafts at the end of each day to prevent fauna entry. Excavations will not be left open overnight where practicable. If this is unavoidable, open excavations (e.g. trenches) must have egress ramps installed at each end, and some form of refuge (e.g. a crumpled blanket) must be provided. Excavations will be inspected by a trained site foreman daily prior to the commencement of construction work to check for injured or trapped fauna. Any trapped fauna within the site will be removed and relocated by a trained person to a minimum distance of 50m from the site. Wildlife Victoria will be contacted if injured/orphaned fauna are found within the site. Wildlife Victoria telephone: 1300 094 535. Management actions must be reported as part of the incident reporting process and a Works Improvement Notice raised if any non-conformance is suspected.	Construction Contractor Superintendent/ Supervisor/Site Safety and Environmental Officer
Pest weeds and pathogens	All machinery and equipment entering the site must be free of soil, seed and plant material and again before leaving the site (also refer to Pest Plant Management Plan and Pest Animal Management Plan). Site personnel will undertake a visual inspection of all machinery and equipment entering the site. Undertake a hygiene wash on equipment and machinery when moving between landholdings when organic material is being handled (eg. topsoil removal or stripping). In this situation, all equipment and machinery that handle organic soil material that may contain noxious weeds or soil pathogens, will have excess soil and organic material removed Ensure all contract machinery and equipment are cleaned down prior to arriving and leaving site. Locate a clean down facility away from watercourses, in an area that can be monitored for future germination. Avoid moving machinery in wet conditions where clay removal is difficult.	Construction Contractor Superintendent/ Supervisor



Construction Phase	Management and Mitigation Measures	Responsibility
	Develop remedial action plans for controlling isolated outbreaks that occur within the work project area, in consultation with the landowner. Site personnel to observe actions relating to management of soil pathogens, particularly with regard to Cinnamon Fungus (<i>Phytophthora cinnamomi</i> or Pc). Minimise soil disturbance at all times. Restrict vehicles and people to designated tracks and trails. Restrict access to sites prone to water inundation.	
Awareness	Provide site personnel with instruction on the identification of native and introduced plants, and re-iterating the wash down requirements and the required measures included in the pest plant management plan to better familiarise contractors with biosecurity hazards during site induction.	Construction Contractor/ Site Safety and Environmental Officer
<i>Bushfire Prevention</i>		
Construction Activities	Storage of hazardous substances and explosives will be in accordance with the Hydrocarbon and Hazardous Substances Management Plan.	Construction Contractor/ Construction Manager
	During Code Red (Catastrophic) and Extreme fire danger rating days, work will not be undertaken.	Construction Contractor/ Construction Manager
	During the fire danger period, the following should be implemented on site and complied with: - The correct type of fire extinguisher (minimum 4.5kg dry chemical) for flammable/combustible liquids and hazardous substances must be installed and easily accessible; - No welding, grinding or other hot works that could emit a spark or flame is permitted unless it is clear of all flammable/combustible liquids, hazardous substances, combustible material and there is a minimum of 2 x 9 litres stored water extinguishers or other suitable firefighting equipment available, i.e. water tanker or firefighting trailer; - Unnecessary fuel and combustible materials within the windfarm and around buildings, storage containers, electricity compounds and substations must be managed (i.e. grass is cut (100 mm), overgrown vegetation trimmed, fine fuels/leaf litter removed when more than 10 mm deep, rubbish is disposed, etc) and maintained to a minimum distance of 4 metres; - The exhaust of all vehicles likely to be driven near or in contact with any vegetation, must pass through a silencing device/spark arrestor and are carrying a 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A; - All plant and heavy equipment must be accompanied by a vehicle carrying minimum 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A and must remain in the vicinity of any operating machinery at all times; - An emergency information container which is painted red and marked 'EMERGENCY INFORMATION' in white contrasting lettering must be installed not less than 25 mm high at all main access points installed at a height of 1.2m – 1.5m. The containers must include a Site plan and up to date Dangerous Goods manifest and SDS's - The windfarm emergency warning system (i.e. UHF/CB radio system) must be working and tested regularly as determined by the emergency controller;	Construction Contractor / Construction Manager/Site Safety and Environmental Officer



Construction Phase	Management and Mitigation Measures	Responsibility
	- All portable fire extinguishers installed around Site offices, storage containers etc must be in place, easily accessible and checked monthly to ensure they are in working order, i.e. check extinguisher body and hose for damage, pressure gauge etc; - All static fire water tanks for firefighting must be full at all times, easily accessible and CFA connections valves must be regularly checked and maintained; - Water access point signage must be in place and easily visible; - CFA must have a map with the location of all fire water tanks and their access tracks; - The EMP must always remains accessible to deputy emergency controllers and Emergency Response Team (ERT) members; - All employees must be aware of emergency procedures, and participate in training and exercise drills at least yearly and scheduled to occur prior to each fire danger period; - All ERT, staff, and contractors must be trained in the use of all fire protection systems available at the windfarm and on their roles and responsibilities in the operation of this EMP.	
	All site activities shall be in accordance with the Bushfire Emergency Response Plan (BERP). Effectiveness of the plan will be measured by drills as per the schedule in the BERP, and required improvements implemented through the Emergency Response Team in consultation with the CFA.	Construction Contractor/ Safety and Environmental Officer
<i>Post-construction Rehabilitation</i>		
General	Carry out ongoing revegetation activities throughout the course of construction. Sequence the construction works to avoid damage to new plantings. Rehabilitation effectiveness will be measured during the civil construction and by reviewing the site acceptance checklist. Site acceptance (handover) will not occur until all areas are sufficiently rehabilitated..	Construction Contractor/ Site Safety and Environmental Officer
Weed control	Undertake weed control at the completion of construction to facilitate successful rehabilitation, as required by post construction Pest Plant monitoring report.	Construction Contractor/ Site Safety and Environmental Officer



11.7. CONTAMINATION

11.7.1. CONSTRUCTION AND OPERATIONAL PROCESSES THAT COULD LEAD TO WATER CONTAMINATION

The quality of surface water could be compromised as a result of activities related to the construction of the wind farm. The following activities have been identified to potentially lead to water contamination:

- water logging;
- possible soil erosion and subsequently an increase in the sediment concentration in surface runoff and siltation of local waterways;
- fuel or oil spills and sedimentation associated with the development of refuelling and wash-down station at the site;
- the operation of the concrete batching plant which could generate wastewater;
- dust generated from the operation of the batching plant; and
- domestic wastewater generated from the maintenance building.

11.7.2. UNEXPECTED CONTAMINATION FIND PROTOCOL

In the event that suspected contaminated materials are encountered/disturbed during construction works, the following contingency plan will be commenced immediately to manage potential adverse impacts from the disturbance of contaminated materials.

- Immediately stop excavation/earthworks works in the subject area and contact the Site Safety and Environment Officer;
- Immediately delineate the unidentified contaminated material;
- Site Safety and Environment Officer to undertake/organise field testing and collect samples for analysis within 48 hours;
- Site Safety and Environment Officer to submit soil samples for analysis at National Association of Testing Authorities (NATA) accredited laboratory in accordance with *National Environment Protection Measure (NEPM) Assessment of Site Contamination (1999)* guidelines (as amended 2013). Samples will need to be tested within the timeframes specified by the lab and under correct chain of custody conditions;
- the results of the laboratory analysis will confirm the presence/absence of contaminated material; and
- if contaminated material is present an appropriate course of action will be advised by the Site Safety and Environment Officer within 48 hours and in accordance with *NEPM (Assessment of Site Contamination) 1999* guidelines (as amended 2013).

Ideally the suspected contaminated material will be left undisturbed until laboratory results have been received. However, if this poses an immediate threat to human health or the environment, the materials will be immediately handled and treated as follows:

- separation of the suspect materials from non-suspect materials (where practicable and safe);
- placement of the suspect materials in an appropriate bunded area (or lined skip) to prevent discharge of contaminants to the environment; and



- management of leachate, including prevention of contaminated discharge to the environment.

11.7.3. TREATMENT/REMEDIATION

Remediation will commence immediately upon receiving the lab results and subject matter expert advice (which will be provided in accordance with the NEPM). The preferred hierarchy for remediation of soil on contaminated sites as set out in NEPM is outlined below:

- if practicable, on-site treatment of the contamination so that it is destroyed or the associated risk is reduced to an acceptable level. (Based on current information this measure is unlikely to be reasonably practicable to implement, but would be considered as part of the treatment/remediation hierarchy as advised by a subject matter expert);
- off-site treatment of excavated soil so that the contamination is either destroyed or the associated risk is reduced to an acceptable level, after which it is returned to the Site;
- consolidation and isolation of the soil on-site by containment with a properly designed barrier;
- removal of contaminated material to an approved site or facility and replacement, where necessary, with validated clean fill; or
- where the assessment indicates remediation would have no net environmental benefit or would have a net adverse environmental effect, implementation of an appropriate management strategy, as advised by a subject matter expert.

Any treatment/remediation will require assessment on an issue specific basis, however these overarching principles should be adopted in the selection of the most appropriate remedial/treatment methodology.

11.7.4. TREATMENT AREAS

It is proposed that potentially contaminated materials shall be stored and treated at strategically located soil storage and handling areas. All potentially contaminated materials are to be stored and treated in these prepared areas. Treatment areas shall be constructed in the following manner:

- perimeter bunds of low permeability clay around the storage area;
- an internal perimeter drain grading to a central sump shall be constructed inside the bund where any run off can be collected, tested and treated if necessary;
- the base of the treatment area to be constructed from low permeability clay and/or covered with a suitable polyethylene membrane (or equivalent); and
- the treatment area shall be located a minimum distance of 100m from a surface waterway.

11.7.5. VALIDATION TESTING

Verification testing of treated materials will occur immediately after treatment is completed and in accordance with NEPM guidance. Testing shall be undertaken by an appropriately qualified consultant to confirm the effectiveness of the treatment. The treatment shall be deemed successful when the treated soils meet the relevant guideline values for the proposed land use.

11.8. CONSTRUCTION NOISE OBJECTIVES

In relation to general construction activities (all construction works other than unavoidable works and low-noise or managed-impact works) Publication 1834 (previously covered by the EPA Noise Control Guidelines publication 1254.1 criteria) will apply and is detailed in **Table 11.2** below.



Table 11.2 EPA Publication 1834 evening and night noise criteria

Period	Day of the week	Time Period	Construction activity up to 18 months	Construction activity after 18 months
Evening	Monday-Friday Saturday Sunday, Public Holidays	1800-2200 hrs 1300-2200 hrs 0700-2200 hrs	Noise to be less than 10 dB above background (LA90), at any residential premises	Noise to be less than 5dB above background (LA90), outside residential dwelling
Night	Monday-Sunday	2200-0700 hrs	Noise from construction activities must be inaudible inside a habitable room with windows open	

The abovementioned criteria provide a basis for setting objective noise criteria if construction work was to occur during the evening.

Hours of work will be as per **Section 11.1**. The community will be regularly updated on construction activities. Sensitive receptors identified to be impacted by construction noise will be given 2 days notice of more detailed construction activities and expected noise impacts.

Controls to consult and inform residents and other people who may be affected by noise as per 1834 include:

- In the early stages of planning, identify and assess those potentially impacted by noise, then document and maintain the information for the duration of your project or activities.
- Engage community to keep them informed, for example community meetings with community and workers.
- Notify community before and during construction, communicating information as per 6.2 of this EMP including:
 - dates and times (start and finish) when noise will be generated
 - why the noise is necessary
 - type of noise
 - measures to minimise noise volume, for example, installation of noise barriers
 - measures to minimise disturbance, for example, works scheduled to cease on certain days to provide residents with a break from the noise and discuss expected noise after implementation of management measures
 - contact details for information (the contact person should have a level of knowledge and responsibility that will enable them to provide a real-time response to queries and complaints)
 - what is happening now and what is happening next.
 - use media such as a project-related website, letter box drops, meetings, individual contacts and notify in languages other than English where appropriate
 - follow an agreed time period to contact community/residents regarding planned work outside normal working hours
- Install and maintain a site information board at the front of the site with contact details, after hours emergency contact details, and regular information updates. Locate the board so it's visible from the outside boundary.
- Maintain a process for managing complaints.



Controls to minimise noise generated by activities onsite (source noise) as per 1834 include:

- Maintain equipment by:
 - inspecting regularly and maintaining equipment to ensure good working order as per manufacturers specifications
 - checking machines with enclosures, including doors and door seals and that the door closes properly against seals
 - maintaining air lines on pneumatic equipment so they do not leak.
- Maintain vehicles by:
 - considering good working conditions of mufflers
 - securing loose parts that may rattle.

Controls to limit vibration and regenerated noise by onsite activities as per 1834 include:

- Sequencing operations so that vibration-causing activities do not occur simultaneously in close proximity.
- Isolate activities from adjoining structures.
- Maintain equipment in accordance with manufacturer's specifications.

Controls to limit the level of noise reaching nearby people offsite as per 1834 include:

- Maximise shielding taking into consideration:
 - topography of the site (e.g. use of earth mounds as barriers)
 - existing structures, temporary buildings and material stockpiles

Controls to minimise noise from any weekend, evening or night-time activities onsite as per 1834 include:

- Plan quieter unavoidable work activities outside normal working hours.
- Schedule noisy unavoidable work when it is less likely to affect residents' sleep and for shorter periods, wherever possible.
- Stockpile material from unavoidable work activities that occur outside normal hours in, for example, an acoustic enclosure. Also restrict load-out to occur during normal working hours.
- Train all workers regarding unavoidable work activities that occur outside normal working hours.

Controls to consult and inform residents and other people who may be affected by outside normal working hours noise as per 1834 include:

- Manage expectations of the community by explaining:
 - what will happen, with as much detail as possible
 - why unavoidable works are required outside normal working hours
 - the timing and nature of works that may affect them and details of any changes to construction work schedules
 - the criteria for qualification for offsite mitigation such as respite offers, acoustic treatment or alternative accommodation.
- Notify residents early so they can make plans to cope with the noise.



11.9. INSPECTIONS AND REPORTING

Informal daily, and formal weekly inspections will be undertaken throughout the construction period by the Site Safety and Environment Officer. This inspection will ensure that appropriate worksite and construction controls are being implemented and are effective. The outcomes of these inspections will be reported in checklists and monthly construction project reports.

Any deviation from the controls will be reported immediately to the relevant site managers, and evaluated and actioned accordingly.

Permanent records of the following activities must be kept on-site and updated as appropriate, to enable audit/review by means of a simple 'check list':

- all excavation activities at any location where potentially contaminated material has been identified;
- quantities of spoil removed from excavations/spatial ID;
- results of verification tests undertaken;
- quantities of treated 'spoil' placed as fill and locations;
- register quantities of any treatment agents brought on-site and used;
- any management of native fauna (e.g. salvage); and
- water quality and groundwater monitoring results from treatment/stockpile areas.

Records of monitoring results will be maintained at all times during the Project construction and available for inspection by the relevant Government agencies at any time.



12. HYDROCARBON & HAZARDOUS SUBSTANCES PLAN

The purpose and scope of this plan is to:

- describe how RCDP and the future construction contractor will manage and control hydrocarbon and hazardous substances risks associated with the construction of the project;
- outline the roles and responsibilities of those involved in the implementation of hydrocarbon and hazardous substances management controls;
- address the requirements of applicable legislation;
- meet the Minister's Conditions of Approval for the Project; and
- address the requirements of the Project Environmental Effects Statement (EES).

The scope of this management plan addresses construction hydrocarbon and hazardous substances use and management in the terrestrial environment.

The objectives are to:

- protect human health and the environment through management of any contamination and use of hazardous substances and dangerous goods; and
- protect the quantity and quality of groundwater consistent with the relevant State water policies.

The following targets are applicable:

- hazardous materials (including chemicals and fuels) must be stored within bunded areas in accordance with EPA Bunding guidelines, and must ensure that any spills do not enter the site stormwater system;
- limit the on-site storage of hazardous substances;
- emergency response and contingency plans are in place;
- spill response kits to be available on-site and maintained to relevant standards; and
- employees and neighbours are not exposed to unacceptable risk.

12.1. MANAGEMENT AND MITIGATION MEASURES

Table 12.1 lists work practices that will be used to control the use of hydrocarbons and hazardous substances during construction and mitigate the potential impacts of these materials and their use on-site.

Hydrocarbons that could be utilised onsite include diesel, oils, hydraulic fluids, lubricants and solvents or degreasers.

The proposed hydrocarbon and hazardous substance inspection and reporting responsibilities are outlined in **Section 12.2**.



Table 12.1 Hydrocarbon and Hazardous Substance Mitigation Measures

Construction Phase	Management and Mitigation Measures	Responsibility
Hydrocarbon and Hazardous Substance Use	All activities involving the handling, storage, use, and disposal of hydrocarbons and hazardous substances will comply with the EPA Publication 1834, Civil construction, building and demolition guide (2020), the OH&S Act 2004, the OH&S Regulations 2007, Chapter 4 – Hazardous Substances and Materials and the Dangerous Goods (Storage and Handling) Regulations 2000. Large quantities of hydrocarbons and hazardous materials will not be stored on-site unless necessary in accordance with EPA Publication 1834. Storage facilities for hydrocarbons and hazardous substances will be located away from watercourses and areas prone to flooding or tidal areas. Any storage containers for hydrocarbon and hazardous substances will be installed on site pre-fabricated as self-bunded and upon mobilisation to site. As such, storage areas will be bunded appropriately according to Victorian EPA publication 1698, Liquid Storage and Handling Guidelines (2018) and EPA Publication 275 Construction techniques for Sediment and Pollution Control (1991). The storage containers will include an impermeable base to the bunded area and bund storage capacity equal to the capacity of the largest storage container plus 10%. Storage areas, including waste storage areas, will be appropriately signed upon installing them on site. All chemicals will be correctly labelled and a register of all hydrocarbon and hazardous substances utilised onsite will be kept with a file of Safety Data Sheets (SDS) for all substances. All employees will be made aware of the location of these SDS. Weekly inspections will be undertaken by the Site Safety and Environmental Officer.	Site Safety & Environmental Officer/Contractor Site Safety and Environment Officer
Prevention of Hydrocarbon and Hazardous Substance Spillages	All spillages will be contained in accordance with the EP Act 2017 and the State Environment Protection Policy (Waters) to prevent their discharge into drainage systems. Should a spill occur on-site that threatens or constitutes material environmental harm, the relevant Government agencies will be informed and the clean-up will be undertaken according to the relevant EPA guidelines, including cleaning up as soon as the spill occurs. Maintenance on contractor machinery will be carried out in designated areas only, located within the contractor compound or another designated hard-stand area. Designated hazardous substance usage areas will be located away from vegetation. A hydrocarbon and hazardous chemical spill kit will be maintained and located at designated maintenance, refueling and hazardous substance storage areas. The spill kit selected for the site will be designed to treat the types of chemicals that are stored on that site. All project personnel will be trained in the hydrocarbon/hazardous substance spill response process, as illustrated in the flowchart in Figure 12.1, to ensure the most efficient deployment of the spill response. The spill response flowchart will be prominently displayed in key areas such as lunch rooms, maintenance workshops and spill response stations. An Emergency Response Plan will be prepared and specific employees will be inducted in its application. Refueling locations will be such that there is no possibility of discharge into a natural watercourse or storm water system in the event of accidental spillage. Fuel and oil storage facilities will be established in accordance with the requirements of the Australian Standard AS1940: The Storage and Handling of Flammable and Combustible Liquids. Storage facilities will be located away from watercourses and areas prone to flooding or tidal areas. If a fuel storage tank is required on-site it will be placed on an impervious bunded pad, or have integral secondary containment (self-bunding) in accordance with EPA guidelines. Waste materials will be stored on-site in a secure area and periodically removed from site to a licensed recycling facility. Refueling of machinery and vehicles will be carried out in a manner which prevents spills. Any maintenance or servicing of machinery and vehicles will be undertaken in accordance with EPA guidelines to minimise the potential for site contamination through oil or fuel leakages. Waste oil filters will be drained overnight and disposed to a regulated waste facility. Plant and vehicles will be subject to routine maintenance to ensure peak operation and to minimise oil/fuel leaks. Routine maintenance schedules will be captured on the site plant register, which will be audited by the Site Safety and Environmental Officer.	Site Safety & Environmental Officer/Contractor Site Safety and Environment Officer



12.2. INSPECTIONS AND REPORTING

Weekly inspections will be undertaken throughout the construction period by the Site Safety and Environment Officer and the Contractors Site Safety and Environment Officer. This inspection will ensure that appropriate hydrocarbon and hazardous substance controls are being implemented and are effective. The outcomes of these inspections will be reported in weekly checklists and monthly construction project reports.

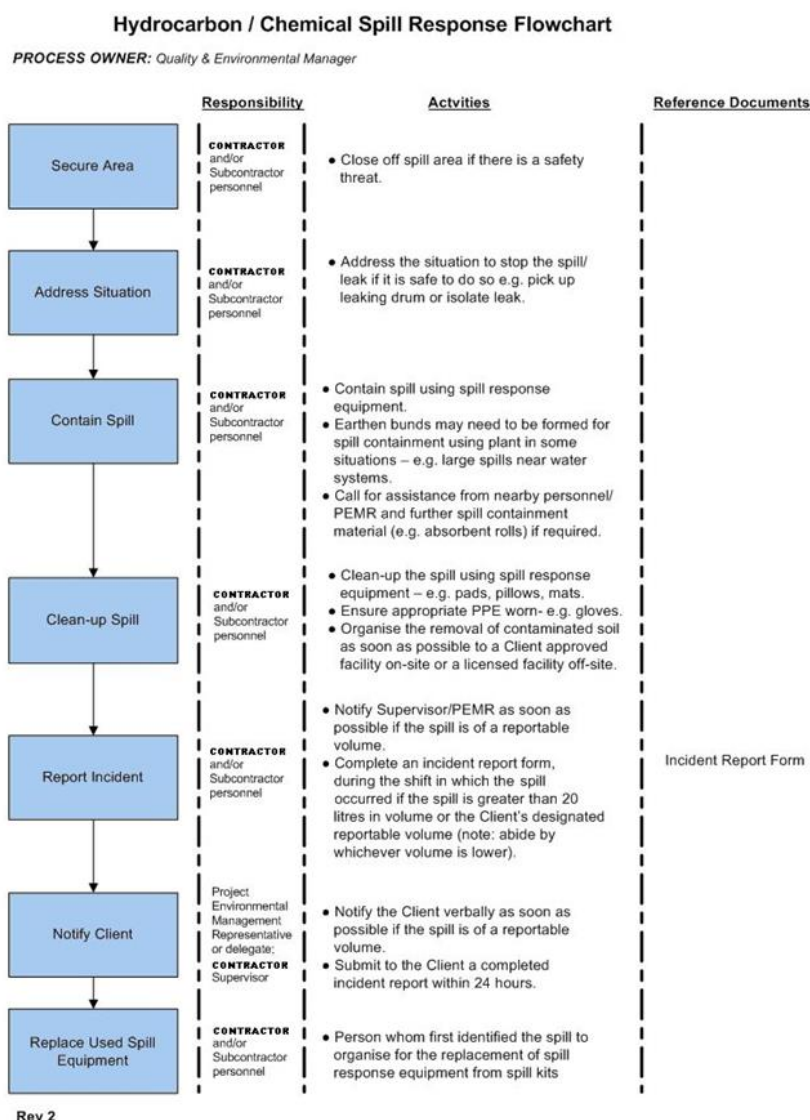
Any deviation from the controls or observed spills will be reported immediately to the relevant site managers and evaluated and actioned accordingly.

Records of the use of hydrocarbons and hazardous substances onsite will be maintained at all times during the Project construction and available for inspection by the relevant Government agencies at any time.

12.3. HYDROCARBON/CHEMICAL SPILL RESPONSE PROCESS

The hydrocarbon/chemical spill response process is set out in **Figure 12.1**.

Figure 12.1 Hydrocarbon/Chemical Spill Response Flowchart





13. BLASTING MANAGEMENT PLAN

The purpose and scope of this plan is to:

- describe how RCDP and the future construction contractor will manage and control blasting risks associated with the construction of the project;
- outline the roles and responsibilities of those involved in the implementation of blasting management controls;
- address the requirements of applicable legislation;
- meet the Minister's Conditions of Approval for the Project; and
- address the requirements of the Project Environmental Effects Statement (EES).

The scope of this management plan addresses blasting management in the terrestrial environment.

The objective is to ensure all blasts are planned and implemented to ensure compliance with regulatory requirements and conditions of consent. The following targets are applicable:

- the community is informed of the planned time and date of pending blasts;
- road closures and evacuations occur within the zone of exclusion;
- required levels of ground vibration and air blast are not exceeded;
- no flyrock is emitted beyond the exclusion zone ;
- no visible emissions of dust/fumes from site; and
- all complaints are recorded and responded to in a timely and professional manner.

13.1. POTENTIAL IMPACTS

Blasting has the potential to generate fumes from incomplete combustion of the chemical explosives and dust clouds from the fracturing of blasted materials. Potential for flyrock to impact off-site areas within 300m of blasts is also possible.

An on-site Blast Management Plan will be prepared by the shot firer in line with the WorkSafe Victoria, 2020, Guidance Note on Blast Management Plans.

13.2. LOCATION OF WHERE EXPLOSIVES WILL BE USED

Blasting may be required for the excavation for the turbine foundations where geotechnical conditions preclude the use of mechanical equipment, such as rock hammers. The requirement for blasting is yet to be determined, pending detailed site-based geotechnical assessment. However, this management plan has been prepared to guide the conduct of any blasting that may be required during construction.

The requirement for blasting will be made by the Principal Contractor during construction.

The list of wind turbine locations that may require blasting based on their associated rock strength is provided in **Table 13.1**.

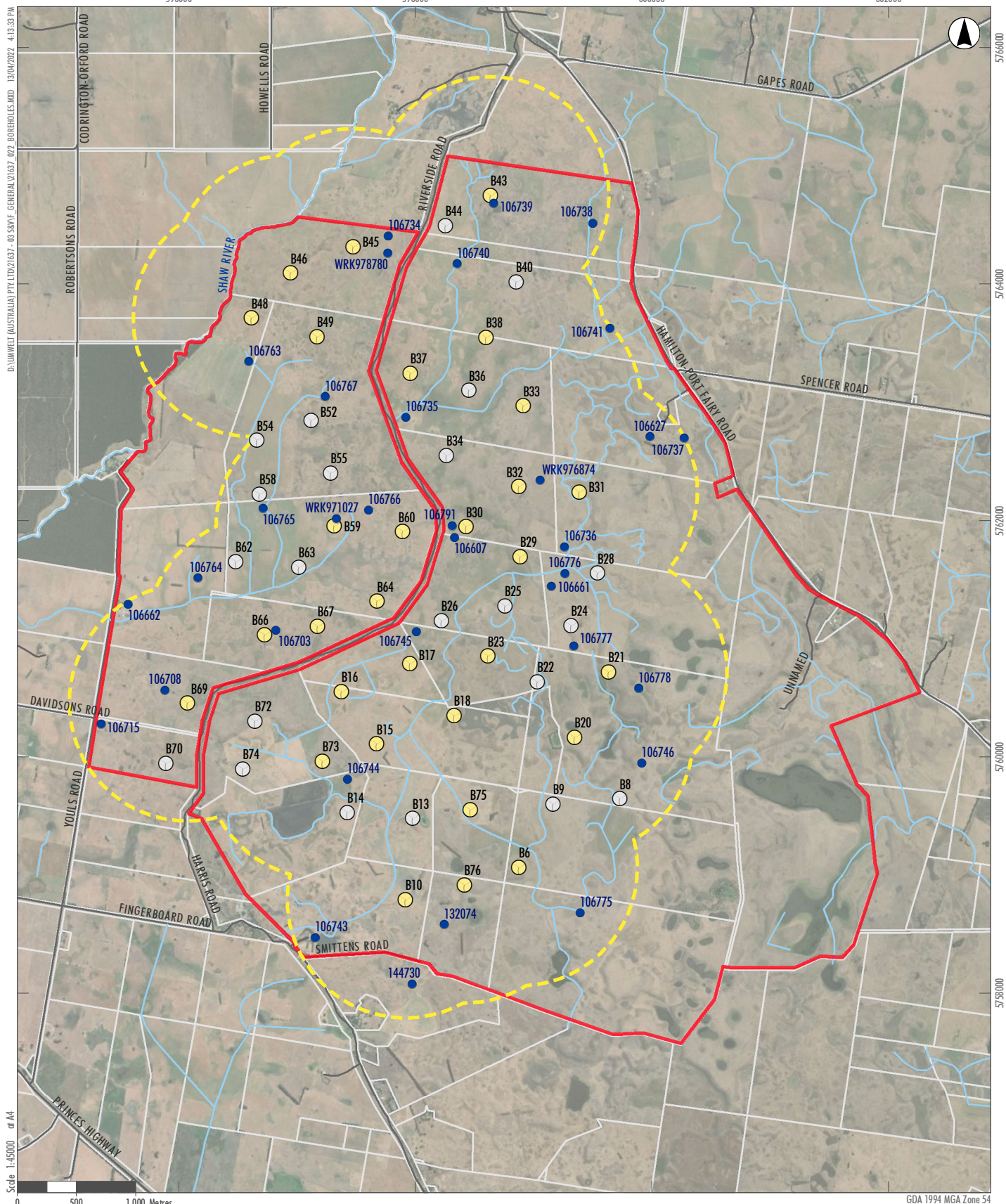


Table 13.1 Locations at which blasting may occur

TURBINE ID at which blasting might occur	GDA94 - MGA Zone 54 Coordinates (m.)		AGD66 - AMG Zone 54 Coordinates (m.)		Rock Strength
	Eastings (X)	Northings (Y)	Eastings (X)	Northings (Y)	
B6	598,877	5,759,061	598,757	5,758,884	Very High
B10	597,917	5,758,790	597,797	5,758,613	High
B15	597,672	5,760,108	597,552	5,759,931	Very High
B16	597,376	5,760,551	597,256	5,760,374	Very High
B17	597,955	5,760,786	597,835	5,760,609	Very High
B18	598,326	5,760,346	598,206	5,760,169	Very High
B20	599,349	5,760,165	599,229	5,759,988	Very High
B21	599,635	5,760,715	599,515	5,760,538	Very High
B23	598,613	5,760,850	598,493	5,760,673	High
B29	598,888	5,761,690	598,768	5,761,513	Very High
B30	598,430	5,761,948	598,310	5,761,771	High
B31	599,385	5,762,242	599,265	5,762,065	Very High
B32	598,877	5,762,286	598,757	5,762,109	Very High
B33	598,914	5,762,968	598,794	5,762,791	Very High
B37	597,956	5,763,248	597,836	5,763,071	Very High
B38	598,599	5,763,549	598,479	5,763,372	Very High
B43	598,636	5,764,754	598,516	5,764,577	High
B45	597,473	5,764,315	597,353	5,764,138	High
B46	596,945	5,764,092	596,825	5,763,915	Very High
B48	596,613	5,763,711	596,493	5,763,534	Very High
B49	597,168	5,763,552	597,048	5,763,375	Very High
B59	597,315	5,761,955	597,195	5,761,778	High
B60	597,891	5,761,905	597,771	5,761,728	High
B64	597,676	5,761,315	597,556	5,761,138	Very High
B66	596,725	5,761,036	596,605	5,760,859	Very High
B67	597,173	5,761,103	597,053	5,760,926	High
B69	596,072	5,760,456	595,952	5,760,279	Very High
B73	597,214	5,759,966	597,094	5,759,789	High
B75	598,465	5,759,554	598,345	5,759,377	High
B76	598,416	5,758,916	598,296	5,758,739	High

13.2.1. LOCATION OF EVERY LICENSED BORE

The location of every licensed bore on any property with an adjoining boundary within 1km of the location of the blasting (ie locations identified in **Table 13.1** above) is shown Figure 13.1.



Legend

- ▬ Project Area
- ▬ 1km Wind Turbine Blasting Radius
- Wind Turbine locations at which blasting might occur
- Wind Turbine locations where blasting is unlikely to be required
- Licensed Bores
- Property Boundaries
- ▬ Roads
- ▬ Drainage Line

FIGURE 13.1

Licensed Bores within 1km of Turbines
Requiring Blasting



13.3. SENSITIVE RECEIVERS AND BUFFER DISTANCES

EPA Publication 1518 Recommended Separation Distances for Industrial Air Emissions recommends a separation or buffer distance of 500m for quarrying of hard rock with blasting. This distance is to address the potential impacts of dust arising from any blasting on sensitive receptors. WorkSafe Victoria (2019) published guidance Safe Distances when using Explosives which establishes the process to determine safe distances in accordance with the requirements of the *Dangerous Goods (Explosives) Regulations 2011* to provide a safe distance for workers and the general public near a blasting area. These guidelines will be used to determine the appropriate buffer distance from the blast area to sensitive receptors based on the type of explosive used and the depth of the blast.

Once the safe distance has been determined an exclusion zone plan is required. All exclusion zone plans will be developed in accordance with the WorkSafe Victoria (2019) Guidance. The exclusion zone plan will identify all sensitive receptors required to be considered including residences, roadside rest areas, toilets, under bridges etc and a schedule for checking them before firing.

Any potentially sensitive site within 1km of the location of the blasting must be identified prior to undertaking any blasting. A review of the wind farm layout endorsed in accordance with Condition 1 of the planning permit (which shows dwellings located within 1km of each turbine location) must be undertaken. The current layout plan (dated 11 November 2021) is provided in Appendix B of this management plan. The sensitive receptors located within 1km of the blasting location will be confirmed via aerial imagery review and site survey to ensure that pre-blast and post-blast qualitative measurements or monitoring are undertaken at all required sites.

Other relevant sensitive receivers to blasting impacts of vibration and overpressure include power poles and road/agricultural infrastructure. These sensitive assets will be included in any assessment of vibration and overpressure prior to a blast event.

The procedure for pre-blast and post-blast qualitative measurement or monitoring at the identified sensitive receptors is provided in Table 13.2.

The exclusion zone will be maintained until the site has been cleared and is ready to be returned to normal conditions. Clearance of all areas, including public places and toilets, will involve the supervisor:

- advising the shotfirer of any fly rock or debris on roads or other areas and removing it
- identifying fumes in underground areas
- collecting all blasting equipment
- advising the shotfirer that the area has been cleared.

People involved in the blasting operation and sentries will remain at their control point until advised by the shotfirer that the area is clear.

13.4. RELEVANT CRITERIA

The Department of Jobs, Precincts and Regions (DJPR) Guidelines for Ground Vibration and Airblast Limits for Mines and Quarries (2020) have been adopted for the determination of appropriate blasting criteria. These criteria are based on the Australian and New Zealand Environment and Conservation Council, Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration, 1990. The blasting and vibration criteria applicable to the Project are detailed below.

13.4.1. AIRBLAST OVERPRESSURE CRITERIA

The airblast overpressure level from blasting operations carried out in or on the premises must be less than:



- 120 dB (Lin Peak) at any time, at any residence or other noise sensitive receiver.

Blast monitoring will be undertaken if the pre-blast assessment predicts overpressure levels within 10% of the criteria at any sensitive receiver.

13.4.2. GROUND VIBRATION (PPV) CRITERIA

The ground vibration peak particle velocity from blasting operations carried out in or on the premises must not exceed:

- 10 mm/s at any time, at any residence or other noise sensitive receiver.

Blast monitoring will be undertaken if the pre-blast assessment predicts ground vibration peak particle velocity within 10% of the criteria at any sensitive receiver.

13.4.3. TIME OF BLASTING

Blasting activities are restricted to the following hours:

- Monday to Friday: 8:00am and 4:00pm
- Saturday: 8:00am and 1:00pm
- Sunday: Nil

Major blasts should only occur once per day.

Blasting will not occur at other times.

The time at which blasting will occur will be confirmed with sensitive receptors within 1km of the blast radius 48 hours in advance.

Relevant guidelines and standards applicable to the management of blasting for the Project are listed below:

- Victorian Government, Dangerous Goods (Explosives) Regulations 2011
- WorkSafe Victoria, 2020, Guidance Note on Blast Management Plans
- WorkSafe Victoria, 2019, Guidelines on Safe Distances when using Explosives
- Australian and New Zealand Environment Council, 1990, Technical Basis for Guidelines to Minimise Annoyance Due to Blasting Overpressure and Ground Vibration.
- AS 2187.1-1998: Explosives – Storage, Transport and Use, Part 1 – Storage.
- AS 2187.2-2006: Explosives – Storage, Transport and Use, Part 2 – Use of Explosives.
- Victoria EPA Recommended separation Guideline distances for industrial residual air emissions 2013
- Victoria EPA Civil construction, building and demolition guide 2020

13.5. BLASTING RESPONSIBILITY

In the event blasting is required, the Construction Contractor will engage a suitably qualified and licensed drill and blast sub-contractor. RCDP will ensure that the shot firer holds a current WorkSafe Victoria licence authorising a person to use blasting explosives. The nominated sub-contractor is currently not appointed. However, the name and qualification of the person responsible for blasting will be provided to DELWP prior to undertaking any blasting.



13.6. MANAGEMENT AND MITIGATION MEASURES

Table 13.1 lists work practices that will be used to control blasting related risks during construction and mitigate the impacts of these risk events. A thorough, documented risk assessment will be undertaken by the licensed blasting contractor to ensure the risks have been reduced using existing risk controls or whether new or additional control measures have to be devised and implemented.

The proposed blasting management programme is outlined in **Table 13.1**.



Table 13.2 Blasting Mitigation Measures

Construction Phase	Management and Mitigation Measures	Responsibility
<i>Source Controls</i>		
Airblast	Predictions of airblast at sensitive receivers within 1km of the blast must be made prior to any blasting activities in accordance with AS 2187.2-2006: <i>Explosives – Storage, Transport and Use, Part 2 – Use of Explosives</i> .	Blasting Subcontractor
	Airblast from blasting must be controlled by ensuring that the explosives have sufficient confinement within the rock mass, to ensure that the explosives' energy is completely used before the gases vent to the atmosphere. From a practical perspective, this means that careful control needs to be maintained on: - the burden on front row blastholes; - the amount of stemming used in blastholes to confine the gases in the holes; and - the rate of movement of the rock mass during the blast.	Blasting Sub-contractor/shotfirer
	The prevailing wind direction has a significant effect on airblast, generally increasing the level of airblast downwind of the blast. No blasting should occur if the prevailing wind is blowing directly towards the nearest sensitive receiver, subject to the receiver being within the predicted zone of airblast influence.	Blasting Sub-contractor/shotfirer
Vibration	Predictions of vibration at sensitive receivers within 1km of the blast must be made prior to any blasting activities in accordance with AS 2187.2-2006: <i>Explosives – Storage, Transport and Use, Part 2 – Use of Explosives</i> .	Site Safety & Environment Officer/ Blasting Sub-contractor
	The vibration generated by blasting must be controlled using two main methods: - Reduce the charge mass of explosives detonating at any instant. - Ensure that the blast design and initiation design promote forward movement of the rock mass. - If any damage to properties and/or structures, the blasting plan will be revised to minimise risk.	Blasting Sub-contractor
<i>Pre-blast</i>		
Condition survey	Prior to the commencement of blasting, an inspection of the nearest sensitive receivers infrastructure within 1km of blasting will be undertaken to assess their prevailing condition. Upon written request, RCDP will undertake an inspection of the material condition of any residence within 2 km of the blasting locations. The inspection will be undertaken within 14 days of the receipt of such a request.	Site Safety & Environment Officer/Construction Manager
Notifications	A schedule of blasts for the proceeding months must be prepared and communicated to affected persons around the site. The schedule should contain detailed information as to the time, location and road closure information.	Construction Contractor/ Site Safety & Environment Officer
	Prior to the commencement of any blast, the Construction Contractor must consult with the Site Safety and Environmental Officer and blasting sub-contractor on the day of the planned blast, prior to handing control of the blast over to the Blasting Sub-Contractor, to determine whether or not to proceed with the blast at that time. Any decision to defer a blast is to be recorded in the same manner as a blast.	Site Safety & Environment Officer/ Blasting Sub-contractor



Construction Phase	Management and Mitigation Measures	Responsibility
	At least 24 hours prior to the commencement of each blast, the Site Safety and Environment Officer will notify all adjoining neighbours with a property boundary within 1km of the blasting location in writing of the intention to undertake blasting. A record is to be kept for each blast detailing contact made, message left or whether they were unable to be contacted.	Site Safety & Environment Officer
	If the planned blast is delayed for more than 2 hours beyond the time communicated to residents, or the blast is cancelled after notification has been made to residents, telephone contact is again made to each of the residents to apprise them of the situation.	Construction Contractor/Site Safety & Environment Officer
	Notifications of a blast must be made to all construction employees via email/signage or the morning pre-start meeting.	Construction Contractor/Site Safety & Environment Officer
Safety of operations	Exclusion zones must be confirmed by the blasting sub-contractor and implemented considering the location of the shot firer, general construction employees and members of the public.	Blasting Subcontractor
	All personnel/members of the public within the zone of influence must be confirmed to be within a 'safe zone' prior to any blast event.	Blasting Sub-Contractor
	Access to the exclusion zone must be strictly controlled during the blasting operation. Appropriate signage will be erected to alert local landowners, Project personnel, contractors and visitors to the proposed blasting. The site clearance and post-blast reoccupation protocol shall be implemented in accordance with the blasting sub-contractors' standard procedures and in accordance with WorkSafe Victoria Guidance (2019).	Blasting Sub-contractor
	Clearance of all areas, including public places and toilets will be undertaken. The shotfirer will be notified when the area has been cleared.	Construction Contractor/Site Safety & Environment Officer
<i>Air Quality</i>		
Dust	Drill rigs are to be fitted with dust control equipment and coarse material is to be used to stem blasts. Drill rigs are to use water injection for drilling and drill areas are to be wetted down prior to drilling during dry and windy conditions.	Blasting Sub-contractor/ Construction Contractor/ Site Safety & Environmental Officer
	Blasting will be undertaken using procedures that will involve an assessment of meteorological conditions prior to blasting in accordance with the Blasting Contractor's Site Blast Management Plan.	Blasting Sub-contractor
	Further dust mitigation measures are included in the Construction and Worksite Management Plan.	
<i>Storage and Handling of Explosives</i>		
General	The storage of explosives on-site shall be in accordance with AS 2187.1-1998: Explosives – Storage, Transport and Use, Part 1 – Storage. Theft of explosives shall be reported immediately.	Blasting Sub-contractor
<i>Flyrock Management</i>		
General	The blasting sub-contractor is to ensure that all blasts are designed in such a manner as to ensure that no flyrock is ejected from the site or on to any infrastructure established on-site. The blasting sub-contractor is to ensure that all people and livestock are excluded from the zone of exclusion during blasting.	Blasting Sub-contractor



Construction Phase	Management and Mitigation Measures	Responsibility
	Where the zone of exclusion extends beyond the site property boundary, necessary traffic controls are to be in place to prevent damage to people and property.	Construction Contractor/ Blasting Sub-contractor
<i>Post-blast Activities</i>		
Review	Following each blast a post-blast review must be conducted. The Site Safety and Environmental Officer is to participate in any review where the abovementioned overpressure/vibration criteria are exceeded, or where complaints have been received in regard to the blast.	Blasting Sub-contractor / Site Safety & Environmental Officer
Condition survey	After the blast, an inspection of the nearest sensitive receivers infrastructure within 1km of blasting will be undertaken to assess their condition. In accordance with any written request for a pre-blast inspection, after the blast RCDP will undertake a follow-up inspection of the material condition of any residence within 2 km of the blasting locations.	Site Safety & Environment Officer/Construction Manager
General and Reoccupation	Following each blast the exclusion zone will be disestablished. . The shotfirer will be advised of any flyrock on roads or other areas and this will be removed. Any fumes in underground areas will be identified. All blasting equipment will be collected. The shotfirer will undertake a post blast inspection to ensure that no explosives have been left unignited. The inspection will include a visual inspection of all locations at which explosives were placed. In case of a misfire, any unexploded charges will be detonated with a secondary shot, or will be excavated and removed according to the shotfirers instruction. When the inspection is completed and it is confirmed that all shots/explosives have been ignited during the blast, the site controller will be notified that the site can be reoccupied.	Blasting Sub-contractor/ Construction Contractor/ Site Safety & Environmental Officer

Table 13.3 Blasting Monitoring Programme

Element	Criteria	Frequency	Location	Procedure and Instrumentation
Overpressure	120 dB (Lin Peak) at any time, at any residence or other noise sensitive receiver.	If pre-blast assessment predicts results within 10% of criteria	Nearest sensitive receiver	Real-time monitors, which will relay the measured results for ground vibration and sound overpressure to the main receiver, shall be used. Instruments shall be manually triggered prior to each blast. Instrumentation used to monitor compliance will meet the requirements of Australian Standard 2187.2.
Vibration	Exceed 10 mm/s at any time, at any residence or other noise sensitive receiver.	If pre-blast assessment predicts results within 10% of criteria	Nearest sensitive receiver	
Flyrock	No flyrock is ejected from the site or on to any infrastructure established on-site	Every blast	Exclusion zone	All blasts will be closely observed and may be periodically recorded on video for analysis.



13.7. SITE CLEARANCE AND POST-BLAST REOCCUPATION PROTOCOL

Within 48 hours and prior to 24 hours before blast

1. The Site Safety and Environment Officer must attempt to communicate the intention to blast to each potentially affected resident.
2. Emergency services and other Authorities including police, WorkSafe Victoria, fire authority and air traffic control will be notified of the proposed blast.
3. Exclusion zone will be confirmed.
4. Briefings for all persons working on site about the operation of the exclusion zone eg waiting areas/approximate timings/warning sirens/signals will be undertaken.

Day of Blast

5. Confirm 24 hour notification requirements have been completed.
6. Notify all employees, sub-contractors, visitors etc. (pre-start meeting) of intention to blast.
7. Observe weather conditions and decide to proceed with blast.
8. Place advisory signage around the site – show blast time and location.
9. Ensure all sentries identified in the blast management plan have appropriate PPE, communication equipment (i.e. portable radio and mobile phones as back up) and other appropriate sentry equipment before being posted.
10. Remove all unnecessary plant and equipment from the zone of exclusion.

Firing the Blast

11. Control of the blast will be handed over to the licensed blasting contractor to proceed as per their Site Blast Management Plan.

Reoccupation Protocol

12. Following each blast a post-blast review must be conducted. The Site Safety and Environmental Officer is to participate in any review where the abovementioned overpressure/vibration criteria are exceeded, or where complaints have been received in regard to the blast.
13. After the blast, an inspection of the nearest sensitive receivers infrastructure within 1km of blasting will be undertaken to assess their condition.
14. In accordance with any written request for a pre-blast inspection, after the blast RCDP will undertake a follow-up inspection of the material condition of any residence within 2 km of the blasting locations.
15. Following each blast the exclusion zone will be disestablished. . The shotfirer will be advised of any flyrock on roads or other areas and this will be removed. Any fumes in underground areas will be identified. All blasting equipment will be collected. The shotfirer will undertake a post blast inspection to ensure that no explosives have been left unignited. The inspection will include a visual inspection of all locations at which explosives were placed. In case of a misfire, any unexploded charges will be detonated with a secondary shot, or will be excavated and removed according to the shotfirers instruction. When the inspection is completed and it is confirmed that all shots/explosives have been ignited during the blast, the site controller will be notified that the site can be reoccupied.



13.8. COMPLAINT HANDLING AND INCIDENT RESPONSE

All complaints will be managed in accordance with the complaints management procedures described in **Section 6.3**.

All environmental incidents will be handled according to the RCDP incident management process described in **Section 9**.

13.9. INSPECTIONS AND REPORTING

A pre- and post-blast inspection will be undertaken for each blast event (infrastructure asset condition assessment etc.). This inspection will ensure that appropriate blasting controls are being implemented and are effective. The outcomes of these inspections will be reported in checklists and monthly construction project reports.

Monitoring results will be reported for each blast, evaluated and actioned accordingly. Following each blast a post-blast review will be conducted and reported to the Construction Manager.

Records of monitoring results will be maintained at all times during the Project construction and available for inspection by the relevant Government agencies at any time.



14. ARCHAEOLOGICAL MANAGEMENT PLAN

(CULTURAL HERITAGE MANAGEMENT PLAN)

Refer to Annex F



15. PEST ANIMAL MANAGEMENT PLAN

Refer to Annex G



16. PEST PLANT MANAGEMENT PLAN

Refer to Annex H



17. BUSHFIRE PREVENTION AND EMERGENCY RESPONSE PLAN

Refer to Annex I



Annex A Site Location Plan



Legend

- Site boundary
- Highway
- Main road
- Other road
- Waterway
- Townships
- Distance from the nearest turbine

Client: Ryan Corner Development Pty Ltd
Project: Ryan Corner Wind Farm

Drawing No: 0105123m_01 Suffix No: R1
Date: 10/01/2012 Drawing size: A4
Drawn by: JC Reviewed by: -
Source: -
Scale: Refer to Scale Bar



0 1.25 2.5 5km

Figure 2.1

Site Layout

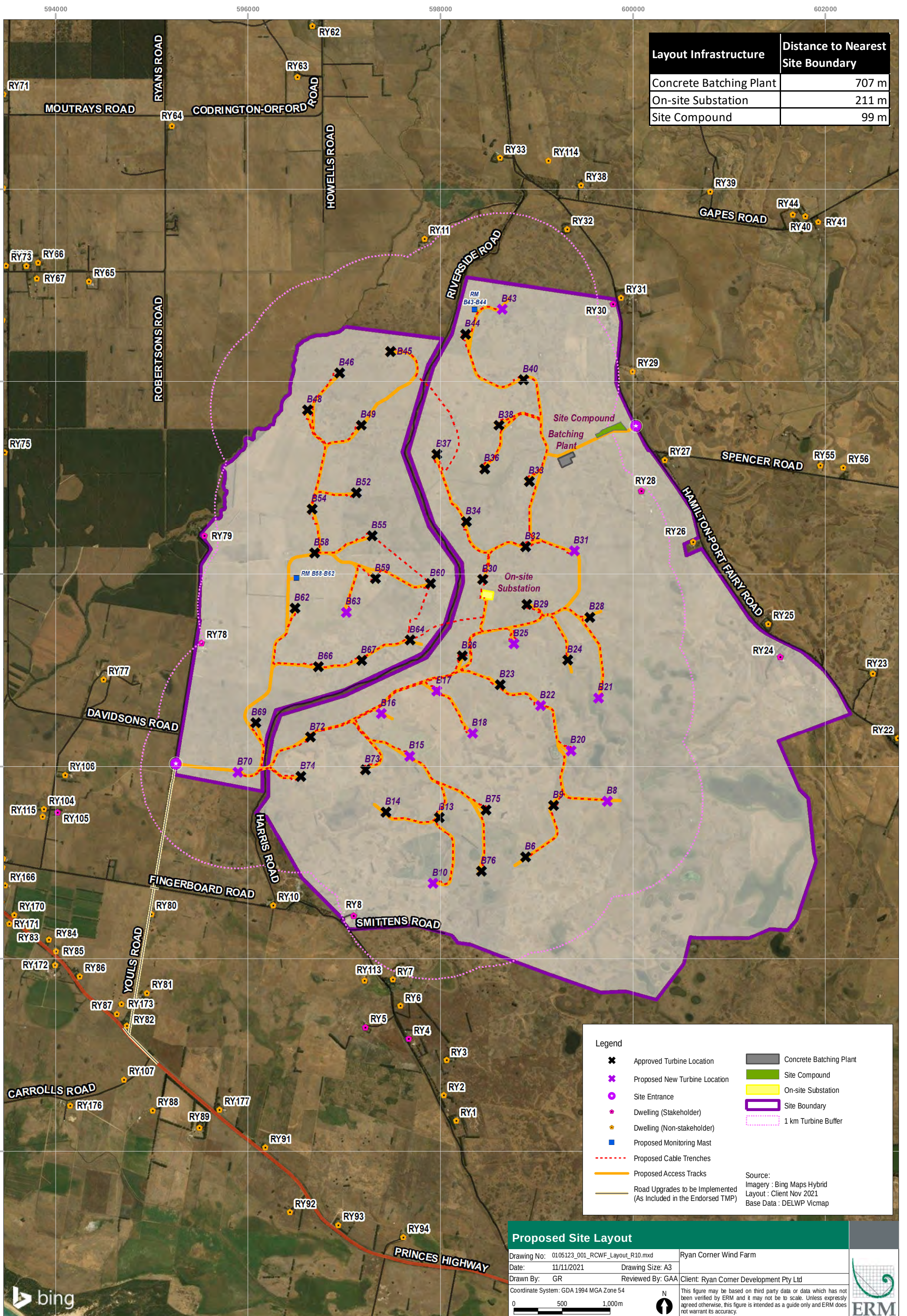
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Annex B Turbine Layout





Annex C Sediment, Erosion and Water Quality Management Plan

Report

**SEDIMENT EROSION AND WATER QUALITY
MANAGEMENT PLAN
RYAN CORNER WIND FARM**

27/04/2022



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1. INTRODUCTION

This Sediment, Erosion and Water Quality Management Plan (SEWQMPSEWQMP) is for Ryan Corner Wind Farm (the Project). The proponent is Ryan Corner Development Pty Ltd (RDPL), a wholly owned subsidiary of Global Power Generation Australia Pty Ltd (GPGA). GPGA is the Australian subsidiary of Global Power Generation, the international generation arm of Naturgy Group. Construction of the Project will be undertaken on behalf of RDPL by a construction contractor (yet to be procured).

Further detailed project information can be found in the following documents:

- Ryan Corner Wind Farm Environmental Management Plan (ERM 2021);
- Ryan Corner Wind Farm Environmental Effects Statement and Application for Planning Permit (ERM 2006); and
- Ryan Corner Wind Farm Amendment to Permit No. 20060222, Planning Permit Assessment Report (ERM, 2017).

1.1. PURPOSE AND SCOPE OF THIS SEWQMP

The SEWQMP is required under Condition 17b of Planning Permit No. 20060222-A, the planning permit for the development and operation of the wind farm. It has been prepared to supplement the *Ryan Corner Wind Farm Environmental Management Plan* (ERM, 2021) (the Site EMP).

The SEWQMP serves as a framework management document and outlines the fundamental principles to be followed in the planning and implementation of erosion and sediment control measures for the entire project.

The purpose of this SEWQMP is as an overarching management document. It does not include detailed engineering design of structures, nor does it provide plans showing the layout of all erosion controls across the site.

This SEWQMP:

- outlines the site constraints including identification of sensitive areas;
- provides a description of the project and key erosion and sediment control risks;
- assesses the erosion hazard at the site;
- provides directions for installing, monitoring and maintaining a suite of erosion and sediment control;
- describes how RDPL and the future construction contractor will manage and control sediment, erosion and water quality risks associated with the construction of the project; and
- outlines the roles and responsibilities of those involved in the implementation of sediment, erosion and water quality management controls.

1.2. OBJECTIVES

The primary objective of this SEWQMP is to minimise erosion, manage sediment and minimise impacts on water quality consistent with relevant State policies and guidelines. This can be achieved by:

- minimising ground disturbance during construction activities;
- stripping, stockpiling and conserving topsoil for later use in rehabilitation;
- managing the flow of stormwater through and around construction areas;
- diverting 'clean' run-on stormwater away from construction areas and separate 'clean' from 'dirty' stormwater, where practicable;



- conveying dirty waters to sediment traps to capture sediment and minimise water pollution;
- installing, monitoring and maintaining erosion and sediment controls in accordance with relevant guidelines and industry best practice;
- ensuring storage and handling of fuels and hazardous chemicals is in accordance with EPA guidelines, to prevent release of hazardous materials to the environment;
- rehabilitating the site progressively with vegetation including pasture grasses, to stabilise the site and restore its agricultural viability; and
- complying with the requirements of applicable legislation and the Minister's Conditions of Approval for the Project.

1.3. RESPONSIBILITIES FOR SITE MANAGEMENT AND PLAN IMPLEMENTATION

RDPL is accountable for implementation of the EMP during construction. Both RDPL and the future head contractor will share some responsibilities for the implementation of the EMP during the construction phase.

All site staff have responsibilities and authorities in relation to environmental management including:

- the right and authority to stop work or refuse to work in a situation that may cause environmental harm;
- duties and responsibilities to prevent pollution; and
- obligations to respond to environmental incidents, including their prevention, cleanup and reporting.

These, and other general obligations, are included in the site induction and outlined further in the Site EMP. Environmental consultants may be commissioned by RDPL as required to provide specialist input and advice on environmental matters, undertake surveys, inspections and monitoring.

Consultants may also be required to prepare environmental reports in consultation with the head construction contractor.

All contractors, sub-contractors and personnel are accountable through conditions of employment or contractual arrangements for ensuring that their work complies with the stated Site EMP framework and procedures.

This SEWQMP will be reviewed and approved by the Site Environmental Officer before works commence.

RDPL and the future head construction contractor will ensure that management controls are appropriately implemented, regularly monitored and audited to assess their effectiveness. Changes to the controls will be instigated if they are not achieving their stated objectives to the satisfaction of the Responsible Authority and any other relevant authorities.

The head construction contractor will prepare their own Construction Environmental Management Plan (CEMP) that will capture the requirements of this SEWQMP and any additional measures required to manage the erosion, sedimentation and water quality risks of the project. The CEMP will outline the requirements for each area of works, and with a particular focus on high risk locations such as watercourse crossing.

1.4. PROJECT OVERVIEW

The Ryan Corner Wind Farm Project will be developed in south west Victoria. The site is approximately 12 km North West of Port Fairy, adjacent to the Hamilton-Port Fairy Road in the Shire of Moyne (as shown in **Figure 1.1**).

The site is generally bordered to the:

- north by individual properties;
- north east and east by the Hamilton–Port Fairy Road;



- south and south east by individual properties; and
- west by Shaw River and Youl's Road.

The site has an area of approximately 3,400 hectares.

The site is dissected by Riverside Road/Harris Road which is a government controlled crown land reserve, managed by Moyne Shire Council. Overall this road reserve does not form part of the wind farm site; however, there will be a requirement to use a small portion of the reserve for a single track crossing and some underground cabling to cross it (as shown **Figure 1.2**).



Figure 1.1 Locality Plan



- Legend**
- Site boundary
 - Highway
 - Main road
 - Other road
 - Waterway
 - Townships
 - Distance from the nearest turbine

Client:	Ryan Corner Development Pty Ltd
Project:	Ryan Corner Wind Farm
Drawing No:	0105123m_01
Suffix No:	R1
Date:	10/01/2012
Drawn by:	JC
Reviewed by:	-
Source:	-
Scale:	Refer to Scale Bar



Figure 2.1
Site Layout

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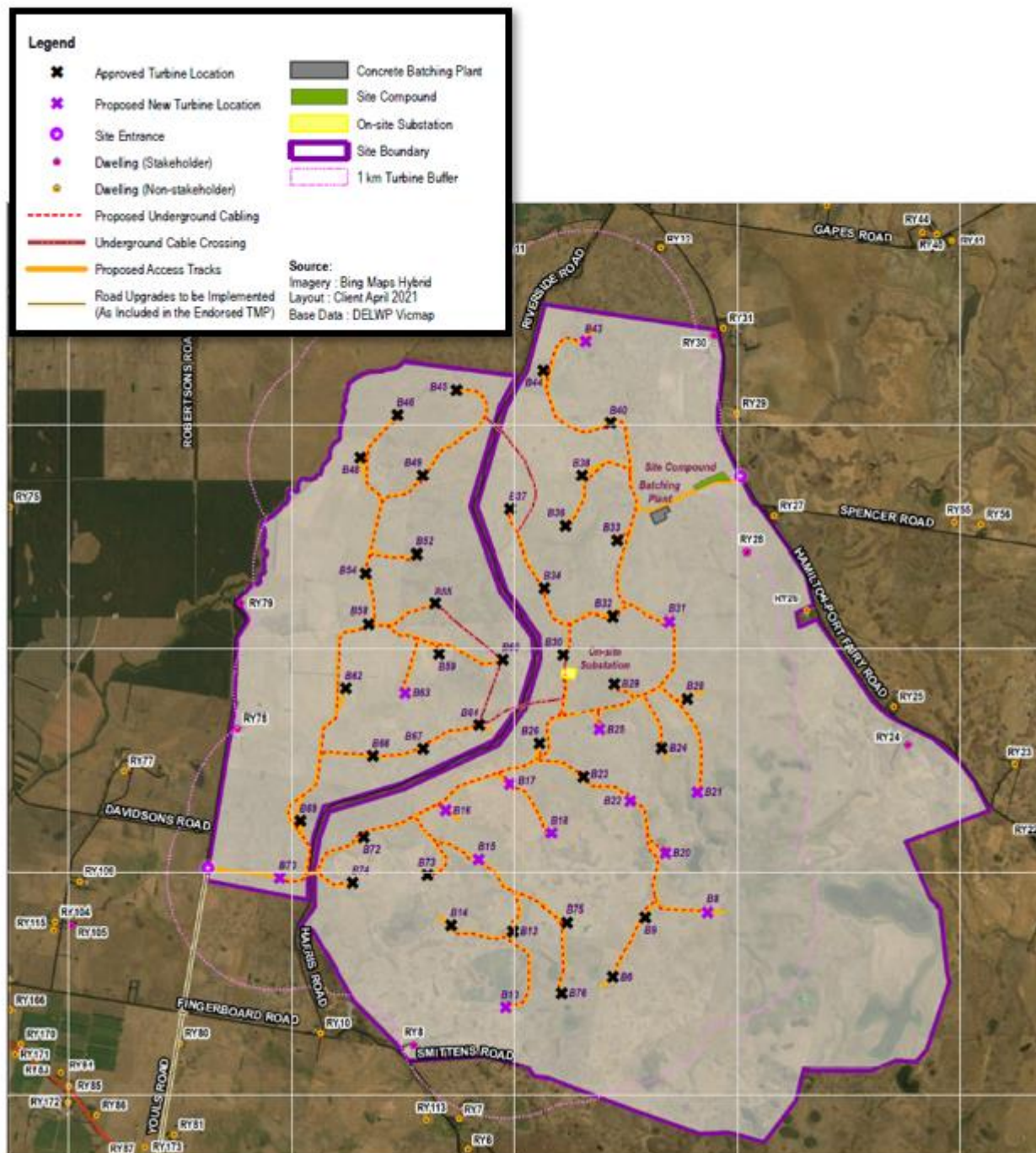
The main components of the Project are:

- 52 Wind Turbine Generators (WTGs);
- a 33/132 kV on-site substation;
- underground/overhead electrical cable network, linking each turbine to the substation;
- external connection to the national electricity grid, through on-site and off-site high voltage electrical substations and associated power line connection;
- a control room/facilities building;
- two site access points (Youls Road and Hamilton-Port Fairy Road);
- a network of internal access tracks; and
- wind monitoring towers (temporary).

Figure 1.2 shows the proposed site layout including the location of the turbines, tracks, network connection, and control room/facilities building.



Figure 1.2 Wind Farm Layout





1.5. CONSULTATION

As per the wording of Condition 17(b) of the Planning Permit, the SEWQMP must be prepared in consultation with the Glenelg-Hopkins Catchment Management Authority.

The CMA provided two letters (dated 30/11 and 10/12) and these letters highlighted concerns around the location of turbines, access tracks and hardstands in relation to water courses and drainage lines. The main concern included that the CMA would be unlikely to issue a works on waterway permit if the construction footprint was in a designated waterway.

In response to this concern, the following changes were made to the layout plan (dated 15.02.21):

- Relocated turbines and associated roads and platforms (B22, B25, B31, B63) to relocate the turbines more than 50m of a waterway.
- Relocated turbine B70 to avoid potential seasonal herbaceous wetland.
- Relocated roads and platforms to avoid wetlands:
 - B73 – B74
 - B29 – Substation
 - B44 – B40
 - B70 – B69
- Relocated concrete batching plant to be more than 100m from a waterway.
- Removed turbine B35

Furthermore, a plan has been provided at **Figure 1.3** showing the locations of the turbines in relation to water courses and drainage lines.

These changes are considered to address CMA's concerns.

1.5.1. FLOODING STUDY

A flooding study has been conducted by the proponent.

The study used official Australian flood information, and noted that the location area of the wind farm was not covered by this information. The study determined that this does not mean that the risk of flooding can be ruled out since there is an important stream in the western area of the project and this overflow could affect the wind farm. Likewise, the superficial runoff generated by heavy storms could also develop relevant flooding.

An IBER hydraulic model was developed to get accurate estimation of flooding risk related to the possible overflow of the mentioned stream. This model has run with a 50 year return period flow published by the Australian Rainfall & Runoff application (<http://rffe.arr-software.org/>), and analysed the hydrodynamic regime of the stream and its floodplain in two dimensions. It showed that the overflow of the stream does occur for the return period of 50 years suggested by the official Guide to Road Design Part 5: Drainage General and Hydrology. Considerations, and that the flood does not exceed 20 cm in depth and 0.25 m/s in speed in the areas where the wind turbines and their service roads are located. Therefore, risk flooding by stream overflow may be minimised as long as the project provides a lift of around 30 cm above the natural terrain to potentially affected roads.



It was also noted that the wind farm is located in a special geomorphological area with a large number of depressions where water stacks due to a clayey geology without an effective natural drainage network. For this reason, in order to analyse the potential effects of this superficial runoff and its corresponding accumulations of water, an IBER model of rain-runoff transformation was developed to simulate how the terrain responds to intense precipitation events. The following results were found:

1. For a 10-year return period stage suggested by the official *Guide to Road Design Part 5: Drainage General and Hydrology*. Considerations for service roads like the ones of the wind farm, the IBER model of rain-runoff transformation showed significant accumulations of water which intercepted some roads and platforms of wind turbines.

Due to the design of the project, the flood area that intercepts those elements does not exceed 30 cm in depth. Therefore, risk flooding by runoff may be minimised by providing affected roads little more than 30 cm of lift above the natural terrain.

Additionally, cross-drainage culverts will have to be carried out wherever a flow of water crosses a road, and water ponds crossed by roads will be hydraulically connected through pipes.

2. For 200-year return period stage suggested by the official *Guide to Road Design Part 5: Drainage General and Hydrology*. Considerations for electricity supply stations, the IBER model of rain-runoff transformation shows a maximum flood depth of 10 cm in the area where the electricity supply station is located. This can be avoided by providing a platform of 10 cm above the natural terrain.





2. METHODOLOGY

A review of relevant documents was undertaken to provide background information on the existing environment and the proposed construction works. Relevant documents included:

- Ryan Corner Wind Farm Environmental Management Plan (ERM 2021); and
- Ryan Corner Wind Farm Environmental Effects Statement and Application for Planning Permit (ERM 2006); and
- Ryan Corner Wind Farm Amendment to Permit No. 20060222, Planning Permit Assessment Report (ERM, 2017).

Erosion hazard was assessed in the key work areas to determine where specialised management techniques are required and also where more conventional techniques may be effective in reducing the hazard to acceptable levels.

Guidelines used in the preparation of this report included the following documents:

- Soil Conservation Authority, Control of Erosion on Construction Sites;
- EPA Victoria, Bunding, Publication 347.1, 2015;
- EPA Victoria, Code of Practice – Onsite Wastewater Management, Publication 891.4, 2016;
- EPA Victoria, State Environment Protection Policy (Waters), No. S-499, 2018;
- EPA Victoria, Civil construction, building and demolition guide, Publication 1834, 2020;
- EPA Victoria, Construction Techniques for Sediment Pollution Control, Publication 275, 1991;
- EPA Victoria, Reducing risk in the premixed concrete industry, Publication 1806, 2019; and
- Landcom NSW, Managing Urban Stormwater Soils and Construction (Volume 1, 4th edition), 2004 (commonly known as the Blue Book).

The Landcom NSW (2004) guidelines are referenced in this SEWQMP as they are widely recognised as the benchmark erosion and sediment control manual in Australia. The principles and design advice provided in Landcom (2004) represent Australian best practice and the guidelines are endorsed by organisations such as the Australasian chapter of the International Erosion Control Association. Where advice given in Landcom (2004) conflicts with advice in Victorian guidelines, it is recommended that relevant authorities be contacted to discuss the preferred approach.

Detailed construction advice for a wide range of erosion and sediment control practices is provided in Landcom (2004), including a set of Standard Drawings (abbreviated SDs). A number of these SDs relevant to this project have been reproduced in **Annex C**.



3. SITE DETAILS

The Ryan Corner Wind Farm site is located in an area dominated by agricultural land use and mostly cleared of native vegetation. Coastal plains are located to the south and east of the site and are primarily derived from calcarenite, marl and silt deposits.

Stony-rises are the most common geomorphological feature found on the site and extend north and west of the site. These stony-rises, resulting from basaltic flows, form intervening depressions that can contain small wetland areas. The basaltic flows provide a rich agricultural resource across the region.

The site slopes generally from the northeast to southwest with elevations ranging between approximately 50 and 30 m AHD. The mostly flat landscape is stable and does not display any significant signs of accelerated erosion or land degradation as a result of past agricultural activities. These features suggest the erosion hazard at the site is low.

3.1. SOILS

Soils derived on the basalt plains at the site tend to be shallow, stony and of moderate fertility. They are subject to agricultural use, predominantly supporting native and improved pastures for low intensity grazing. There is no indication that the soils are significantly dispersible; therefore, a standard suite of erosion and sediment controls is appropriate.

3.2. VEGETATION

Vegetation cover plays a significant role in the effective management of erosion. Preventing soils from being exposed to the erosive forces of wind and water by providing a layer of vegetation can reduce erosion and subsequent sedimentation. An understanding of the vegetation composition before disturbance allows for planning for rehabilitation activities to revegetate the site to a condition similar to the pre-disturbance state.

The long agricultural use of the site has resulted in it largely consisting of pasture grasses with little overstorey vegetation. There are isolated occurrences of native species located within and adjacent to the Riverside Road reserve. This road reserve supports a high diversity of native grasses.

3.3. WATERCOURSES AND LEGISLATIVE REQUIREMENTS

A number of waterways are located within and adjacent to the site that are at risk of pollution, should sediment become entrained in stormwater and travel off-site. These receptors include Ritchies Creek and Shaw River, which drain through the western part of the site and into Yambuk Lake further south.

The site also contains a number of ephemeral water bodies (wetlands) including Island Swamp and the Duck Hole, which drain into Goose Lagoon further south. The size and depth of these water bodies varies with some being commonly dry during summer months. However, some of the waterbodies are more permanent. It is understood that the Duck Hole has dried out only once in the last fifty years (**Figure 1.1**). The locations for these waterbodies and site topography are primary considerations in the positioning of site infrastructure and development of the erosion and sediment control plan.

During wet periods other large areas of the site can become inundated with water. The site is not located within a Land Subject to Inundation Overlay under the Moyne Planning Scheme, however advice from the Glenelg Hopkins Catchment Management Authority (CMA) indicated that areas of the site are low-lying and indicative of potential wet/inundated areas during wet years or following large rainfall events. Before finalising the location of the turbines, access tracks, and batching plant, an assessment of flooding for the site will be undertaken by a suitably qualified professional. This assessment will inform the final location of these assets, or any design/construction controls to be implemented and included in the head Construction Contractor's CEMP. As such, an assessment of flooding has been done by the proponent.



Relevant water quality criteria are stipulated in the SEPP (Waters) and ANZG (2018) guidelines for fresh and marine water quality. The ANZG (2018) guidelines also include a guide for deriving guideline values for water quality.

The State Environment Protection Policy (Waters) (SEPP) requires that land disturbance activities be carefully controlled and soil conservation measures undertaken to minimise soil erosion and the discharge of sediments and other pollutants to waters. The SEPP requires that monitoring of surface waters where the construction activity adjoins or crosses surface waters must be undertaken by the party responsible for the construction activity to assess if beneficial uses are being protected..

A designated waterway can generally be defined as:

- A river, creek, stream or watercourse; or
- A lake, lagoon, swamp or marsh.

Glenelg Hopkins CMA has provided a map of designated waterways within and in the vicinity of the site. This map is provided at Annex D.

The authorisation of works on designated waterways is managed by Glenelg Hopkins CMA through the Authority's Waterways Protection By-law under the provisions of the Water Act, 1989, Section 219. Glenelg Hopkins CMA has the regulatory role of managing permits to ensure that works undertaken on designated waterways are performed in an environmentally sound way to ensure protection of waterways.

Prior to works being undertaken on a waterway within the Glenelg Hopkins Region, the person responsible for the works is required to have a permit issued from Glenelg Hopkins CMA. Permits are required for both permanent and temporary works. Works to be undertaken that may require permits include (refer **Figure 1.2**):

- construction of road crossings (eg culverts, bridges or causeways) and trenching for service installation, in a number of locations along Ritchies Creek;
- construction of wind turbine towers in close proximity to Ritchies Creek and the unnamed southwestern wetland area.

During detailed design stage the precise locations of all infrastructure and services would be determined. Glenelg Hopkins CMA would be contacted to identify those works requiring permits, once the detailed design is completed.

Any works on waterways must maintain or improve the environmental value of the site and surrounds, and not create off-site impacts during construction. To obtain a permit, applicants must demonstrate that the proposed works will meet hydraulic and environmental criteria and not adversely impact on cultural or heritage issues. To help achieve this objective, the head Construction Contractor's CEMP will capture this requirement for all works on waterways and will be provided to the Glenelg Hopkins CMA on request.

3.4. CLIMATE

Climatic factors such as rainfall and temperature patterns are relevant to the SEWQMP in a number of ways. Rainfall is the main agent of erosion and therefore, wet or stormy months are more likely to generate erosion-causing rainfall than dry months. Climatic factors control soil moisture regimes and will have an influence on revegetation timing and methods.

The mean annual rainfall at Ryan Corner is 785.0 mm (refer **Table 3.1**). On average, August is the wettest month with a mean monthly rainfall of 91.3 mm, while February is the driest month with an average of 34.3 mm. Annual average evaporation rates exceed annual average precipitation rates by almost double. Rainfall is commonly winter and spring dominant, and major rainfall and erosion events are more likely to occur in the June to September period.



For a large part of the year (October through to April) average evaporation exceeds average rainfall and this moisture deficit may lead to water stress, particularly in newly establishing plants. Supplementary watering is likely to be required during these times to assist revegetation. Conditions favourable to vegetation establishment without supplementary watering are most likely to occur during Autumn and early winter.

Table 3.1 Rainfall and Evaporation Data for the Ryan Corner Area

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN.
Mean monthly rainfall (mm) ¹	36.0	34.3	51.4	64.4	77.1	82.9	90.5	91.3	80.24	70.87	57.7	49.4	735.0
Mean monthly evaporation (mm) ²	207.7	190.4	155	87	52.7	36	43.4	58.9	75	105.4	129	170.5	1311
¹ Rainfall Data from Koroit 090051 (1889 – 2010), Latitude: 38.29° S, Longitude: 142.37° E ² Evaporation Data from Hamilton Research Station 090103 (1965 – 2000), Latitude: 37.83° S, Longitude: 142.06° E													



4. EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES

The following sections provide an assessment of the erosion hazard at the site, identify the erosion and sediment controls that will be suited, and provide design criteria for those controls.

4.1. EROSION HAZARD ASSESSMENT

Erosion hazard at the Ryan Corner wind farm site was estimated using the Revised Universal Soil Loss Equation (RUSLE) and details are provided in **Annex B**. The RUSLE provides a quantitative estimation of erosion hazard based on five factors: rainfall erosivity; soil erodibility; slope length and gradient; soil cover and management practices. A detailed description of the RUSLE equation and its contributing factors is provided in Landcom (2004).

The overall erosion hazard has been assessed as very low. This is a consequence of favourable climatic conditions (low rainfall erosivity) and the low slope gradients, which limit the generation of high velocity, erosive runoff. Localised areas of greater erosion hazard will exist, for example where steeper slopes occur (eg road batters) and in areas of concentrated water flow, such as along watercourses and table drains. Particular attention to erosion control should be applied in these areas.

4.2. DESIGN ARIS AND CALCULATION OF PEAK FLOWS FOR CONTROL DEVICES

Many erosion and sediment devices, particularly those associated with the conveyance of concentrated water flows, must be designed for the predicted stormwater flows they will carry. This is to ensure that devices are sized to convey and remain stable during the predicted peak flows during the design storm event.

Landcom NSW (2004) (the “Blue Book”) recommends average recurrence intervals (ARIs) for design of erosion and sediment controls as shown in **Table 4.1**. All earthworks, including waterways/drains/spillways and their outlets, will be constructed to be stable in at least the 10-year ARI, time of concentration (tc) storm event.

Table 4.1 Design ARIs in Years for Erosion and Sediment Control

Control Measure Life	0-12 months	12-28 months	> 4 years
Diversion bank	1-10	10-20	Further design required
Level Spreader	1-10	10-50	Further design required
Waterway	1-10	10-50	Further design required
Sediment trap	1-5	5-20	Further design required
Outlet Protection	1-20	20-100	Further design required
Grade Stabilisation	1-20	1-100	Further design required
¹ Landcom (2004)			

To calculate design flows requires knowledge of catchment areas as well as historical hydrological data on rainfall intensity, frequency and duration (IFD). An IFD table was developed for the site using the process outlined in Australian Rainfall and Runoff (Pilgrim, 1987) and a copy is provided in **Annex A**.

Data from the IFD table will be used to calculate peak flows and design control measures for individual catchments, during preparation of CEMPs where relevant. Designs will be undertaken by suitably experienced personnel.



4.3. STAGING OF WORK

Works shall not commence in any area until the relevant erosion and sediment controls described in the construction contractor's CEMP for that area have been installed. Staging of work should proceed in the following order:

- confine ingress to and egress from the site to a single stabilised access point. Sediment or barrier fencing will be used to define the access point;
- install sediment fence (downslope) and barrier fence (upslope) of all works areas to define the site and minimise unnecessary disturbance;
- install geotextile silt fences (with sedimentation basins where appropriate) on all drainage lines from the site which are likely to receive run-off from disturbed areas;
- install upslope stormwater diversion drains and their stabilised outlets;
- install additional sediment traps or sediment basins and their stabilised outlets as relevant;
- install earth banks or catch drains to divert runoff (overland flow) from construction areas to sediment traps to prevent the concentration and diversion of waters onto steep or erosion prone slopes;
- clear the site and strip and stockpile topsoil and subsoil separately;
- undertake essential construction works ensuring that erosion and sediment controls are regularly maintained and new controls installed as required, as works proceed;
- connect roof stormwater systems to permanent drainage as soon as practicable;
- on completion of construction works, replace topsoil and rehabilitate the site ensuring that permanent stabilisation is achieved within 20 days of completion of construction works; and
- remove temporary erosion and sediment controls only after the areas that they protect are successfully stabilised.

4.4. EROSION CONTROL

Erosion control measures to be implemented during construction activities are as follows:

- Confine all land disturbances to a minimum practical working area and limit disturbance to two metres beyond the edge of any essential construction activity, to remain in the vicinity of the identified works area;
- plan construction works to limit the amount of disturbed area at any one time;
- provide a single stabilised site access point to each key construction area that is defined using sediment fence (downslope) and barrier fence (upslope). The access point should be stabilised by sealing with concrete or asphalt, or constructing a stabilised site access formed with loose rock fill (refer SD 6-14);
- clearly visible and sturdy barrier fencing will be erected at the discretion of the Site Environmental Officer to define essential construction areas and help minimise unnecessary disturbance by preventing vehicular (cars and construction machinery) and pedestrian access to restricted areas; and to help reduce wind and water erosion as a consequence. Barrier fence will be installed upfront and before construction works commence in any given area;
- divert clean stormwater from upslope of disturbed areas using earth banks or catch drains, and using energy dissipaters or level spreaders at their outlets as appropriate, to discharge stormwater in safe areas, avoiding erosion and flooding hazards. In some situations this requirement may be removed if there is minimal risk of run-on (for example on crests);



- limit vehicular access to the site to that essential for construction work and ensure all vehicles park in designated areas that have been suitably stabilised (e.g. with road base);
- before construction, strip topsoil and stockpile this for later use in rehabilitation;
- forward stripping of vegetation and topsoils will be undertaken as close as possible (and no more than two weeks in advance of) commencement of bulk earthworks and other construction activities, in individual areas;
- coordinate work schedules, if more than one contractor is working on a site, so that there are no delays in construction activities which would cause disturbed land to remain unstabilised for longer than 2 weeks;
- to prevent the spread of weeds, ensure weed-infested topsoil is kept separate from clean (weed-free) topsoil, is marked accordingly, and not used in rehabilitation;
- soil to be removed shall be stockpiled and separate soil horizons shall be retained in separate stockpiles, not mixed, and replaced as soon as possible;
- stockpiles of topsoil (refer SD 4-1) will be located at least 5 m from areas of likely concentrated or high velocity flows, particularly the earth banks and roads. An additional buffer of at least 40m should be provided between stockpiles and natural waterways, and 30m between stockpiles and drainage lines
- all areas of concentrated flow (diversion banks and waterways), will be designed by a suitably qualified person to convey and remain stable during the design storm event. Stabilisation with 350 gsm jute matting or equivalent may be required (refer SD 5-7 in **Annex C**);
- during windy weather unsealed roads will be kept moist (not wet) by sprinkling with water to reduce wind erosion;
- measures in accordance with EPA Publication 275 to trap and retain topsoil will be employed where steep batters are present and present a risk of topsoil loss;
- • on completion of major works and before revegetation, reinstated subsoils should be left with a loose surface to encourage water infiltration and help with keying topsoil later. This will be very important on steeper slopes; and
- final site landscaping will be undertaken as soon as practicable and as agreed with relevant authorities. In accordance with Victorian guidelines, a permanent vegetation cover will be established within 180 days of final land shaping. Annual cover crops will be used to provide temporary cover and undersown with the desired mix of perennial species.

4.5. STORMWATER MANAGEMENT

The following stormwater management controls will apply to all construction activities and will be utilised during site development: divert clean stormwater away from areas to be disturbed by construction activities using earth banks or catch drains. For temporary banks construction is to follow SD 5-5 for earth banks (low flow). For permanent banks, construction is to follow SD 5-6 for earth banks (high flow). Clean water diversion banks should be installed upfront and before any earthworks commence in the areas they protect. Permanent diversion banks will be sized by a suitably qualified person, using hydrological data and design criteria provided at Section 0. Note that the need for upslope diversion may be removed where construction sites have minimal upslope catchment or the risk of stormwater run-on is low;

- collect dirty water in earth banks or catch drains for diversion to sediment control structures as shown in Annex C. For temporary banks, construction is to follow SD 5-5 for earth banks (low flow). For permanent banks, construction is to follow SD5-6 for earth banks (high flow);



- install temporary earth diversion banks (refer SD 5-5) at the direction of the site manager to mitigate against unforeseen erosion hazards, particularly when rain is forecast. These shall be used to shorten slope lengths, or to divert localised run-on away from high hazard areas (such as unstable batters);
- check dams (SD 5-4) using rock aggregate, sandbags or geotextile “sausages” may be installed within drains and diversion channels to help reduce erosion, especially on steep sections. Care will be taken to ensure there is adequate provision for a spillway that allows flows to be retained within the diversion channel and not escape thereby potentially causing scouring and/or flooding of adjacent lands;
- maintain slope lengths no greater than 80 metres in disturbed areas and preferably <50 metres on exposed road surfaces. To reduce slope lengths in construction areas install temporary earth diversion banks following SD 5-5. On roads consider the use of cross banks and mitre drains to shed water from the surface;
- design stormwater drainage to avoid increased flooding or surface flows to steep or erosion prone areas; and
- ensure roof water from site infrastructure is discharged in suitably stabilised locations to prevent erosion. Roof stormwater should be connected to the permanent drainage system as soon as practicable. Where buildings are without gutters, the ground surface beneath the roof drip-line should be stabilised with gravel or suitable non-erodible material.

4.6. WASTEWATER MANAGEMENT

The majority of wastewater generated on-site will be produced from:

- run-off from site compounds and spoil management areas;
- chemical and fuel storage compounds;
- wash-down of concrete haul trucks, agitators and batching plant;
- wash-down of vehicles to prevent weed/pathogen spread; and
- dewatering from excavations and sedimentation ponds/tanks (if relevant).

Waste management shall occur in accordance with the requirements of the Construction and Worksite Management Plan forming part of the site EMP. Litter shall be managed to ensure it does not end up in wastewater or stormwater off site.

Bulk storage areas for fuels, oils and chemicals used during construction will be contained within an impervious bund to retain any spills of more than 110% of the volume of the largest container in the bunded area. Any spillage will be immediately contained and absorbed with a suitable absorbent material.

Spill kits will be provided at each storage area, with smaller kits contained within site vehicles and at areas of the worksite where handling and use of dangerous goods occur. Staff will be provided with appropriate training in spill response.

Material Safety Data Sheets (MSDS) for all chemicals stored on-site will be maintained by the Site Safety and Environment Officer and made available to site personnel. Site personnel will be informed of their location as a part of the site induction.

Refuelling of equipment on-site or any other activity which could result in a spillage of a chemical, fuel or lubricant will be undertaken away from drainage/stormwater lines. In the event water is polluted by chemicals and/or fire fighting materials (e.g. foams) the water will be collected, and disposed at an approved Liquid Waste Treatment Facility.

All activities that generate wastewater will, where practical, utilise various controls including bunding to contain wastewater to enable its removal, treatment and/or reuse in an environmentally acceptable manner.



Concrete washout areas will be suitably sized to contain the expected volumes of washout including solids and liquids. These will be regularly maintained and located in a position where wastewater will not enter any drainage lines/waterways. The locations and size of concrete washout areas will be marked on the relevant CEMP.

All domestic wastewater (grey water and black water) generated from the maintenance building will flow to an underground septic system. The septic system shall be managed in accordance with EPA permits and requirements, including monitoring and maintenance requirements. Moyne Shire Council requires the capacity to be (number of persons +1) x 150L/day with the use of water reduction fixtures (*Application to Install/Alter a Septic System*, Moyne Shire Council). The septic system will need to accommodate for 3 staff. As such, the capacity of the septic system will be 600L/day. An alarm system will be fitted to indicate failure of any pump or aeration equipment, and a service agreement will be entered into with a licensed plumber for annual inspection and maintenance and/or in accordance with manufacturer and installer specifications.

Any on-site wastewater system will be located at least 100 metres from any watercourse.

The temporary site toilet facilities will be pump – out and therefore will not have a disposal treatment field. These will be bunded to ensure that any runoff is captured in the event of a leak, and located appropriately to not pose risk of environmental harm. Vehicle wash down area run-off will be managed to minimise potential issues such as ponding, weed dispersion and surface water quality impacts.

Annual inspection program shall be developed that will provide a maintenance schedule for the on-site management of the wastewater system.

The temporary construction wastewater management for the on-site facilities will be managed appropriately. The temporary site facilities will:

- Comply with Worksafe Vic's compliance codes for construction facilities, and Hire and Rental Industry Association Code of Practice - GUIDELINES FOR THE PROVISION OF PORTABLE TOILETS ON CONSTRUCTION SITES AND AT EVENTS WHERE CONNECTION TO A SEWER IS NOT PRACTICAL;
- Be serviced under a contract for regular and adequate pump-out and transport off site by an appropriately licensed company; and
- Be sited appropriately to not pose risk of environmental harm.

4.7. SEDIMENT CONTROL

Sediment traps shall be installed to treat dirty water runoff from disturbed areas and retain sediment as close as possible to its source.

Sediment traps work most effectively by damming water and allowing sediment to settle under gravity in relatively quiescent conditions. As such, they will generally be installed in areas of sheet flow. Construction of sediment traps in areas of concentrated flow (eg drains, waterways) will be avoided, as they have limited effectiveness in these areas and can lead to scouring and unwanted damage.

A range of materials may be used to construct sediment traps, such as woven geotextiles, earth, rock, mulch or crushed concrete. Certified weed-free straw bales may also be used, but hay bales will be avoided as they provide a potential source of weed seeds. When installing sediment traps, materials will be firmly anchored to the ground to prevent water passing under them. Adequate provision will be allowed for water to bypass the trap during larger storms without causing flooding or erosion of adjoining areas.

To ensure that silt from batters, cut-off drains, table drains and road works is retained on the site during and after the construction stage of the project, geotextile silt fencing (refer SD 6-8 in **Annex C**) should be installed downslope of disturbed areas and elsewhere at the discretion of the Site Superintendent, to retain the coarser sediment fraction. Silt fences will have a return of 1 metre upslope at intervals of approximately 20 metres. Returns are installed to subdivide the catchment area of the silt fence, to improve its effectiveness and help



prevent structural damage during peak flows. The catchment area of each section of fence should be small enough to limit flow if concentrated at one point to less than 50 L/s in the 10-year ARI storm event. This works out to be about 2,500 m² at the site.

When installing silt fences, the fence should be placed as close as possible to along the contour, to provide a maximum surface area to the passage of stormwater.



Silt fences should be maintained so that no more than 30 % of the design capacity is lost to accumulated sediment. This is achieved by removing silt routinely. All silt removed from any trapping device should be disposed in locations where further erosion and consequent pollution to downslope lands and waterways will not occur.

Sediment basins are a specific type of sediment trap comprising large earth dams designed to capture dirty water runoff, and are the most effective of all sediment trapping devices. They will be used only at the larger construction sites such as the substation site and concrete batching plant. Otherwise most of the work areas are relatively small and sediment control can be achieved using conventional sediment traps, without the use of sediment basins.

Detailed design of sediment basins, where required, will be included in the Construction Contractor's CEMP.

Design of the basins will include:

- sizing sediment basins to maximise capture of run-off from construction areas and dewatering activities from excavations (5-day 90th percentile rainfall, depth based on 30mm rain);
- location and stabilisation of open drains (e.g. diversions, catch and berm drains);
- batter treatments; and
- methods for dissipating high velocity flows etc.

The management of temporary sediment basins will involve the following:

- the condition and capacity of the sediment ponds will be monitored on a regular basis to ensure sufficient free capacity and in anticipation of rain events;
- water will not be discharged from sediment basins unless water quality guidelines are satisfied, unless otherwise specified;
- monitoring water quality during dewatering activities (e.g. monitoring pump operations);
- collected sediment shall be removed as necessary to maintain sufficient volume within the sediment basin;
- sediment removed from the sediment basin shall be transported to the nominated stockpile locations on the site or removed off-site on a regular basis;
- the water within the sediment basin, once tested and found to meet discharge standards, will be either reused (where feasible – e.g. dust suppression) or discharged into the nearest waterway/stormwater system; and
- laboratory analysis may be used to confirm water quality where required.

4.8. ACCESS ROADS

A stabilised access point will be provided at each of the main access points, being the intersections with Hamilton-Port Fairy Road, Youls Road and Riverside/Harris Road. This is to minimise the risk of sediment tracking to the external roadway and to provide durability to the pavement at these high use locations. Bitumen sealing of the internal access track for a distance 50m into the site from the intersections with external roads would meet the requirement for a stabilised access. Alternative options include the use of cattle grid type shaker ramp in conjunction with a submerged wheel bath, or wheel wash, within a section of aggregate-capped pavement. Detailed design of these measures would be required.



4.9. INTERNAL ROAD NETWORK

An internal unsealed road network will be constructed to allow access to each turbine location as shown in **Figure 1.2**. The network of access tracks will be constructed to provide access to each turbine, during construction and operation, as well as access to the control room and substation. The tracks will be unsealed, constructed of a granular sub-base of existing material and a granular base of crushed rock (40 mm); both compacted, designed and constructed to bear the load of the equipment being transported across the site.

The road network will be constructed in two phases.

- **Construction Phase:** the tracks will be constructed with a typical width of 6 to 10 m and be crowned to promote shedding of rainwater. This width is designed to provide a track of adequate size for the transport of the turbine equipment to each location, and for access of the lifting cranes.
- **Operation Phase:** once construction is complete, the width of the tracks will be reduced to 4 to 5 m. This will be achieved by deep ripping the redundant road surface, then spreading soil and mulch mixed with native grass seeds over the redundant road and the associated drainage, to restore the previously-cleared grasslands. The integrity of the track will remain, to allow future access of heavy equipment for maintenance activities.

As the site is made up of variably sloping topography, tracks would be located where possible to minimise construction difficulties and the need for constructed drainage. Cut and fill would be minimised as far as possible to limit the creating of batters that will be exposed to erosion, and to reduce the need for construction of formalised table drains. This can be achieved by locating tracks along topographic high points (eg ridge lines) and avoiding tracking across steep slopes. Where necessary in steeper areas tracks will be designed to a maximum slope of 10%.

Where cut and fill is required, the fill will be compacted cut material from the site. If an additional material, such as gravel and rock, is required it will be sourced from local quarries.

Detailed design of the roads is yet to be undertaken. The Construction Contractor's CEMP will be prepared to manage impacts associated with road construction and operation and will utilise the best management practices outlined in this SEWQMP.

4.9.1. Unsealed Road

The focus of erosion and sediment control for unsealed roads will be on maintaining good stormwater drainage. The primary aim is to ensure that stormwater is readily shed from the road surface and, most importantly, is not allowed to track longitudinally along the road for any great distance. The Construction Contractor's CEMP will consider this in stipulating management measures will be prepared for the unsealed roads once the detailed road and drainage designs are available.

The following principles shall be considered and where practicable incorporated in the road design and Construction Contractor's CEMP:

- as far as possible, locate tracks along ridgelines and in areas without large upslope catchments, to minimise the erosion hazard and drainage requirements;
- limit the clearing width to the minimum that is practicable;
- retain any cleared vegetation (i.e. trees and shrubs) for use later in rehabilitation;
- strip and stockpile topsoil separately for use in rehabilitation;
- minimise cut and fill by constructing the road at-grade where ever possible;
- ensure the road surface has a cross-sectional grade to allow free surface drainage and avoid excessive ponding and concentration of flow in wheel ruts;



- employ outfall drainage where practicable to shed water over the downslope batter of the road, especially where the road alignment is generally parallel to the contours;
- where the road is positioned along a crest or ridge use a crowned road surface that sheds water to both sides;
- when grading roads, avoid the formation of windrows along the shoulders. These retain water on the road surface and increase erosion;
- where table drains are used, ensure these are properly stabilised and install regularly spaced mitre drains to discharge water from drains, releasing this in well vegetated, stable areas;
- mitre drains shall be installed regularly to convey runoff from the road shoulders and any table drains to disposal areas away from the road alignment. As a general rule the maximum spacing between mitre drains should be 50m, however this may be further reduced in high erosion hazard areas (e.g. on steep slopes). Mitre drains should have a grade of no more than 5%. They should discharge to areas that are well stabilised and free of obstructions (e.g. large rocks, tree trunks);
- cross-banks (or rollover banks) or cross-drains should be considered in suitable locations to shed water from the road surface, discharging water in well vegetated, stable areas. Cross-banks are earth banks that extend across the road roughly perpendicular to the road alignment. They contain a bank and upstream channel to direct runoff across the road surface, to prevent the concentration of runoff along the road surface and reduce runoff velocities, thereby reducing erosion. These measures are highly useful where roads are aligned acutely to or perpendicular to the contours over long distances; and
- stabilise road batters using techniques such as rolled erosion control products (RECPs, eg jute matting), mulching, spray-on stabilisation measures (e.g. hydromulching or bitumen emulsion), revegetation and hard armouring where required (e.g. within concentrated flow lines).

4.9.2. Watercourse Crossings

Access track crossings of Ritchies Creek will be required in at least four locations on the site. Design of the new crossings has not yet been undertaken and options that might be employed include fords, pipes or box culverts. Detailed design will be undertaken by the construction contractors and shall be in accordance with the recommendations of the Works on Waterways Guidelines (Glenelg Hopkins CMA 2010).

These new crossings will be traversing designated waterways and as such will require a Works on Waterways permit before the works commence (refer Section 3.3). The Construction Contractor's CEMP will address these crossings and will specifically focus on measures to manage erosion in these high hazard areas through careful scheduling of work, management of stormwater and rapid stabilisation of disturbed areas.

4.10. MAJOR CONSTRUCTION SITES

Significant earthworks and construction activities will be required at a number of locations, particularly for the works compounds and laydown areas, substation site, turbine sites and the concrete batching plant. In these locations, the construction areas will be prepared as stabilised "pad" sites with an aggregate or bitumen seal provided to support construction activities.

At these pad sites, to reduce erosion, aid trafficability and minimise down-time during wet weather, the ground surface will be stabilised with a suitable non-erodible base material such as compacted crushed sandstone, and overlain by durable aggregate. The placement of aggregate over base materials will reduce erosion and loss of fines from the compacted base. Aggregate will need to be "topped up" or respread from time to time.



4.10.1. Substation Site

The substation will require significant earthworks to establish the site suitable for construction. The substation will comprise a switching yard, a control room and a microwave tower. The approximate area of disturbance to establish these facilities is 3 Hectares.

The relevant Construction Contractor of the substation will prepare a CEMP to manage the construction impacts at the substation site.

4.10.2. Site Compound and Laydown Yard

Temporary site compounds and lay down area(s) will be established for construction and turbine equipment. The site compounds will include a number of demountable buildings, portable sanitary facilities, and an amenities block. These will be installed on-site for the duration of the construction work.

The site compound and lay down areas will be located in appropriate locations on the site which provide practical access to work areas and avoid environmentally sensitive areas such as watercourses. Locations will be agreed with the site landowners.

The relevant Construction Contractor will prepare a CEMP to manage construction impacts at the site compounds.

4.10.3. Tower Foundations

The base of each tower supporting the turbine will be set in reinforced concrete foundations designed to IEC standards and certified to Australian Standards. Subject to completion of geotechnical and engineering designs, the foundation is a reinforced structural concrete slab design set approximately 1 m below ground level, and is approximately 15m x 15m and 2-3 m deep. The concrete foundation is set below ground level, with the tower stub protruding above ground level, to which the lowest tower section is attached.

As the base of the foundation is below ground level, this will be backfilled with the excavated material, and the surface revegetated with grass once construction is complete. This will allow stock to graze right up to the tower itself, minimising the amount of land removed from productive agricultural use.

Remaining excavated materials will be used as fill elsewhere around the site, in the site access tracks or the compacted equipment standing areas, subject to appropriate management to avoid the potential spread of weed species.

The relevant Construction Contractor will prepare a CEMP to manage construction impacts at the tower sites.

4.10.4. Securing Pad Sites

To secure pad sites install erosion and sediment controls in the following sequence:

- (i) install sediment fence downslope of all areas to be disturbed prior to any new land disturbance;
- (ii) install barrier fence around perimeter of pad sites to define the work site and to confine land disturbance to the minimum practicable area;
- (iii) install sediment traps where recommended;
- (iv) install earth banks, catch drains and pipes where indicated to divert upslope (clean) stormwater around, or if absolutely necessary, through work areas. In doing so, ensure that measures are in place to prevent dirty water runoff entering clean water drains;
- (v) install temporary culverts and waterway crossings as required to convey stormwater beneath roadways;

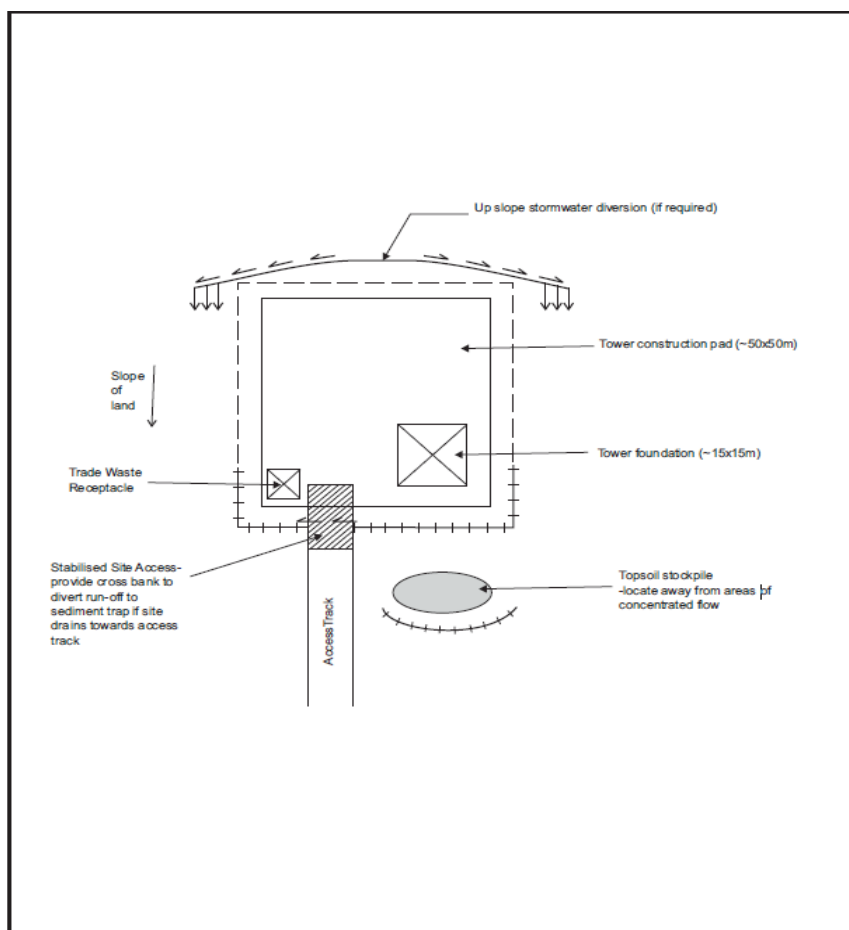


- (vi) install earth banks and catch drains to capture dirty water runoff from disturbed areas and divert this to sediment traps and basins as indicated;
- (vii) strip and stockpile topsoil progressively from areas being subjected to earthworks. Stockpile locations should be away from areas of stormwater drainage, vehicular traffic and sensitive lands (e.g. river banks and riparian areas);
- (viii) install stabilised site accesses and temporary access tracks where indicated; and
- (ix) proceed with construction and excavation works only once the above control measures are in place

Figure 4.1 provides a generic erosion and sediment control plan for the turbine pad sites showing the indicative layout of controls. The layout of controls at the substation and site compounds should be similar, depending on landform.

Construction Contractors should prepare CEMPs for each of the key construction areas. **Figure 4.1** may be used as a guide for the sort of information that will need to be provided in the CEMPs.

Figure 4.1 Generic Erosion and Sediment Control Plan for Tower Construction



- Legend**
- Earth Bank (refer to SD5-6)
 - Level Spreader (refer to SD5-6)
 - Sediment Fence (refer to SD6-6)
 - Barrier Fence
 - Stabilised Site Access (refer to SD5-6)
 - Topsoil Stockpile (refer to SD4-1)

Client: Ryan Corner Development Pty Ltd
 Project: Ryan Corner Wind Farm
 Drawing No: 0105123m_09 Suffix No: R2
 Date: 10/01/2012 Drawing size: A4
 Drawn by: JC Reviewed by: ML
 Source: -
 Scale: Refer to Scale Bar

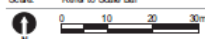


Figure 4.1
Generic Erosion and Sediment Control Plan for Tower Construction
 Environmental Resources Management Australia Pty Ltd
 Level 3, Tower 3, World Trade Centre
 15-35 Scheyde Street, Docklands, VIC 3008
 Telephone +61 3 9696 8011





4.11. TRENCHING

A 33 kV electrical cable network will link each of the turbines to the substation, installed primarily underground in a network generally following the access tracks as shown in **Figure 1.2**. In some areas trenching will need to cross watercourses. The final location would be determined during detailed design.

The cables would be laid in trenches approximately 0.5 m wide and 1 m deep, surrounded by sand for protection, and backfilled with the excavated material. The control and communications cable will be installed in the same trench as the electrical cable.

The following erosion and sediment controls apply to trenching activities:

- where possible, avoid trenching in areas where water flow is likely to concentrate (eg diversion banks and watercourses);
- employ direction drilling techniques instead of trenching to lay services across watercourses, if feasible;
- if trenching in waterways is unavoidable, refer to additional information at **Section 1.1**.
- limit the time trenches are open to less than three days and avoid opening trenches whenever storms are forecast. Storms can occur at any time of the year, so weather forecasts will be monitored;
- use common trenching for the various service and drainage connections;
- protect any nearby (downslope) drainage inlets with grass filter strips and/or sediment barriers until the trench line is rehabilitated;
- remove and store vegetated topsoil (sod) so that it can be replaced on the trench to provide immediate erosion protection after backfilling is completed. Store topsoil separately from any subsoil overburden so that when the trench is to be refilled, the topsoil can be replaced above the subsoil;
- ensure trench widths are the minimum needed to safely install the services;
- retain any cut vegetation (i.e. trees and shrubs) for placement later along the easement during rehabilitation. Any cut trees should be placed across the slope to act as windrows and slow the flow of stormwater across the disturbed easement. The cut vegetation will in addition assist erosion control by protecting the soil surface. It will also provide habitat for small mammals and reptiles, and provide sheltered niches for establishment of native plants;
- organise service installations to enable progressive backfilling;
- when trenching parallel to site contours (across grade), soil from the excavation should be placed and compacted on the uphill side of the trench to form an earth bank. This is to prevent clean stormwater entering the trench (where after it must be managed as “dirty” water) by directing stormwater around and away from the open trench. This measure may be avoided where trenches are expected to be open for less than 24 hours and where the likelihood of rain is low;
- when trenching perpendicular or obliquely to site contours (down grade):
 - use sandbags as plugs or bulkheads across trench inverts to shorten the length of stormwater flow in the trench (so reducing erosion of soils in the trench);
 - ensure plugs, collars or trench stops are employed to control tunnel erosion after backfilling is completed;
 - provide cross banks at regular intervals to prevent concentrated water flows along the finished (backfilled) trenchline;
- backfill subsoil and compact to 95 per cent Standard Proctor. Then, replace topsoil and any sod to match surrounding ground levels. Provide an appropriate allowance for settling of uncompacted backfill material (e.g. 10%); and



- after backfilling, remove excess or unsuitable spoil from the site.

Annex C provides a number of standard drawings describing erosion and sediment controls associated with trenching.

Detailed design will be undertaken in accordance with the recommendations of the Works on Waterways Guidelines (Glenelg Hopkins CMA 2010). These new crossings will be traversing designated waterways and as such will require a Works on Waterways permit before the works commence (refer **Section 3.3**).

4.11.1. Trenching in Waterways

Where trenching through waterways is unavoidable:

- plan works so that the duration from initial disturbance to final rehabilitation is the minimum possible. Aim to undertake all work within a single day;
- schedule work during periods when the likelihood of rainfall is low (ideally November and April), and when rain is not forecast in the subsequent 3 days;
- limit the length of open trench either side of the watercourse, to minimise the risk of sediment-laden water flowing down the trenchline and into the watercourse in the event of a storm;
- schedule works for periods where stream flows are low and rain is not forecast;
- divert the water flow safely through the work site;
- protect the waterway against erosion;
- maintain flows to prevent upstream ponding; and
- rehabilitate the site immediately upon completion of works and install permanent erosion controls over all disturbed areas. The bed and banks of the watercourse should be immediately stabilised with erosion-resistant materials such as jute matting or rock armouring, designed to remain stable during concentrated flows.

Detailed design for any waterway crossings will be undertaken in accordance with the recommendations of the Works on Waterways Guidelines (Glenelg Hopkins CMA 2010) and a Works on Waterways permit will be obtained before the works commence (refer **Section 3.3**).

The Construction Contractor's CEMP will consider management of all trenching through watercourses.

4.11.2. Directional Drilling Considerations

When installing services across waterways, if practical, employ techniques that avoid disturbing the bed and banks (e.g. under boring or use of bridge crossings).

Directional drilling is the preferred method of installing services through flowing waterways if services cannot be attached to bridges. Should directional drilling be used, ensure that the bore hole terminates a sufficient distance from the stream banks to avoid disturbance to the riparian zone and monitor the drilling process for frac-outs of drilling fluid. If frac-outs occur cease work immediately and initiate remedial works. The Contractor will develop a management plan that addresses frac-outs and other potential hazards if directional drilling is to be employed.

Directional drilling will be used to cross the cables at the northern and middle sections of Riverside Road and the above will be adhered to where appropriate.



5. DUST MANAGEMENT

Dust has the potential to be generated by construction activities occurring on site such as excavation, earthworks, and vehicular movement. The purpose of this section is to detail mitigation measures that could minimise dust emissions generated from these activities. Refer to Section 6.2 for additional measures for the mitigation of dust generation and impact due to the operation of the on site concrete batching plant.

The following dust management procedure is written in accordance with Environment Protection Authority of Victoria, “Civil construction, building and demolition guide”, Publication No. 1834, dated November 2020.

During operation water carts shall be used as required to spray water on access track and soil stockpiles to minimise dust generation. Water trucks may be utilised to minimise dust generation from internal roads due to construction vehicle movements. Roads which pass in close vicinity to residences will be more frequently wet down (if required). Use of water trucks will be optimised to ensure a balance between dust suppression, water conservation and prevention of water erosion/damage to the site roads. The decision and requirement for water suppression will be based upon visual inspection and prevailing meteorological conditions.

Vehicular traffic shall be restricted to constructed site access roads and designated site entry and exit points.

Plant, equipment and materials storage shall be restricted to constructed lay down areas.

Disturbed areas shall be rehabilitated and revegetated as soon as practicable.

Temporarily stop works if dust is visibly discharging or emitting nuisance airborne particles beyond site boundaries. Resume works only when effective controls can be implemented, or weather conditions and air quality improve.



6. OTHER POLLUTION CONTROL AND WASTE MANAGEMENT MEASURES

Pollution control measures included in the EMP's Construction and Worksite Management Plan, prepared in accordance with EPA Publication 1834, will be implemented. Some of these measures are detailed below.

All potentially contaminating materials used or stored on the site (e.g. fuel, oils) during and after construction shall be prevented from entering the groundwater or surface water systems. This will be achieved through storage in securely bunded areas away from waterways and vegetation. Bulk storage areas for fuels, oils and chemicals used during construction will be contained within an impervious bund to retain any spills of more than 110% of the volume of the largest container in the bunded area. Any spillage will be immediately contained and absorbed with a suitable absorbent material. Storage will comply with AS 1940- 1993 The Storage and Handling of Flammable and Combustible Liquids.

Emergency spill clean up kits will be maintained on-site in agreed locations that are accessible and known to all site workers. Spill kits will be used in the event of inadvertent spills of fuels, oils, hydraulic fluids and other hazardous wastes, to contain the spill and avoid contamination of waters. Workers will be trained in the use of spill kits. Contaminated soils shall be excavated and disposed by means to be authorised by the Site Superintendent.

Material Safety Data Sheets (MSDS) for all chemicals stored on-site will be maintained by the Site Safety and Environment Officer and made available to site personnel. Site personnel will be informed of their location as a part of the site induction.

Refuelling of equipment on-site or any other activity which could result in a spillage of a chemical, fuel or lubricant will be undertaken away from drainage/stormwater lines. In the event water is polluted by chemicals and/or fire fighting materials (e.g. foams) the water will be collected, and disposed at an approved Liquid Waste Treatment Facility. A designated refuelling area should be established with drip trays installed and spill kits on stand-by. Should refuelling in the field be required, absorptive mats and drip trays are to be used in the refuelling process.

Trade waste receptacles will be provided for the safe and efficient storage of all construction and miscellaneous wastes. Recyclable materials shall be separated and recycled where possible. Otherwise, disposable wastes will be removed from site regularly and disposed by approved means.

6.1. DEWATERING OF THE PROJECT SITE

Areas of the project site may require dewatering during the lifetime of the construction activities. This may apply to low lying depressions becoming inundated following a significant storm event; to dewatering of open trenches following rainfall; or dewatering of watercourses to allow for service installation (ie trenching) or installation of road crossings (culverts or causeways). This water has the potential to be contaminated with suspended sediment and therefore will be managed so that disposal does not contribute to water pollution.

When pumping dirty water out of construction areas the pump intake will be kept as close to the surface of pools as possible to avoid sucking sediments off the bottom. Discharging runoff to a natural waterway is generally not supported; however, may be undertaken if the water is first treated such that the turbidity 75th percentile is below 20 Nephelometric Turbidity Units (NTUs), is lower in total suspended solids (TSS) concentration than upstream locations, and never exceeds the regulatory water quality standard as set out in the SEPP (Waters). As a general rule, discharge waters should have a TSS < 50 mg/L.

During dewatering, water with a high sediment load should, wherever possible, be directed to vegetated areas. Areas will be selected that have adequate capacity to effectively remove suspended solids and prevent pollution of receiving waters. Precautions will be taken to ensure that such areas don't become waterlogged. Sediment control structures shall be used in areas where dense vegetation is not available, to facilitate sediment settling. Other options that may be used include the use of dewatering bags that trap sediment. Alternately, dirty waters may be used by water carts for dust suppression.



6.2. CONCRETE BATCHING PLANT

A concrete batching plant will be temporarily installed on-site, to deliver the concrete requirements for the wind turbine foundations and other concrete slabs (e.g. substation and buildings). Under the construction program, the plant would be required on site for a minimum of 10 months. It is anticipated that the footprint will be approximately 80 m by 80 m in size, the majority of which is for truck turning and stockpiling of materials.

Any temporary water storage structure (i.e. turkey nest/dam) located adjacent to the concrete batching plant (to be retained only during the construction phase) will be designed to limit risk of overtopping.

Correct siting is of vital importance in minimising risks due to erosion and sedimentation during construction and the pollution hazard overall during operation. The final location of the concrete batching plant has been selected to minimise potential impacts of the plant and provide an amenity buffer distance of at least 100 m between the plant and sensitive land uses. The location is shown on the plan at **Figure 1.2**.

Siting accords with the EPA Publication 1806: Reducing risk in the premixed concrete industry (EPA, 2019) (supersedes EPA Publication 628), and will meet the following criteria:

- location in close proximity to proposed track network, to avoid additional track construction just for access to batching plant;
- location within the construction site to minimise the transport distances;
- location on an existing clear and level area, to minimise preparatory earthworks for levelling;
- avoidance of identified ecologically-sensitive areas, such as the wetland areas in the south east and southwest of the site (refer **Figure 1.2**), riparian area of Ritchies Creek, grasslands and high quality rocky knolls scattered across the site;
- avoidance of flood prone land so that contaminated stormwater and process waste water can be retained on site;
- avoidance of established drainage lines, to minimise risk of contamination of watercourses. A minimum 100m buffer to all watercourses will be provided; and
- location away from either on-site or off-site dwellings to minimise potential air quality and noise impacts on sensitive receivers.

The batching plant will be designed and operated in accordance with EPA Publication 628, based on specific best practice environmental management approaches, detailed as follows:

- during construction, erosion and sediment controls will be provided in accordance with instructions provided in **Section 4.10**. A CEMP will be prepared by the relevant Construction Contractor for the batching plant once final siting is decided and detailed design information and final drainage plans are available;
- separate stormwater collection and drainage systems will be provided to allow for discharge of clean stormwater (through a system designed to minimise local erosion) and collection and reuse of contaminated stormwater (through a first flush collection pit);
- a stormwater recycling system will be provided with capacity sufficient to store contaminated runoff generated by 20 mm rain within 24 hours, with operating management system to use collected waste water as soon as possible (to maintain containment capacity);
- suitable compounds will be provided for the placement of waste concrete and mortar slurries (either at the concrete batching plant or at individual works compounds, or both). These may comprise shallow excavations that are suitably bunded to prevent stormwater ingress. Dried concrete will be disposed by an acceptable means;



- a wash bay for concrete trucks will be provided. Water discharged from the wash bay will be encouraged to evaporate and/or infiltrate the soils, and any surplus flows will be directed to sediment traps.;
- surface water shall only be allowed to discharge from the concrete batching plant during wet weather. Discharges will be monitored for pH (pH should be between 6 and 9) and suspended solids (levels should be less than 80mg/L);
- any excess contaminated waste water will be disposed of off-site by a licensed waste contractor and at an appropriate waste management facility;
- to minimise dust emissions the following shall be undertaken where practicable:
 - Keep sand and aggregates damp
 - Cover or enclose conveyor belts and hoppers
 - Keep pavements and surfaces clean
 - Fit cement silos with high level alarms, multibag pulse jet filters, airtight inspection hatches and automatic cut-off switches on the filler lines
 - Keep duct work airtight
 - Enclose the loading bay
 - Develop and implement an inspection regime for all dust control components
 - Clean up spills immediately
- to minimise noise emissions the following shall be undertaken where practicable:
 - Select quieter equipment
 - Alter or enclose equipment to reduce noise at the source
 - Isolating noise generating equipment by using an acoustic enclosure, for example perforated metal facing with rockwool or glasswool insulation or acoustic screens;
 - Reducing sound reverberation within the plant by using acoustic wall absorbers or wall insulation such as rockwool or glasswool
 - Ensure hooters are used for emergencies only
 - avoid public address systems for paging staff
- the area of the batching plant will be fully rehabilitated after the construction phase is completed (refer Section 7) The temporary concrete batching plant will be decommissioned once construction of the wind farm is complete. All batching plant materials, site offices and vehicles shall be removed from site. All wastes such as excess concrete and general waste shall be appropriately disposed and recycled where possible. Any contaminated material such as soil shall be cleaned up and disposed as prescribed waste using a licensed prescribed waste transporter. Stockpiled topsoil shall be re-spread and all cleared vegetation will be reinstated.



7. SITE STABILISATION AND REHABILITATION

Phase works so that manageable areas of land are exposed at any one time and ensure that site stabilisation measures are progressively installed throughout the development. Site stabilisation should be undertaken progressively as works are concluded in individual areas. Where possible, progressive rehabilitation will occur to minimise the area of exposed surfaces following completion of works.

Site stabilisation can be achieved using vegetation, rock armouring, paving, concrete or any other cover that protects the ground surface against erosion. It is essential that all disturbed lands be stabilised to mitigate ongoing erosion problems and prevent sediment pollution of downstream lands and waterways. The preferred site stabilisation method will be identified on a site by site basis and included within the relevant CEMPs. Advice from a soil conservationist and local agronomist is recommended during this process.

Stabilised site access points will be installed (typically crushed concrete, road base, rumble grids) at each of the major site entrance/exits to minimise the tracking of soil from the site onto roads during construction.

When selecting stabilisation methods a key factor that will be considered is the form of water runoff over the stabilised area. Areas subject to concentrated flow (ie watercourses and drains) will require different stabilisation techniques to those subject to sheet flow.

In most areas, revegetation will be the preferred method of stabilisation and it is likely that the revegetation goal will be to use pasture grasses, to achieve a similar condition and pasture species composition to present, so that the lands may continue to be used for grazing purposes. The revegetation program will be dictated by climatic conditions and would generally not be commenced during winter and summer, when conditions may prevent successful establishment. Victorian guidelines provide flexibility to account for this and recommend that a permanent vegetation cover will be established within 180 days of final land shaping. Annual cover crops will be used to provide temporary cover and undersown with the desired mix of perennial species. Revegetation details will be provided in the relevant CEMPs.

Areas of concentrated flow can be subject to scouring velocities and periodic inundation that render vegetation establishment difficult or impossible. Therefore, measures like hard armouring, and use of geofabrics to assist vegetation establishment is often required. To determine appropriate stabilisation techniques in areas of concentrated flow peak flows will be calculated and stabilisation designed accordingly, by reference to guidelines such as Landcom (2004) that provide advice for acceptable velocities within vegetated channels. This detail would be outlined in the relevant CEMPs.

Some finished slopes may be too steep to effectively revegetate, for example cut batters steeper than 2(horizontal):1(vertical)). In these situations it can be difficult to reinstate and prepare suitable growing media (ie topsoil) and protect this against erosion while plants establish. Longer term, steep slopes are also prone to drying out, leading to moisture stress in plants. Hard armouring and use of geofabrics may be required on steep batters and would be addressed in the relevant CEMP prepared by the Construction Contractor.

7.1. Revegetation

Successful revegetation of lands, a principal stabilisation technique, requires:

- availability of acceptable soil materials;
- correct site preparation and replacement of topsoil (see SD 4-2 and SD 7-1);
- selection of the most suitable establishment technique;
- selection of appropriate plant species, fertilisers and ameliorants;
- application of sufficient water for germination and to sustain plant growth if rainfall is insufficient; and
- an adequate maintenance program.



It is common practice to use annual species as a fast growing and highly effective temporary cover crop. However, these plants will die within one season, providing almost no surface protection thereafter. For longer term protection a mixture of perennial and annual species is best. While the perennial species are usually slower to establish, they will grow under the annual species and succeed them to provide a permanent surface protection.

Clearly visible barriers will be installed to limit access to vegetative buffer zones and rehabilitation areas.

Fertilising and watering will be used as required to assist establishment of vegetation during rehabilitation. Areas not satisfactorily revegetated will be investigated to determine the reason for failure. Appropriate remedial action will be undertaken, including replacing any lost topsoil and resowing the site.

Note that supplementary watering may be required at all times of the year, but is more likely to be needed during the period September to April.

The Construction Contractor's CEMP will provide details of the revegetation program and ongoing monitoring requirements.



8. SITE MONITORING AND MAINTENANCE

Essential to an effective system of sediment control devices, is an adequate inspection, maintenance and cleaning program. Inspections, particularly during storms, will show whether devices are operating effectively. Where a device proves inadequate, it should be quickly redesigned to make it effective (EPA, 1996).

8.1. DURING CONSTRUCTION

The site superintendent will inspect the site paying particular attention to:

- ensuring barrier fencing is maintained and exclusion zones are being observed by all site workers and contractors;
- waste receptacles are emptied regularly in a manner approved by the site superintendent;
- ensuring progressive and prompt rehabilitation of lands, that rehabilitation has effectively reduced the erosion hazard and that repairs or upgrades are initiated as appropriate;
- constructing additional erosion and/or sediment control works as might become necessary to ensure the desired erosion and sediment control is achieved, i.e. make ongoing changes to the Plan;
- maintaining erosion and sediment control measures in a functioning condition until all earthworks are completed and the site is rehabilitated;
- removing trapped sediment and disposing this in safe areas;
- inspecting silt fences on each working day for undercutting, sagging and overtopping, and repaired immediately. Accumulated silt behind the silt fence will be removed before the level of accumulated silt reaches one third of the original height of the fence;
- where concern is raised over stability of creek crossings, turbidity upstream can be monitored and compared with downstream; and
- removing temporary soil conservation structures as the last activity in the rehabilitation program.
- Identify any areas of localised soil erosion and implement immediate remediation measures within 1 week. This might include:
 - planting additional stabilising vegetation or wind breaks;
 - stabilising soils with a mulch or alternative soil binder; or
 - taking steps to minimise any concentrated stormwater flows.

It is recommended that an appropriately skilled Environmental Scientist or Soil Conservationist be consulted to undertake regular inspections of the erosion and sediment controls and to advise on necessary changes, to help ensure the success of the erosion and sediment control program. A recommended inspection guideline is provided in **Table 8.1**.

Table 8.1 Recommended Inspection Guideline

Installation	Problem	Frequency of inspection	Remedial action
Sediment controls, silt fences and traps	Ineffective control of sediment Poor design causing scouring around controls	Weekly in dry weather Within 24 hours of significant rainfall events (nominated as >20 mm in any 24-hour period)	Remove sediment from trap Replace/repair barrier or filter material where damaged Redesign control if ineffective or causing erosion Improve maintenance



Installation	Problem	Frequency of inspection	Remedial action
Haul roads	Soil on haul roads Erosion on unsealed roads Dust generation on unsealed roads	Weekly in dry weather Within 24 hours of significant rainfall events (nominated as >20 mm in any 24-hour period)	Install wheel wash and rumble grid Manually wash vehicle wheels Increase road cleaning frequency Regularly grade and maintain unsealed roads, and consider paving in problem areas; Install new drainage (eg cross banks, mitre drains) to improve problem areas
Cut-off and diversion drains	Water not diverted away from sensitive areas Erosion in drains Erosion at outlets	Weekly in dry weather Within 24 hours of significant rainfall events (nominated as >20 mm in any 24-hour period)	Replace or repair damaged drains Redesign ineffective drains Relocate incorrectly placed drains Line eroding drains and outlets with erosion-resistant materials
Stream crossings	Unstable Erosion of bed and banks mobilising sediment into stream	Weekly in dry weather Within 24 hours of significant rainfall events (nominated as >20 mm in any 24-hour period)	Stop use until installation has been redesigned Re-stabilise eroding areas employing geofabrics and hard armouring as required
Stockpiles and bare slopes	Erosion	Weekly in dry weather Within 24 hours of significant rainfall events (nominated as >20 mm in any 24-hour period)	Minimise exposure to water and wind erosion Ensure long term stockpiles are effectively stabilised

¹ Modified from Victorian EPA (1996) *Environmental Guidelines for Major Construction Sites*.

8.2. POST CONSTRUCTION

Inspect revegetation areas regularly, investigate failures and replant in failed areas.

Ensure an adequate watering and fertilising system is maintained in revegetation areas.

Identify any areas of localised soil erosion and implement immediate remediation measures within 1 week. This might include:

- planting additional stabilising vegetation or wind breaks;
- stabilising soils with a mulch or alternative soil binder; or
- taking steps to minimise any concentrated stormwater flows.

Identify any areas of localised poor drainage and take remedial action. This might include:

- installing formalised drainage channels or pipes;
- improving soil permeability by cultivating the soil surface;
- improving soil permeability by installing infiltration trenches; or
- planting moisture tolerant vegetation in problem areas.

Recommended site inspection frequency and procedure to be undertaken by the Site Safety and Environment Officer is provided in the EMP (ERM 2010).



9. REQUIREMENT FOR PROGRESSIVE SEWQMP

This SEWQMP will be supplemented by a series of Progressive SEWQMPs detailing individual control measures in key construction areas, and based on the detailed road and drainage plans. These will be prepared once the detailed design documentation is available and before works begin.

The Progressive SEWQMPs will:

- be prepared by a suitably qualified professional (preferably a soil conservationist) in association with construction personnel, to formulate practical documents for field reference. This process will allow consideration of specific construction methods and will provide a sense of ownership of the proposals to all parties;
- be prepared for:
 - different stages of construction (e.g. initial clearing, grubbing, topsoil stripping and stockpiling with revision for bulk earthworks);
 - areas of high erosion hazard, particularly those associated with creek crossings;
 - key project/construction areas such as access tracks; the wind turbine pads; vegetation clearing; watercourse crossings; concrete batching plant; trenching; laydown yard and compound area; and the substation compound;
- be prepared on base plans that show contours and drainage paths, the constructed drainage network (if any), limits of disturbance and extent of earthworks, location of sensitive areas and location of control measures;
- include documentation to explain the ordering and scheduling of works, particularly the order in which the erosion and sediment controls will be installed;
- describe specific construction details, notes and operating procedures;
- integrate with work procedures, work method statements, activity statements and their scheduling especially in relation to culvert and bridge construction;
- be site-specific and will not generally repeat the information contained in this SEWQMP and/or the contractor's EMP;
- be given a sequential number and recorded in a register for progressive SEWQMPs; and
- be controlled and distributed in accordance with the contractor's quality system procedure for document control.

The Contractor will ensure that Progressive SEWQMPs are developed to cover works areas as detailed above, with a particular focus on high erosion hazard areas such as waterway crossings.

The Contractor will ensure that the Progressive SEWQMPs are regularly reviewed and changes implemented to manage the erosion hazard and prevent pollution at the site. Additional erosion and sediment control works will be installed as might become necessary, for example due to unforeseen events or site conditions. This may be particularly relevant to initiate repairs after severe rain events.

All subcontractors will be informed of their responsibilities in minimising the potential for soil erosion and pollution to downslope areas. Appropriate training will be provided during site inductions and tool-box talks.



10. CONCLUSION

This Sediment, Erosion, and Water Quality Management Plan (SEWQMP) has been prepared for the Ryan Corner Wind Farm to outline the fundamental principles to be followed in the planning and implementation of erosion and sediment control measures for the entire project. It contains a description of the proposed works; provides general advice outlining a suite of best management practices for use in erosion and sediment control; and includes specific advice for managing construction impacts on key components of the construction project.

It is recommended that the Construction Contractor prepare a Construction Environment Management Plan (CEMP) that considers each key construction component of the project once the detailed design has been completed. The CEMP can include base plans showing the land contours, proposed drainage network and extent of construction activities.

In summary, the erosion hazard at the site is low as a result of favourable climatic and landform conditions. A standard suite of erosion and sediment controls will be sufficient to control erosion and minimise the risk of sediment pollution of lands and waterways during construction activities.



REFERENCES

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Environment Protection Authority (EPA 2015) Bunding, Publication 347.1.

Environment Protection Authority (EPA 2016), Code of Practice – Onsite Wastewater Management, Publication 891.4.

Environment Protection Authority (EPA 2018), State Environment Protection Policy (Waters), No. S-499.

Environment Protection Authority (EPA 2020), Civil construction, building and demolition guide, Publication 1834.

Environment Protection Authority (EPA 2019) Reducing risk in the premixed concrete industry, Publication 1806.

Landcom (2004) Managing Urban Stormwater Soils and Construction (Volume 1, 4th edition). Landcom, Sydney.



Annex A IFD Chart

Ryan Corner IFD							
Location:		38.3 S	RUSLE <i>R-factor</i> =			803	
142.125 E							
Simple	I (mm/hr) for ARI (yrs)						
Time	1 Year	2 years	5 years	10 years	20 years	50 years	100 years
5 mins	39.7	53.2	72.8	87.1	106	136	161
6 mins	37	49.6	67.8	81	98.9	126	149
10 mins	30.1	40.1	54.1	64.2	78	98.6	116
20 mins	21.6	28.6	37.8	44.3	53.2	66.4	77.6
30 mins	17.4	22.9	29.9	34.9	41.6	51.6	59.9
1 hr	11.7	15.2	19.6	22.5	26.7	32.7	37.7
2 hrs	7.64	9.9	12.5	14.3	16.8	20.4	23.4
3 hrs	5.94	7.68	9.64	11	12.8	15.5	17.7
6 hrs	3.85	4.96	6.15	6.93	8.05	9.65	11
12 hrs	2.48	3.18	3.92	4.39	5.08	6.07	6.87
24 hrs	1.55	1.99	2.46	2.77	3.21	3.83	4.35
48 hrs	0.93	1.2	1.5	1.7	1.98	2.38	2.71
72 hrs	0.67	0.871	1.09	1.24	1.45	1.75	1.99
Extended	I (mm/hr) for ARI (yrs)						
Time (mins)	1	2	5	10	20	50	100
5	39.7	53.2	72.8	87.1	106.4	135.7	161.0
6	37.0	49.6	67.8	81.0	98.9	126.0	149.4
7	34.9	46.6	63.6	75.8	92.5	117.6	139.3
8	33.0	44.1	60.0	71.4	87.0	110.3	130.6
9	31.5	42.0	56.9	67.6	82.2	104.1	123.0
10	30.1	40.1	54.1	64.2	78.0	98.6	116.3
11	28.8	38.4	51.7	61.2	74.3	93.7	110.4
12	27.7	36.9	49.5	58.6	71.0	89.3	105.2
13	26.7	35.5	47.6	56.2	68.0	85.5	100.5
14	25.8	34.3	45.8	54.0	65.3	82.0	96.2
15	25.0	33.1	44.2	52.0	62.8	78.8	92.4
16	24.2	32.1	42.7	50.2	60.6	75.9	88.9
17	23.5	31.1	41.3	48.6	58.5	73.2	85.7
18	22.8	30.2	40.1	47.0	56.6	70.8	82.8
19	22.2	29.4	38.9	45.6	54.9	68.5	80.1
20	21.6	28.6	37.8	44.3	53.2	66.4	77.6
21	21.1	27.9	36.8	43.1	51.7	64.5	75.3
22	20.6	27.2	35.8	41.9	50.3	62.7	73.1
23	20.1	26.5	34.9	40.9	49.0	61.0	71.1
24	19.7	25.9	34.1	39.8	47.7	59.4	69.2
25	19.2	25.4	33.3	38.9	46.6	57.9	67.4
26	18.8	24.8	32.6	38.0	45.5	56.5	65.8
27	18.5	24.3	31.9	37.1	44.4	55.1	64.2
28	18.1	23.8	31.2	36.3	43.5	53.9	62.7
29	17.8	23.4	30.5	35.6	42.5	52.7	61.3
30	17.4	22.9	29.9	34.9	41.6	51.6	59.9
31	17.1	22.5	29.4	34.2	40.8	50.5	58.7
32	16.8	22.1	28.8	33.5	40.0	49.5	57.5
33	16.5	21.7	28.3	32.9	39.2	48.5	56.3
34	16.2	21.3	27.8	32.3	38.5	47.6	55.2
35	16.0	21.0	27.3	31.7	37.8	46.7	54.2
36	15.7	20.6	26.8	31.2	37.1	45.9	53.2
37	15.5	20.3	26.4	30.6	36.5	45.0	52.2
38	15.3	20.0	26.0	30.1	35.9	44.3	51.3
39	15.0	19.7	25.6	29.6	35.3	43.5	50.4
40	14.8	19.4	25.2	29.2	34.7	42.8	49.6
41	14.6	19.1	24.8	28.7	34.2	42.1	48.8
42	14.4	18.9	24.4	28.3	33.7	41.5	48.0
43	14.2	18.6	24.1	27.9	33.2	40.8	47.3
44	14.0	18.3	23.7	27.5	32.7	40.2	46.5
45	13.8	18.1	23.4	27.1	32.2	39.6	45.8
46	13.7	17.9	23.1	26.7	31.7	39.0	45.2
47	13.5	17.6	22.8	26.4	31.3	38.5	44.5
48	13.3	17.4	22.5	26.0	30.9	38.0	43.9
49	13.2	17.2	22.2	25.7	30.5	37.4	43.3
50	13.0	17.0	21.9	25.3	30.1	36.9	42.7
51	12.8	16.8	21.7	25.0	29.7	36.5	42.1
52	12.7	16.6	21.4	24.7	29.3	36.0	41.6
53	12.6	16.4	21.1	24.4	29.0	35.5	41.1
54	12.4	16.2	20.9	24.1	28.6	35.1	40.5
55	12.3	16.0	20.7	23.8	28.3	34.7	40.0
56	12.2	15.9	20.4	23.6	27.9	34.3	39.6
57	12.0	15.7	20.2	23.3	27.6	33.8	39.1
58	11.9	15.5	20.0	23.0	27.3	33.5	38.6
59	11.8	15.4	19.8	22.8	27.0	33.1	38.2
60	11.7	15.2	19.6	22.5	26.7	32.7	37.7



Annex B Erosion Hazard Assessment



B1 EROSION HAZARD

Managing Urban Stormwater: Soils and Construction (Landcom, 2004) describes a method for assessing erosion hazard using the revised universal soil loss equation (RUSLE). The RUSLE is designed to predict the long term, average, annual soil loss from sheet and rill erosion at nominated sites under specified management conditions. It is used to assess erosion hazard at construction sites and estimate sediment flux.

The RUSLE equation is represented by:

$$A = R K L S P C$$

where,

A = computed soil loss (tonnes/ha/yr)

R = rainfall erosivity factor

K = soil erodibility factor

LS = slope length/gradient factor

P = erosion control practice factor

C = ground cover and management factor.

R-Factor

The rainfall erosivity factor, R, is a measure of the ability of rainfall to cause erosion. It is the product of two components: total energy (E) and maximum 30 minute intensity for each storm (I30). Rosewell and Turner (1992) identified a strong correlation between the R-factor and the 2-year ARI, 6-hour storm event (denoted S) and proposed the following equation:

$$R = 164.74 (1.1177)^S 0.6444$$

Where S = 4.96 mm/h (at Ryan Corner, from IFD chart)

Using the above, at Ryan Corner R = 803. This is very low

K-Factor

The soil erodibility factor, K, is a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff. Texture is the principle component affecting K, but structure, organic matter and permeability also contribute. In the RUSLE, it is a quantitative value that is normally experimentally determined.

Soil K-factor data was not available for Ryan Corner but has been estimated. A conservative K-factor of 0.04 is adopted, which is moderate.

LS-Factor

The slope length-gradient factor, LS, describes the combined effect of slope length and slope gradient on soil loss. It is the ratio of soil loss per unit area at any particular site to the corresponding loss from a specific experimental plot of known length and gradient. The LS factor can be read from Table A1 in the Blue Book). It should be noted that an increase in slope gradient has a proportionately greater effect on LS, compared with an increase in slope length.

The site is mostly quite flat with gradients typically less than 3 %. Slope lengths in disturbed areas would be typically less than 80 m. Under this combination of slope length/gradient the LS Factor is 0.65.

P-Factor



The erosion control practice factor, P , is the ratio of soil loss with a nominated surface condition ploughed up and down the slope. It is reduced by practices that reduce both the velocity of runoff and the tendency of runoff to flow directly downhill. At construction and mining sites, it reflects the roughening or smoothing of the soil surface by machinery. The P -factor used here is 1.3 that is normally assigned to compacted construction sites.

C-Factor

The cover factor, C , is the ratio of soil loss from land under specified crop or mulch conditions to the corresponding loss from continuously tilled, bare soil. The most effective method of reducing the C -factor is maintenance, or formation of a good ground cover. The best practices are those that reduce both the amount of soil exposed to raindrop impact and the erosive effects of runoff.

The C -factor assigned here during mining operations is 1.0, typical of that for bare, compacted soil. Table A3 in the Blue Book (Edition 4) provides estimated C -factors for various cover types. It is worth noting that the C -factor is the factor that can be most readily manipulated to affect a change in erosion hazard. For example, changing the soil surface from a condition of bare, compacted earth ($C = 1.0$) to one with 70% cover of grasses ($C = 0.05$) leads to a proportionate reduction in soil loss, i.e. 20 times lower erosion hazard.

B.2 PREDICTED SOIL LOSS

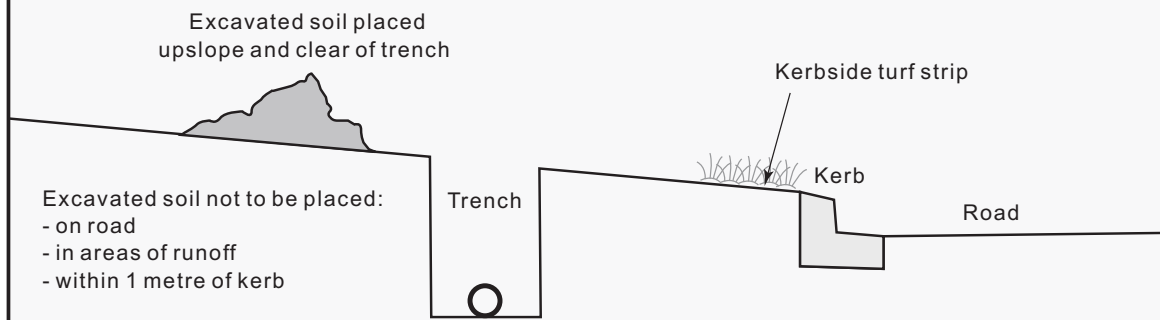
Using the RUSLE, the predicted annual soil loss is 27 tonnes/hectare/year. This is Soil Loss Class 1 (< 150 tonnes/ha/yr) which is rated Very Low (refer Table 4.2 in the Blue Book).

Based on this assessment it is concluded that the overall site erosion hazard is very low and consequently, a standard suite of erosion and sediment controls may be employed.



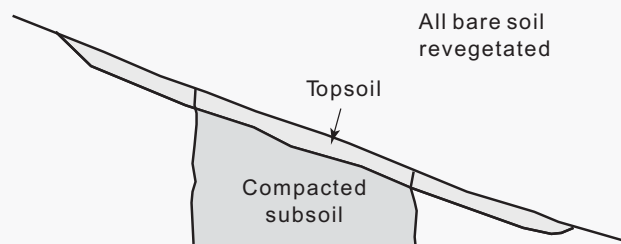
Annex C Standard Drawings

When excavating trench...

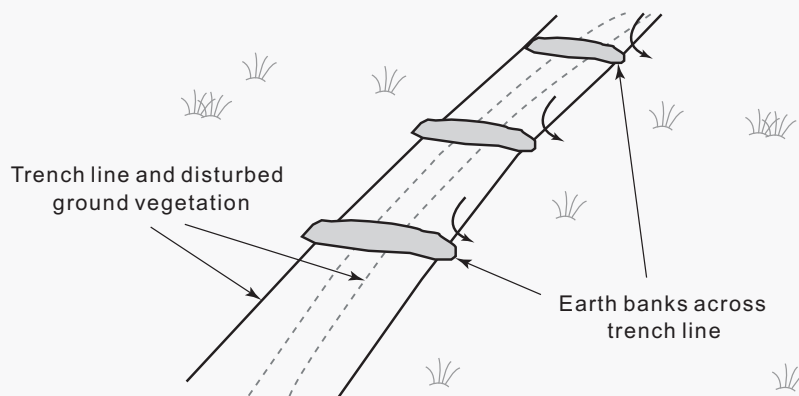


When backfilling trench...

Trench backfilled, compacted to 95 per cent standard compaction, topsoiled, levelled and topped up as necessary should subsidence occur



On steep and/or long sections of trench...



Construction notes for figure 6.1

1. Do not open any trench unless it is likely to be closed in three days
2. Place excavated material up-slope of the trench
3. Stockpile topsoil separately from subsoil
4. Divert runoff from the line of the cut with diversions as directed by SD 5-2
5. Rehabilitate in accordance with specification

Figure 6.1 Erosion and sediment control during trenching activities

Source: Managing Urban Stormwater: Soils and Construction - Volume 2A Installation of Services

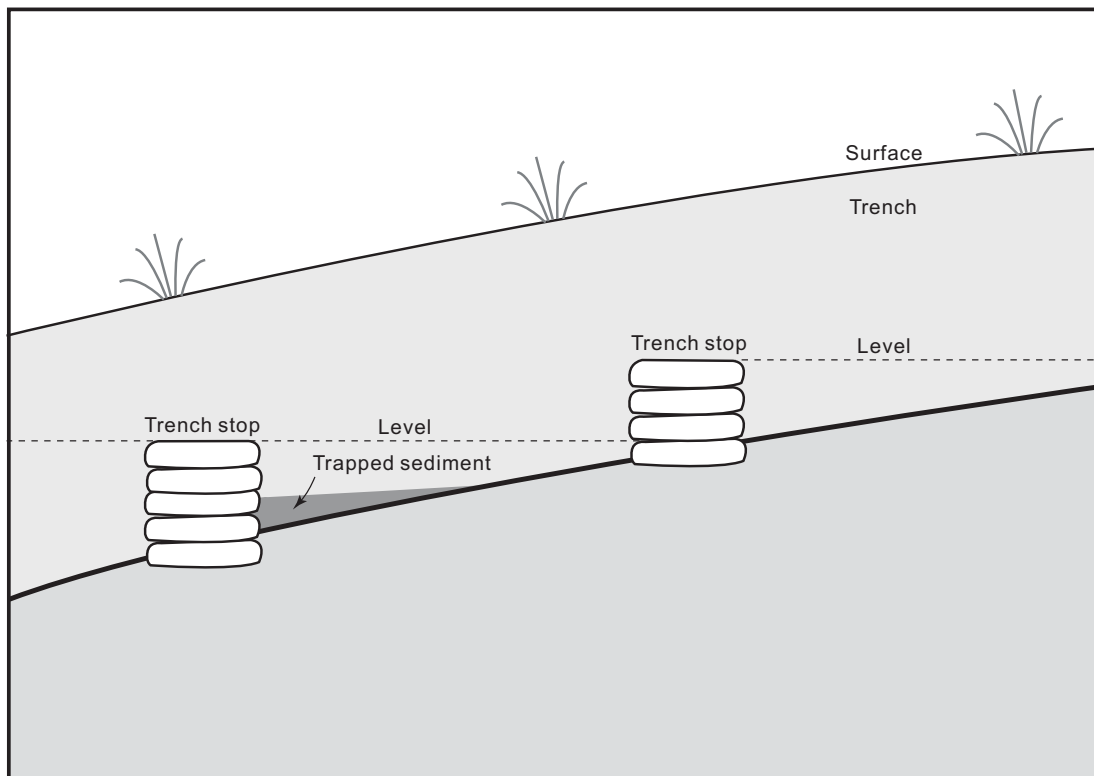


Figure 6.2 Typical trench stop detail

Source: Managing Urban Stormwater: Soils and Construction - Volume 2A Installation of Services

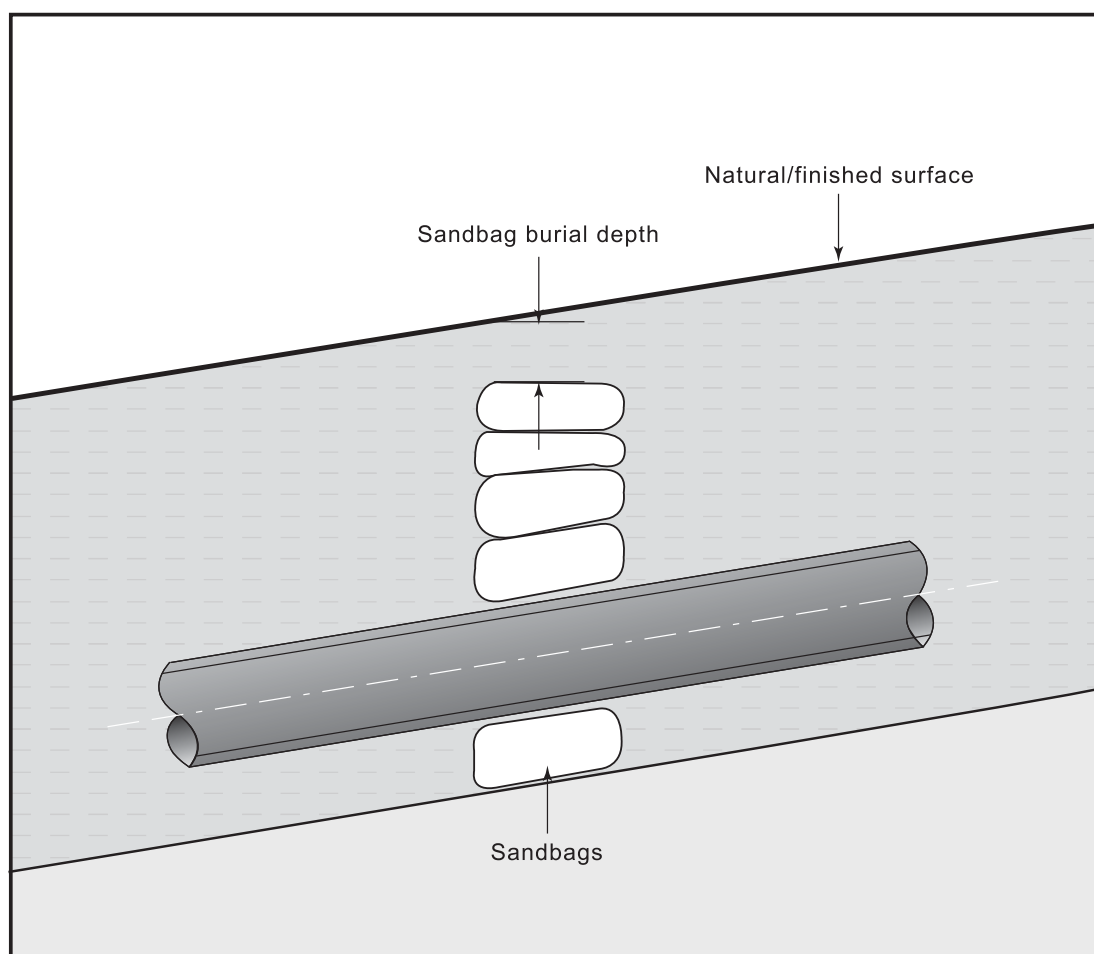
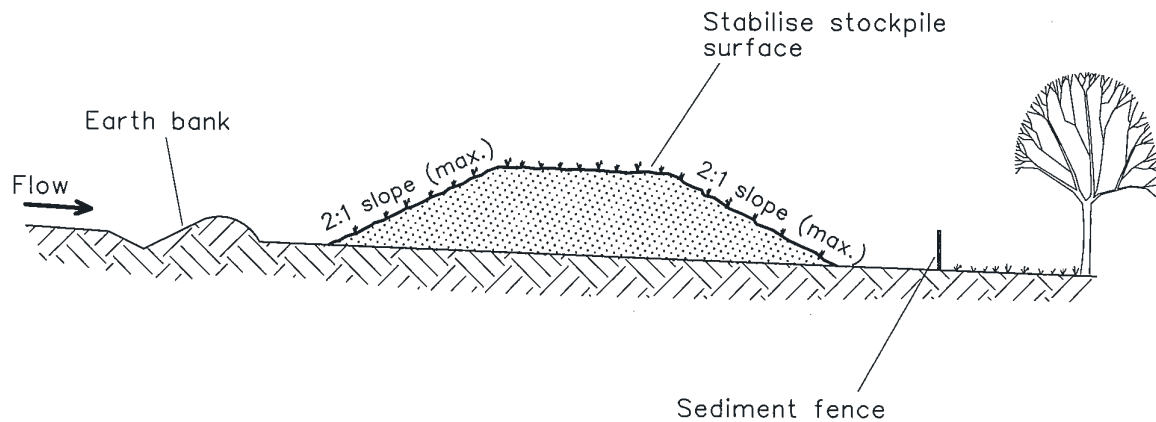


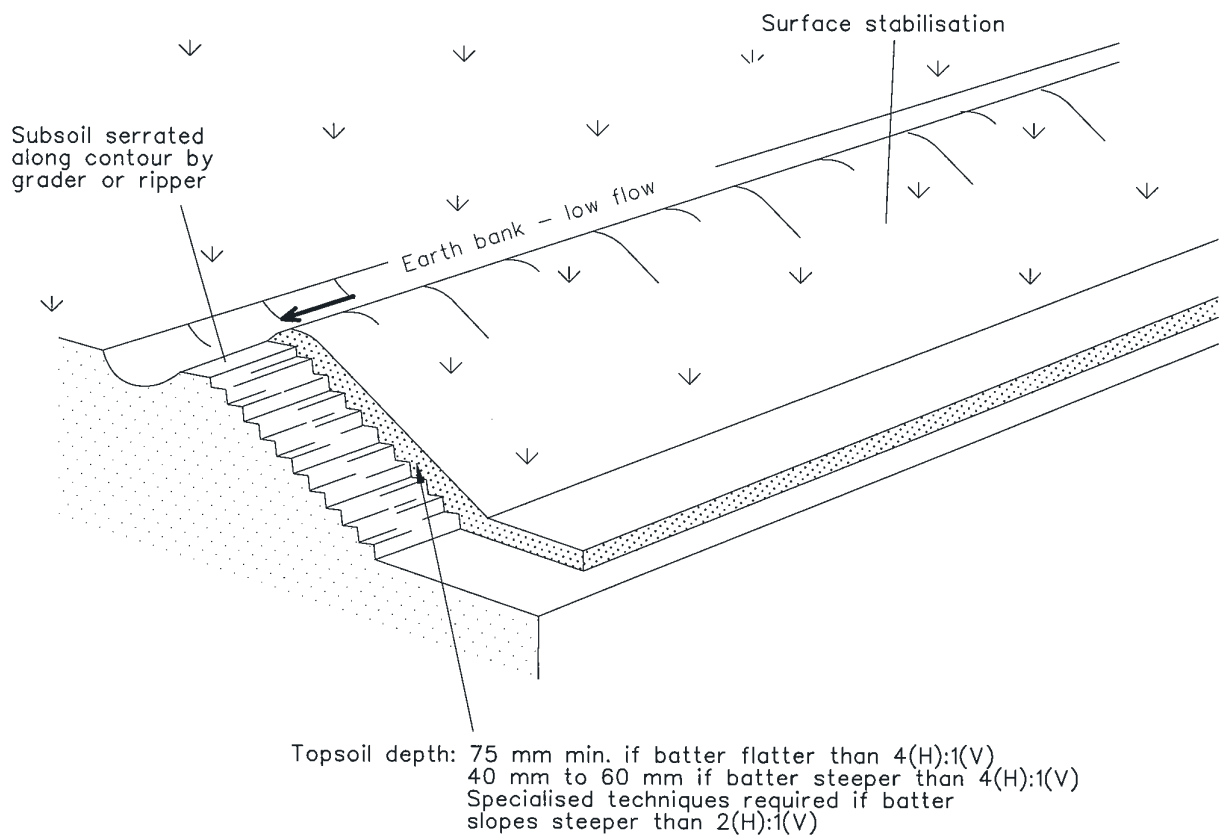
Figure 6.3 Detail of typical seepage collar or bulkhead

Source: Managing Urban Stormwater: Soils and Construction - Volume 2A Installation of Services



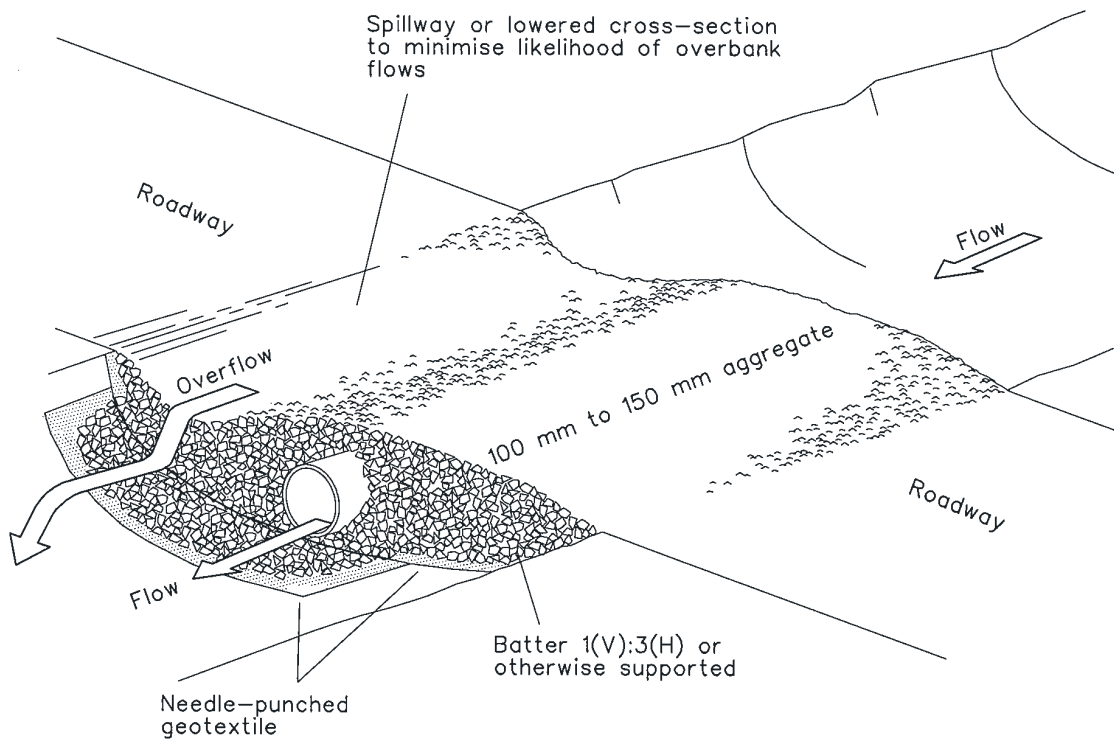
Construction Notes

1. Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
2. Construct on the contour as low, flat, elongated mounds.
3. Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
4. Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
5. Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.



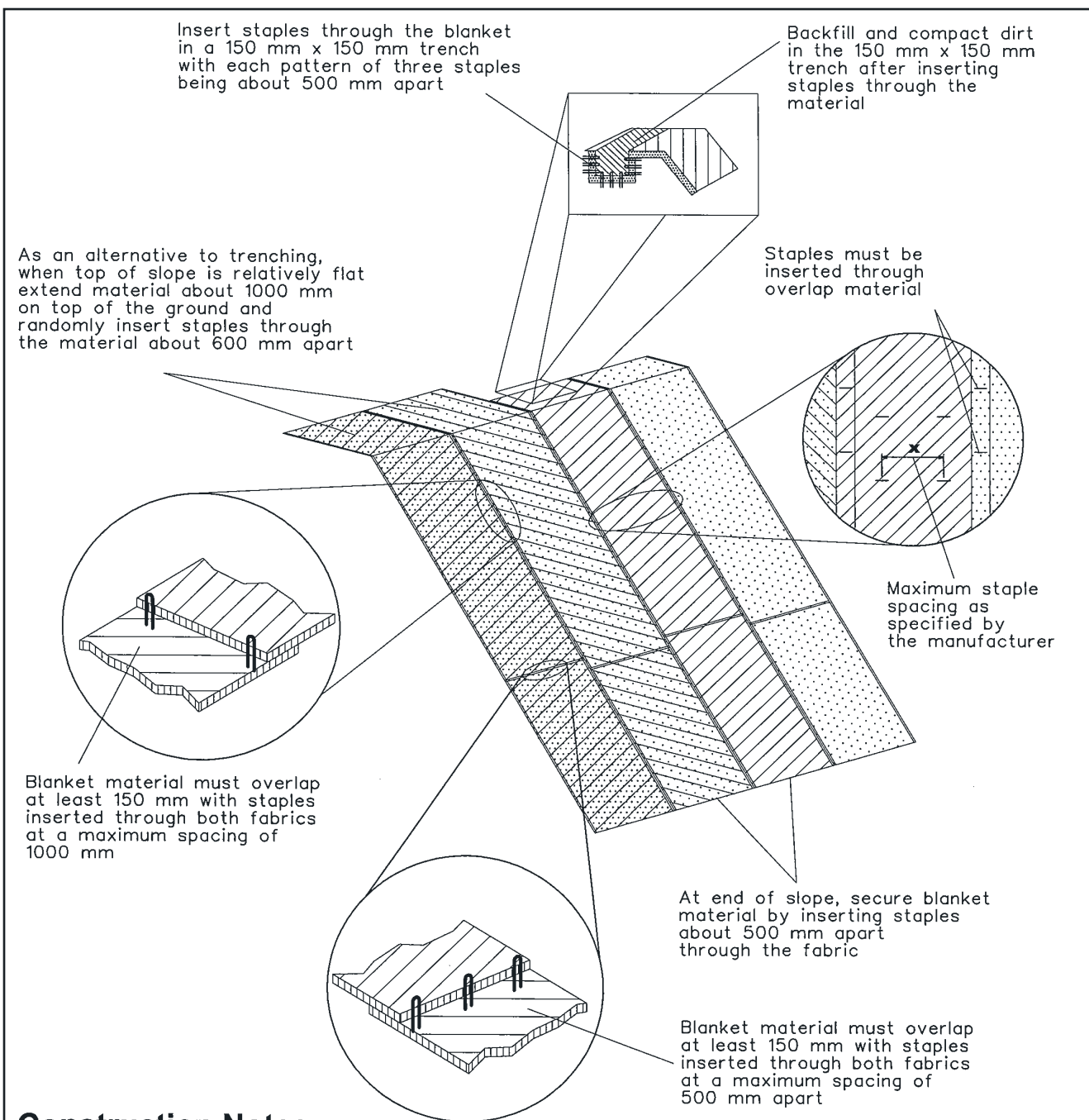
Construction Notes

1. Scarify the ground surface along the line of the contour to a depth of 50 mm to 100 mm to break up any hardsetting surfaces and to provide a good bond between the respread material and subsoil.
2. Add soil ameliorants as required by the ESCP or SWMP.
3. Rip to a depth of 300 mm if compacted layers occur.
4. Where possible, replace topsoil to a depth of 40 to 60 mm on lands where the slope exceeds 4(H):1(V) and to at least 75 mm on lower gradients.



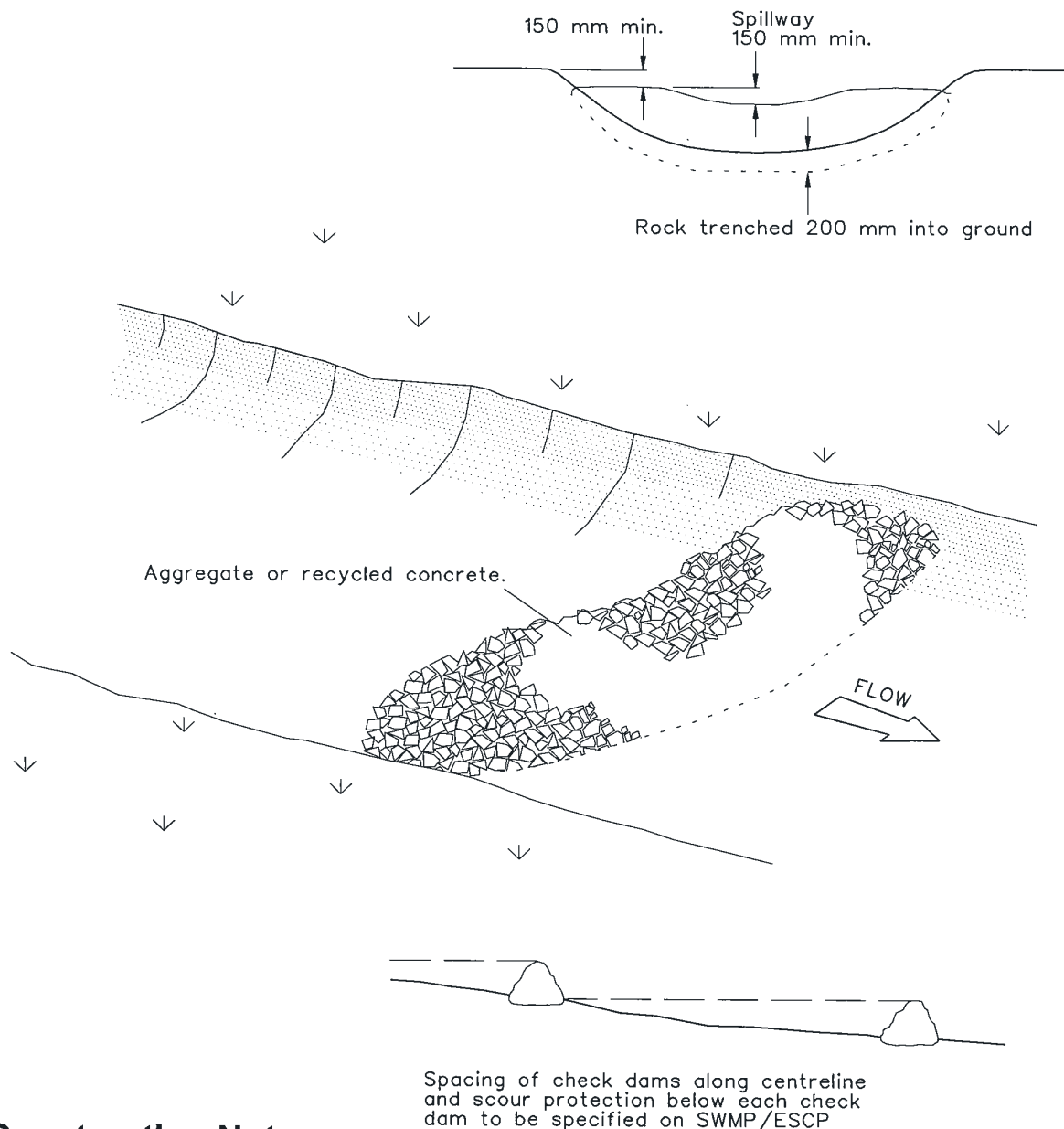
Construction Notes

1. Prohibit all traffic until the access way is constructed.
2. Strip any topsoil and place a needle-punched textile over the base of the crossing.
3. Place clean, rigid, non polluting aggregate or gravel in the 100 mm to 150 mm size class over the fabric to a minimum depth of 200 mm.
4. Provide a 3-metre wide carriageway with sufficient length of culvert pipe to allow less than a 3(H): 1 (V) slope on side batters.
5. Install a lower section to act as an emergency spillway in greater than design storm events.
6. Ensure that culvert outlets extend beyond the toe of fill embankments.



Construction Notes

1. Remove any rocks, clods, sticks or grass from the ground surface before laying the matting.
2. Spread topsoil to at least 75 mm depth.
3. Where appropriate, complete fertilising and seeding on a properly prepared seedbed (Standard Drawing 7-1) before laying the matting.
4. Ensure the fabric can be continuously in contact with the soil by grading the surface carefully first.
5. Lay the matting in "shingle-fashion" with the ends of each upstream roll overlapping the next roll downslope.
6. Ensure sufficient staples are used to maintain a good contact between the soil and the matting.

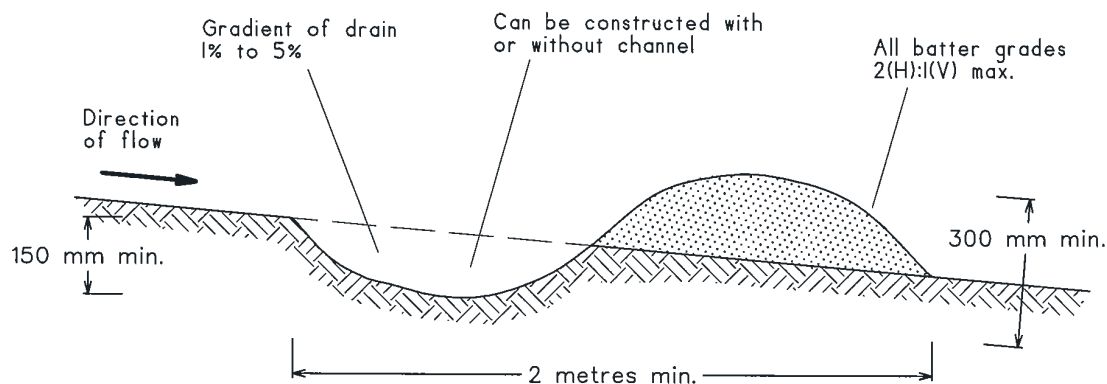


Construction Notes

1. Check dams can be built with various materials, including rocks, logs, sandbags and straw bales. The maintenance program should ensure their integrity is retained, especially where constructed with straw bales. In the case of bales, this might require their replacement each two to four months.
2. Trench the check dam 200 mm into the ground across its whole width. Where rock is used, fill the trenches to at least 100 mm above the ground surface to reduce the risk of undercutting.
3. Normally, their maximum height should not exceed 600 mm above the gully floor. The centre should act as a spillway, being at least 150 mm lower than the outer edges.
4. Space the dams so the toe of the upstream dam is level with the spillway of the next downstream dam.

ROCK CHECK DAM

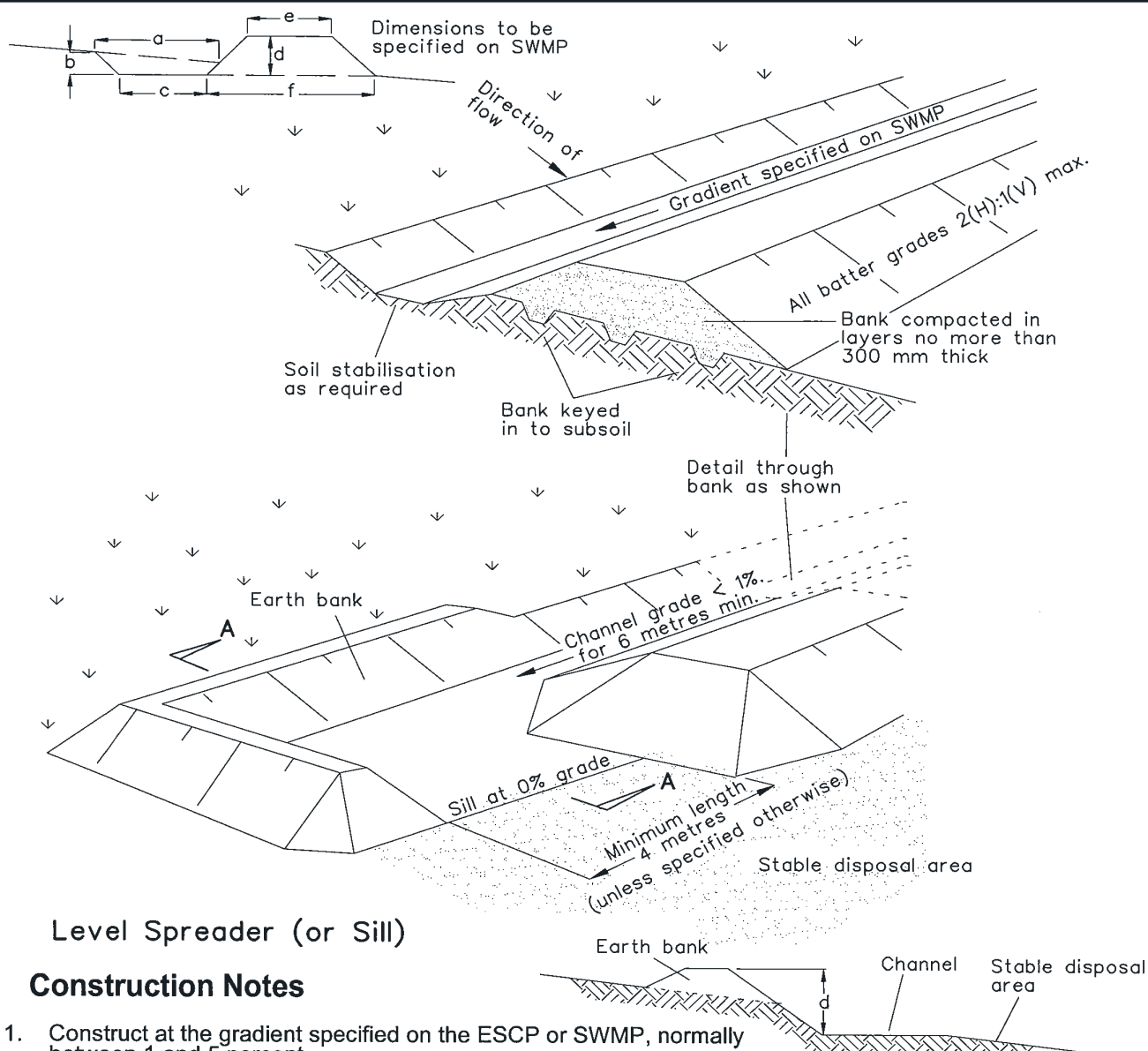
SD 5-4



NOTE: Only to be used as temporary bank where maximum upslope length is 80 metres.

Construction Notes

1. Build with gradients between 1 percent and 5 percent.
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction.

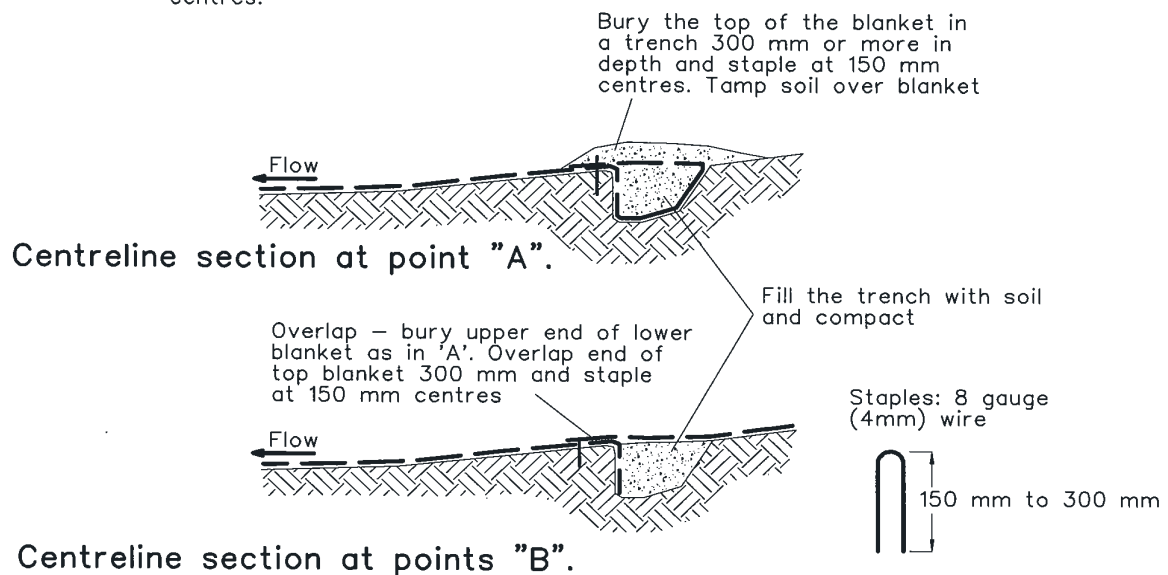
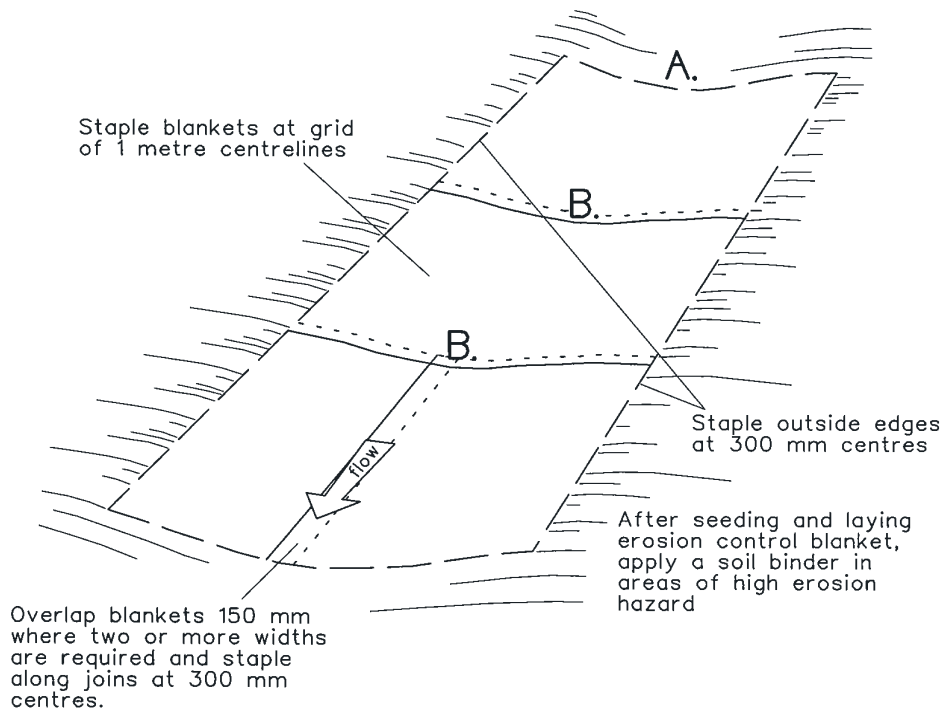


Level Spreader (or Sill)

Construction Notes

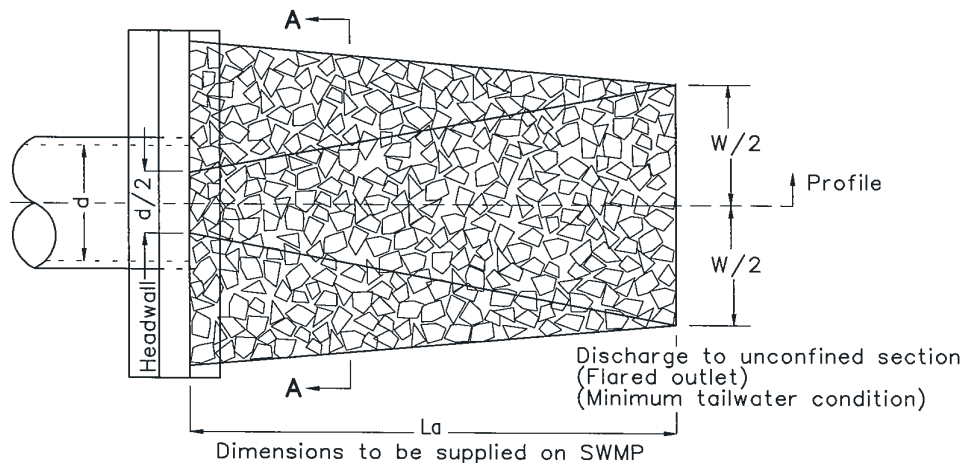
1. Construct at the gradient specified on the ESCP or SWMP, normally between 1 and 5 percent
2. Avoid removing trees and shrubs if possible - work around them.
3. Ensure the structures are free of projections or other irregularities that could impede water flow.
4. Build the drains with circular, parabolic or trapezoidal cross sections, not V-shaped, at the dimensions shown on the SWMP.
5. Ensure the banks are properly compacted to prevent failure.
6. Complete permanent or temporary stabilisation within 10 days of construction following Table 5.2 in Landcom (2004).
7. Where discharging to erodible lands, ensure they outlet through a properly constructed level spreader.
8. Construct the level spreader at the gradient specified on the ESCP or SWMP, normally less than 1 percent or level.
9. Where possible, ensure they discharge waters onto either stabilised or undisturbed disposal sites within the same subcatchment area from which the water originated. Approval might be required to discharge into other subcatchments.

Section AA

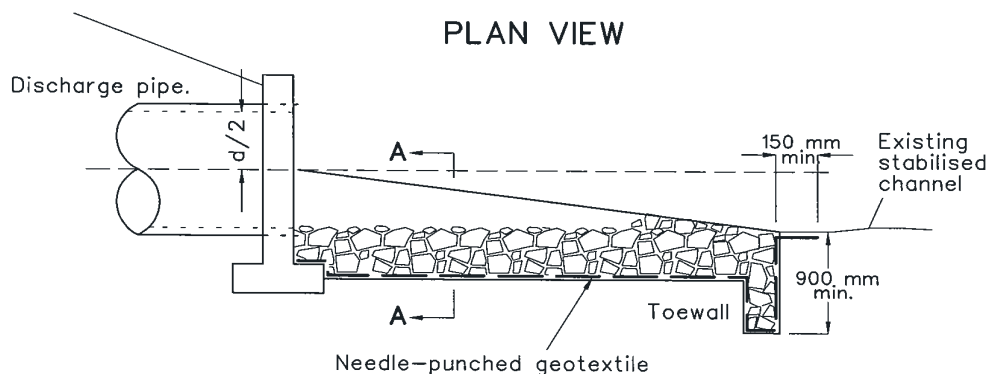


Construction Notes

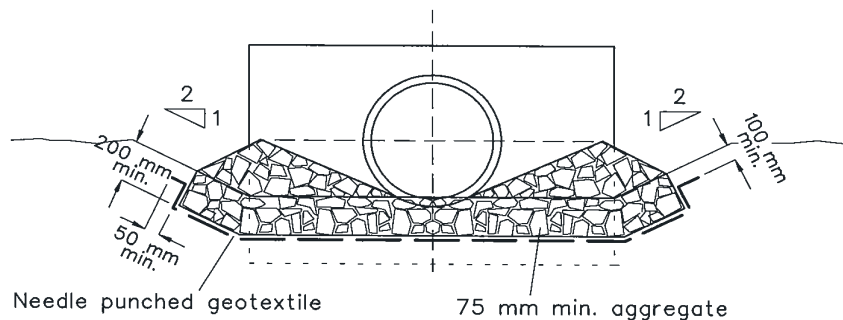
1. Remove any rocks, clods, sticks or grass from the surface before laying matting
2. Ensure that topsoil is at least 75 mm deep.
3. Complete fertilising and seeding before laying the matting.
4. Ensure fabric will be continuously in contact with the soil by grading the surface carefully first.
5. Lay the fabric in "shingle-fashion", with the end of each upstream roll overlapping those downstream. Ensure each roll is anchored properly at its upslope end (Standard Drawing 5-7b).
6. Ensure that the full width of flow in the channel is covered by the matting up to the design storm event, usually in the 10-year ARI time of concentration storm event.
7. Divert water from the structure until vegetation is stabilised properly.



PLAN VIEW



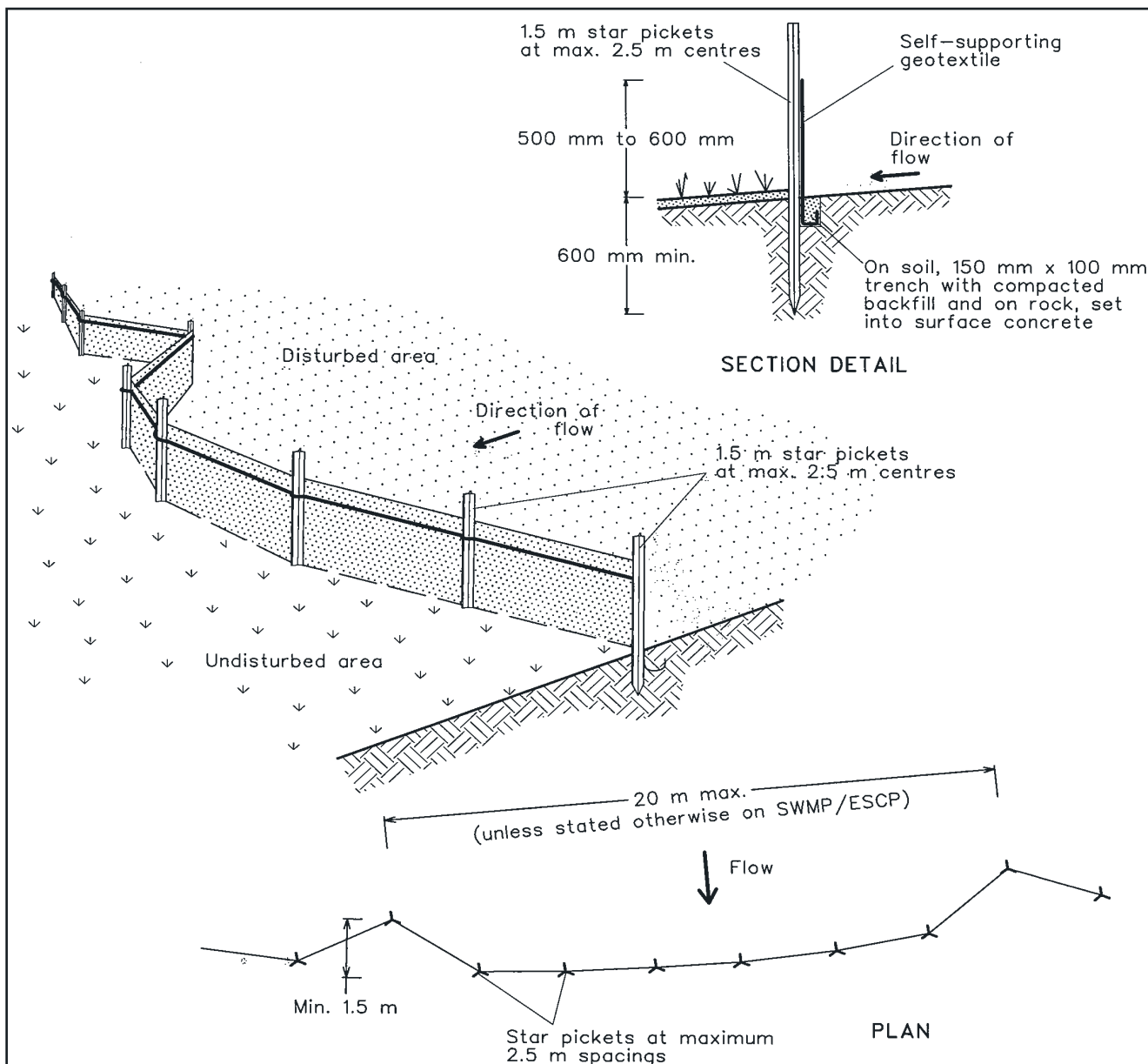
PLAN VIEW



CROSS SECTION AA

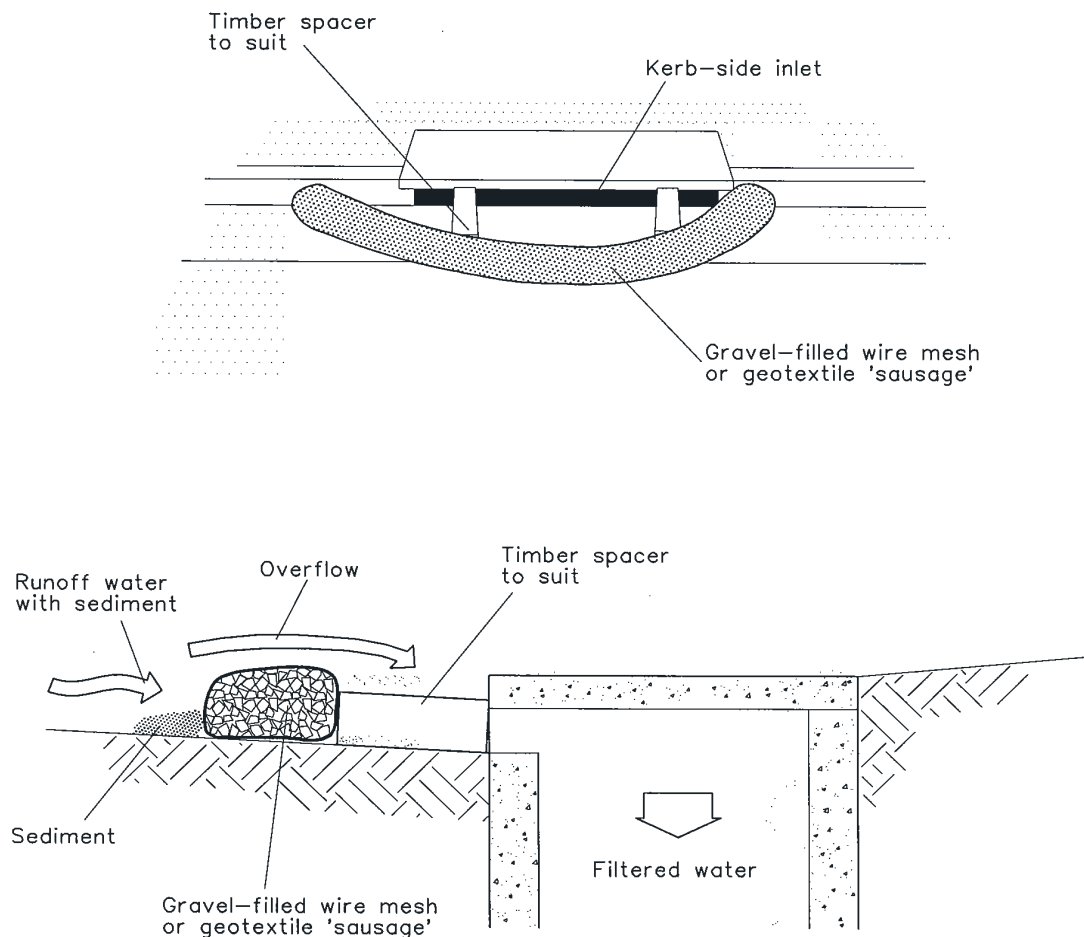
Construction Notes

1. Compact the subgrade fill to the density of the surrounding undisturbed material.
2. Prepare a smooth, even foundation for the structure that will ensure that the needle-punched geotextile does not sustain serious damage when covered with rock.
3. Should any minor damage to the geotextile occur, repair it before spreading any aggregate. For repairs, patch one piece of fabric over the damage, making sure that all joints and patches overlap more than 300 mm.
4. Lay rock following the drawing, according to Table 5.2 of Landcom (2004) and with a minimum diameter of 75 mm.
5. Ensure that any concrete or riprap used for the energy dissipater or the outlet protection conforms to the grading limits specified on the SWMP.



Construction Notes

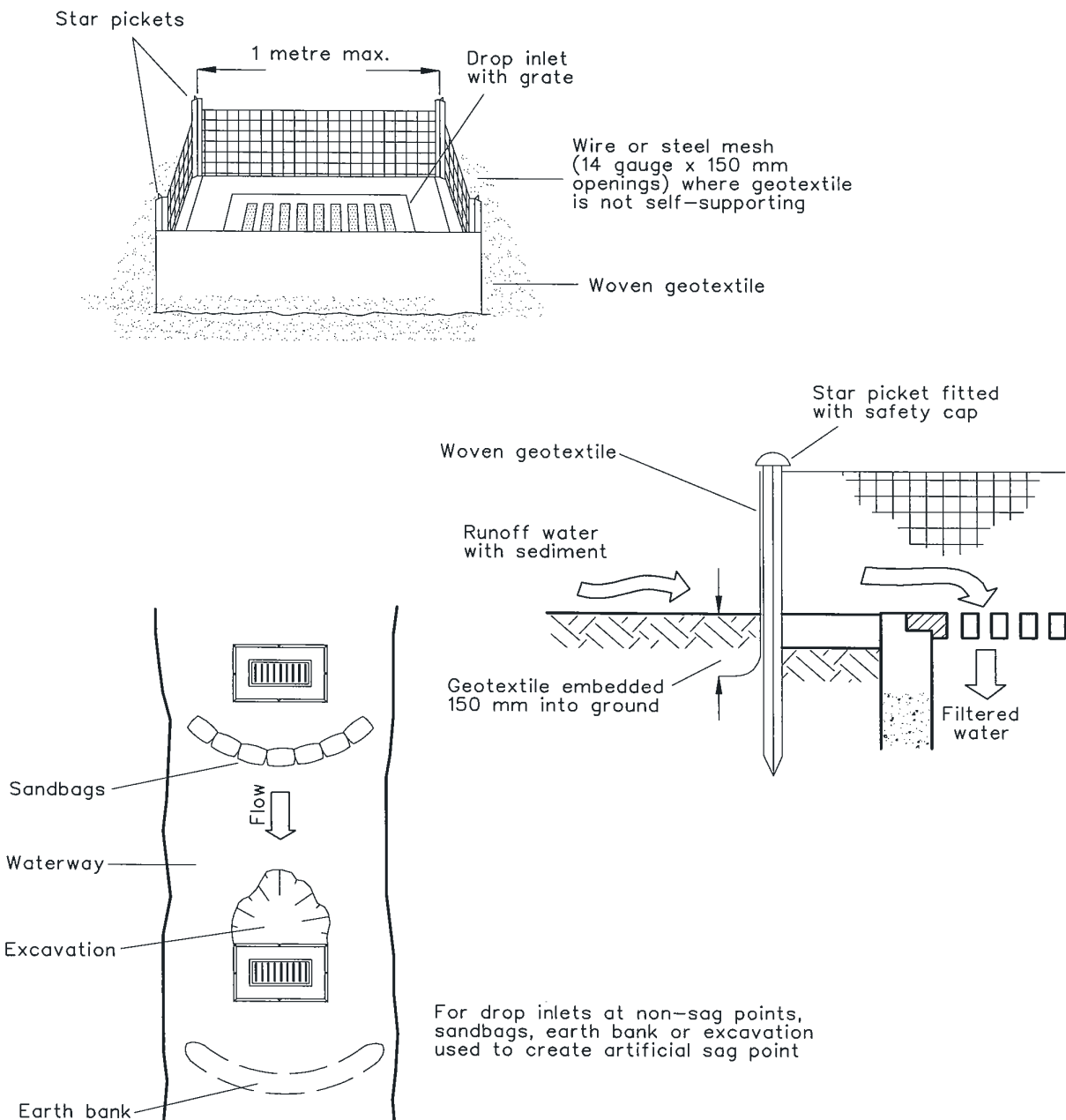
1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.



NOTE: This practice only to be used where specified in an approved SWMP/ESCP.

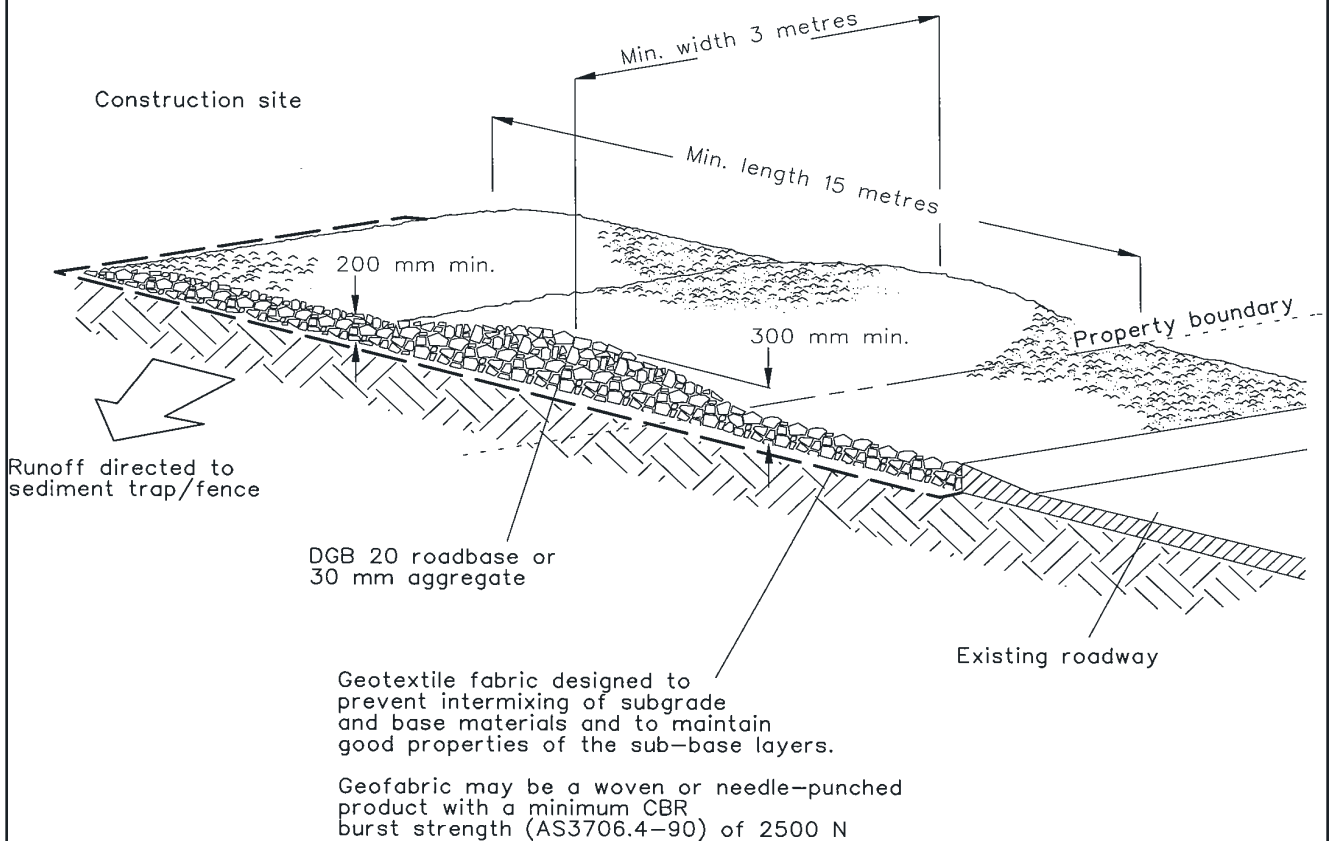
Construction Notes

1. Install filters to kerb inlets only at sag points.
2. Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
3. Form an elliptical cross-section about 150 mm high x 400 mm wide.
4. Place the filter at the opening leaving at least a 100-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
5. Form a seal with the kerb to prevent sediment bypassing the filter.
6. Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.



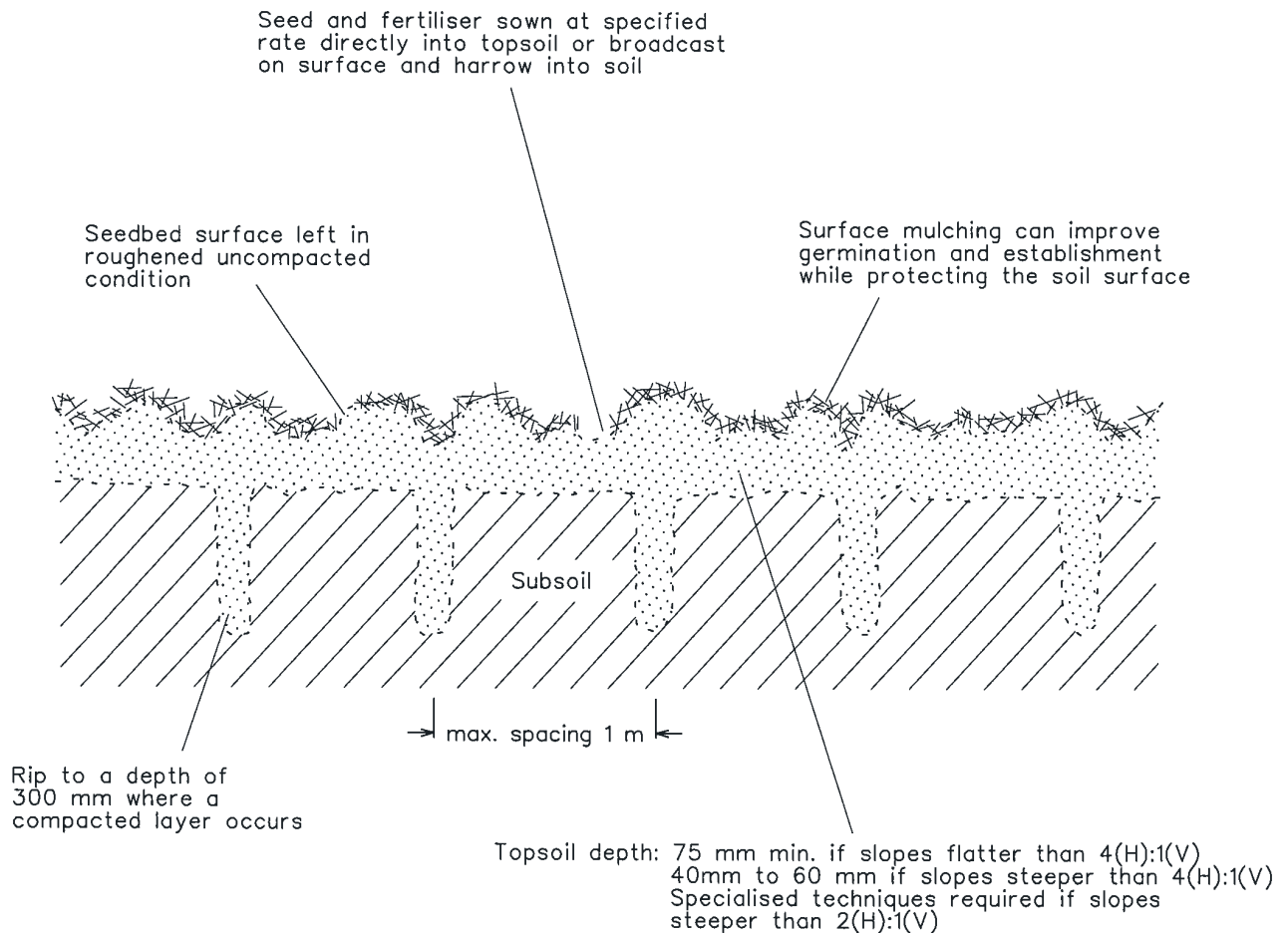
Construction Notes

1. Fabricate a sediment barrier made from geotextile or straw bales.
2. Follow Standard Drawing 6-7 and Standard Drawing 6-8 for installation procedures for the straw bales or geofabric. Reduce the picket spacing to 1 metre centres.
3. In waterways, artificial sag points can be created with sandbags or earth banks as shown in the drawing.
4. Do not cover the inlet with geotextile unless the design is adequate to allow for all waters to bypass it.



Construction Notes

1. Strip the topsoil, level the site and compact the subgrade.
2. Cover the area with needle-punched geotextile.
3. Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
4. Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
5. Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

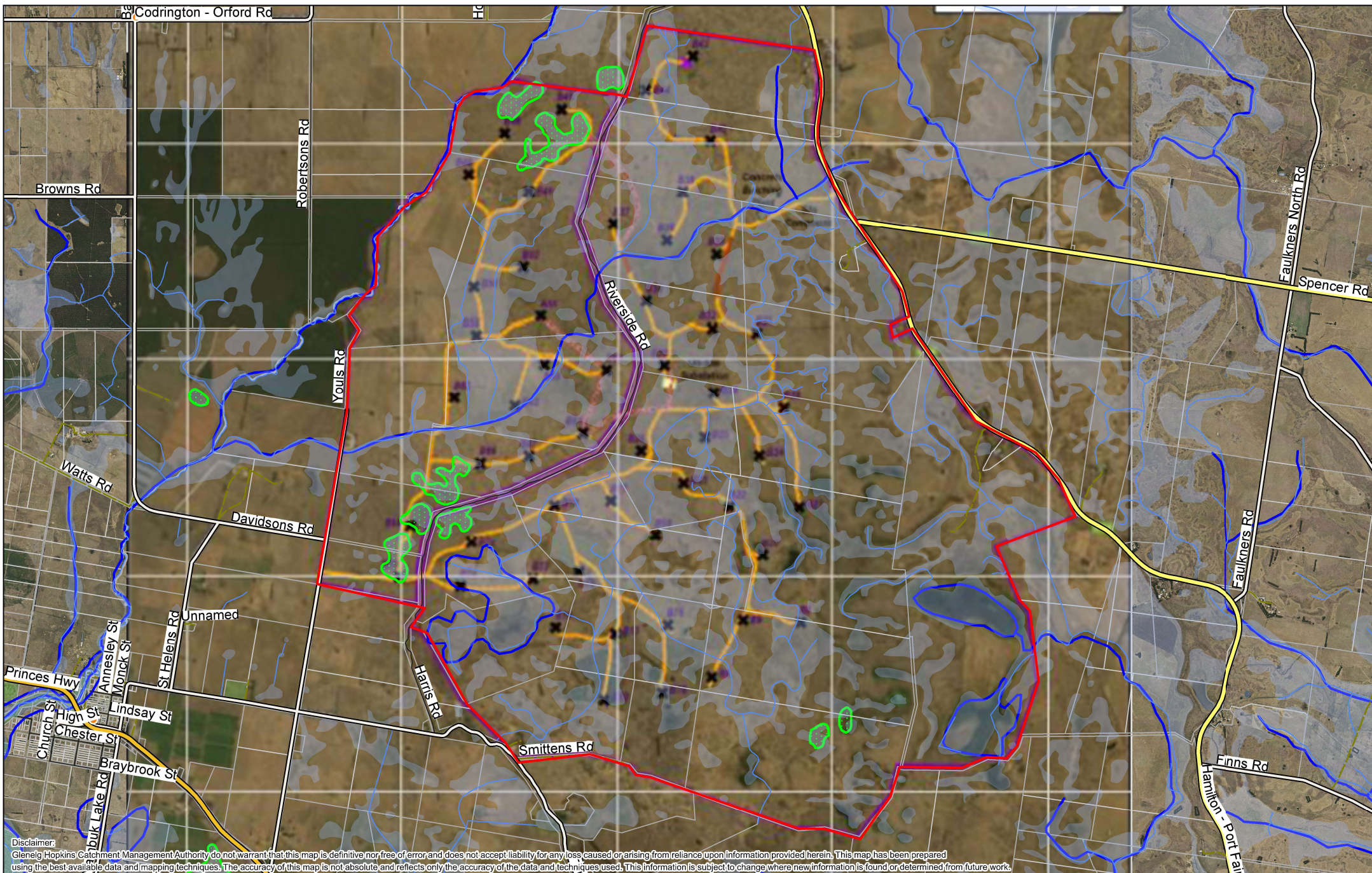


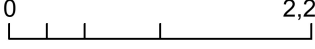
Construction Notes

1. Loosen compacted soil before sowing any seed. If necessary, rip the soil to a depth of 300 mm. Avoid rotary hoe cultivation.
2. Work the ground only as much as necessary to achieve the desired tilth and prepare a good seedbed.
3. Avoid cultivation in very wet or very dry conditions.
4. Cultivate on or close to the contour where possible, not up and down the slope.



Annex D Glenelg Hopkins CMA Designated Waterways



	MAP SCALE  0 2,200 metres	LEGEND  Parcel (Title)  Property Boundary  Potential Seasonal Herbaceous Wetland  Designated Waterway  Waterway/drain  Waterbody area	Ryans Corner Windfarm		
			SEWQMP		
			DRAWN BY: Tatjana Bunge	SHEET: 01 of 02	



Annex D Risk Register

RISK REGISTER

STANDARD ACTIVITIES

Item No.	Activity / Job Step	Hazards (Potential For Harm)	Risks (Unwanted Event)	Risk Assessment			Risk Reduction Plan					Residual Risk Assessment			Close Out
				Likelihood	Consequence	Risk Score	System Controls	Additional Controls	By Whom	When	Probability	Consequence	Risk Score		
CONSTRUCTION ACTIVITIES OR CONDITIONS															
1	Site establishment	Clearing of work areas	Removal/modification of habitat of flora and ground-dwelling fauna	2	3	M	Refer to Construction and Worksite Management Plan	Contractor to consult with Wildlife Victoria on how to manage injured fauna encountered during the works (13 000 94535)			1	3	M		
2			Disturbance or damage to known or unidentified Aboriginal heritage site	3	4	H	Refer to Cultural Heritage Management Plan				2	4	M		
3			Disturbance or damage to non-Aboriginal heritage site	3	3	H	Refer to Cultural Heritage Management Plan				2	3	M		
4			Dust emissions from the clearance of large areas may reduce air quality	3	2	M	Refer to Construction and Worksite Management Plan	Contractor to consider a water cart if large areas are to be disturbed that may result in increased dust levels.			2	2	L		
5		Visual change to existing conditions.	Landowners, residents and community disturbed or concerned	2	3	M	Refer to Environmental Management Plan	Consult with Landowners, residents and community			1	3	M		
6		Levelling and compaction for portable buildings and truck loading area	Erosion, increased stormwater run-off and disruption to drainage lines leading to degradation of waterways.	3	3	H	Refer to Sediment, Erosion and Water Quality Management Plan				2	2	L		
7	On-site sanitary facilities	Wastewater disposal	Incorrect disposal of wastewater may damage local habitats and contaminate groundwater and waterways	2	3	M	Refer to Construction and Worksite Management Plan and Sediment, Erosion and Water Quality Plan				1	2	L		
8	Transport of equipment, materials and staff to/from and around site	Operation of heavy vehicles	Incompetent operation of vehicles causing damage or loss of local habitat and collision with fauna.	3	3	H	Refer to Construction and Worksite Management Plan	All operators of vehicles and plant/equipment are to be appropriately licensed. Speed limits are set out in this EMP and are to be adhered to.			2	3	M		
9			Accidental oil spillage during refuelling or parking causing soil/water contamination and damage to habitats	2	3	M	Refer to Hydrocarbon and Hazardous Substances Management Plan and Construction and Worksite Management Plan	Contractor to maintain spill kits in areas of refuelling (if required). In most, if not all cases, on-site refuelling can be avoided.			1	3	M		
10			Spread of contaminated materials	3	3	H	Refer to Hydrocarbon and Hazardous Substances Management Plan and Pest Plant Management Plan	Training to be provided to operators on how to deal with fuel/oil spills.			1	2	L		
11			Transfer of noxious or declared weeds	4	4	H	Refer to Pest Plant Management Sub-Plan and Construction and Worksite Management Plan	Wash vehicles prior to leaving areas that are identified as containing noxious weeds.			3	3	H		
12		Increased traffic movements	Traffic conflicts/collisions and disturbance to other road users, residents and fauna	4	4	H	Refer to Construction and Worksite Management Sub-Plan	Vehicle movements in standard hours.			3	3	H		
13			Damage to roads external to the site	3	2	M	Refer to Construction and Worksite Management Sub-Plan	Record the status of roads prior to commencing works to measure if damage is caused.			1	2	L		
14		Vehicle Exhaust	Atmospheric emissions released into the air	4	2	M	Refer to Construction and Worksite Management Plan	All vehicles/plant to be appropriately licensed. Vehicles to be inspected daily for any leaks or evident problems.			3	2	M		
15			Disturbance and damage to flora and fauna	3	2	M	Refer to Construction and Worksite Management Plan and Native Vegetation Management Plan	Contractors to mark out traffic routes to avoid disturbance of sensitive flora and fauna			2	2	L		
			Fire Risk	2	3	M	Refer to Bushfire and Emergency Response Plan	Induction/awareness Diesel vehicles to be used in areas of long grass			3	3	M		
16		Energy Consumption	Waste of natural resources, and energy.	3	2	M	Refer to Construction and Worksite Management Plan	Operators of vehicles plant are to shut off when not in use.			2	2	L		
17	Earthworks for access tracks, underground cabling, turbine foundations	General operation of machinery	Incompetent machinery operation causing damage or loss of local habitat	1	2	L	Refer to Construction and Worksite Management Plan	Operators of vehicles/plant are to shut off when not in use.			1	2	L		
18			Accidental oil spillage during refuelling and maintenance causing soil/water contamination and damage to habitats	2	3	M	Refer to Hydrocarbon and Hazardous Substances Management Plan	Training to be provided to operators on how to deal with fuel/oil spills.			1	3	M		
19		Machinery Exhaust	Atmospheric emissions released into the air	4	2	M	Refer to Construction and Worksite Management Plan	All vehicles/plant to be inspected daily to ensure that it is operating within manufacturers parameters.			3	2	M		
20			Disturbance and damage to local residents, flora and fauna	3	2	M	Refer to Construction and Worksite Management Plan and Native Vegetation Management Plan	Contractors to mark out traffic routes to minimise disturbance of flora and fauna.			2	2	L		
21		Storage of hazardous substances	Accidental spillage may cause disturbance to local habitats and contamination of soil/water	2	3	M	Refer to Hydrocarbon and Hazardous Substances Management Plan	Store hazardous materials in secure bunded unit. Spill procedures and spill kits to be available. Consideration of Health and Safety requirements also.			1	3	M		
22		Vibration	Damage to nearby structures, buildings, homes and disturbance to local residents and fauna	2	3	M	Refer to Blasting Management Plan				1	3	M		

23	Excavation and blasting (if required)	Excavation of the site has the potential to contaminate groundwater	2	3	M	Refer to Sediment, Erosion and Water Quality Management Plan	Emergency response to covering soil piles during heavy rain.			1	3	M		
24		Dust emissions from the excavation of the site may reduce air quality	3	2	M	Refer to Construction and Worksite Management Plan	Development of monitoring protocols and water cart to be available to reduce dusts to be considered.			2	2	L		
25		Soil erosion	3	3	H	Refer to Sediment, Erosion and Water Quality Management Plan	Contractors to mark out traffic routes to minimise disturbance soil.			2	2	L		
26		Disturbance or damage to flora and fauna (trenching etc)	2	3	M	Refer to Construction and Worksite Management Plan and Native Vegetation Management Plan	Contractor to consider the storage of excavated soil.			1	3	M		
27		Disturbance or damage to known or unidentified Aboriginal heritage site	3	4	H	Refer to Cultural Heritage Management Plan				2	4	M		
28		Disturbance or damage to non-Aboriginal heritage site	3	3	H	Refer to Cultural Heritage Management Plan				2	3	M		
29		Disturbance to local residents as a result of blasting overpressure, noise and vibration	2	3	M	Refer to Blasting Management Plan	All vehicles/plant to be inspected daily.			1	3	M		
30		Unidentified contaminated soil leading to inappropriate disposal or reuse.	3	3	H	Refer to Construction and Worksite Management Plan	Consideration to be given to testing soil should soil encountered contain odours or staining. All soil leaving site will require testing.			2	3	M		
31		Stockpiling of topsoil/spoil	Sedimentation and a reduction in surface water quality	3	3	H	Refer to Sediment, Erosion and Water Quality Management Plan	Emergency response to covering soil piles during heavy rain.			2	3	M	
32			Potential impact on air quality if stockpiles are not appropriately located and covered.	3	3	H	Refer to Construction and Worksite Management Plan	Development of monitoring protocols and water cart to be available to reduce dusts to be considered.			2	2	L	
33	Removal of vegetation		Removal of native vegetation as a result of site access or other	3	3	H	Refer to Native Vegetation Management Plan			3	3	H		
34			Loss of vegetation cover may increase the risk of erosion	3	2	M	Refer to Sediment, Erosion and Water Quality Management Plan			2	2	M		
35			Disturbance to fauna as a result of loss of habitat	2	3	M	Refer to Construction and Worksite Management Plan			1	3	M		
36	Excessive noise	Disturbance to local residents and fauna from blasting, plant etc	2	3	M	Refer to Construction and Worksite Management Plan and Blasting Management Plan	Contractors to mark out traffic routes to minimise disturbance soil.			2	2	M		
37	Establishing concrete batching plant	Establishing plant	Removal/modification of habitat of flora and ground-dwelling fauna	2	3	M	Refer to Construction and Worksite Management Plan			1	3	M		
38			Inexperienced operator making errors in setup process causing damage to property	1	2	L	Refer to Environmental Management Plan			1	2	L		
39		Levelling and compaction for truck loading area	Increased stormwater run-off and disruption to drainage lines which may impact on-site and off-site waterways.	3	3	H	Refer to Sediment, Erosion and Water Quality Management Plan			2	2	L		
40		Transport and storage of materials	Uncovered trucks, storage silos and weigh hoppers has the potential to reduce air quality	3	2	M	Refer to Construction and Worksite Management Plan			2	2	L		
41		Plant operation	Dust emissions from the excavation of the site may reduce air quality	3	2	M	Refer to Construction and Worksite Management Plan			2	2	L		
42		Excessive noise	Disturbance to local residents and fauna	2	2	L	Refer to Noise and Vibration Management Plan			1	2	L		
43		Insufficient use of materials and potable water	Waste of natural resources, and energy.	3	2	M	Refer to Construction and Worksite Management Plan			2	2	L		
44		Cleaning pump and hoses	Inappropriate disposal of waste/wastewater	3	3	H	Refer to Construction and Worksite Management Plan and Sediment, Erosion and Water Quality Management Plan			2	2	L		
45		Transporting concrete from plant to turbine locations	Accidental spillage may cause disturbance to local habitats and contamination of soil/water	2	2	L	Refer to Construction and Worksite Management Plan			1	2	L		

46	Construction of turbines, wind towers, substation and control buildings	Pouring concrete foundations	Accidental spillage may cause disturbance to local habitats and contamination of soil/water	2	2	L	Refer to Environmental Management Plan	Contractor to consider appropriate measures for the disposal of any spilled or excess concrete.			1	2	L	
47		Corrosion potential of footings by groundwater	The corrosion of footings has the potential to contaminate regional aquifers	1	2	L	Refer to Sediment, Erosion and Water Quality Management Plan				1	2	L	
48		Sheltering of pests	Disturbance or damage to flora and fauna	3	2	M	Refer to Pest Animal Management Plan	Contractor is to ensure that all waste generated as part of the works is removed from Site.			2	2	L	
49		Bird and bat collision with wind towers and turbines	Disturbance or loss of fauna	3	3	H	Refer to Bats and Avifauna Management Plan				2	3	M	
50	Rehabilitation works at completion of construction	Re-use of topsoil and spoil to backfill over foundations allowing vegetation rehabilitation	Spread of noxious or declared weeds	4	4	H	Refer to Pest Plant Management Plan	Consideration to be given to washing vehicles prior to leaving areas that are identified as containing noxious weeds.			3	3	H	
OPERATIONAL ACTIVITIES OR CONDITIONS														
51	Ongoing occupation of the site and buildings	Sheltering of pests	Disturbance or damage to flora and fauna	3	2	M	Refer to Pest Animal Management Plan	Contractor is to ensure that all waste generated as part of the works is removed from Site.			2	2	L	
52		Potential bushfire	Loss or damage to wind farm equipment and habitats	3	5	H	Refer to Bushfire Emergency Response Management - Plan	Refer to specific sections in Health and Safety Plan			2	5	H	
53	Wind towers and turbine operation	Bird and bat collision with turbines	Disturbance or loss of fauna	3	3	M	Refer to Bats and Avifauna Management Plan				2	3	M	
54		Inappropriate operation and training program	Incompetent operation of the wind turbines causing damage to property and local fauna and fauna.	2	4	M	Refer to Environmental Management Plan				1	4	M	
55		Exposure to noise	Disturbance to residents and fauna	3	2	M	Refer to Construction and Worksite Management Plan	Noise compliance assessment required to be undertaken			2	2	L	
56		Blade shadow flicker	Disturbance to local residents and fauna	3	2	M	Refer to Environmental Management Plan				1	2	L	
57		Television and radio reception and interference	Disturbance to local residents	2	2	L	Refer to Television and Radio Reception Management Plan				1	2	L	
58		Excessive lighting	Disturbance to residents and fauna	1	2	L	Refer to Construction and Worksite Management Plan				1	1	L	
59	Maintenance of turbines, substation and control buildings	Storage of hydraulic oil	Accidental spillage may cause disturbance to local habitats and contamination of soil/water	2	3	M	Refer to Hydrocarbon and Hazardous Substances Management Plan				1	3	M	
60	Vehicle movements around site	General operation of vehicles	Incompetent operation of vehicles causing damage or loss of local habitat and collision with fauna.	1	2	L	Refer to Construction and Worksite Management Plan	All operators of vehicles and plant/equipment are to be appropriately licensed. Speed limits are to be adopted for Site.			1	2	L	
61			Accidental oil spillage causing soil/water contamination and damage to habitats	2	2	L	Refer to Hydrocarbon and Hazardous Substances Management Plan and Construction and Worksite Management Plan	Training to be provided to operators on how to deal with fuel/oil spills.			1	2	L	
62			Transfer of noxious or declared weeds	2	3	M	Refer to Pest Plant Management Plan	Consideration to be given to washing vehicles prior to leaving areas that are identified as containing noxious weeds.			1	3	M	
63		Ongoing maintenance and use of access tracks	Erosion, increased stormwater run-off and disruption to drainage lines leading to degradation of waterways.	3	3	H	Refer to Sediment, Erosion and Water Quality Management Plan	Contractors to mark out traffic routes to minimise disturbance of flora and fauna. Contractor to consider the use of a water cart during days of high traffic movement and dusty conditions.			2	3	M	
64	On-site sanitary facilities	Wastewater disposal	Incorrect disposal of wastewater may damage local habitats and contaminate groundwater and waterways	2	3	M	Refer to Construction and Worksite Management Plan				1	2	L	



Annex E Corrective and Preventative Action Register

Ryan Corner Wind Farm – Corrective and Preventative Action Register

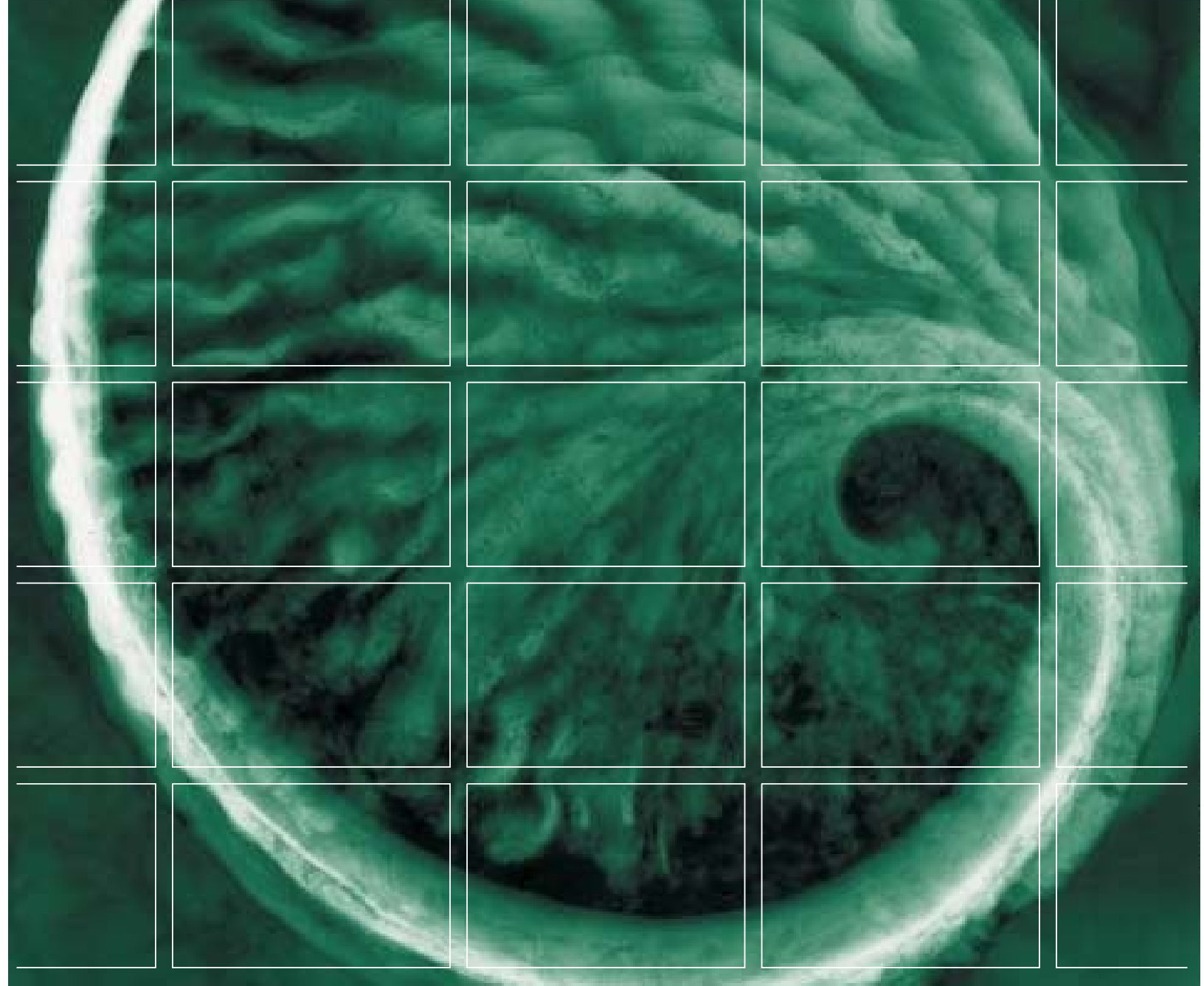
Action ID #	Previous Incomplete Action ID #	Description of Non-Compliance	Corrective Action Required	Date Identified (DD/MM/YYYY)	Agreed Timeframe (DD/MM/YYYY)	In Relation To	Key Responsible Contact	Method of Identification	Priority	Location	Actions undertaken (action sequence)	Hierarchy of control (select highest applicable)	Action Completion Date	Days Remaining	Current status	If incomplete, Linked New Action ID #

Options for the above mentioned could be as follows:

Method of Identification	Priority	Hierarchy of Controls	In Relation To
Risk Assessment	High	Elimination	OH&S
Workplace Inspections	Medium	Substitution	Flora and Fauna
Internal Audits	Low	Isolation	SEWQMP
External Audits		Engineering	Noise
Hazard/Incident Report		Administrative	Training
Site Inspection/Walk		PPE	Hydrocarbon & Hazardous Substances
Complaints			Bushfire Prevention
Meetings			Pest Animal
OHS Assessments			Pest Plant



Annex F Cultural Heritage Management Plan



**Cultural Heritage Management Plan:
Ryan Corner Wind Farm, Ryan Corner,
Port Fairy, Victoria**

Sponsor Name: TMEA Australia Pty. Ltd.

Completion Date: 28 July 2008

ERM Reference: 0080097

AAV Management Plan Identifier: 10298

Cultural Heritage Advisors: Luke Kirkwood

Authors: Luke Kirkwood and Asher Ford

Sponsor Name: TMEA Australia Pty. Ltd.

Cultural Heritage
Management Plan: Ryan
Corner Wind Farm, Ryan
Corner, Port Fairy, Victoria

Completion Date: 28 July 2008

ERM Reference: 0080097

AAV Management Plan Identifier: 10298

Cultural Heritage Advisors: Luke Kirkwood

Authors: Luke Kirkwood and Asher Ford

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Sponsor Name: TMEA Australia Pty. Ltd.

Cultural Heritage
Management Plan: Ryan
Corner Wind Farm, Ryan
Corner, Port Fairy, Victoria

Completion Date: 28 July 2008

ERM Reference: 0080097

AAV Management Plan Identifier: 10298

Cultural Heritage Advisors: Luke Kirkwood

Authors: Luke Kirkwood and Asher Ford

For and on behalf of
Environmental Resources Management
Australia

Approved by: Oona Nicolson

Signed:

A handwritten signature in black ink, appearing to read 'Oona Nicolson', is written over a light blue horizontal line.

Position: Principal Consultant

Date: 28 July 2008

Aboriginal Heritage Act 2006
Section 65

Cultural Heritage Management Plan - Notice of Approval

I, Ian Hamm, Deputy Director, Aboriginal Affairs Victoria, acting under authority delegated to me by the Secretary, Department of Planning and Community Development, hereby approve the cultural heritage management plan referred to below:

RYAN CORNER WIND FARM, RYAN CORNER, PORT FAIRY, VICTORIA

Cultural Heritage Management Plan number: 10298

Sponsor: TME Australia Pty Ltd

Cultural Heritage Advisor: Mr Luke Kirkwood [ERM Australia]

Authors: Mr Luke Kirkwood & Mr Asher Ford [ERM Australia]

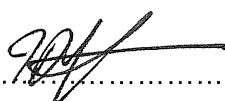
Cover Date: 28 July 2008

Pages: 88 + Annex A - K

Received for Approval: 28 July 2008

Pursuant to s.65(6) of the Act this cultural heritage management plan takes effect upon the granting of this approval.*

Signed:


IAN HAMM

Dated: **31 JULY 2008**

** This notice of approval should be inserted after the title page and bound with the body of the management plan.*

The contents of the approved Cultural Heritage Management Plan forming part of the endorsed Environmental Management Plan (EMP) are sensitive, and have been removed from the endorsed EMP made available to the public to protect cultural heritage.



Annex G Pest Animal Management Plan

Final Report

Pest Animal Management Plan for the Ryan Corner Windfarm, Yambuk, Victoria

Prepared for

Environmental Resource Management Pty Ltd

May 2021



Ecology and Heritage Partners Pty Ltd

DOCUMENT CONTROL

Assessment	Pest Animal Management Plan
Address	Ryan Corner Windfarm, Yambuk, Victoria
Project number	14354
Project manager	Emma Keith (Botanist)
Report author	Sally Burgemeestre (Bushfire Consultant/Field Ecologist)
Report reviewer	Andrew Hill (Director/Principal Ecologist)
Mapping	Monique Elsley (GIS Coordinator)
File name	14534_PestAnimalManagementPlan_RyanCorner_Final_V3_03052021
Client	Environmental Resource Management Pty Ltd
Bioregion	Victorian Volcanic Plains
CMA	Glenelg Hopkins
Council	Moyne Shire

Report versions	Comments	Comments updated by	Date submitted
Draft	-		23/11/2020
Final	-		25/11/2020
Final V2	Department of Jobs, Precincts and Regions	EK	10/12/2020
Final V3	Updated w amended development plan	SB	03/05/2021

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- Fiona Koutsivos (ERM) for project information;
- Melissa Kilkelly (Global Power Generation) for site information and access;
- Landholders for site information and access;
- The Victorian Department of Environment, Land, Water and Planning for access to ecological databases.

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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by ERM on behalf of Global Power Generation Australia Pty Ltd to provide a Pest Animal Management Plan (PAMP) for the proposed Ryan Corner Windfarm. This PAMP has been prepared to address condition 17 (g) of the Planning Permit (Permit No. 20060222-A) granted by the Minister for Planning under Division 6 of Part 4 of the Planning and Environment Act 1987. Ecology and Heritage Partners Pty Ltd previously prepared a PAMP for the Ryan Corner Windfarm in 2010 (Ecology Partners Pty Ltd 2010). However, due to the significant time since the site assessment for this management plan was conducted, a reassessment of the study area was required in order to provide details on the current condition with respect to pest animal abundance and subsequent management actions.

The purpose of this PAMP is to reassess the Ryan Corner Windfarm to identify and map pest animal species listed under Victoria's *Catchment and Land Protection Act 1994* occurring within the study area to guide management of these pest species within the areas proposed for construction of the wind energy facility.

1.2 Pest Animal Management Plan Objectives

Condition 17 (g) of the planning permit stipulates:

- *A Pest Animal Management Plan to be prepared in consultation with the Department of Economic Development, Jobs, Transport and Resources. This plan must include:*
 - i. *Procedures for the control of pest animals, particularly by negating opportunities for the sheltering of pests; and,*
 - ii. *Follow-up pest animal control for all areas disturbed by the wind energy facility construction works for a period of two (2) years following the completion of the wind energy facility.*

As such, the objectives of this PAMP are to:

- Identify the location and species of pest animal species that are occurring or have the potential to occur within the study area; and,
- Provide a management plan that will include mitigation, monitoring and control methods to be implemented throughout each construction phase (pre-construction, construction and post-construction) of the wind energy facility to control the current distribution and prevent further spread of pest animal species.

1.3 Study area

The study area, the Ryan Corner Windfarm, is located approximately 12 kilometres north west of Port Fairy, Victoria (Figure 1). The study area covers 3390 hectares and comprises four private landholdings. The study area is bound by private property to the north, Hamilton-Port Fairy Road to the east, Fingerboard Road to the south and Youls Road to the west. Riverside Road and Harris Road dissect the study area north to south.

The study area is mostly comprised of minor undulations and low-lying areas that are subject to inundation during heavy rainfall; inundation was evident within most properties during the site assessments. A number of ephemeral creek and drainage lines are present throughout the study area and permanent water bodies are particularly prevalent in the south eastern corner of the study area. Areas of stony knolls are present on the rises across of the study area. The land within the study area has historically been used for agricultural purposes, such as grazing and cropping, and typically contains a mixture of improved and unimproved pasture. According to the Department of Environment, Land, Water and Planning (DELWP) NVIM Map (DELWP 2020a) the study area is located within the Victorian Volcanic Plain bioregion, the Glenelg Hopkins Catchment Management Authority, and the Moyne Shire municipality.

2 LEGISLATION AND POLICY CONSIDERATIONS

Commonwealth and State government legislation and policy relevant to the PAMP include:

- *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act);
- *Flora and Fauna Guarantee Act 1988* (FFG Act); and,
- *Catchment and Land Protection Act 1994* (CaLP Act).

A breakdown of the relevant legislation is provided below.

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act deals with actions that have, or are likely to have, a significant impact on a matter of national environmental significance. The key threatening processes listed under the EPBC Act relevant to the PAMP are:

- Competition and land degradation by European Rabbits *Oryctolagus cuniculus*; and
- Predation by the European Red Fox *Vulpes vulpes*.

2.2 State Legislation

2.2.1 Catchment and Land Protection Act 1994

The CaLP Act is the main state legislation relating to the control of pest animal species (DSE 2002a). Classification of pest animals according to the CaLP Act falls into four categories.

1. Prohibited Pest Animals – declared prohibited pest animals are those that:
 - Do not occur naturally in the wild in Australia before European settlement;
 - Either:
 - Are a serious threat to primary production, Crown land, the environment or community health in a place outside Victoria; or
 - for which its potential to threaten primary production, Crown land, the environment or community health in Victoria is unknown; and
 - the importation, keeping and sale should be banned.
2. Controlled Pest Animals – declared controlled pest animals are those that:
 - Did not occur naturally in the wild in Australia before European settlement;
 - Have a high potential to become a serious threat to primary production, Crown land, the environment or community health in Victoria; and
 - Should only be kept in high security collections approved by the Minister.

3. Regulated Pest Animal – declared regulated pest animals are those that:
 - Did not occur naturally in the wild in Australia before European settlement;
 - Is, or has the potential to become, a serious threat to primary production, Crown land, the environment or community health in Victoria; and
 - Should only be kept in collections or at premises approved by the Minister.
4. Established Pest Animal – declared established pest animals are those that:
 - Are established in the wild in Victoria;
 - Are a serious threat to primary production, Crown land, the environment or community health in Victoria; and
 - Should be eradicated or controlled or its spread in the wild should be prevented (DPI 2009).

2.2.2 Flora and Fauna Guarantee Act 1988

The FFG Act provides the listing of taxa and communities of flora and fauna which are threatened, and potentially threatening processes. The listed potentially threatening processes under the FFG Act that consider pest animals and are relevant to the study area are:

- Predation of native wildlife by the European Red Fox; and,
- Reduction in biomass and biodiversity of native vegetation through grazing by the European Rabbit.

3 METHODOLOGY

3.1 Desktop Assessment

Relevant literature, online-resources and databases were reviewed to provide an assessment of flora and fauna values associated with the study area. The following information sources were reviewed:

- The DELWP NatureKit Map (DELWP 2020b) and Native Vegetation Information Management (NVIM) Tool (DELWP 2020a) for:
 - Modelled data for location risk, remnant vegetation patches, scattered trees and habitat for rare or threatened species; and,
 - The extent of historic and current EVCs.
- The Victorian Biodiversity Atlas (VBA) for previously documented fauna records within the project locality (DELWP 2018a);
- The Commonwealth Department of Agriculture, Water and the Environment (DAWE) Protected Matters Search Tool (PMST) for matters of National Environmental Significance (NES) protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) (DAWE 2020a);
- Relevant listings under the Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act), including the latest Threatened and Protected Lists (DELWP 2018b);
- Aerial photography of the study area; and,
- Previous ecological assessments relevant to the study area; including;
 - Ryan Corner Windfarm Pest Animal Management Plan. Ecology Partners Pty Ltd 2010.

3.2 Site Assessment

An assessment of the study area was undertaken two suitably qualified ecologists across four days; the 5th – 7th and 27th of October 2020. The study area was walked and any area with the potential to harbour pest animal species was actively searched. Observations of individuals, scats, burrows, dens and warrens were recorded, and significant sightings mapped. Furthermore, any location with the potential to harbour pest animal species was noted.

The surveys primarily focused on the areas where wind turbines, access tracks and cabling are proposed to be constructed. The majority of the properties were traversed on foot and incidental records were also made where infestations were observed within other parts of the study area. Point locations of pest animal species, and evidence thereof, were recorded using a hand-held GPS with an accuracy of ± 5 metres.

3.2.1 Assessment Qualifications and Limitations

This report has been written based on the quality and extent of the ecological values and habitat considered to be present or absent at the time of the desktop and field assessments being undertaken. Camera trapping was not undertaken as part of this assessment. The nature of assessment meant that nocturnal, transitory or

uncommon fauna species may have been absent from potentially occupied habitats at the time of the field assessment.

It should also be noted that while the surveys were conducted at an optimal time of year for species identification (mid-spring), during the site assessments there was significant inundation of the study area due to recent heavy rainfall, meaning that many animal scats were not obvious or had been washed away in the inundation.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of +/-5 metres. This level of accuracy is considered to provide an accurate assessment of the ecological values present within the study area; however, this data should not be used for detailed surveying purposes.

Nevertheless, the terrestrial fauna data collected during the field assessments and information obtained from relevant desktop sources is considered to adequately inform an accurate assessment of the pest animal values present within the study area.

4 EXISTING CONDITIONS

4.1 Introduced and Planted Vegetation

The study area mostly contains a mixture of improved and unimproved pasture, with the majority of the study area and surrounding landscape historically being used for agricultural purposes and land clearing for grazing and cropping (Plate 1). The majority of native vegetation within the study area has been removed and is now mostly restricted to road reserves. Areas of invasive flora species such as African Boxthorn *Lycium ferocissimum* provide habitat for pest animal species (Plate 2). Planted windrows of consisting mostly of Radiata Pine *Pinus radiata* and Cypress Pine *Callitris* spp. exist within all properties across the study area and also provide habitat and refuge for pest animal species (Plate 3). Low lying areas of the study area were subject to inundation at the time of the assessment (Plate 4).



Plate 1. Agricultural uses within the study area (Ecology and Heritage Partners Pty Ltd 27/10/2020).



Plate 2. Invasive African Boxthorn provides habitat for pest fauna (Ecology and Heritage Partners Pty Ltd 06/10/2020).



Plate 3 . Planted windrows provide habitat and refuge for pest fauna (Ecology and Heritage Partners Pty Ltd 06/10/2020).



Plate 4. Low lying areas inundated with water (Ecology and Heritage Partners Pty Ltd 27/10/2020).

4.2 Fauna Habitat Characteristics

Most of the study area is highly modified due to past and current agricultural practices and is dominated by exotic pasture grasses. Cattle and sheep were present within the study area at the time of the assessment. Native vegetation and fauna habitat were represented by a some of scattered trees and planted windrows, which occur regularly throughout the study area.

The majority of the study area consists of paddocks which contain improved exotic pastures, likely to be used as a foraging resource by common generalist bird species which are tolerant of modified open areas. Fauna observed using this habitat included; Australian Magpie *Cracticus tibicen*, Australian Raven *Corvus coronoides*, Willie Wagtail *Rhipidura leucophrys*, Black Swan *Cygnus atratus*, Superb Fairy-wren *Malurus cyaneus*, Little Corella *Cacatua sanguinea* Sulphur-crested Cockatoo *Cacatua galerita*, Welcome Swallow *Hirundo neoxena*, Wedge-tailed Eagle *Aquila audax*, Black Kite *Milvus migrans*, and Eastern Grey Kangaroo *Macropus giganteus* (observed in road reserve).

4.2.1 Windrows

There is a high number of windrows located throughout the site, which are generally associated with property boundaries, external roads and paddock boundaries. Pest animal species such Red Fox *Vulpes Vulpes*, European Rabbit *Oryctolagus cuniculus* and European Hare *Lepus europaeus* are likely to use these as movement corridors, protective habitat and grazing/foraging opportunities. There were several deceased animals located within the windrows such as a deceased fox cub and deceased cattle and sheep, which could promote scavenging by foxes (Plate 5 and Plate 6).



Plate 5. Evidence of rabbit activity within a windrow (Ecology and Heritage Partners Pty Ltd 27/10/2020).



Plate 6. Deceased fox pup found within a windrow (Ecology and Heritage Partners Pty Ltd 27/10/2020).

4.2.2 Rocky Outcrops

Granite rock is highly prevalent throughout the study area in the form of rock outcrops and ridges. Pest species such as European Rabbit and European Hare are likely to utilise these areas as habitat and Red Fox *Vulpes vulpes* likely frequent these areas in search of prey species (Plate 7 and 8).



Plate 7. Rocky outcrops within the study area (Ecology and Heritage Partners Pty Ltd 27/10/2020).



Plate 8. Rocky outcrops can be used as a refuge by pest fauna (Ecology and Heritage Partners Pty Ltd 27/10/2020).

4.2.3 Farming Infrastructure

Areas of uninhabited farming infrastructure provide protected (i.e. fenced) areas in which European Rabbit can colonise. These areas are generally free of disturbances from cattle and sheep and provide relative safety from predators as they are surrounded by fences (Plate 9 and Plate 10).



Plate 9. Farming Infrastructure can be used as a refuge by pest fauna (Example from Hawkesdale WF; Ecology and Heritage Partners Pty Ltd 27/10/2020).



Plate 10. Infrastructure within the study area (Example from Hawkesdale WF; Ecology and Heritage Partners Pty Ltd 27/10/2020).

5 PEST ANIMAL ASSESSMENT

Several pest animal species were identified within the study area. It is likely that pest animals are also present in the surrounding landscape or may use the study area for foraging and movement.

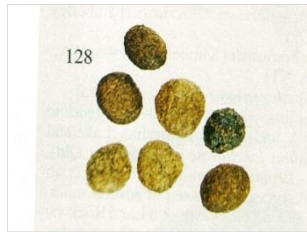
5.1 Site Assessment Results

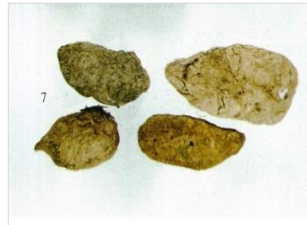
Three pest animal species were identified within the study area (Table 1). Three of these pest animal species (European Rabbit *Oryctolagus cuniculus*, Red Fox *Vulpes Vulpes* and European Hare *Lepus europaeus*) are listed under the CaLP Act. Feral cats *Felis catus* is also likely to use the study area to undertake hunting activities, however, as the species was not observed it is omitted from the management plan. Pest animal species observed within the study area are listed in Table 1 and the status, ecology and likely impacts of CaLP listed established pest species are detailed below in Table 2.

Table 1. Observed pest species within the study area

Scientific Name	Common Name	Pest Animal Category
<i>Oryctolagus cuniculus</i>	European Rabbit	Established
<i>Vulpes Vulpes</i>	Red Fox	Established
<i>Turdus merula</i>	Common Blackbird	-
<i>Acridotheres tristis</i>	Common Myna	-
<i>Sturnus vulgaris</i>	Common Starling	-
<i>Alauda arvensis</i>	Eurasian Skylark	-
<i>Passer domesticus</i>	House Sparrow	-

Table 2. More Significant Pest Species Profiles

Species known to occur within the study area	
Red Fox <i>Vulpes Vulpes</i> Status: Declared Pest Animal (CaLP Act 1994). Behaviour and Habitat: Red Foxes are chiefly nocturnal hunters, being most active in the evening and early mornings. The species may travel up to 10-15 kilometres per night within their home range, revisiting sites of interest several times a night. By day, they usually rest in dens which may comprise a hollow log or tree, an enlarged rabbit burrow, wombat burrow or dense undergrowth. A Red Fox may use several resting sites within its home range and does not necessarily return to the same site each day. Where present, European Rabbits make up a large part of the Red Fox diet. Other common food items include; carrion (domestic livestock and native fauna), House Mice, insects, reptiles and amphibians, birds, grain, vegetable matter (including crops), and fruit crops such as grapes, apples and blackberries (DEDJTR 2015). Reproduction and Lifecycle: Females are monoestrous with a 1-6-day oestrus cycle. In Australia, breeding occurs between June and October (mostly between early August and late September). Litter sizes range from 1 to 12, with average litter sizes being three to six pups. Males disperse further than females and dispersal distances tend to be related to habitat type, usually < 50 km (IACRC 2015). Red Foxes can live up to nine years, although few individuals live more than six years in the wild, with many not surviving beyond two years. Likely Distribution: Red Foxes occur throughout the study area. Records of active and potential dens, individual observations and observations of fur trapped in fences are illustrated in Figure 2. Known and Potential Impacts: Preying on native animals	  T: Red Fox within the study area B: Characteristic scats¹
European Rabbit <i>Oryctolagus cuniculus</i> Status: Declared Pest Animal (CaLP Act 1994) Behaviour and Habitat: European Rabbits are mostly active from late afternoon to the early morning. Typically emerging between two to three hours before sunset, European Rabbits graze then socialise on or near the warren or harbour until dusk when they move further away. European Rabbits typically stay above ground during the night unless disturbed and mostly feed in areas of short vegetation within 300 metres of a warren/harbour. The species is capable of forming extensive burrows or warrens for shelter. In the absence of warrens European Rabbits can also exist above ground where there is abundant surface harbour. Fallen timber or logs, rocks and dense thickets of native scrub or woody weeds create ideal conditions (DEDJTR 2015). Reproduction and Lifecycle: Females can breed at any time of the year if there is sufficient feed available. The main breeding season is determined by rainfall and the early growth of high-protein plants (usually between autumn and late summer). During this time, wild rabbits form territorial groups containing 1-3 males and 7-10 females, led by a dominant pair. Wild European Rabbits can begin breeding at four months of age and may produce five or more litters in a year, with up to five young per litter. In less favourable conditions they can still produce one or two litters each year. European Rabbits have a gestation time of 28-30 days. Young emerge from the warren weaned at approximately 18 days and leave the nest at 23-25 days. Survival of young varies between years and with seasonal conditions, and also depends on the incidence of diseases. Wild rabbits rarely survive past six years of age (IACRC 2015). Distribution: European Rabbits occur throughout the study area, with windrows and areas of native scrub providing suitable habitat and conditions for warren development. Records of warrens and areas of high activity are illustrated in Figure 2. Known and Potential Impacts: facilitating weed growth, supporting other pest species e.g. Red Fox, and increasing erosion through excessive grazing (i.e. diggings and warrens).	  T: European Rabbit (example) B: Scats

European Hare <i>Lepus europaeus</i> Status: Declared Pest Animal (CaLP Act 1994) Behaviour and habitat: Hares are largely solitary animals but can form grazing groups as a response to predation. Hares will travel up to four kilometres to feed on a variety of food. Unlike rabbits, hares do not form burrows or warrens and instead rest in shallow depressions in the ground called a 'form' usually found within long grass, rocks, logs or branches. Hares are largely herbivorous and feed mainly after sunset with a diet consisting largely of leaves, stems and rhizomes of grasses. Reproduction and Lifecycle: Under favourable conditions, hares can produce approximately 4 litters each consisting of up to 5 leverets (young) annually. Gestation period ranges between 38 to 46 days, with an average gestation time of 42 days. After three days the young will disperse into the surrounding location, only returning to a central space to suckle. Hares begin to breed at eight months of age, while the average lifespan is approximately 1 to 2 years (Agriculture Victoria, 2020). Distribution: A single hare was observed utilising the study area, with extensive areas of long grass, rocks, logs and branches providing suitable habitat for the rearing of young.	 European Hare (example)
Species Likely to occur within the study area	
Feral Cat <i>Felis catus</i> Status: Established Behaviour and Habitat: Feral Cats are mostly solitary animals and usually maintain a home range which may be up to 10 km² for males and less for females. Although Feral Cats may be active at any time, they are usually more active at night, with the two periods of greatest activity centred near the times of sunrise and sunset. Often during the day, Feral Cats will lay up in sheltered areas, usually in European Rabbit burrows, hollow logs or dense thickets of scrub. Dietary studies have shown that the European Rabbit is the major food item of Feral Cats in Victoria, however, mice, smaller native mammals, reptiles, birds and invertebrates are also commonly preyed upon (DEDJTR 2015). Reproduction and Lifecycle: Female Feral Cats can reproduce at 10–12 months of age, with males reaching maturity at approximately one year of age. Feral Cats generally do not breed during winter. Longer breeding periods have been noted in drier, warmer areas compared to cooler wetter places. They produce up to three litters a year (65 days gestation) averaging four kittens per litter. Female Feral Cats are likely to reproduce for all of their adult lives. Feral Cats are considered to have an average lifespan of three to five years (Denny and Dickman 2010). Likely Distribution: Feral Cats are likely to occur throughout the study area. Within the site and immediate surrounds, Feral Cats are likely to be reliant on both hunting and food subsidy provided by human activities. The highest densities of Feral Cats have been recorded in resource-rich habitats such as landfills, with studies reporting densities ranging from 200 - 2,800 cats/km². Studies completed in habitats where Feral Cats are reliant on hunting have recorded densities ranging from <1 - 7 cats/km². Known and Potential Impacts: Predating on native animals and spreading disease (toxoplasmosis).	  T: Feral Cat (example) B: Scats

5.1.1 Active Searching and Opportunistic Observations

Evidence of pest animals was identified via targeted active searching throughout the study area. Over the survey period, the following features were identified on site (Figure 2):

- Five areas of high European Rabbit activity (scats and diggings);
- Four European Rabbit sightings;
- Two areas containing abandoned European Rabbit warrens;
- Two additional areas containing European Rabbit diggings and scats;

- Five active Red Fox dens;
- Two areas of Red Fox activity (fur in fence, scats)
- Three potential Red Fox dens (no signs of recent activity);
- Two Fox sightings; and,
- One European Hare sightings.

The presence of scats/diggings coupled with the limited detection of European Rabbit warrens may indicate that populations within the study area are harbouring in dense vegetation and ground debris rather than establishing warren networks. A breakdown of pest species observed per property is provided in Table 3.

Table 3. Key pest animal species observed within each land parcel within the study area

Property	Key Species Observed	Evidence	Potential Habitat
Moore	European Rabbit	Warren observed; Rabbits Sighted.	Windrows present on site; Long grass; rocky outcrops
Homan	N/A	Warren Observed (high activity; associated with infrastructure)	Windrows present on site; Long grass; rocky outcrops; inhabited Infrastructure
Wright	N/A	Potential fox den observed.	Windrows present on site; Long grass; rocky outcrops
Hocking	European Rabbit	European Rabbit sighting.	Windrows present on site; Long grass; rocky outcrops
Forrest	N/A	Warren Observed (high activity).	Windrows present on site; Long grass; rocky outcrops
Winter	N/A	Rabbit scats; Rabbit Warren; and, Fox den (on property boundary between Youl and Winter).	Windrows present on site; Long grass; rocky outcrops
Youl	European Rabbit	Warren (along fence line between Youl and Porter); Rabbit sighting (along fence line between Youl and Porter); and, Fox den (on property boundary between Youl and Winter).	Windrows present on site; Long grass; rocky outcrops
Porter	European Rabbit	One Warren (along fence line between Youl and Porter); and, Rabbit sighting (along fence line between Youl and Porter);	Windrows present on site; Long grass; rocky outcrops
Dumesny	Red Fox	Three Red Fox dens; Abandoned warren; Fox sighted; One active warren (high activity);	Windrows present on site; Long grass; rocky outcrops
McDonald	European Rabbit	Two Fox dens One potential fox den Fox sighting	Windrows present on site; Long grass; rocky outcrops
McNamara	European Hare	Hare sighting.	Windrows present on site.

5.2 Key Pest Animal Species

The survey identified a number of pest species on the study area, including three pests listed as established pest animals under the CaLP Act (see Table 1; Table 2). Of these species, the control and management of the following key pest animal species are considered to be most important, due to their potential threat to study area values:

- European Rabbit (Rabbit); and
- European Red Fox (Red Fox).

The current abundance of rabbits, hares and foxes on the study area has not been established as this was beyond the project scope. However, the impact of rabbits, hares and foxes was evident throughout the study area through the presence of burrows, forms (shallow depressions) and predation on livestock, and both pests should be considered as being present at all properties within the study area.

The surrounding agricultural landscape provides ideal conditions for rabbits and foxes to proliferate, therefore control of these species throughout the study area will be required. Eradication of these species is considered unlikely due the large area of suitable habitat and difficulty of control. While the European Hare was recorded at one property, it is currently considered to be in low abundance across the study area and is not cause for concern.

Although this PAMP does not directly address the remaining pest animal species identified in Table 2, general mitigation measures are provided in Section 6 to avoid or reduce the likelihood these and other pest animal species.

5.2.1 Threats and Impacts of Key Pest Animal Species

According to the Glenelg Hopkins CMA's *Regional Catchment Strategy* (2013-2020), pest animals (and plants) pose some of the most significant threats to regional values and terrestrial habitats within the region.

"Pest animals impacting negatively on the Glenelg Hopkins region include rabbits, foxes, feral goats, carp, pigs, feral cats and feral deer. These species have caused widespread economic and environmental impact and have significant potential for further impact. Invasive animals declared under the Catchment and Land Protection Act, such as rabbits and foxes, are well established in the Glenelg Hopkins region. Some studies indicate that foxes may account for up to 30 per cent of the deaths of newborn lambs" (Glenelg Hopkins CMA, 2013).

The following table summarises the potential threats associated with these key species.

Table 4. Summary of distribution and potential impacts and threats of key pest species.

Pest Species	Distribution	Potential Impacts/Threats
Red Fox	Likely to be widespread and common across the study area	The Red Fox is an adaptable and elusive predator and scavenger. Despite management efforts, the fox is now common throughout Victoria and are a major threat to the survival of native fauna (DNRE 2002b). They are Australia's number one predator, and there are reports of them taking up to 30% of lambs in some areas. The combined economic and environmental impact of the red fox is greater than for any other introduced vertebrate, totalling around \$227.5m per year (IACRC 2007). The Red Fox is declared as an established pest animal throughout Victoria under the CaLP Act (DPI 2007).
European Rabbit	Widespread and common across the study area	Rabbits are the most serious vertebrate pest animals in Victoria, causing major economic and environmental damage (DNRE 2002a). Direct impacts of rabbits on native flora and fauna include: • grazing on native flora and preventing regeneration; and, • competition with fauna for food and shelter. Indirect effects include: • supporting populations of foxes, and • digging and browsing leading to a loss of vegetation cover; and, • Slope instability and soil erosion (DEWHA 2008).

5.2.2 Threats to Agricultural Values

The main land use within the study area is agricultural, which includes livestock grazing on improved and unimproved pasture and cropping. Areas of improved pasture mostly comprise Perennial Ryegrass *Lolium perenne* and Sub Clover *Trifolium* sp., whereas unimproved pasture contains a higher component of common pasture weeds such as Yorkshire Fog *Holcus lanatus* and Cape Weed *Arctotheca calendula*. Some areas of unimproved pasture also contained a higher component of noxious weeds including African Boxthorn that provides harbour for rabbits and hares.

Potential impacts from pest animals to agricultural values include:

- Invasive noxious weeds creating harbour for rabbits (i.e. African Boxthorn);
- Grazing of crops and pasture from rabbits; and
- Predation of livestock from the Red Fox.

6 MANAGEMENT ACTIONS

Earthworks and construction associated with the windfarm construction will involve the removal and transportation of plant material and soil as well as the use of various machines, vehicles and equipment. This means that there is an innate risk of spreading plant and animal diseases, and pest plants and invasive animals to and from the study area (and areas adjacent). Preventing increases in pest species within the study area is a priority for ecological management of the study area.

Depending on the desired outcome the main approach to management will be control of pest animals. While total rabbit and fox eradication is achievable at a local scale when using integrated rabbit control methods. It is considered unlikely within the study area given the designated management timeframe (i.e. two years following completion of construction). Furthermore, fox populations are very resilient to conventional methods of control, and rapid re-colonisation of areas occurs after control measures are applied. This suggests that control is either rarely achieved or not achieved, particularly when applying a once-off management technique. As such, the following approaches will be undertaken:

- To alleviate the impact of rabbits on agricultural and natural environments which is achievable through integrated rabbit control techniques (DJPR 2020a).
- To alleviate the impact of foxes on agricultural and ecological values through integrated control techniques (DJPR 2020b).

The following recommended control measures have been developed with reference to the findings of surveys, previous control efforts in the locality and key guidelines/prescriptions relating to each target pest animal species. The proposed measures aim to achieve the overall objective of the control program, being to prevent the establishment of pest species and maintain existing populations below thresholds at which the ecological values of the site may not be significantly compromised.

6.1 Pre-Construction

Rabbit and Red Fox numbers have the potential to increase during the pre-construction phase of the development, particularly if no control and/or monitoring is conducted during the lead up to construction. Increased rabbit numbers within the study area may also act as an attractant to foxes and resulting in an increase in foxes moving into the area. Furthermore, an increase in foxes may have flow on effects that could see an increase in the risk of predation of livestock.

6.1.1 Management Actions

The following needs to be considered as part of the pre-construction activities within the study area:

- Pest plant control contractors with demonstrated experience working in ecologically sensitive environments will be engaged to undertake pest plant control of the African Boxthorn habitat;
- If invasive fauna is found to be inhabiting the construction footprint a qualified and experienced Pest Controller will be engaged to address the infestation;
- If European Rabbit or Red Fox warrens are identified within the construction footprint, it must be collapsed post the removal of topsoil to ensure that invasive species do not take up residence;

- A wash down area will be established within the study area for periodic cleaning of excess soil and organic matter to avoid the spread of noxious weeds and soil pathogens. Contaminated water from the wash down area should not be discharged into drainage lines or flow into areas of environmental sensitivity. Sediment from the wash down area should be retained in wash down bays and prevented from spreading over the site. Sediment and wash down water may not leave the site until decontaminated; and,
- All equipment and machinery to be thoroughly cleaned off site prior to commencing works.

Actions to limit the spread of diseases and pest plant species (as these can harbour pest animal species) will follow best-practice protocols as detailed in the *Summary of State and Territory Noxious Weeds Legislation* (AWC 2008), *Victorian Pest Management – A Framework for Action: Weed Management Strategy* (DNRE 2002c), *Weeds of National Significance (WONS) Strategies* (DEPI 2008) and *Developing and Implementing a Weed Management Plan* (CRC 2004). These protocols address the potential spread of weeds and plant disease.

In order to be successful, the control of pest animals on the site must be part of an integrated pest management approach within the locality. The various groups (including landowners) and organisations required to work together include the Department Environment, Land, Water and Planning (DELWP), Landcare and Glenelg Hopkins CMA. To ensure that an integrated management approach is adopted, liaison with these groups is required. Further, it is essential to consult with these groups and local authorities in order to work within existing management strategies for the control of pest animals in the study area.

6.2 During Construction

European Rabbit

The construction phase could create additional opportunities for harbour and/or burrows for the European Rabbit within the site and surrounding areas. The prevention of any harbour should be a priority.

Construction activity during the project and lack of rabbit control/prevention has the potential to increase impacts already being caused by the existing rabbit populations in the local area. The potential impacts may include:

- Increased grazing pressure on native flora (including threatened flora species);
- Increased resource competition for native fauna;
- Increased burrowing opportunities from soil disturbed during construction; and
- Increased area of potential habitat from harbour resulting from debris on the site.

Red Fox

Red Fox numbers are generally controlled by actions undertaken at a broad scale. If no Red Fox control measures were to be undertaken in the construction area, then Red Fox numbers could potentially increase within the site and surrounding area. Any increase in Red Fox numbers has the potential to increase the existing ecological and agricultural impacts caused by the Red Fox (e.g. predation on native fauna and livestock). Therefore, control actions undertaken would contribute to overall Red Fox control within in the local area.

6.2.1 Management Actions

Given the high level of disturbance associated with construction it is unlikely that pest fauna species will move into the study area. Mitigation measures to ensure pest fauna are not using the construction area, while Control/Eradication measures attempt to eliminate observed infestations. Mitigation and Control/Eradication measures for European Rabbit and Red Fox are provided below (Table 5; Table 6).

Table 5. Mitigation and Control/Eradication Measures for European Rabbit during the construction phase of the project.

European Rabbit Prevention Measures			
Mitigation Measure	Action	Location	Responsibility
Harbour for Rabbits	Store construction materials, machinery and equipment in designated areas.	Areas impacted by construction activities	Site/Project Environmental Officer
Harbour for Rabbits	Avoid stock piling soil, weeds (i.e. African Boxthorn) and rubbish within the construction area	Areas impacted by construction activities	Site/Project Environmental Officer
Harbour for Rabbits	Do not remove or modify any vegetation (native or non-native) identified as harbour until approval has been granted by a qualified Ecologist.	Areas impacted by construction activities	Site/Project Environmental Officer
Harbour for Rabbits	Revegetate disturbed areas as soon as practicable to minimise the area of exposed soil as potential for burrows	Areas impacted by construction activities	Site/Project Environmental Officer
European Rabbit Control Methods			
Method	Action	Timing of Action	Responsibility
Warren fumigation	In the event that warren networks are identified, this method may be employed. This must only be undertaken by a suitably experienced and licenced operator after the completion of a risk assessment and deployment of appropriate safety measures.	If warren networks are located, they must be fumigated just before the start of the rabbit breeding season.	Suitably qualified contractor
Warren ripping	In order to avoid impacts on native vegetation communities, ripping would be constrained to areas on non-native vegetation.	Appropriate actions all year	Suitably qualified contractor
Baiting	This must be undertaken by a suitably experienced and licenced operator after the completion of a risk assessment and deployment of appropriate safety measures. If Sodium fluoroacetate (1080) is used as the bait, notifications must be made to adjoining landowners and neighbours of its use.	Appropriate actions all year	Suitably qualified contractor

Table 6. Mitigation and Control Measures for Red Fox during the construction phase of the project.

Red Fox Mitigation Measures			
Mitigation Measure	Action	Location	Responsibility
Fox abundance	Monitor abundance and distribution of fox activity	All areas	Site/Project Environmental Officer
Red Fox Control/Eradication Methods			
Control Measure	Action	Timing of Action	Responsibility
Fumigation and den destruction ¹	If completed at appropriate times, fumigation and den destruction can be effective in reducing fox numbers.	Fumigation should be conducted in August and September ²	Suitably qualified contractor
Shooting	If done properly shooting is the most humane way to control foxes. This method is often undertaken in combination with other control methods. Shooting must only be undertaken by an authorised professional that is suitably experienced and a licenced operator. The completion of a risk assessment and deployment of appropriate safety measures must be undertaken.	This action can occur all year round.	Suitably qualified contractor
Trapping	Only cage traps are to be used to control Red Foxes. Foxes are known to be extremely trap-shy thus this method should not be solely relied upon. Trapping must only be undertaken by a suitably experienced and licenced operator after the completion of a risk assessment and deployment of appropriate safety measures.	This action can occur all year round.	Suitably qualified contractor
Baiting	This must be undertaken by a suitably experienced and licenced operator after the completion of a risk assessment and deployment of appropriate safety measures. If Sodium fluoroacetate (1080) is used as the bait, notifications must be made to adjoining landowners and neighbours of its use.	Appropriate actions all year	Suitably qualified contractor

Note 1: The most effective fox control is achieved during late winter and spring, as foxes are less mobile as they are generally rearing young and food demands are high at this time of year.

Note 2: Fumigation and den destruction are most effective during August and September, within 10 weeks of cubs being born.

6.3 Post Construction

European Rabbit

Rabbits are likely to pose a threat via the over-grazing of re-seeded pasture areas, native revegetation of trees located at access points and revegetation or shrubs following construction. Areas of revegetation or reseeded will need to be safeguarded against grazing. Furthermore, areas immediately adjacent to the construction footprint where the soil has been disturbed are likely to provide potential habitat for burrows due to the permeability of the freshly turned soil. All above ground harbour (i.e. abandoned construction materials, excavated soil) will also provide potential habitat for rabbits.

Red Fox

The main threat caused by red fox post-construction is the potential to increase their presence and abundance through lack of rabbit control on the site, which in turn increases the potential for ecological and agricultural impacts on the site and within surrounding areas.

6.3.1 Management Actions

Ongoing pest animal control will be carried out by qualified pest plant control contractors, to the satisfaction of the responsible authority (Moyne Shire). In addition, the following actions (provided in Table 7) should be undertaken to prevent any increases population levels and harbour European Rabbits and population levels of Red Foxes due to construction.

Table 7. Post-construction management actions

Mitigation Measure	Action	Location	Responsibility
Harbour for Rabbits	Remove all above ground surface harbour for rabbits (particularly weeds such as Boxthorn, Blackberry, Gorse and Sweet Briar), as well as discarded construction materials	Areas impacted by construction activities	Site/Project Environmental Officer
Revegetation Impacts	Use rabbit proof fencing around revegetated areas; as well as plastic guards around each plant	Areas impacted by construction activities and access points	Site/Project Environmental Officer
Fox Abundance	Continue to monitor for increases in fox activity	All Areas	Site/Project Environmental Officer
Fox and Rabbit abundance	Contribute to local pest animal control programs for 2 years following completion of construction	All Areas	Site/Project Environmental Officer

7 MONITORING AND REPORTING

A regular monitoring program must be undertaken for pest animal species within the construction area throughout the construction phases and the two-year post-construction period for each species outlined below in Section 7.1. A brief report detailing the observations outlined below will be prepared at the end of each monitoring event in order to analyse different approaches to increase efficiency and maximise the control of infestations.

At the completion of the two-year post-construction period, an audit will be undertaken by a qualified ecologist to compare the results of the current assessment with the site condition at the end of the pest animal control period. Details of the animal control techniques employed across the construction areas will be given in the report.

7.1 Monitoring

7.1.1 European Rabbit

A regular monitoring program will be undertaken for rabbits throughout the construction area for two years post-construction. Monitoring of the area for the presence (e.g. rabbit warrens, sightings) and/or damage caused by rabbits (overgrazing) will be undertaken four times annually (early spring, late spring, summer, autumn) for two years, as part of an integrated pest management approach within the study area.

Important stakeholders in managing rabbits include: DELWP, Parks Victoria, GHCM, local government and private landholders (DNRE 2002a).

Monitoring and annual reporting of rabbit management will also follow established processes such as bioregional planning to ensure that relevant information is recorded on appropriate monitoring systems, including the Integrated Pest Management System and the Environmental Information System of Parks Victoria (DNRE 2002a).

7.1.2 European Red Fox

A regular monitoring program will be undertaken for foxes throughout the construction area for two years post-construction. Monitoring of the area for the presence (e.g. sightings) or evidence (predation of livestock and native fauna; scats) will be undertaken as part of an integrated pest management approach within the study area.

Important stakeholders in managing foxes include: DPI, DSE, Parks Victoria, GHCM, local government and private landholders (DNRE 2002b).

Monitoring and annual reporting of fox management will also follow established processes such as bioregional planning to ensure that relevant information is recorded on appropriate monitoring systems, including the Integrated Pest Management System and the Environmental Information System of Parks Victoria (DNRE 2002b).

7.2 Performance Indicators

Key performance indicators for pest animal management include:

- Control the population of rabbits and foxes within the construction footprint to meet the requirements under the CaLP Act for established pest animals; and,
- No net increase in the impacts of foxes and rabbits on agricultural and environmental values within the study area.

7.3 Responsibility

Site/Project Environmental Management Officer.

7.4 Timeframes

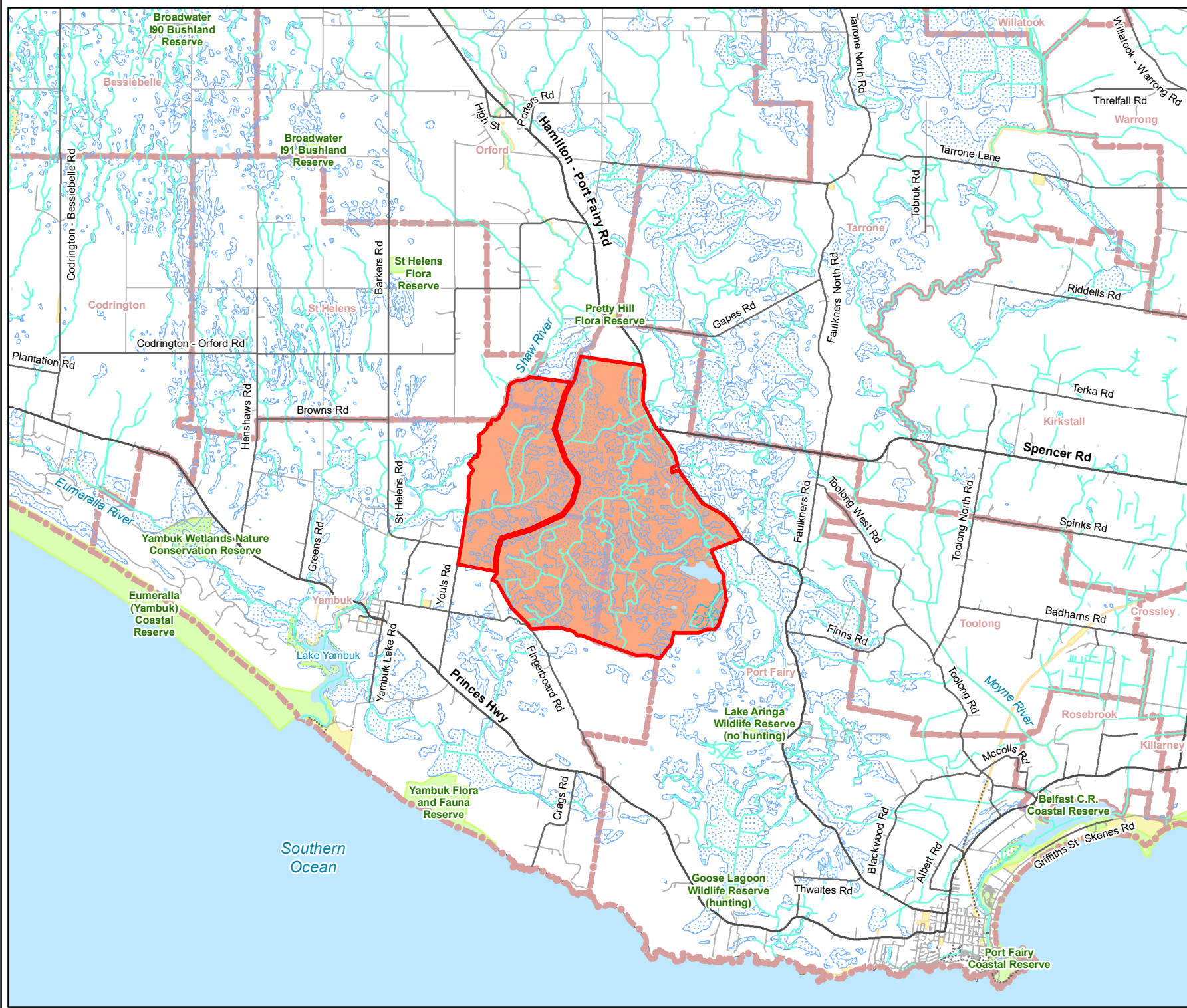
The above Pest Animal Management Plan is to be completed before, during and following the construction phases, ideally at the recommended time for the implemented method. Monitoring is to be ongoing and undertaken biannually to the satisfaction of the responsible authority.

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FIGURES



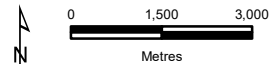
Legend

- Study Area
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities



Figure 1

**Location of the study area
Pest Animal Management
Plan, Ryan Corner Wind Farm**



Map Scale: 1:125,000 @ A4
Coordinate System: GDA2020 MGA Zone 54



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

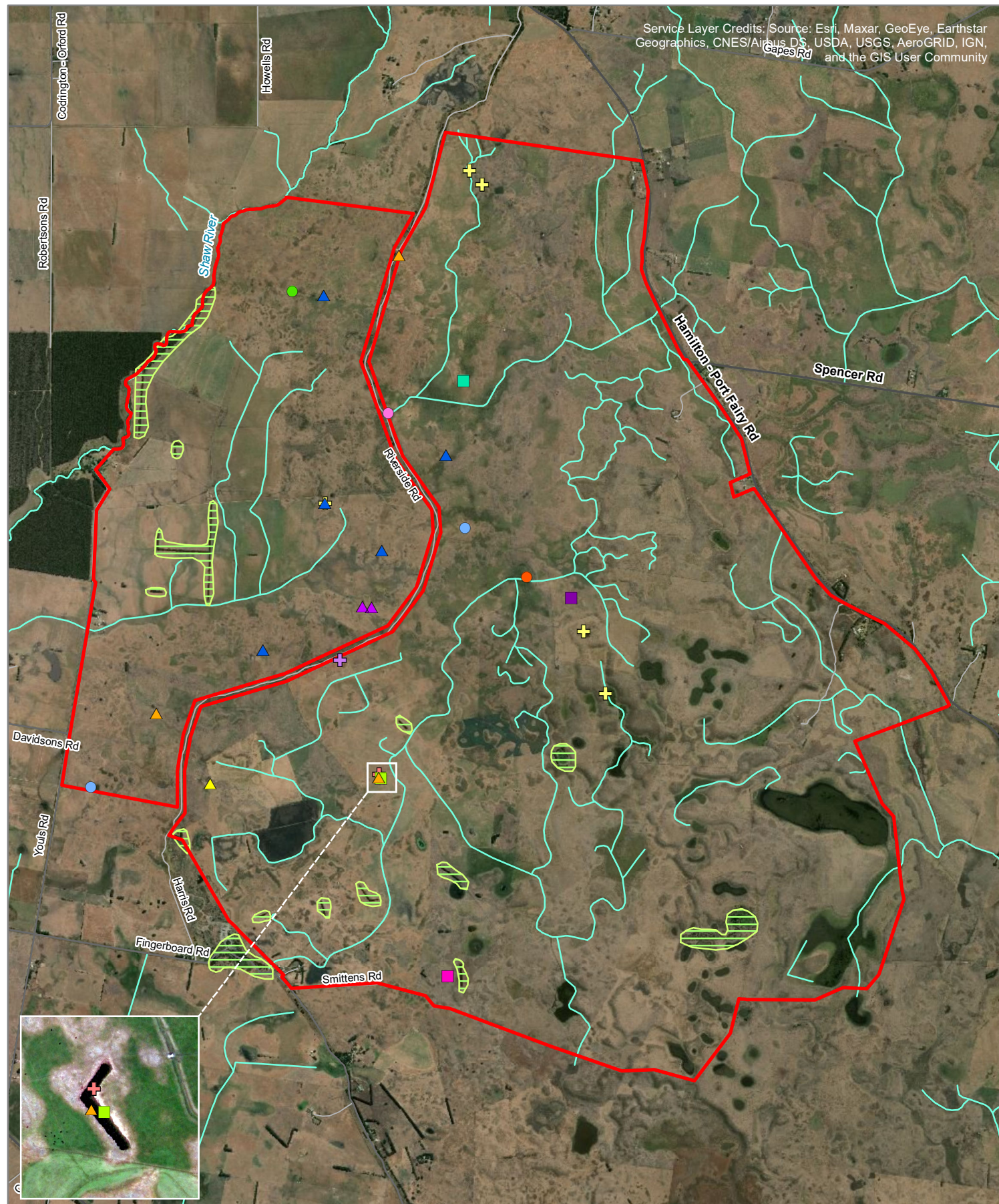


Figure 2
Invasive fauna
Pest Animal
Management Plan,
Ryan Corner Wind
Farm

Legend

Study Area

Potential refuge/harbour habitat

Invasive fauna

+ Fox Fur in Fence (evidence of movement)

+ Deceased Fox Pup

+ Fox Den

● Possible Den

● Fox Scat

● Fox Sighting

● Fox Sighting & Potential Den

■ Hare Sighting

▨ Large Rabbit Warren

■ Possible Abandoned Warren

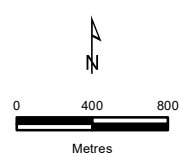
■ Old Rabbit Warren

▲ Rabbit Scat

▲ Rabbit Sighting

▲ Rabbit Warren

▲ Rabbits



Map Scale: 1:40,000 @ A4
Coordinate System:
GDA2020 MGA Zone 54

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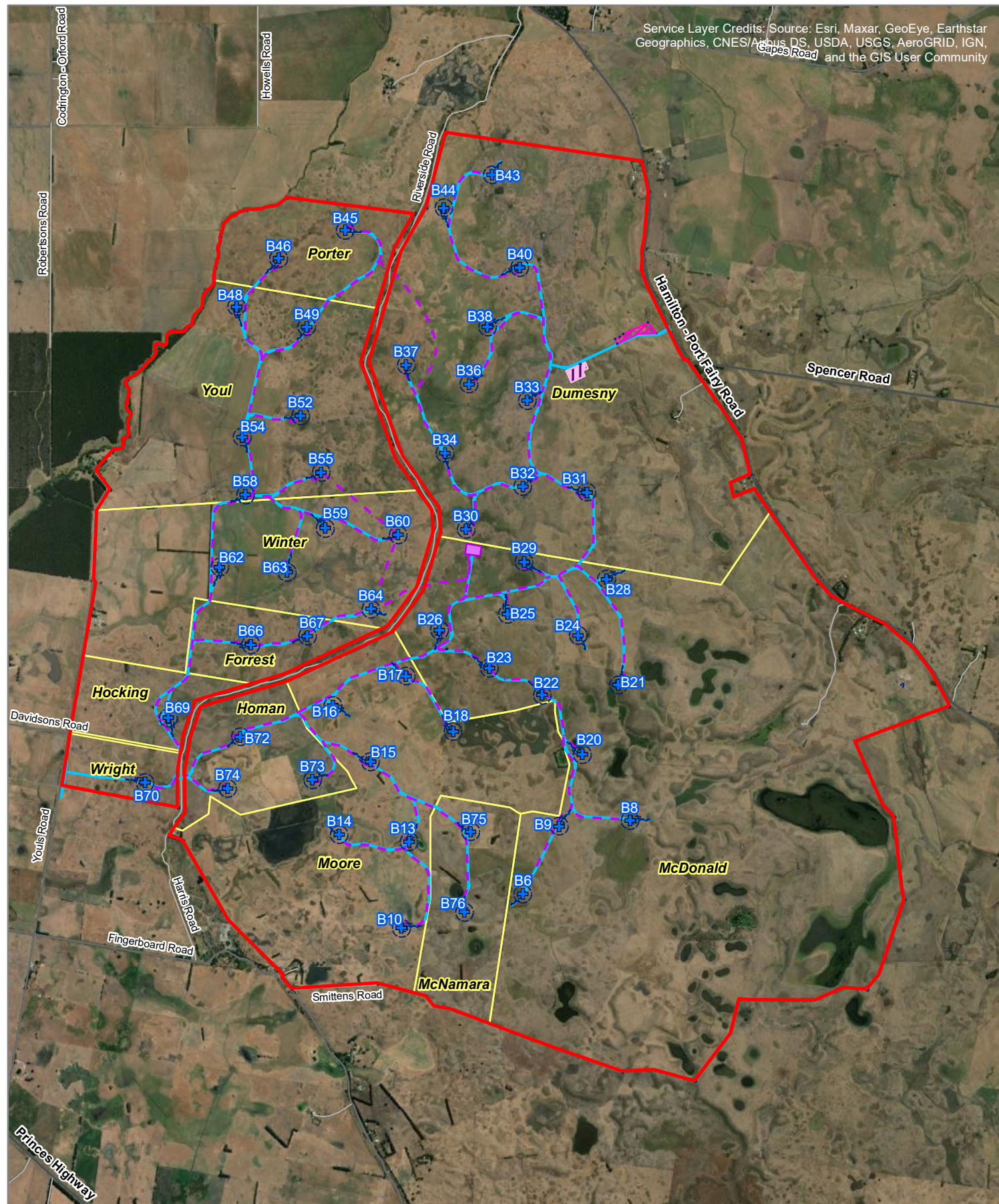
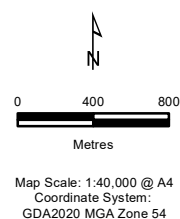


Figure 3
Proposed layout and
landowners
Pest Animal
Management Plan,
Ryan Corner Wind Farm

Legend

- | | |
|---|---|
| Study Area | Batch Plant |
| + Wind turbines | Site Compound and Laydown Area |
| Wind turbine and hardstand area | Substation |
| Proposed Access Tracks or Existing Road Upgrades | Landowners |
| Cable trenches | |



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Annex H Pest Plant Management Plan

Final Report

Pest Plant Management Plan: Ryan Corner Windfarm Yambuk, Victoria

Prepared for

Environmental Resource Management Pty Ltd

May 2022

PLANNING and ENVIRONMENT ACT
MOYNE PLANNING SCHEME

PERMIT NO. 2006-0222-2

Condition 17

ENDORSED PLAN

Sheet 412 of 500

Signed:  for
MINISTER FOR PLANNING
Date: 04/05/2022

Ecology and Heritage Partners Pty Ltd

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1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by ERM on behalf of Global Power Generation Australia Pty Ltd to provide a Pest Plant Management Plan (PPMP) for the proposed Ryan Corner Windfarm. This PPMP has been prepared to address condition 17 (h) of the Planning Permit (Permit No. 20060222-A), granted by the Minister for Planning under Division 6 of Part 4 of the Planning and Environment Act 1987. Ecology and Heritage Partners Pty Ltd previously prepared a PPMP for the Ryan Corner Windfarm in 2010 (Ecology Partners Pty Ltd 2010), however, due to the significant time since the site assessment for this management plan was conducted, a reassessment of the study area was required in order to provide up to date details on the current condition with respect to pest plant cover and subsequent management actions.

The purpose of this PPMP is to reassess the Ryan Corner Windfarm to identify and map key noxious weeds occurring within the study area, the current coverage of these weeds and include provisions to prevent the introduction of new weeds, control existing weeds and prevent the further spread of weeds, with a focus on noxious weeds listed under Victoria's *Catchment and Land Protection Act 1994* and Weeds of National Significance (WoNS).

1.2 Pest Plant Management Plan Objectives

Condition 17 (h) of the Planning Permit stipulates:

A pest plant management plan to be prepared in consultation with the Department of Economic Development, Jobs, Transport and Resources and DELWP Planning including:

- i. Procedures to prevent the spread of weeds and pathogens from earth moving equipment and associated machinery including the cleaning of all plant and equipment before transport to the site and the use of road making material comprising of clean fill that is free of weeds;*
- ii. Sowing of disturbed areas with perennial grasses; and,*
- iii. A protocol to ensure follow-up weed control is undertaken on all areas disturbed through construction of the wind energy facility for a minimum period of 2 years following completion of the works.*

Therefore, the objectives of this PPMP are to:

- Identify the location, species and extent of weed infestation within the construction footprint and outline the relevant national and State legislative requirements for weed control;
- Provide a management plan that will include mitigation, monitoring and control methods to be implemented throughout each construction phase (pre-construction, construction and post-construction) of the wind energy facility to prevent both the spread of the existing weed species and introduction of new weed species and plant pathogens;

- Ensure that the activities in the study area do not exacerbate existing weed impacts, which may in turn cause economic or environmental impacts to surrounding landholders;
- Achieve ecologically appropriate on-ground management of pest species within the study area; and,
- Avoid impacts of pest weed species control on non-target species.

1.3 Study Area

The study area, the Ryan Corner Windfarm, is located approximately 12 kilometres north west of Port Fairy, Victoria (Figure 1). The study area covers approximately 3390 hectares and comprises 11 private landholdings. The study area is bound by private property to the north, Hamilton-Port Fairy Road to the east, Fingerboard Road to the south and Youls Road to the west. Riverside Road and Harris Road dissect the study area north to south.

The study area is mostly comprised of minor undulations and low-lying areas that are subject to inundation during heavy rainfall; inundation was evident within most properties during the site assessments. A number of ephemeral creek and drainage lines are present throughout the study area and permanent water bodies are particularly prevalent in the south eastern corner of the study area. Areas of stony knolls are present on the rises across of the study area. The land within the study area has historically been used for agricultural purposes, such as grazing and cropping, and typically contains a mixture of improved and unimproved pasture. According to the Department of Environment, Land, Water and Planning (DELWP) NVIM Map (DELWP 2020a) the study area is located within the Victorian Volcanic Plain bioregion, the Glenelg Hopkins Catchment Management Authority, and the Moyne Shire municipality.

2 LEGISLATIVE AND POLICY CONSIDERATIONS

Commonwealth and State government legislation and policy regarding the control and spread of listed noxious weeds include:

- *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act; Commonwealth);
- Weeds of National Significance (WONS);
- *Flora and Fauna Guarantee Act* 1988 (FFG Act); and,
- *Catchment and Land Protection Act* 1994 (CaLP Act).

A breakdown of the relevant legislation is provided below.

2.1 Commonwealth Legislation

2.1.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth EPBC Act deals with actions that have, or are likely to have, a significant impact on a matter of national environmental significance. There are currently no key threatening processes relevant to pest plants listed under the EPBC Act.

2.1.2 Weeds of National Significance (WONS)

The National Weeds Strategy Executive Committee was established in 1997, which concluded that the greatest impact from weed problems within Australia was related to the effect and spread of specific individual species. On this basis, a list of Weeds of National Significance (WONS) was developed. The determination of WONS is the first attempt to prioritise weeds over a range of land uses at the national level. WONS are those weeds which have been identified as already causing significant environmental damage and must be eradicated (DEWHA 2009).

Four major criteria were used in determining WONS:

- The invasiveness of a weed species;
- A weed's impacts;
- The potential for spread of a weed; and
- Socio-economic and environmental values (DEWHA 2009).

Individual landowners and managers are ultimately responsible for managing WONS, while the State government is responsible for overall legislation and administration (AWC 2008; DEWHA 2009).

There is no legislative requirement to manage a WONS in Victoria, unless the species is a declared noxious weed listed under the CaLP Act.

2.2 State Legislation

2.2.1 Flora and Fauna Guarantee Act 1988

The FFG Act provides the listing of taxa and communities of flora and fauna which are threatened, and potentially threatening processes. The potentially threatening processes listed under the FFG Act relevant to the study area include:

- Invasion of native vegetation by African Boxthorn *Lycium ferocissimum* and Blackberry *Rubus fruticosus*; and,
- Invasion of native vegetation by environmental weeds.

2.2.2 Catchment and Land Protection Act 1994

Under the CaLP Act the definition of a pest plant or weed is defined as:

“exotic plant (excluding any that cannot be declared under the CaLP Act) that threatens or has the potential to threaten the existence or wellbeing of valued environmental, agricultural, social or personal resources or assets” (DSE 2008).

For the purposes of this PPMP, weed species have been categorised in two broad classes: noxious weeds (regionally controlled and prohibited, and state prohibited weeds) and environmental weeds (overlap often occurs between these classes), which includes all other weeds and introduced pasture species. Sown pasture species have not been referred to as environmental weeds.

Environmental weeds are usually plants of garden, horticultural or agricultural origin and many are not recognised under environmental legislation. However, management of these species is still important, as they can out compete and displace indigenous plant species and alter fauna habitats. In some instances, plants that are of value in agricultural production systems can become major weed problems in native ecosystems. Environmental weeds may also represent a threat to agricultural production (also known as agricultural weeds). They can reduce the available area for agricultural use, interfere with agricultural practices and affect the quality of produce.

The key legislation relating to the management of weeds in Victoria is the CaLP Act. This legislation places responsibility on land managers to control and prevent the spread of noxious weeds from their properties.

Under the CaLP Act, certain plants are declared as noxious weeds in Victoria. These are considered to either: cause environmental or economic harm; or have the potential to cause such harm. They can also present risks to human health. Current legislation requires that these species must be controlled or eradicated (DPI 2008a).

There are four categories of noxious weeds defined under the CaLP Act (DPI 2008b), including:

- State Prohibited (S);
- Regionally Prohibited (P);
- Regionally Controlled (C); and,
- Restricted (R).

2.2.2.1 State Prohibited Weeds

These weeds either do not occur in Victoria but pose a significant threat if they invade, or are present, pose a serious threat or can reasonably be expected to be eradicated. Under the CaLP Act landowners may be directed to prevent their growth and spread (DPI 2008a).

2.2.2.2 Regionally Prohibited Weeds

In general, Regionally Prohibited Weeds are not widely distributed in a region, although are capable of spreading further and they must be managed to eradicate them from the region. Land owners and managers, including public authorities responsible for the management of Crown lands, are responsible for control of these weeds on their lands (DPI 2008b).

2.2.2.3 Regionally Controlled Weeds

These weeds are usually widespread and are considered critical in a particular region. Continuing control measures are required to prevent their spread. Land owners have the responsibility to take all reasonable steps to control and prevent the spread of these weeds on their land and the roadsides that adjoin their land (DPI 2008b).

2.2.2.4 Restricted Weeds

This includes plants that pose an unacceptable risk of spreading in this State or to other parts of Australia, and are a serious threat to another State or Territory of Australia (DPI 2008a).

It should be noted that all land managers/persons are required under the CaLP Act to prevent the growth and spread of a Regionally Controlled Weeds for which they are responsible. Land managers that do not control Regionally Controlled Weeds may be issued with a Land Management Notice or Directions notice that requires specific control work to be undertaken. Failure to comply with the conditions of a Notice may result in court action and fines or the issuing of an infringement notice and fine (DPI 2008b).

There are no legal requirements to eradicate or control Restricted Weeds growing on land; however, Restricted Weeds cannot be traded, transported or spread in Victoria. Sections 70, 70A and 71 of the CaLP Act for all declared noxious weeds, irrespective of category or region, prohibits the:

- Transport of a noxious weed or its propagules within Victoria; and,
- Deposition on land of a noxious weed or its seeds (DPI 2008b).

3 METHODOLOGY

3.1 Desktop Assessment

A desktop assessment of the following literature and databases was undertaken in order to provide site context and background information regarding the development of the PPMP:

- Department of Natural Resources and Environment (DNRE) 2002. Victorian Pest Management – A framework for Action: Weed Management Strategy;
- Department of Environment, Water, Heritage and the Arts (DEWHA) 2009. Weeds in Australia;
- The Illustrated Flora Information System of Victoria (IFLISV) (Gullan 2017) and Atlas of Living Australia (ALA) (ALA 2020) for assistance with the distribution and identification of flora species;
- Department of Environment, Land, Water and Planning (DELWP) 2018. Advisory list of environmental weeds in Victoria;
- Aerial photography of the study area; and,
- Previous ecological assessments relevant to the study area; including;
 - Ryan Corner Windfarm Pest Plant Management Plan. Ecology Partners Pty Ltd 2010.

3.2 Site Assessment

An assessment of the study area was undertaken by two suitably qualified ecologists across four days; 5, 6, 7 and 27 October 2020. The assessment aimed to identify the relevant species of weeds present, their distribution, cover and abundance and their threat level across each property.

The surveys primarily focused on the areas where wind turbines, access tracks and cabling are proposed to be constructed. The majority of the properties were traversed on foot and incidental records were also made where infestations were observed within other parts of the study area. Point locations of weed infestations were recorded using a hand-held GPS with an accuracy of ± 5 metres.

3.2.1 Assessment Qualifications and Limitations

This report has been written based on the quality and extent of the ecological values and habitat considered to the present or absent at the time of the desktop and field assessments being undertaken. The surveys were conducted at an optimal time of year for species identification (mid-spring), however it should be noted that during the site assessments, there was significant inundation of the study area due to recent heavy rainfall, meaning that some low-growing or ground spreading species were not assessable.

Ecological values identified within the study area were recorded using a hand-held GPS or tablet with an accuracy of ± 5 metres. This level of accuracy is considered to provide an accurate assessment of the ecological values present within the study area; however, this data should not be used for detailed surveying purposes.

Nevertheless, the flora data collected during the field assessments and information obtained from relevant

desktop sources is considered to adequately inform an accurate assessment of the required values within the study area.

4 EXISTING CONDITIONS

4.1 Introduced and Planted Vegetation

The study area mostly contains a mixture of improved and unimproved pasture, with the majority of the study area and surrounding landscape historically being used for agricultural purposes and land clearing for grazing and cropping (Plate 1). This long-term disturbance has been a key factor in the facilitation of the spread of weed species. The majority of native vegetation within the study area has been removed and is now mostly restricted to road reserves. There were scattered occurrences of native species, such as Poison Lobelia *Lobelia pratioides* and Chocolate Lily *Arthropodium strictum* (Plate 2) and Austral Bracken *Pteridium esculentum* around the stony knolls. However, the properties are dominated by pasture grasses. Low lying areas of the study area were subject to inundation at the time of the assessment (Plate 4) and planted windrows consisting mostly of Radiata Pine *Pinus radiata* and Cypress Pine *Callitris* spp. exist within all properties across the study area.



Plate 1. Agricultural uses within the study area (Ecology and Heritage Partners Pty Ltd 06/10/2020).



Plate 2. Native Chocolate Lily within the study area (Ecology and Heritage Partners Pty Ltd 27/10/2020).



Plate 3. Austral Bracken around the stony knolls (Ecology and Heritage Partners Pty Ltd 06/10/2020).



Plate 4. Low lying areas inundated with water (Ecology and Heritage Partners Pty Ltd 27/10/2020).

5 WEED ASSESSMENT

5.1 Site Assessment Results

The general locations of infestations of invasive species (weeds) are shown on Figure 2. It is noted that the weed mapping extent represented in Figure 2 shows the major infestations of the relevant species and point locations where individuals were observed. Point mapping of all weed species was not undertaken due to the extent of infestations across the broader site, particularly introduced pasture grasses. Weed control will occur across the areas disturbed by the turbine and cabling construction and needs to be targeted for appropriate invasive species to fulfil legislative and approval requirements, as per the Planning Permit conditions.

The majority of the study area where wind turbines are proposed for construction contain improved pasture (Plate 5), with sown pasture species such as Perennial Ryegrass *Lolium perenne*, Couch *Cynodon dactylon*, Sub-clover *Trifolium* spp. and Barley Grass *Hordeum* spp. were common across most of the study area. Evidence of weed control and grazing by livestock was present across some of the properties. Common pasture weeds such as Cape Weed *Arctotheca calendula*, Yorkshire Fog *Holcus lanatus*, Ribwort *Plantago lanceolata* and Dock *Rumex* spp (Plate 6), were also present across all properties. Cape Weed in particular had a high coverage within areas where wind turbines are proposed for construction. The most common noxious weeds recorded on each property were woody weeds such as African Boxthorn *Lycium ferrosissimum* (Plate 7) and herbaceous thistles such as Winged Slender-thistle *Carduus tenuiflorus*, Variegated Thistle *Silybum marianum* and Spear Thistle *Cirsium vulgare* (Plate 8).

A total of 47 exotic species were recorded during the assessment, including 12 species listed as noxious under the CaLP Act (Table 1, Appendix 1.2). Eight of these species are considered to be key weed species; the predicted threat level in Table 1 is based on the current distribution, invasiveness and level of impact of each species within the study area. The property where these key species were recorded is also given in Table 1.

Table 1. Key noxious and woody weed species observed within the study area.

Property	Common name	Scientific name	Noxious weed status	Listed	Predicted threat level	Percentage cover across study area
Dumesny, Porter, Youl, Winter, Wright, Homan, Moore, McDonald, McNamara	Winged Slender-thistle	<i>Carduus tenuiflorus</i>	R	CaLP	H	15%
Dumesny, Porter, McDonald	Spear Thistle	<i>Cirsium vulgare</i>	R	CaLP	M	1%
Dumesny, Porter, Youl, Winter, Forrest, Hocking, Wright, Homan, Moore, McNamara, McDonald	African Boxthorn	<i>Lycium ferrosissimum</i>	C	CaLP, WoNS	H	15%
Dumesny	Serrated Tussock	<i>Nassella trichotoma</i>	P	CaLP, WoNS	H	<1%
Porter, McDonald	Briar Rose	<i>Rosa rubiginosa</i>	C	CaLP	M	1%
Winter	Blackberry	<i>Rubus fruticosus</i> spp. agg.	C	CaLP, WoNS	M	1%
Dumesny, Porter, Youl, Winter, Forrest, Homan, Moore	Variegated Thistle	<i>Silybum marianum</i>	R	CaLP	H	5%
Porter, Homan	Apple of Sodom	<i>Solanum linnaeanum</i>	R	CaLP	M	1%

Notes: Classification: C = Regionally Controlled, R= Restricted, CaLP= Catchment and Land Protection, WoNS = Weeds of National Significance.



Plate 5. Improved pasture within the study area (Ecology and Heritage Partners Pty Ltd 06/10/2020).

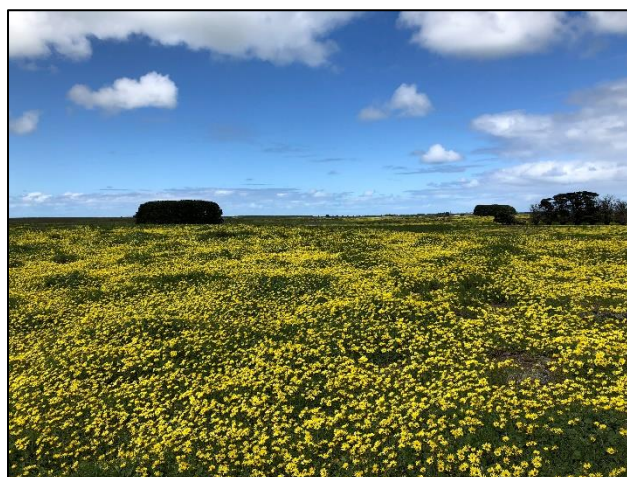


Plate 6. A mixture of environmental weeds (Ecology and Heritage Partners Pty Ltd 06/10/2020).



Plate 7. African Boxthorn within the study area (Ecology and Heritage Partners Pty Ltd 06/10/2020).



Plate 8. Variegated Thistle within the study area (Ecology and Heritage Partners Pty Ltd 07/10/2020).

5.2 Key Weed Species

Eight key weed species were recorded within the study area during the assessments, four of which are predicted to have a high threat level based on their impact, invasiveness and distribution (Table 1). The control and management of these key species must be undertaken as part of the construction process to limit the potential spread of these species from construction activities. The control and management actions for these key species are given below in Section 6. The location of these key weed species is shown on Figure 2. Environmental weeds such as Great Brome *Bromus diandrus*, Yorkshire Fog *Holcus lanatus* and Cape Weed were also recorded within the study area. Cape Weed was found to be the most abundant environmental weed and was recorded at most turbine locations. While competition between Cape Weed and pasture grasses is common, annual Cape Weed control is not typically considered necessary, as long as the sites are grazed, and a broad leaf herbicide is applied as required.

6 WEED MANAGEMENT PLAN

Earthworks and construction associated with the windfarm construction will involve the removal and transportation of plant material and soil as well as the use of various machines, vehicles and equipment. This means that there is an innate risk of spreading plant and animal diseases, and pest plants and invasive animals to and from the study area (and areas adjacent). Vegetation within and surrounding the study area contains a range of environmental and noxious weeds. Native vegetation is under threat from further pest plant encroachment. Preventing further spread of weed species is a priority for ecological management of the study area.

Pest plant control should be undertaken by an experienced contractor(s). A licensed contractor should ensure that the appropriate control techniques are based on individual situations and the targeted species. Contractors will also need to be aware of the potential for new infestations of exotic flora species not currently present on the site and undertake appropriate weed control as necessary.

Threats to agricultural and environmental values by invasive weed species include:

- Modification of native fauna habitat;
- Loss of threatened flora species through competition;
- Invasive species, such as African Boxthorn, creating harbour for rabbits;
- Loss of productivity within improved pasture; and
- Contamination of crops.

6.1 General Weed Control Principles

General principles and targets for weed control are required to be met in the operational phase of the project and are listed below.

- Weed control will begin as soon as possible (immediately for woody weeds, Winter/Spring 2021 for herbaceous weeds), particularly for the weeds listed in Table 2;
- Control all CaLP Act listed noxious weeds (cover reduced to <1% as far as practicable) throughout the construction areas;
- All remaining herbaceous and graminoid weed species are to be controlled at or below current levels;
- As there was a low abundance of Gorse recorded during the assessment, it is considered possible to eradicate this species from the study area;
- Weed control will be conducted in a manner that minimises soil disturbance;
- Where herbicide application is employed, non-residual herbicides are to be employed;
- Weed control should be focussed on the target species, and steps must be taken to ensure that off-target species are not impacted;

- Pest plants that reproduce sexually (by seed) are best controlled before seed set; and,
- Weed control works will be monitored regularly to assess their effectiveness, perform follow up works and evaluate the feasibility of management objectives.

6.2 Eradication versus Control

It is likely that several control methods will be required, including spraying, physical removal, hand pulling, and cutting and painting. A broad summary of weed control protocols is provided in Appendix 1.1.

Weed management measures have been developed to comply with regulations outlined in the CaLP Act for noxious weeds. Appropriate implementation of the weed control measures outlined in this Plan will ensure compliance with responsibilities under the CaLP Act and the relevant planning permit conditions

Depending on the type of weed being controlled on the site, the main approach to management will be eradication of weeds (Weeds CRC 2004). Eradication may be achieved where:

- The weed occupies only a small area and will not reinvade from adjoining areas;
- The infested area is known and at low density;
- The control method used kills all plants before maturity; and
- The weed seed does not remain dormant on the soil, or the infestation is detected before seeds are released (Weeds CRC 2004).

Where eradication is not possible, weeds will be controlled to <1% cover throughout the study area. Containment of weed species is likely to be a more realistic management approach when dealing with widespread, well established species. Containment is aimed at reducing new weed infestations and the need for future control by limiting the extent and intensity of infestations. The key to containment is to focus on treating isolated infestations, rather than core infestations, with the objective of preventing weed populations extending beyond the perimeter of the core infestation (Weeds CRC 2004).

To further reduce future infestations, and control existing populations, a number of mitigation measures should be considered. A summary of basic procedures is outlined in Table 3.

6.3 Pre-Construction

Before the commencement of construction, the following management actions should be undertaken to ensure that further spread of existing weeds or the introduction of new weed species into the study area is avoided. Weed species have the potential to spread between sites and properties via contaminated machinery, vehicles, equipment, clothing and footwear. Where appropriate, such as between different landholdings, weed hygiene measures must be implemented during the pre-construction phase for personnel, vehicles and equipment in order to minimise the spread and/or introduction of noxious weed species into the construction area or other areas across the properties.

6.3.1 Management Actions

The following management actions must be implemented during the pre-construction phase:

- Control of any noxious weeds within the construction area by a licensed contractor;
- Vehicle access points must be established at entry points to the construction zones and all vehicles accessing the construction zone will only enter and exit through the designated access points;
- A weed awareness and management induction must be completed by all personnel before entering the construction zones;
- Clothing and footwear must be checked daily before entering and exiting the construction zone for noxious weed material; and,
- All equipment and machinery are to be thoroughly cleaned offsite prior to commencing works.

6.4 During Construction

During construction, weed species have the potential to germinate and spread throughout the study area, around infrastructure, fencing, soil stockpiles and areas disturbed by construction activities. Ongoing weed control works must be undertaken during construction to minimise the spread and/or introduction of noxious weed species into the study area. Topsoil removed from the construction area also has the potential to spread noxious weeds and must be managed appropriately to further reduce the potential for increased weed spread throughout the study area.

6.4.1 Management Actions

The following management actions must be implemented during the construction phase:

- All plant and equipment must arrive clean to site; they will otherwise be required to be cleaned at the wash down area prior to transporting within the site or turned away and washed down off site;
- A wash down area must be established on site for equipment and machinery that requires cleaning prior to leaving site. Water from the wash-down bay must not be discharged into drainage lines or flow into areas of environmental sensitivity. Washdown water is to be recovered and treated to be free of biological contaminants and hydrocarbons and may be re-used for subsequent washdowns or as dust suppression or applied to non-sensitive areas;
- Movement of vehicles, equipment and machinery between properties will be restricted as much as reasonably practicable to minimise the spread of noxious weeds;
- A hygiene wash will be undertaken on equipment and machinery when moving between landholdings when organic material is being handled (eg. topsoil removal or stripping). In this situation, all equipment and machinery that handle organic soil material that may contain noxious weeds or soil pathogens, will have excess soil and organic material removed;
- Vehicles and machinery entering the construction zone must do so at a designated entry and exit points and use constructed roads where possible;
- Weed control must be undertaken on a quarterly basis within the construction area of relevant species (i.e. Table 2), to minimise the spread and/or introduction of noxious weed species into the study area;
- A weed awareness and management induction must be completed by all personnel before entering the construction zones;

- Personnel clothing and footwear must be checked for contaminants before entering and exiting the constriction zones;
- Imported topsoil must be certified weed free; and,
- Disturbed areas will be sown as soon as possible with perennial pasture grasses.

6.5 Post Construction

The introduction and spread of weed species within the construction area remains as a potential threat in the post construction phase, particularly in the first year as weeds have a higher likelihood of re-colonising or emerging from disturbed areas. Management actions must be implemented for a period of two years following the completion of construction to ensure that noxious weed species do not become established within and surrounding the turbines and cabling.

6.5.1 Management Actions

The following management actions must be implemented during the post construction phase:

- The construction areas and any areas adjacent (such as access points) will be monitored four times in the first year (early spring, late spring, summer and autumn) and bi-annually for at least the following year to identify any new outbreaks of noxious weeds;
- Monitoring will be undertaken by a licensed weed contractor who will be accompanied by a qualified botanist during each visit of the first year to assess the impact of weeds within and surrounding the turbines and windfarm infrastructure;
- A brief progress report will be prepared at the end of each monitoring assessment detailing the outcomes/performance of the weed management actions. The report will include details of weed species, species location, distribution, cover and recommended control measures; and,
- At the completion of the two year post-construction period, a weed audit will be undertaken by a qualified botanist comparing the results of the 2 year report to the results of the current assessment, and detail the weed control/eradication techniques employed during the two year period, and providing any recommendations for the future.

Table 2. Control methods for key weed species recorded in the study area

Common name	Scientific name	Treatment Method	Treatment Plan	Timing of Treatment	Desired Outcome Within Construction Footprint
Winged Slender-thistle	<i>Carduus tenuiflorus</i>	HP & SS	Larger infestations should be controlled first with smaller infestations individually targeted as required. Ensure top 20-40mm of the taproot are removed. Hand pulling is effective for small patches and individual plants. Prevent seedling establishment by maintaining good ground cover of perennial pasture species.	Early Spring	Contain by removing all new plants within two years Eliminate (<1% cover) or as far as practicable
Spear Thistle	<i>Cirsium vulgare</i>	HP & SS	Small individuals only recorded within study area. Individuals can be hand pulled or spot sprayed. Ensure top 20-40mm of the taproot are removed. Prevent seedling establishment by maintaining good ground cover of perennial pasture species.	Early Spring	Contain by removing all new plants within two years Eliminate (<1% cover) or as far as practicable
African Boxthorn	<i>Lycium ferocissimum</i>	MR, CP & SS	Boxthorn has a deep and extensive root system; whole crown of small plants must be dug out, larger individuals require mechanical removal and cut and paint/herbicide application. Removed specimens must be burned as material takes a long time to breakdown and can continue to provide habitat for rabbits.	March to May, before main fruiting season	Contain by removing all new plants within two years Eliminate (<1% cover) or as far as practicable
Serrated Tussock	<i>Nassella trichotoma</i>	HP & SS	Serrated Tussock was observed within one property only but should be treated as a priority to stop further spread; hand pull tussocks and spot spray with appropriate herbicide.	Late Winter to Early Summer	Contain by removing all new plants within two years Eliminate (<1% cover)
Briar Rose	<i>Rosa rubignosa</i>	MR, CP & SS	Only a few small individuals were recorded within the study area, but should be treated as a priority to stop further spread; dig out whole crown of small plants. If species spreads, apply herbicide (cut and paint).	Late Spring to Early Autumn	Contain by removing all new plants within two years Eradicate from construction footprint
Blackberry	<i>Rubus fruticosus</i> spp. agg.	SS & CP	Spray large infestations with appropriate herbicide during summer; cut and paint during autumn. Only one small individual was recorded within the study area but should be treated as a priority	Summer	Contain by removing all new plants within two years

Common name	Scientific name	Treatment Method	Treatment Plan	Timing of Treatment	Desired Outcome Within Construction Footprint
			to stop further spread; this can be slashed, and any further spread of species must be controlled via herbicide application.		Eradicate from construction footprint
Variegated Thistle	<i>Silybum marianum</i>	HP & SS	Larger infestations should be controlled first with smaller infestations individually targeted as required. Apply herbicide at seedling/rosette stage. Hand pulling is effective for small patches and individual plants. Ensure top 20-40mm of the taproot are removed. Prevent seedling establishment by maintaining good ground cover of perennial pasture species.	Early Spring	Contain by removing all new plants within two years Eliminate (<1% cover) or as far as practicable
Apple of Sodom	<i>Solanum linnaeanum</i>	MR & CP	Only a few small individuals were recorded within the study area, but should be treated as a priority to stop further spread; dig out whole crown of small plants. If species spreads, apply herbicide (cut and paint).	Spring to Summer during flowering period	Contain by removing all new plants within two years Eradicate from construction footprint

Notes: CP = Cut and Paint; MR = Mechanical Removal; HP = Hand pull; SS = Spot Spray

Table 3. Summary of weed mitigation measures

Mitigation Measure	Action	Timing	Location	Responsibility
Control of significant weed infestations	Priority weed species will be controlled by a licensed contractor.	Pre, during and post construction, as required, but at least 4 times a year	Areas of weed infestation throughout the construction areas	Site/Project Manager
Vehicle and equipment hygiene	A washdown area will be established on site for: - Plant and equipment entering the site that has not been confirmed to have been cleaned prior to entering the site; - Plant and equipment leaving the site after working in weed infested areas. A hygiene wash will be undertaken on equipment and machinery when moving between landholdings when organic material is being handled.	Pre and during construction	Designated wash-down area or hygiene wash area	Site/Project Manager
Weed management/ vehicle and equipment hygiene	Vehicles will enter and leave the site via defined entry points and use internal access roads to minimise potential weed spread.	Pre and during construction	Areas impacted by construction	Site/Project Manager
Topsoil management	Disturbed areas will be sown as soon as possible with perennial grasses to minimise risk of noxious weeds reestablishing. Imported topsoil must be certified weed free.	During construction	Areas impacted by construction	Site/Project Manager
Weed monitoring	Construction areas and access points will be monitored four times annually in the first year and bi-annually in the second year from the completion of construction.	Post construction; early spring, late spring, summer and autumn of the first year and spring and summer of the second year	Areas impacted by construction	Weed Contractor and Botanist (first year)
Reporting	A brief report outlining the weed control techniques employed and results of the weed control will be prepared.	At the end of each monitoring event	Areas impacted by construction	Weed Contractor
Weed audit	At the completion of the two-year post construction period, a weed audit will be undertaken to compare the results of the audit to the results of this assessment.	Two years from the completion of construction	Areas impacted by construction	Botanist

7 MONITORING AND REPORTING

A regular monitoring program must be undertaken for noxious weed species within the construction area throughout the construction phases and the two-year post-construction period. Monitoring must include the current noxious weed species present, abundance, cover and any new outbreaks of other weed species or further infestations of current weed species must be recorded. Monitoring is to be undertaken four times annually during the first year after completion of construction (early spring, late spring, summer and autumn) and twice during the second year (spring and summer). During the first year and spring (approximately 6 months into the second year) monitoring in the second year, the weed contractor undertaking the monitoring will also be accompanied by a qualified botanist to assess the impact of weeds within the construction areas.

Monitoring of the construction areas should include:

- Photographs taken from the same point during each assessment for comparisons;
- A record of the distribution, cover and abundance of key weed species using GIS mapping;
- Any new weed infestations or outbreaks across the construction areas; and,
- Details of the effectiveness of the weed control techniques employed.

A brief report detailing the above will be prepared at the end of each monitoring event in order to analyse different approaches to weed management, increase efficiency and maximise the removal and control of infestations.

At the completion of the two-year post-construction period, a weed audit will be undertaken by a botanist to compare the results of the current assessment with the site condition at the end of the weed control period. Details of the weed control techniques employed across the construction areas will be given in the report.

7.1 Performance Indicators

Key performance indicators for the PPMP include:

- Meeting the requirements of the CALP Act in relation to the eradication and control of key noxious weeds identified within the construction footprint;
- Achieving control and elimination of key noxious weed species within the construction footprint where possible and no net increase in cover of environmental weeds; and,
- Minimal impacts to native vegetation, scattered trees and fauna.

7.1.1 Logbooks

The following logbooks must be maintained on site during all construction phases and made available to the Responsible Authority upon request:

- Weed control logbook;
- Washdown logbook; and,

- Importation/exportation of materials logbook.

7.2 Responsibilities

It is the responsibility of the Site Manager to engage a licensed contractor to undertake the prescribed control methods outlined in this management plan.

7.3 Timeframes

The above Pest Plant Management Plan is to be completed before, during and following the construction phases, ideally at the recommended time for the implemented method. General monitoring is to be ongoing and monitoring during the two years post construction is to be undertaken in accordance with the above timeframes given in Section 6.

7.4 General Weed Control Information

Weed control will primarily target key weed species and focus on areas of high weed abundance by commencing weed control from the edge of the population and converging towards the centre of the population. Spring and summer are appropriate seasons to target many weeds as they are actively growing in this period and herbicide application is more effective.

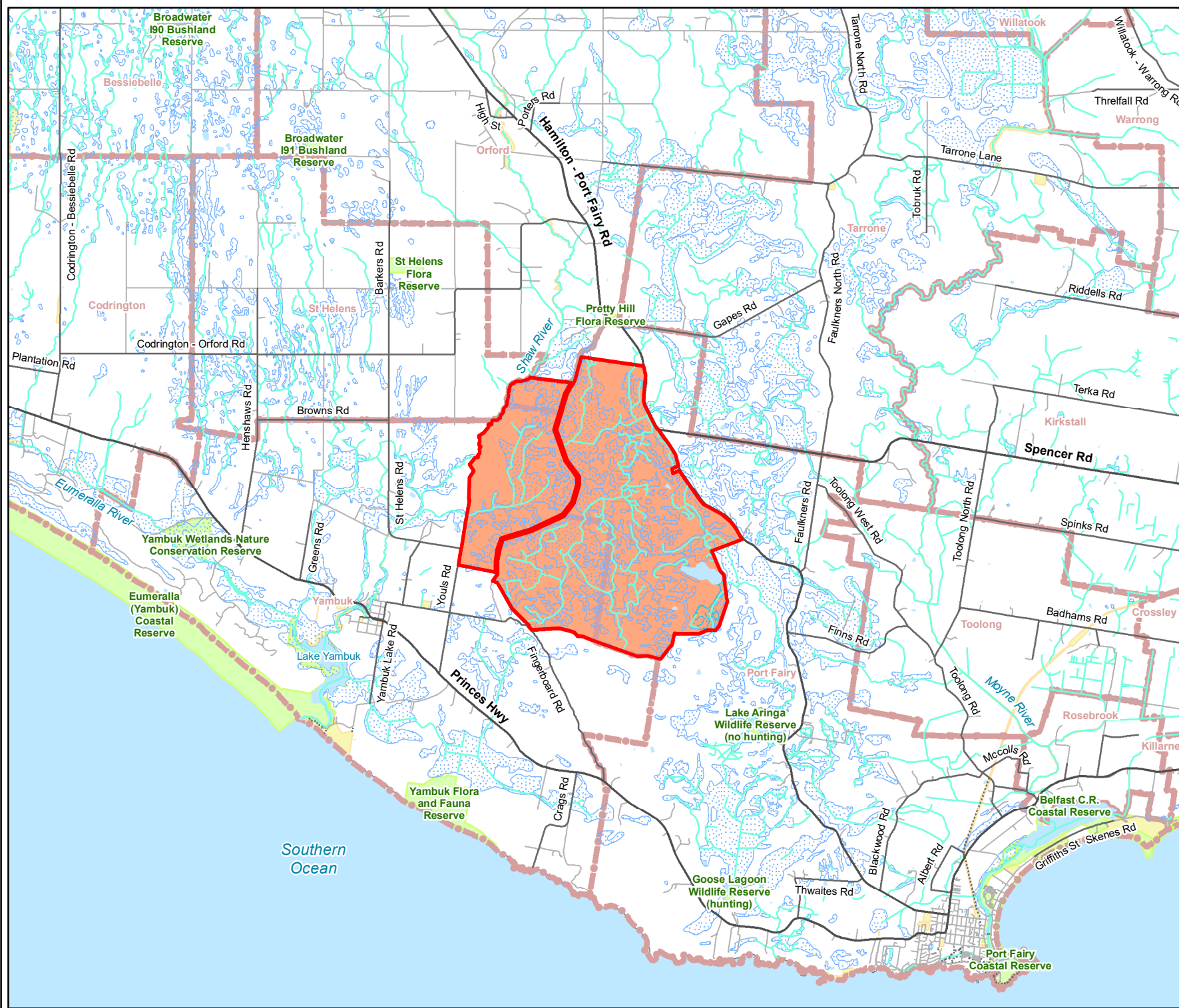
It is important that realistic timeframes for weed control works are implemented in order to apply a definite structure to weed management within the study area. Licensed weed control contractors will make appropriate decisions on which technique to use based on site-specific considerations. Contractors will also need to be aware of the potential for new outbreaks of weed species not recorded in this assessment and implement appropriate weed control techniques as necessary. If any other high priority noxious weeds are identified within the study area, appropriate weed control works must be undertaken in accordance with relevant legislation / local laws.

It is likely that a variety of weed control techniques such as mechanical removal, hand pulling, spot spraying, slashing and cutting and painting, will need to be employed for the major infestations of high threat weeds.

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FIGURES



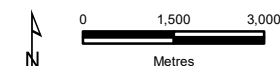
Legend

- Study Area
- Major Road
- Collector Road
- Minor Road
- Proposed Road
- Walking Track
- Minor Watercourse
- Permanent Waterbody
- Land Subject to Inundation
- Wetland/Swamp
- Parks and Reserves
- Crown Land
- Localities



Figure 1

**Location of the study area
Pest Plant Management Plan,
Ryan Corner Wind Farm**



Map Scale: 1:125,000 @ A4
Coordinate System: GDA2020 MGA Zone 54



VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

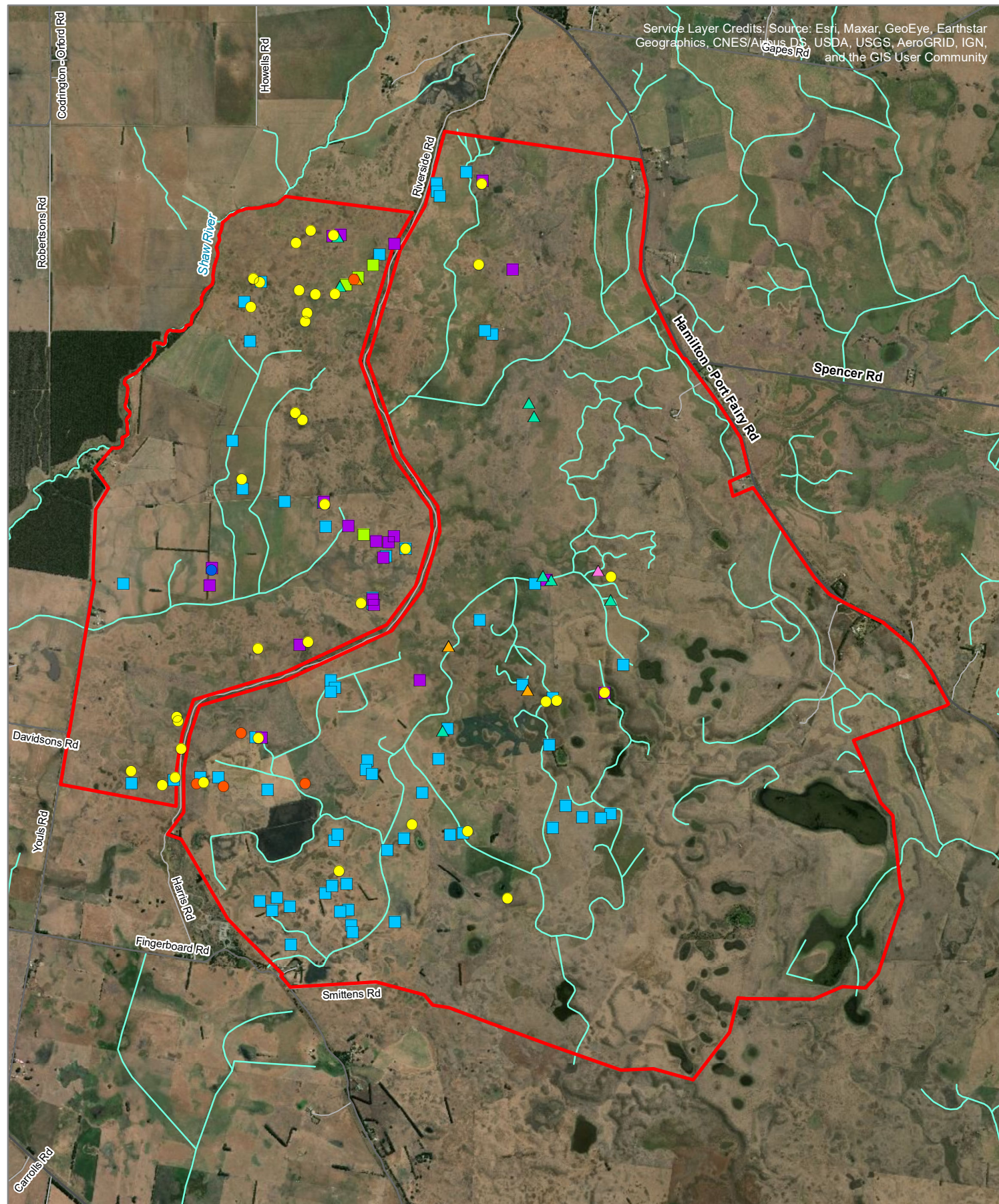


Figure 2
Weeds
Pest Plant Management Plan, Ryan Corner Wind Farm

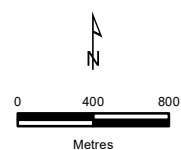
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Study Area

Weeds

- African Boxthorn
- Apple of Sodom
- Blackberry
- ▲ Briar Rose

- ▲ Serrated Tussock
- ▲ Spear Thistle
- Variegated Thistle
- Winged Slender-thistle & Variegated Thistle
- Winged Slender-thistle



Map Scale: 1:40,000 @ A4
 Coordinate System:
 GDA2020 MGA Zone 54

VicMap Data: The State of Victoria does not warrant the accuracy or completeness of information in this publication and any person using or relying upon such information does so on the basis that the State of Victoria shall bear no responsibility or liability whatsoever for any errors, faults, defects or omissions in the information.

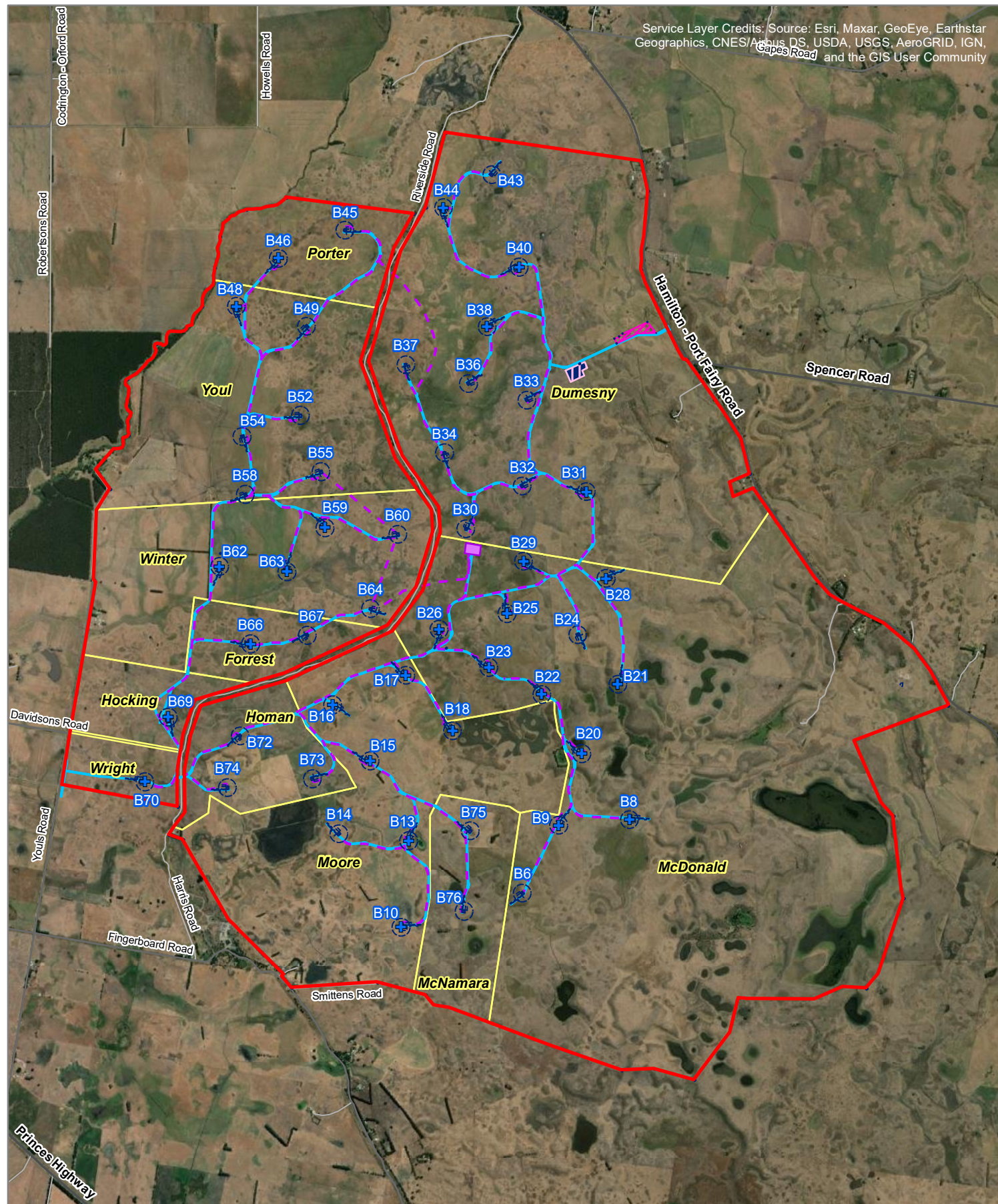
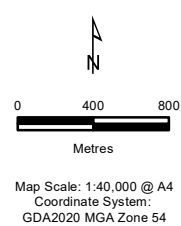


Figure 3
Proposed layout and
landowners
Pest Plant
Management Plan,
Ryan Corner Wind
Farm

Legend

- | | |
|---|--|
| Study Area | Batch Plant |
| + Wind turbines | Site Compound and Laydown Area |
| Wind turbine and hardstand area | Substation |
| Proposed Access Tracks or Existing Road Upgrades | Landowners |
| Cable trenches | |



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APPENDICES

Appendix 1.1 – Summary of Weed Control Methods

Weed control measures identified in Table 2 and others are described in detail below. Weed control measures (including type of herbicide) should follow the guidance of an experienced contractor for the control of the weed species identified above.

Herbicides

Spot spraying and Rig-spraying

The application of herbicides is an effective and efficient control technique for a range of woody, herbaceous and grass weeds. The correct use and application of herbicides can provide targeted control of a range of species; however, it must be stressed all use of herbicides must be used in accordance with the manufacturer's specifications and occupational health and safety policies.

Application methods for herbicides include spot spraying with a knapsack for small or sensitive areas, or for targeted species. Rig spraying is best used in larger areas which are not sensitive to high volume application of herbicide and there is limited potential for off-target damage. Rig spraying is not recommended for any weeds within close proximity to a drainage or creekline due to the risk of runoff and the potential damage to ecologically sensitive areas. Dabbing of species with foam tipped application device, with the herbicide applied from an attached bottle, should be used in sensitive areas or in areas where weed control is targeted to a small number of plants, especially bulbs or tuberous plants.

Timing of intervals, plant age and growth seasons, plant stress levels and climatic factors all need to be considered when developing methodologies for the application of herbicides to ensure successful outcomes. Problems exist with ongoing unsuccessful herbicide treatments, which may result in weeds developing herbicide resistance, or the build-up of chemicals in the soil. Surrounding plants' susceptibility to herbicides and ongoing uses of the treated areas should also be considered when choosing the right herbicide to be used in a weed control program, as some herbicides are residual and may persist within the soil for varying durations.

Drill and Fill

Drill and fill, also known as direct injection, is a method where the selected herbicide (usually Glyphosate) is injected through a device into a hole that has been made into the targeted plant (i.e. woody species). The hole is usually made through the use of a drill but sometimes a tomahawk or saw may be used to put small nicks into the targeted plant. It is essential that the hole or nick must always be lower than the first branch containing foliage (i.e. ideally, the lowest possible point on the plant) and also the herbicide is applied into the hole as quick as possible. The general rule of thumb is that the herbicide must be applied within 30 seconds. Holes are scattered around the main trunk at 50 millimetre intervals, depending on the diameter of the trunk and also branches or angle of the trunk. It is essential that a complete ring around the trunk of the plant be made of this herbicide filled holes to ensure plant death, as large gaps may allow sections of the target tree to survive. Generally, the holes or nicks do not need to be deeper than 20 millimetres, but do need to be deep

enough to penetrate the outer cambium layer of the tree. This allows the phloem to carry the herbicide into the roots, which will kill the plant over a number of weeks, depending on conditions.

The benefits of this method include: the retention of standing material for habitat, no costs for the removal of the plant from the site; no dragging of material across sensitive areas; and, speed, as the method is fast to execute (i.e. drill and fill, and move on).

The drawbacks of this method are that if it is not executed correctly, trees may re-grow, particularly as accessing the base of the trunk of spiny plants such as African Box-thorn can be difficult. However, if the application is successful, dead standing vegetation can become a fire hazard and look aesthetically displeasing to the community.

Cut and Paint

The cut and paint method of control requires the cutting of the target species at the very base, under any foliage, and the immediate application of herbicide (usually a glyphosate, dependent on the target species). The application can be done through a 'dabber' bottle or paint brush. Care will be undertaken during application, to avoid splash of herbicide causing non-target damage. Once cut down, the biomass of the target species may sometimes be left on the ground, but usually requires removal. This is particularly necessary if it bears fertile seeds or has the potential to re-shoot from contact with moist ground (i.e. *Salix* sp.), or covers native vegetation.

Many herbicides are available that are very effective in the control of woody weed species. Typically, these herbicides are applied to the stem, trunk or roots of the target plant by 'drill and fill', 'cut and paint' or 'frilling' methods of application. These herbicides can be more effective than manual removal alone, as the chance of the plant re-sprouting is significantly reduced.

Mechanical Removal

Mechanical removal by machine may include grooming of woody weed infestations by a tractor-mounted groomer (slasher/mulcher), which is quite effective on Gorse, African Box-thorn and Hawthorn infestations. The excavation of Spiny Rush has been used in areas of dense infestations where other means of eradication may be a slow process due to difficult access.

Manual Removal

Some weed species are resilient against other methods of eradication, such as herbicides, and will be targeted by manual removal. Infestations of species such as African Box-thorn, Fennel, Serrated Tussock and Toowoomba Canary-grass will be combated by manual removal techniques.

Additionally, manual removal is a crucial technique when used in conjunction with herbicides for the control of both woody and herbaceous weed species. This combination of weed eradication is advised for almost all weed species.

Ring-barking

Ring-barking is a viable technique for use when eradicating large woody shrubs and trees. The technique involves the use of a large knife, tomahawk or axe to make a continuous cut around the trunk of the plant.

The cut should be 5 to 10 centimetres wide and deep enough to penetrate the heart-wood (Muyt 2001). This technique should not be used when removing species which can reproduce by suckering.

Mowing

While it has been found that mowing may enhance the survival of many weed species, in some instances mowing can be used to control their spread. Areas located in close proximity (500 metres – 1 kilometre) to sites of ecological significance that are currently mown, should undergo an intensive mowing regime (every week), particularly in spring. This method of weed control is only effective against species which are prevalent within mown areas. It will prove most effective in controlling the spread of grass species such as Chilean Needle-grass, Serrated Tussock and Toowoomba Canary-grass.

Mulching

It is advised that mulching be used in areas of revegetation which were previously dominated by exotic vegetation. Mulching can be a very effective technique in suppressing species which may invade, particularly from mown areas.

In areas of remnant vegetation, mulch should be used very carefully. Only people who have an in-depth knowledge and long history of the specific site should advise the use of mulch in these areas to ensure native species (particularly rare and threatened species) are not affected by the use of mulch.

Soil Scalping

Soil scalping involves the removal of a thin layer of topsoil in areas of extremely high weed cover abundance. Care must be taken in order to ensure that enough soil is removed to eliminate the possibility of re-colonisation from the soil seedbank. If soil scrapping is to be undertaken, a minimum of depth of 10 centimetres of soil needs to be removed to be effective. Soil scalping cannot be undertaken in areas of native vegetation nominated for retention and protection.

It is important that this process is directly followed by high density revegetation and mulching in order to reduce the migration of other weeds into these areas. This process is only favoured in areas that are considered a major source population for weed species of high threat to agriculture, heritage or areas of conservation significance.

Appendix 1.2 – Exotic Flora Species Recorded

Table A1.2 – Commonly observed exotic species recorded within the construction footprint.

Scientific Name	Common Name	Status	~Percentage Cover
<i>Agrostis capillaris</i>	Brown-top Bent	-	<1%
<i>Aira caryophyllea</i> subsp. <i>caryophyllea</i>	Silvery Hair-grass	-	<1%
<i>Anthoxanthum odoratum</i>	Sweet Vernal-grass	-	<1%
<i>Arctotheca calendula</i>	Cape weed	-	15%
<i>Avena barbata</i>	Bearded Oat	-	<1%
<i>Avena sativa</i>	Oat	-	<1%
<i>Briza minor</i>	Lesser Quaking-grass	-	<1%
<i>Bromus catharticus</i>	Prairie Grass	-	<1%
<i>Bromus diandrus</i>	Great Brome	-	<1%
<i>Callitris</i> spp.	Cypress Pine	-	<1%
<i>Carduus tenuiflorus</i>	Winged Slender-thistle	R	15%
<i>Cerastium glomeratum</i>	Sticky Mouse-ear Chickweed	-	<1%
<i>Cirsium vulgare</i>	Spear Thistle	R	1%
<i>Conium maculatum</i>	Hemlock	R	<1%
<i>Cynodon dactylon</i>	Couch	-	15%
<i>Cynosurus echinatus</i>	Rough Dog's-tail	-	<1%
<i>Cytisus scoparius</i>	English Broom	WoNS, R	<1%
<i>Dactylis glomerata</i>	Cocksfoot	-	1%
<i>Echium plantagineum</i>	Paterson's Curse	C	<1%
<i>Ehrharta erecta</i> var. <i>erecta</i>	Panic Veldt-grass	-	<1%
<i>Ehrharta longiflora</i>	Annual Veldt-grass	-	<1%
<i>Erodium botrys</i>	Big Heron's-bill	-	<1%
<i>Foeniculum vulgare</i>	Fennel	R	<1%
<i>Holcus lanatus</i>	Yorkshire Fog	-	5%
<i>Hordeum</i> spp.	Barley Grass	-	5%
<i>Hypochaeris radicata</i>	Flatweed	-	<1%
<i>Lolium perenne</i>	Perennial Rye-grass	-	10%
<i>Lycium ferocissimum</i>	African Box-thorn	WoNS, C	15%
<i>Malva</i> spp.	Mallow	-	<1%
<i>Nassella trichotoma</i>	Serrated Tussock	WoNS, P	<1%
<i>Oxalis pes-caprae</i>	Soursob	R	<1%
<i>Paspalum</i> spp.	Paspalum	-	<1%
<i>Phalaris aquatica</i>	Toowoomba Canary-grass	-	2%
<i>Pinus radiata</i>	Radiata Pine	-	1%

Scientific Name	Common Name	Status	~Percentage Cover
<i>Plantago lanceolata</i>	Ribwort	-	2%
<i>Poa annua</i>	Annual Meadow-grass	-	<1%
<i>Rosa rubiginosa</i>	Briar Rose	C	<1%
<i>Rubus fruticosus</i> spp. agg.	Blackberry	WoNS, C	<1%
<i>Rumex crispus</i>	Curled Dock	-	1%
<i>Silybum marianum</i>	Variegated Thistle	R	5%
<i>Solanum linnaeanum</i>	Apple of Sodom	R	<1%
<i>Sonchus oleraceus</i>	Common Sow-thistle	R	<1%
<i>Sporobolus africanus</i>	Rat-tail Grass	-	<1%
<i>Trifolium fragiferum</i> var. <i>fragiferum</i>	Strawberry Clover	-	<1%
<i>Trifolium repens</i> var. <i>repens</i>	White Clover	-	1%
<i>Trifolium</i> spp.	Sub-clover	-	15%
<i>Vulpia</i> spp.	Fescue	-	<1%

Note: C = Controlled Weeds, R=Restricted weeds, P = Prohibited Weeds, WoNS = Weeds of National Significance, - = not applicable, CaLP= Catchment and Land Protection



Annex I Bushfire Emergency and Response Management Plan

2021

Bushfire Prevention & Emergency Response Plan – Ryan Corner Windfarm



Version Control and History

Version	Date	Prepared by	Reviewed by / responsible for	Required action / timelines	Date reviewed	Authorised by
1.0	15/10/2020	John Mealia	ERM	ERM	20/10/2020	ERM
2.0	24/10/2020	John Mealia	ERM & Principal Contractor	ERM	26/10/2020	ERM
3.0	27/10/2020	John Mealia	CFA & MSC	CFA & MSC	11/11/2020 & 30/11/2020	ERM
4.0	30/11/2020	John Mealia	ERM	ERM	3/12/2020	ERM
5.0	4/12/2020	John Mealia	ERM	ERM	22/01/2021	ERM
6.0	22/01/2021	John Mealia	ERM	ERM	22/01/2021	ERM
7.0	17/02/2021	John Mealia	ERM	To update layout plan	17/02/2021	ERM
8.0	16/03/2021	John Mealia	ERM	To remove the word 'draft' from the title page	16/03/2021	ERM
9.0	29/04/21	John Mealia	ERM	ERM – insert updated Council and GPG emerg. Contact details, and amended construction hours for Saturdays and Sundays, and wind farm layout	29/04/21	ERM
10.0	20/04/2022	John Mealia	Umwelt	Confirm the full bore isolation valve, storz connection, and adapter requirements	20/04/2022	Umwelt

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7.0	ERM – Fiona Koutsivos	Email	Fiona Koutsivos
8.0	ERM – Fiona Koutsivos	Email	Fiona Koutsivos

Note: This section is intended for the purpose of demonstrating compliance with the planning permit conditions and will be moved to an Appendix in the approved plan for operational efficiency purposes.

Introduction Note

This Bushfire Prevention & Emergency Response Plan (**BP&ERP**) has been designed to be a practical *bushfire* and *emergency* operational plan during construction and once completed, will undergo a full review and be amended to reflect normal operations to meet the ongoing needs of the people working at the Ryan Corner Wind Farm (**Site**) and surrounding community. It has been developed with operational employees input to ensure it is a practical, easy to use plan by those who will rely upon it, potentially under *emergency* conditions and for training purposes whilst meeting, and in some cases, exceeding the Planning Permit Condition 17(e) and the Country Fire Authority (**CFA**) Guidelines for Renewable Energy Installations Guidelines – February 2019 (**CFA Guidelines**).

This will assist with achieving compliance with the Occupational Health & Safety Act 2004 which requires development of any *emergency* response plan to be practical, *risk* based and achievable.

The following is an abstract from section 21 of the OH&S Act - duties of employers to employees :

‘must provide such information, instruction, training or supervision to employees of the employer as is necessary to enable those persons to perform their work in a way that is safe and without risks to health’.

Construction will be undertaken in accordance with an Environmental Management Plan pursuant to Condition 17(a) of the Planning Permit and will occur between the hours outlined in **Table 2**. This BP&ERP should be read in conjunction with the Environmental Management Plan.

This BP&ERP provides defined terms as *italic*. Definitions for these terms can be found in Section 3.

Planning Permit Condition 17(e)

Planning permit condition 25(e) requires ‘A *bushfire* prevention and *emergency* response plan prepared in consultation with the CFA and **Moyne Shire Council who is the Responsible Authority (RA)** to the satisfaction of the Minister for Planning’. Table 1 below lists what the plan must consider and provides details on where the relevant response can be found within the plan.

Table 1

No	Condition	Response – No / Page
I.	Criteria for the provision of static water supply tanks solely for firefighting purposes, including minimum capacities, appropriate connections, and signage.	16 / 9, 17 / 10, 18 / 10.
II.	Criteria for access to static water supply tanks for firefighting vehicles,	12 / 9, 13 / 9, 14 / 9, 15 / 9.
III.	Procedures for vegetation management, fuel control and the provision of firefighting equipment during the declared fire danger periods,	1 / 8, 2 / 8, 3 / 8, 8 / 8, 9 / 8, 10 / 9, 11 / 9, 19 / 10, 20 / 10, 21 / 10.
IV.	Minimum standards for access roads and tracks to allow access for firefighting vehicles	4 / 8, 5 / 8, 6 / 8, 7 / 8.
V.	The facilitation by the operator, before or within 3 months after the commencement of the operation of the wind energy facility, of a familiarization visit to the site and explanation of <i>emergency</i> service procedures for the Country Fire Authority, Rural Ambulance Victoria,	44 / 12.

	Moyne Shire Council's Municipal Emergency Management Committee and Victoria Police.	
VI.	Subsequent familiarization sessions for new personnel of those organisations on a regular basis and/or as required, and	44 / 12.
VII	If requested, training of authority personnel in relation to suppression of wind energy facility fires.	45 / 12.

CFA Guidelines for Renewable Energy Installations Guidelines – February 2019.

The purpose of CFA Guidelines is to provide details about standard measures and process in relation to fire safety, *risk* and *emergency* management that should be considered when designing, constructing and operating new renewable energy facilities, and upgrading existing facilities.

This BP&ERP responds to the following sections of Part 1 of the Guidelines:

- **Section 1, Development of installations:** 1.1 - Consultation, 1.2 – Planning, design and construction,
- **Section 2, Emergency Management:** 2.1 – Risk management, 2.2 Emergency management plan, 2.3 provision of *emergency* information, 2.4 fire brigade site and familiarization and exercises, 2.5 Training for facility staff,
- **Section 3, Site infrastructure:** 3.1 – Access, 3.2 – Fire fighting waste and supply, 3.3 dangerous goods,
- **Section 4, Site operations:** 4.1 – Operation and maintenance of facilities, 4.2 – Fuel / vegetation management.

Ryan Corner Rd Wind Farm Site

The Project is located in south-west Victoria approximately 12 km north-west of Port Fairy. The Site is bounded by Youls Road to the west, Shaw River and Riverside Road to the north, Hamilton-Port Fairy Road to the east and Fingerboard Road and Smittens Road to the south.

It will comprise of up to 52 wind turbines with a maximum height of 180m over the Site area of 3,600ha and will generate up to 218 MWh of electricity per annum, refer Site Plan on page 15.

Planning Permit 20060222-A (**the planning permit**) was issued on 21 August 2008 to allow for:

“Use and development of land for a wind energy facility, and removal of native vegetation.”

Site Access

Two points of access will be provided during construction activities. A western access will be located on Youls Road approximately 300m south of Davidson Road. An eastern access point will be provided on Hamilton-Port Fairy Road approximately 300m north of Spencer Road.

Over dimensional vehicles will only be provided access via the western access on Youls Road. Riverside Road and Harris Road will not be used for site access.

Note: An emergency information container (painted red and marked 'EMERGENCY INFORMATION' in white contrasting lettering will be located at each of the two points and installed at a height of 1.2m – 1.5m and be accessible with a fire brigade standard 003 key.

A Traffic Management Plan will be developed detailing comprehensive traffic management protocols for the Project prior to construction commencing.

Site Details

A summary of the Site is provided in the following tables.

Table 2 - Site address / details

Owner/occupier	Ryan Corner Development Pty Ltd
Address	Land in Ryan Corner, generally described in planning permit No:20060222 - A
Zone	Farming

Area	3,600ha
Overlays	Site is not within a Bushfire Management Overlay nor is it a designated Bushfire Prone Area.

Table 3 - Infrastructure

Infrastructure	Detail
Number of Turbines	Up to 52 in total.
Maximum Height	180m above natural ground level
Capacity	218 MW
Other infrastructure	High Voltage Transmission Line
Batching Plant	Refer batching plant layout – Appendix I

Table 4 - Construction Hours

Day	Time
Monday to Friday	7.00 am – 6.00 pm
Saturday	7.00 am – 4.00 pm
Sunday	7.00 am – 1.00 pm

Note: Where work occurs outside of these hours, this will be undertaken in accordance with relevant management plans and in consultation with relevant stakeholders.

Table 5 – Employees numbers

Number:	Peak 140
Shift Numbers:	N/A
Shift hours:	7.00 am – 5.00 pm

Table 6 – Plant and equipment

Type	Weight	Fitted fire protection systems, i.e. fire extinguisher type
5 x Grader	15T	Dry powder extinguisher
3 x Dozer	30T	Dry powder extinguisher
5 x excavator	25T	Dry powder extinguisher
7 x roller	12T	Dry powder extinguisher
8 x Articulated dump truck	32T	Dry powder extinguisher, Fire suppression system
3 x Articulated water cart	32T	Dry powder extinguisher, Fire suppression system, water cannon
Franna crane	24T	Dry powder extinguisher
Cranes	4x 150T, 1x 500T, 2x 750T (rated lifting capacity)	Dry powder extinguisher
80X Light vehicles	1.5T	Dry powder extinguisher, water extinguisher
30x Generators	1T	Dry powder extinguisher

Table 7 – Fire Brigade

Responding fire brigades	Career / volunteer	Distance from site entry gate (approximate)	Primary / support	Appliances / equipment
Yambuk	Volunteer	4km	Primary	1 x tanker, 1 x ute
Toolong	Volunteer	13km	Secondary	1 x tanker,
St Helen	Volunteer	5km	Secondary	1 x tanker,

Table 8 – Building details

Building Type	Floor area m ²	Construction type – i.e. relocatable	Fire protection systems – i.e. fire extinguisher type
Wind farm control room	50m ²	Prefab metal	• Dry powder extinguishers • Automated fire suppression system
Substation switching room	50m ²	Prefab metal	• Dry powder extinguishers • Automated fire suppression system
Site demountables	600m ²	Prefab metal	• Dry powder extinguishers

Table 9 – Dangerous Goods

Type	Class	Quantities	Storage area	Fire protection
Diesel	C1	500 Litres	Generator Fuel Pod & Hazardous Chemical Container	Dry powder extinguisher 4.5KG and Elide Fireball Extinguisher within HazChem Container
Unleaded	3	100 Litres	HazChem Container	Dry powder extinguisher 4.5KG and Elide Fireball Extinguisher within HazChem Container
Marker Paint	2	150 Cans	HazChem Container	Dry powder extinguisher 4.5KG and Elide Fireball Extinguisher within HazChem Container
Hand Sanitiser	3	100 Litres	HazChem Container, Toilet Block & Compound	Dry powder extinguisher 4.5KG and Elide Fireball Extinguisher within HazChem

Risk assessment methodology

The method used in this Assessment is based on the National *Emergency* Risk Assessment Guidelines (NERAG). A summary of the *risk* management principles, framework and process can be found in **Appendix A**.

Context

To conduct a fire *risk* assessment of all fire and other *emergency* related *hazards* and *risks* within the Site and determine the most practicable *risk* and evidence-based *fire protection system* and other mitigation controls to achieve an *acceptable level of risk*.

Risk Assessment

The Assessment process was based on the established *risk* context determined above and consisted of seven interrelated *risk* management phases, which are illustrated in **Appendix A**.

To assist with the *risk* assessment process and determining the most appropriate *fire protection systems*, other safety measures and treatments, *emergency* response procedures and standards, it is important to identify and analysis each of the main *risk* factors and their potential fire *hazards* and *risks*. This will help determine the appropriate *risk* and evidence-based mitigation treatments to achieve an *acceptable level* using *risk* and evidence-based *fire protection systems*, *safety measures* and *emergency* management procedures.

To achieve this end, there are 46 *risk* and evidence-based mitigation treatments which will be implemented.

Risk identification

The main *risk* factors identified include:

- Wind turbine / substation fires,
- *Bushfire*,
- Building – exposure to bushfire,
- *Dangerous Goods*, and
- Potential *ignition sources* – including plant and equipment, hot works and smoking.

Risk analysis and treatments

Wind turbine / substation fires

The *risk* of fire from wind turbines is presented by potentially malfunctioning turbine bearings, inadequate crankcases lubrication, cable damage during rotation, electrical shorting or arcing occurring in transmission and distribution facilities. These fires are typical of occurring at height, within the turbine itself. Temperature sensor and alarm systems including fire indicator panel, VESDA installation, smoke alarms and heat detectors are incorporated in the design of wind turbines (**refer Appendix I and J**); therefore, the control room is notified upon a fire being ignited and the appropriate response protocols activated including notifying the emergency services.

The on-site electrical substation also presents a *risk* of fire from malfunction or electrical shorting occurring in transmission and distribution facilities. Similarly, alarm systems will be commissioned to provide early warning of the ignition of a fire. The substation will also be equipped with high quality components, surge protection and other mechanisms to prevent fires (isolation equipment etc).

Additional *fire protection systems* will include:

- Internal *fire protection systems*, where appropriate, installed at the wind energy facility.
- Lightning protection devices, where appropriate, installed at the wind energy facility.

- Dedicated monitoring systems within each wind turbine that detect temperatures increases in turbines and then shuts down when threshold temperature is reached.
- Construction of the wind farm energy facility outside the *fire danger period* where possible.
- A program of training of CFA volunteers and Fire Rescue Victoria (**FRV**) personal in fire suppression in and around the wind energy facility.

Refer **Appendix I and J** for the fire indication panel schematic to be used at the Site and Fire Alarm Control Panel – Installation, Commissioning and Operations Manual.

Bushfire

Vegetation profile and topography

The vegetation within and around the Site is agriculture (grazing). The dominant vegetation is exotic pastures and grasses. There is remnant vegetation along creek beds and road reserves. . Agroforestry is also common to the northwest of the Site, refer to NVP (prepared by Nature Advisory December 2020) for more detail on native vegetation assessment.

The Site is undulating with rocky knolls, swampy areas, and flat pastures. The Site generally slopes from northeast to southwest from 46m AHD to 16m AHD. The topography of the region shows a gradual drop in elevation from north to south towards the ocean with little topographical relief (with the exception of a few isolated areas) within the Site and therefore the direct effect of slope and aspect on fire behaviour would be negligible.

At the time of an inspection on the 8th October 2020, all the paddocks were lush green due to above average rainfall across the district, with an average fuel load across the landscape of around 5 tonnes per hectare.

The grazing pastures are mainly perennial grasses with some isolated native trees which are indigenous located sparsely across the landscape. The grazed pastures (i.e. exotic pastures and grasses) would have an approximate heat yield of between 13,700 and 13,900 kJ/kg during the *fire danger period* using a moisture content of 10 with a fuel load of between 2 and 5 tonnes per hectare (t/ha) depending on the time of year.

Surrounding road network

The following is a list of main roads (not including internal tracks) surrounding and within the Site, including the road plus gravel edge width, to assist with determining their suitability for use as fire breaks:

- Youis Rd – 4m wide bitumen.,
- Robertson Rd - 4m wide dirt.
- Fingerboard Rd and Smitten Rd - 4m wide bitumen.
- Riversdale Rd – 3m dirt.
- Hamilton – Part Fairy Rd - 6m wide bitumen.

All road reserves comprise predominantly native grasses with varying vegetation profiles in terms of structure and fuel loads. There are isolated trees along some parts of the road reserve.

Note: Road width and vegetation profile of road reserve is important to determine the type of methods which could be used to manage roadside fuel structure and loads. These methods could include ploughing mineral fire breaks and/or burning parallel to the road edge to increase road (fire break) width and/or road reserve slashing to modify fuel profile to reduce fire behaviour.

Roadside slashing would only be suitable for roads with a minimum width of 5m, refer response below regarding fire break performance.

It is also important to note the internal 5m tracks will provide a network of fire breaks to support existing roads across and within the Site footprint to assist grassfire management strategies and tactics by either stopping or reducing the *forward rate of spread*.

Bushfire prevention

Bushfire prevention is defined as strategies and tactics directed towards the prevention and suppression of *bushfires* within the skills, training and capabilities of employees working at the wind farm during the declared *fire danger period*.

A goal of *bushfire* prevention is to educate windfarm employees to take precautions to prevent potentially harmful *bushfires*, have readiness strategies in place so they are prepared in case of a *bushfire* and response tactics if a *bushfire* occurs from within or external to the windfarm to ensure their safety and wellbeing.

An important fire prevention strategy is to have an *emergency* management structure and planning process in place which is provided in **Appendix B**. This will ensure *bushfire* prevention, readiness and response strategies / tactics are continually tested through exercises, training and improvements made from lessons learnt. The result is windfarm employees working together effectively as possible to contribute towards achieving a safe workplace.

Bushfire prevention also involves providing firefighting capability to responding fire brigades which have a regulatory responsibility (section 20 under the CFA Act 1958) for the prevention and suppression of fire and for the protection of life and property in case of fire in the country area of Victoria. To assist the fire brigades to achieve these statutory obligations, the windfarm has provided, where *practicable*, CFA's preferred safety measures as detailed in their Guidelines which have been listed below.

Bushfire Prevention and readiness works

The following *bushfire* prevention and readiness conditions will be implemented.

Road widths and design to allow safe access and egress

1. All internal tracks will be minimum 5m width and used as fuel breaks to achieve a 90% probability of stopping a fire based on CSIRO Grass fire research into the performance of fire breaks, refer **Appendix E**. The 4m external and internal roads listed will achieve a 70% probability of stopping a fire.
2. To improve the performance of the road networks as a fire break within and around the Site, a roadside slashing program of 6m slashing or burning of 6m from the road pavement on the Site side will be undertaken prior to each *fire danger period*.
3. As detailed above, constructed access tracks to wind turbines will be minimum of 5 metres trafficable width providing both a 90% probability of stopping a grass fire or significantly reducing *its forward rate of spread*, with a 4 metre vertical clearance for the width of the formed track to allow fire brigade access.
4. Roads will be constructed to a standard so that they are accessible in all weather conditions and capable of accommodating a vehicle of 15 tonnes for the for the trafficable road width. **Note – the road network will be constructed to be fit for purpose for over-dimensional vehicles with axle loadings up to 20T/axle.**
5. The average grade will be no more than 1 in 7 (14.4%) (8.1°) with a maximum of no more than 1 in 8 (12.5%). **Note – the landscape is mainly flat with some low-lying undulation and therefore below the required average road grade.**
6. Dips in the road will also have no more than a 1 in 8 (12.5%) (7.1°) entry and exit angle. **Note - all entry and exits will be relatively flat.**
7. During the fire danger period the grazing paddocks are vehicular accessible.

Fuel / vegetation management

8. It is assumed that under the landowners current practice, all grazing paddocks within the windfarm footprint will continue to be grazed by either cows or sheep to assist with reducing grass fuel loads.
9. Grass will be no more than 100mm in height and leaf litter no more than 10mm deep for a distance of 30m around constructed buildings and viewing platform. **Note – In addition to this condition, all unnecessary fuel and combustible materials around buildings, storage containers, will be managed (i.e. grass is cut (100mm)), overgrown vegetation trimmed, fine fuels / leaf litter removed when more than 10mm deep, rubbish is disposed, etc) and maintained to a minimum distance of 4 metres.**
10. A fuel reduced area of 10 metres will be maintained around the perimeter of electricity compounds and substation type facilities. **Note - In addition to this condition, all unnecessary fuel and combustible materials around electricity compounds and substations will be managed (i.e. grass is cut (100mm), overgrown vegetation trimmed, fine fuels / leaf litter removed when more than 10mm deep, rubbish is disposed, etc) and maintained to a minimum distance of 4 metres.**
11. There will be no long grass or deep leaf litter in areas where plant and heavy equipment will be working. **Note – plant and equipment will be restricted to travel and work from roads and crane pads which will be 36metres x 36metres and the following fire protection systems will be provided:**
 - a. Ensure the exhaust of all vehicles likely to be driven near or in contact with any vegetation, passes through a silencing device / spark arrestor and are carrying a 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A;
 - b. All plant and heavy equipment will be accompanied by a vehicle carrying minimum 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A and must remain in the vicinity of any operating machinery at all times.

Firefighting water supply

12. Water access points shall be located in safe easily identifiable areas, accessible in all weather conditions and kept clear at all times.
13. Water access points will be designed, constructed and maintained for a load limit of at least 15 tonnes. **Note – the road network which includes water access points will be constructed to be fit for purpose for over-dimensional vehicles with axle loadings up to 20T/axle.**
14. A turning point with a minimum radius of 12 metres will be provided for fire appliances at all water access points.
15. Fire brigade will be able to park within 4 metres of the water supply outlet on a hard-standing area.
16. Two bulk static above ground water storages (45,000 Litres) will be provided at strategic locations on main tracks to allow optimum coverage, easy access and will be capable of being refilled manually within 24hours and have external water level indicators installed. **Note - a single 45,000L water tank can supply 20 x 2200L firefighting tankers or 4 x strike teams (5 x tankers). This is important when considering the location of water tanks to support firefighting tactics during a grass fire. Using a scenario of grassfire with a fire danger rating of 70 (Extreme) burning under the influence of a wind speed of 40km/h, the forward rate of spread in grazed pasture conditions would be 10km/h or 5.5km/h with**

a wind speed of 20km/h¹. If we assume a hard suction hose is attach to a bulk water tank and it takes 6 minutes to attach the hose, fill the tanker and detach the hose is 6 minutes (average), it will take 30minutes to fill a strike team. During this time the fire would have travelled 5km or 2.5 km respectively depending on the wind speed.

17. All tanks will be manufactured with at least one (preferably 2) 150mm full bore isolation valve equipped with a Storz connection, sized to comply with the required suction hydraulic performance. A 65mm Storz adapter with a matching cap is required .
18. Water access are to be marked by appropriate signage as per CFA's Guidelines for identification of street hydrants for firefighting purposes.

Building fires

The Site is not within a Bushfire Management Overlay nor declared Designated Bushfire Prone Area and therefore all buildings will be constructed to the National Construction Code for their Classification. However, the following *bushfire* protection measures will be implemented around all buildings and Site infrastructure:

19. Grass will be no more than 100mm in height and leaf litter no more than 10mm deep for a distance of 30m around constructed buildings and viewing platform.
20. No trees, bushes or shrubs will be planted within 10m of a building and viewing platform,
21. A fuel reduced area of 10 metres will be maintained around the perimeter of electricity compounds and substation type facilities.

Dangerous goods

Fuel storage facilities will be established in accordance with the requirements of AS1940 – 2017: The storage and handling of flammable and combustible liquids, and the storage of explosives on-site will be in accordance with AS 2187.1 – 1998: Explosive – storage, transport and use, Part 1 – Storage. In addition to meeting the requirements of both standards, the following controls will also be achieved:

22. 1 x 9kg dry chemical fire extinguishers (minimum rating: 2A 60B(E)) will be installed in close proximity of the outside hydrocarbons and *hazardous* substances storage and handling area,
23. All activities involving the handling, storage, use, and disposal of hydrocarbons and *hazardous* substances will comply with the EPA Liquid Storage and Handling Guidelines, Publication 1698, 2018, EPA, Environmental Guidelines for Major Construction Sites, Publication 480, 1995, OH&S Act 2004, the OH&S Regulations 2017, Chapter 4 – Hazardous Substances and Materials and the Dangerous Goods (Storage and Handling) Regulations 2012.
24. Storage areas will be bunded according to Victorian EPA Bunding Guidelines 2015, and EPA Environmental Guidelines for Major Construction Sites, Publication 480, 1995, EPA Construction Techniques for Sediment and Pollution Control, Publication 275 (1991). This would include creating an impermeable base to the bunded area and bund storage capacity equal to the capacity of the largest storage container plus 10%.
25. Storage areas, including waste storage areas, will be sign posted.
26. A hydrocarbon and *hazardous* chemical spill kit will be maintained and located as close as possible to designated maintenance, refueling and *hazardous* substance storage areas.

¹ CSIRO Grassland Fire Spread Meter.

27. All Site employees will be trained in the hydrocarbon/*hazardous* substance spill response process, as illustrated in the flowchart in **Appendix G**, to ensure the most efficient deployment of the spill response.
28. A register of all hydrocarbon and *hazardous* substances utilised on-site will be kept with a file of *Safety Data Sheets* (SDS) for all substances. All employees will be made aware of the location of these SDS.
29. CFA will be notified on the arrival and departure of explosives at the Site during the construction period.

Potential *ignition sources* – including plant and equipment, hot works, smoking poor housekeeping.

The following *risk* treatments will be implemented to minimise the *risk of ignition sources* during construction and ongoing Site testing and maintenance:

Plant and heavy equipment

30. 1 x 4.5kg dry chemical portable fire extinguishers will be fitted to all mobile plant,
31. All plant and heavy equipment will be accompanied by a vehicle carrying minimum 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A and must remain in the vicinity of any operating machinery at all times. This will be particularly important during the *fire danger period* as it may be a requirement under section 50 of the CFA Act, refer **Appendix E**.
32. The Site will use a Maintenance Management System to provide computerised maintenance designed to manage plant and equipment. This will include all maintenance requirements, preventive maintenance, safety inspection schedules, training etc,
33. Introduce written policy and procedures for the safe operation of mobile plant near vegetation and *combustible materials* during the *fire danger period*,
34. Check of all plant and equipment prior to use / operation with an exhaust system to ensure it is operating correctly and is clear of any build-up of particulate matter, vegetation etc near engine manifolds, exhaust pipes etc.

Hot works and smoking

35. All hot work e.g. open flame work such as welding, cutting and grinding shall not commence unless authority has been given by the Designated Supervisor. A “Hot Work Permit” will be completed prior to commencement of any work and will remain current for 24 hours only’,
36. No external cutting, welding, grinding or any other hot works that emits a spark or flame during a day of total fire ban or during days when the fire danger rating is Extreme or above or during windy weather conditions outside the *fire danger period*,
37. No smoking other than in designated areas and suitable steel container for disposing of cigarette butts will be provided.
38. As part of Sites monitor, review and continuous improvement processes, after a fire or incident, it be immediately investigated by a qualified person, an event summary report completed, and immediate action taken to prevent a repeat.

Fire danger permits

39. Whilst there will be no welding, cutting or grinding in the open air on a day of Total Fire Ban, if there are critical operational requirements which demands hot works to be undertaken on such a day, these works will not be undertaken until a CFA Section 40 permit has been issued by the CFA District 5 Headquarters – 5551 1500.

House keeping

40. The Site will be regularly cleared of all empty *DGs* containers and other *hazardous* materials / substances no longer used or required to keep overall Site fuel loads to a minimum,
41. The Site will have a house keeping policy and procedures that all employees must ensure their allocated work area is maintained in a clean state prior to ending their shift and Site management will undertake a weekly safety inspection using a checklist to identify any poor housekeeping issues to ensure the Site is maintained in a clean state and to prevent the accumulation of any potential unnecessary fuel loads or other *hazards* which could become an *ignition source*,
42. The weekly inspection will include, during the *fire danger period*, ensuring all mobile and static plant and equipment are being checked daily prior to the commencement of each shift to ensure there is no build-up of particulate matter near the engine manifolds and exhausts pipes,
43. The Site will have a policy that all visitors must be escorted by a Site employee to ensure their safety and the safety of the Site.

Site familiarisation and training invitation for CFA, Ambulance Victoria, Moyne Shire Council MEMPC and Victoria Police.

44. Prior to or within 3 months after the commencement of the operation of the Site, an invitation will be made to the Country Fire Authority, Ambulance Victoria, Moyne Shire Council's Municipal Emergency Management Committee and Victoria Police to participate in a familiarization visit to the Site and explanation of *emergency* service procedures,
45. Subsequent familiarization sessions for new personnel of those organisations listed above will be provided upon request and/or as deemed necessary of Site management, and
46. If requested, training will be provided to CFA personnel in relation to suppression of wind energy facility fires.

Monitor and review

The nature of *emergency*-related *risk* can change over time. This includes shifting of organisational priorities and work practices, perception and culture. As a result, the *risk* assessment will be updated regularly during construction to ensure it is current, and the *risk* treatments remain relevant.

The monitoring and review process will be undertaken annually and include checking the effectiveness of mitigation and treatments and be documented as part of reporting the organisational *risk* management plan, including:

- physical inspections including mobile and static plant and equipment, electrical equipment, housekeeping to ensure the Site is maintained in a clean state, *fire protection systems* are in place and in working order, employees training and exercises are regularly undertaken, etc
- ensuring the mitigation treatments are operating effectively and always looking for opportunities for continuous improvements,
- ensuring the best and most up-to-date available information is used as evidence for the likelihood, consequence and confidence levels, this should include the outcomes from fire and *emergency* management training and exercising,
- incorporating information from *emergency* events that may have occurred since the last *risk* assessment,
- accounting for changes in the context of the *risk* assessment, and
- identifying and accounting for emerging *risks*.

To achieve the monitoring and review process, this BP&ERP will be reviewed annually until all construction works are completed to assess and plans effectiveness of each *risk* treatment listed. This could be done through a safety audit which will include a fire and emergency exercise based on

credible scenarios using the BP&ERP. This approach would also assist with re-evaluating the consequence's and likelihood of the identified fire *hazards* as part of the continuous improvement process.

Within 6 months of the construction phase coming to an end, this BP&ERP will be fully reviewed and transition to reflect the normal operations of a windfarm when commissioning is completed. This review process will include input from both CFA and Moyne Shire Council to ensure it meets their expectations and will be endorsed by Moyne Shire Council under the planning permit prior to coming into operation.

This will be endorsed by DELWP and Moyne Shire will be responsible for administration and endorsement of the permit and associated endorsed plans.

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POLICY AIM AND AUTHORITY

POLICY FOR EMERGENCIES

The management of the Ryan Corner Windfarm have commissioned the production of this Bushfire Prevention & Emergency Response Plan (BP&ERP) as part of our commitment to the health, safety and well-being of all staff, contractors and persons who enter the Ryan Corner Windfarm for any legitimate purpose and for the welfare and general good of the surrounding community and environment.

AIM OF THIS PLAN

The aim of this plan is to reduce the potential for loss or injury to life, property and the environment which could occur at the windfarm and adjoining properties. The plan is based on the application of sound *risk* management principles and using *risk* and evidence-based *bushfire* and other *emergency* procedures that have been approved by Ryan Corner Windfarm management supported by *fire protection systems* and training as part of the windfarms development and ongoing management.

The plan will be reviewed annually by the windfarm *emergency* management committee or as additional *bushfire* and other *emergency risk* mitigation treatments are implemented to ensure relevance, and so all employees and contractors are both comfortable and informed on their respective roles and responsibilities during an *emergency*.

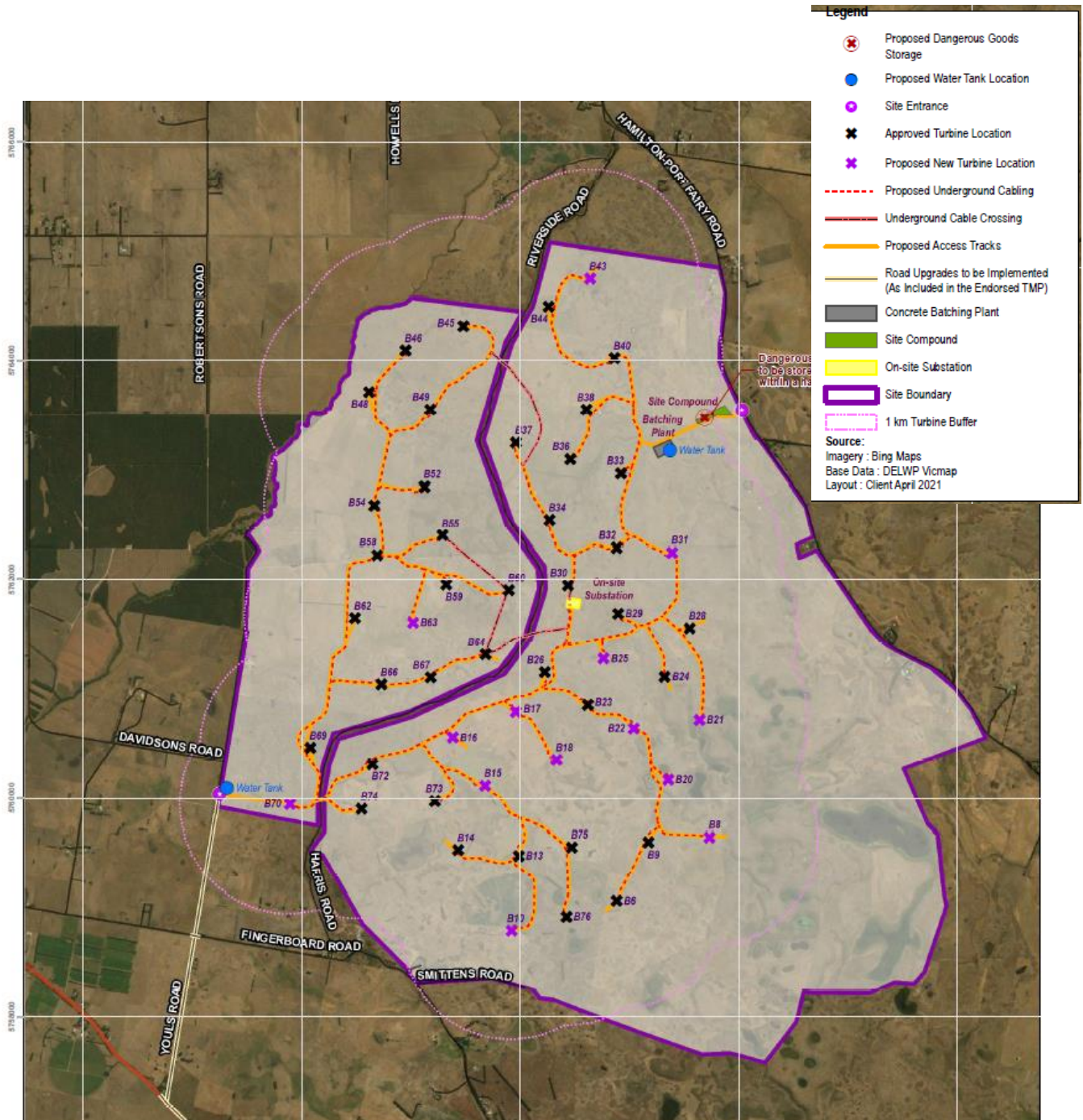
RYAN CORNER WINDFARM MANAGEMENT APPROVAL

This BP&ERP is a subplan of the Ryan Corner Windfarm Environmental Plan and is consistent with Ryan Corner Windfarm occupational health and safety policy and overall windfarm Site management plan and has been developed with the assistance off a person qualified and experienced in fire and *emergency* management.

Authorised by:

Implementation date:

Windfarm Site Plan



Emergency Contact Numbers

Fire Brigade	000
Police	000
Ambulance	000
State Emergency Service (Storms etc)	000
Worksafe Victoria (Hotline)	13 23 60
Vic Roads – Report a Hazards (24 hours)	131 174
Powercor (24 hours)	13 24 12
Animal Welfare (Wildlife Victoria)	1300 094 535
Moyne Health Services – Port Fairy	03 5568 0100
Moyne Shire Council	0428 669 119

Non-Emergency Contact Numbers

Yambuk Fire Brigade (CFA)	(BH) 5568 4328
CFA District 5 Headquarters	5551 1500

Emergency Response Team Mobile Numbers – To be finalised at a later date prior to works commencing

Name	Company	Ph.
Javier Reguera	On behalf of Global Power Generation Australia	0410 483 631
Daniel Cullen	On behalf of Global Power Generation Australia	0466 548 257
Corey Briffa	BMD Constructions	0427 577 690
Matt Smith	BMD Constructions	0417 613 612
Steve Drefke	Consolidated Power Projects	0437 900 029

IMPORTANT NOTE

- This BP&ERP uses defined terms which are shown in *italic* and their definition can be found in Section 3.
- Appendix B provides information on the Emergency Management Committee, Emergency Response Team and their responsibilities' in relation to *bushfire*.
- Appendix C provides information on employees training and exercising requirements.
- Appendix D provides information of Fire Danger Ratings and potential

1 Responsibilities of the *Emergency Controller*

Prevention, Readiness and Response Responsibilities

It is the responsibility of the *emergency controller* to ensure all of the following duties are undertaken. The *emergency controller* can delegate some or all his/her roles and responsibilities to a *deputy emergency controller* as required.

1.1 PREVENTION

During the *fire danger period*

- Ensure all flammable and combustible liquids are safely stored to prevent accidental spillage, vapour escape, rupture and are well away from potential *ignition sources*. Treat empty flammable / combustible liquid storage containers as full;
- Ensure there is an up to date *DG* manifest available at the Site office and at the main storage area and *Safety Data Sheet (SDS)* for each dangerous good being stored and handled on Site.
- Dispose of any unused or excess *hazardous substances*, and ensure incompatible *hazardous substances* are stored separately to prevent accidental mixing;
- Ensure the correct type of fire extinguisher (minimum 4.5kg dry chemical) for flammable / combustible liquids and *hazardous substances* are installed and easily accessible;
- Implement and monitor the Site's no smoking policy except in designated areas;
- Ensure no welding, grinding or other hot works that could emit a spark or flame is undertaken unless it is clear of all flammable / combustible liquids, *hazardous substances*, *combustible material* and there is a minimum of 2 x 9 litres stored water extinguishers or other suitable firefighting equipment available, i.e. water tanker or firefighting trailer;
- Ensure unnecessary fuel and *combustible materials* within the windfarm and around buildings, storage containers, electricity compounds and substations are managed (i.e. grass is cut (100mm), overgrown vegetation trimmed, fine fuels / leaf litter removed when more than 10mm deep, rubbish is disposed, etc) and maintained to a minimum distance of 4 metres;
- Ensure the exhaust of all vehicles likely to be driven near or in contact with any vegetation, passes through a silencing device / spark arrestor and are carrying a 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A;
- Ensure all plant and heavy equipment will be accompanied by a vehicle carrying minimum 1 x 9 litre water stored pressure fire extinguisher with a minimum rating of 3A and must remain in the vicinity of any operating machinery at all times;
- Ensure a monthly safety inspection of all plant and equipment to ensure there are no faults or mechanical defects and the silencing device / spark arrestor is working efficiently;
- Ensure lightning protection devices are installed where required and are regularly inspected and maintained.

- Ensure no welding, grinding or other hot works that could emit a spark or flame is undertaken unless the following controls are in place:
 - No hot works on days of Severe or above grass fire danger rating at the windfarm,
 - Hot works will be undertaken on non-combustible surfaces (mineral earth, crushed rock, concrete pads, etc.
 - Minimum 2 x 9L water fire extinguishers are at hand for immediate use,
 - A hot works permit has been issued with the above prescription before work commences.
- Conduct weekly inspections to identify any poor housekeeping issues to ensure all 36m x 36m crane pad areas (*bushfire protection area*) and around all Site buildings, storage containers etc are maintained in a clean state as much as *practicable* to prevent the accumulation of *combustible materials*, vegetation or other *hazards*, i.e. *hazardous substances*.
- Provide administrative support and awareness by including fire brigade burning notices within the windfarm weekly newsletter to the community.

1.2 READINESS

During the *fire danger period*

- Install an *emergency* information container which is painted red and marked 'EMERGENCY INFORMATION' in white contrasting lettering not less than 25mm high at all main access points installed at a height of 1.2m – 1.5m. Ensure the containers has a Site plan and up to date *DGs* manifest and SDS's;
- Ensure the windfarm *emergency* warning system (i.e. UHF/CB radio system is working and tested regularly as determined by the *emergency controller*;
- Ensure all portable fire extinguishers installed around Site offices, storage containers etc are in place, easily accessible and checked monthly to ensure they are in working order, i.e. check extinguisher body and hose for damage, pressure gauge etc;
- Ensure all static fire water tanks for firefighting are full at all times, are easily accessible and CFA connections valves are regularly checked and maintained;
- Ensure water access point signage is in place and easily visible;
- Ensure CFA has a map with the location of all fire water tanks and their access tracks;
- Ensure the BP&ERP always remains accessible to *deputy emergency controllers* and Emergency Response Team (ERT) members;
- Ensure all employees are aware of *emergency* procedures, and participate in training and exercise drills at least yearly and preferable prior to each *fire danger period*;
- Ensure all ERT, staff, and contractors are trained in the use of all *fire protection systems* available at the windfarm and on their roles and responsibilities in the operation of this BP&ERP;
- Ensure the *bushfire protection area* / safe assembly points are checked for any deficiencies, this includes ensuring the area is clear of any *combustible material*, *hazardous substances* etc,
- Ask all employees and contractors to download the Vic Emergency App on their phones and set them to receive all *bushfire* warnings and severe weather events in the area;
- Maintain written records of all testing, maintenance, training and exercising etc.
- Continually monitor the 4-day FDR for planning purposes, refer **Appendix D** for FDR's and potential fire behaviour.
- When the FDR is going to reach or has reached 'Severe' or above, broadcast it over the UHF/CB radio network at least the day prior for planning purposes and again on the morning (same time each day) as determined by the *emergency controller*,
- Implement a heightened fire awareness of all ERT members, employees and contractors during 'Severe' and above FDR to ensure they strictly adhere to all fire prevention and readiness requirements and have increased vigilance to prevent fire, to constantly look for fires and are clear on their delegated response role;
- Ensure a defendable space to a minimum distance of 10m is established and maintained around all Site buildings, storage containers, static plant and equipment etc.
- Ensure all cars, trucks and mobile plant are located on a mineral earth parking area, with no *combustible material* within a minimum distance of 1m.
- On days of fire danger ratings of severe and above, provide advice to the local fire brigade captain of the location of work Site location / locations for that day the night before.
- Liaise with the local fire brigade prior to each *fire danger period* to discuss the windfarms evacuation strategy and response protocols to get their input and advice and to provide situational awareness.

1.3 RESPONSE

BUSHFIRE EMERGENCY

Emergency controller or in his/her absence, deputy emergency controller:

- Ensure the health and safety of all staff, contractors and visitors at the windfarm;
- Evacuate all staff, contractors and visitors to the safe assembly point if time permits;
- If time does not permit, ensure all employees and contractors working in the area or in the path of the *bushfire* are instructed to evacuate to their nearest *bushfire protection area*, or well clear of the windfarm to a safe location that is not in the path of the fire,
- Ensure the fire brigade have been notified;
- Ascertain the location and size of the *bushfire* by conducting a *dynamic risk assessment*;
- Ensure a role call is immediately taken at the assembly point and at the *bushfire protection area* using the UHF/CB radio network;
- If required, delegate roles and responsibilities to *deputy emergency controllers*, ERT members and trained employees and contractors to protect the assembly point, *exposures*, including Site buildings, storage containers etc;
- Coordinate all response activities based on relevant *bushfire* response procedures;
- If the *bushfire* is small and is within the capability of the ERT, and/or trained employees and contractors and there is sufficient fire firefighting equipment available (weight of attack), initiate fire response – ONLY IF SAFE TO DO SO;
- Ensure the fire brigade are met on arrival at the relevant windfarm Site point of entry, provide a quick briefing on the fire situation and potential *exposures* including the number of persons taking shelter at *bushfire protection area/s* and any other relevant information;
- If considered necessary and time permits, advise neighbouring properties of any *bushfire* within or could threaten the windfarm and may impact / affect their property;
- Ensure all ERT, trained employees and contractors, are dressed in the minimum protective clothing prior to undertaking any *bushfire* response roles including:
 - protective clothing made from natural fibres (cotton or wool) such as overalls or a long-sleeved cotton shirt and cotton trousers or jeans;
 - leather safety boots;
 - safety helmet;
 - cotton or leather gloves;
 - goggles or safety glasses; and
 - minimum P2 mask.

REMEMBER, PROTECTION OF LIFE IS THE FIRST PRIORITY

Note: in the event of a fire or other emergency on site, the Moyne Shire Council should be notified.

2 Emergency Response Procedures

2.1 MINOR FIRES / INCIDENTS – Including vehicle fires

1. Evacuate the immediate area;
2. Immediately report the fire / incident to the *emergency controller* or in his/her absence, *deputy emergency controller* via the UHF/CB radio network or mobile phone;
3. If required, call the **Fire Brigade on 000** and give the following information:
 - Name of person making call and the name of the windfarm;
 - Nearest access point to the fire; and
 - Type and size of the fire.
4. If there has been an injury requiring medical treatment, call for an **Ambulance on 000**;
5. *Emergency controller* or in his/her absence, *deputy emergency controller* immediately undertake a *dynamic risk assessment* and action the following:
 - determine the size of the fire and what material is involved and any *exposures*;
 - if required, remove any *exposures* well clear of the fire / incident;
 - identify the most appropriate extinguishing agent and procedures using the fire class table below to 'contain', 'control' and 'extinguish' the fire;
 - if safe to do so – task a trained employees member, contractor the ERT to 'contain', 'control' and 'extinguish' the fire / incident; and
 - if it is not safe to 'contain', 'control' and 'extinguish' the fire / incident, ensure the area remains evacuated and await the arrival for the fire brigade.

Fire Class	Examples of minor fires / incidents	Fire Response procedures
A	Ordinary combustible materials such as wood, cloth, paper, grass, scrub, rubber and plastics.	WATER FIRE EXTINGUISHER AND/OR WATER TANKER
B	Flammable and combustible liquids – fuel, oils, greases.	DRY CHEMICAL FIRE EXTINGUISHER
C	Flammable / combustible gases - LPGas cylinders, aerosol cans,	Attempt to turn off the cylinder if safe to do so and extinguish consequence fires based on the Class of fire. If it is not possible to turn off the gas cylinder – IMMEDIATELY EVACUATE THE AREA AND REFER TO PROCEDURES FOR LARGE FIRES. DO NOT EXTINGUISH THE FIRE.
D	Combustible metals – aluminium, magnesium.	IMMEDIATELY EVACUATE THE AREA. DO NOT ATTEMPT TO EXTINGUISH THE FIRE.
E	Electrical – appliances, switchboards.	Switch off power or disconnect battery and extinguish consequence fires based on Class of fire. If power cannot be turned off, use DRY CHEMICAL FIRE EXTINGUISHER.

Minor fire / incidents command and control

6. *Emergency controller* or in his/her absence, *deputy emergency controller* direct all staff, contractors or ERT members and equipment in response to the fire / incident until the fire brigade arrives.

2.3 BUSHFIRE

1. Immediately report the fire to *emergency controller* or in his/her absence, *deputy emergency controller* via the UHF/CB radio or mobile phone,
2. *Emergency controller* or *deputy emergency controller* ascertain the location and size of the *bushfire* by conducting a *dynamic risk assessment*;
3. *Dynamic risk assessment* must include:
 - The FDR of the day and potential fire behaviour – refer **Appendix D**,
 - Location of fire and direction of spread,
 - Determine potential *rate of spread* using CSIRO Grassland Fire Spread Meter,
 - If the *bushfire* is external, determine location and approximate distance from the windfarm, approximate time and point of impact, *rate of spread*, and potential *fire behaviour*,
 - Determine any potential exposures in the path of the *bushfire*, including staff, contractors, plant or equipment, safe assembly points, site offices, storage containers etc,
4. Ensure the fire brigade is called on **000** and give the following information:
 - Name of person making call,
 - Name of windfarm and nearest access point to the fire,
 - Bushfire situation including any threat to life and exposures,
 - Number of staff, contractors and visitors at the windfarm, and
 - Location of assembly points.
5. If required, *emergency controller* or *deputy emergency controller* notify all employees and contractors to immediately cease all work activities, put all *hazardous substances*, LPGas cylinders, welding equipment, portable plant and equipment etc inside a closed storage container, ensure all vehicles, mobile plant and equipment are parked on a cleared area with no *combustible material* within 6m (only if safe to do so) and then immediately evacuate to the assembly point if time permits and do a roll call.
6. If there is not enough time to evacuate all employees and contractors to an assembly point, instruct those working in the area or path of the *bushfire* to go to the nearest *bushfire protection area* and to position their vehicle / plant at the safest part of the protection area to minimise exposure to the *radiant heat* and smoke and remain inside their vehicle / plant with the engine running and air conditioning operating. Once the *fire front* has passed, immediately make their way to the safe assembly point and notify *emergency controller* or *deputy emergency controller*.
7. If it is not possible to safely reach a *bushfire protection area* instruct the relevant employees and/or contractors to travel away from the fire and provide direction so as they are moving away from the fire path of travel.
8. If there is enough time and ERT members / trained employees are available before the *bushfire* impacts the windfarm, the following readiness options should be considered:
 - Strategically position water tankers and/or firefight trailer around the assembly point where the fire is likely to impact and to protect *exposures*.
8. *Emergency controller* or *deputy emergency controller* direct all staff, contractors and equipment and after the passage of the *fire front*, continually monitor the whole windfarm and surrounding area for at least 4 hours.

Note: Methods to assist with a *dynamic risk assessment* include:

- Listening to local ABC radio,
- Monitoring the Vic Emergency App,
- Visiting the Vic Emergency Web: www.emergency.vic.gov.au,
- Own observations and local weather conditions to determine wind speed and direction, smell of smoke and smoke plume color, size and direction, is *bushfire* visible etc, and
- Training and experience.

2.6 DANGEROUS GOODS INCIDENT

1. Immediately evacuate the area to a safe area well clear of the incident and upwind;
2. **If there are any concerns the dangerous goods (i.e. explosives) involved could explode, react violently on the application of water or give off highly toxic smoke or gases, EVACUATE THE AREA and establish a 'No Go Impact Zone' of minimum 150 metres around the incident, ensuring all remaining employees / contractors stay up wind and behind a protective barrier i.e. plant or vehicle. No one enters the Zone and await the arrival of the fire brigade;**
3. Immediately report the incident to the *emergency controller* or in his/her absence, *deputy emergency controller* via the UHF/CB radio network or mobile phone;
4. If required, call the **Fire Brigade on 000** and give the following information:
 - Name of person making call and the name of the windfarm;
 - Nearest access point to the fire; and
 - Type and size of the fire.
3. If there has been an injury requiring medical treatment, call for an **Ambulance on 000** and refer to *safety data sheet (SDS)* for treatment information;
4. No one must be allowed to enter the affected area until the *emergency controller* or in his/her absence, *deputy emergency controller* has attended the incident and undertaken a *dynamic risk assessment* to determine / action the following:
 - ensure all untrained staff, contractors have been evacuated to a safe area well clear of the incident and up wind;
 - identify the type of material, size and seriousness of the dangerous goods involved and extent of the spill, leak or fire;
 - assess its toxicity, flammability, health effects, and the personal protection required by reviewing the *SDS*;
 - if the incident involves a leak, spill or fire, review relevant section of the *SDS* to determine how to 'contain', 'control' or 'extinguish' a fire;
 - assess current external weather conditions and potential to affect the incident, i.e. wind direction and speed, potential for rain;
 - identify any exposures including buildings, plant and equipment, etc;
 - identify any potential ignition sources including plant and equipment, electrical equipment, lighting, etc;
 - remove all potential ignition sources – but only IF SAFE TO DO SO including:
 - turning off electric power to any buildings close, involved or under threat;
 - turning off electric power to any static plant, close, involved or under threat;
 - remove all other potential ignition sources; and
 - remove mobile plant / vehicle well clear of the area otherwise ensure they remain turned off.
 - determine and establish a 'No Go Impact Zone' which unauthorised persons and mobile plant / vehicles must not enter.
5. Determine the most appropriate and safest method to contain and control the spill, leak or fire, this should include, if safe to do so:
 - turn off any isolation valves, (eg oil, gas, fluid, etc);

- if the incident involves a spill of flammable / combustible liquid, stop the spread by creating a soil bund around the spill using hand tools;
 - if the incident is a small fire involving a flammable or combustible liquid, extinguish the fire using the extinguishing media detailed in the SDS.
6. The *emergency controller* or *deputy emergency controller* meet the fire brigade to advise where to go and provide a briefing on the current situation and request instructions on the further role of the ERT.

Mobile plant, vehicles, radios, pagers, mobile telephones and radios are ignition sources and MUST be kept clear of the 'No Go Impact Zone'.

Note No 1:

- It is very important that the *emergency controller* or *deputy emergency controller* establish a command point where he/she can see as much of the incident and surrounding area as possible and has direct telephone or radio communication with all ERT members and nearby mobile plant operators. It will also be important to keep site manager updated; and
- It will also be very important the *emergency controller* or *deputy emergency controller* does not become directly involved in the incident to ensure he/she maintains an over view of situation (situational awareness) and can deploy ERT and resources to where most needed and to ensure the 'No Go Impact Zone' remains isolated and all staff, contractors and visitors are well clear and up wind.

Section 3 - Definitions

Acceptable level of risk - for the purpose of this BP&ERP, '*acceptable level of risk*' is defined as; 'the level of human and/or material injury or loss from an industrial process that is considered tolerable by a community or authorities in view of social, regulation, economic and environmental cost benefit analysis.

Bushfire - a fire involving grass, scrub or forest.

Bushfire Protection Area – is each 36m x 36m pad crane area providing temporary protection from radiant heat and direct flame contact until the fire front passes. This will require person/s to position their vehicle / plant at the safest part of the protection area to minimise exposure to the radiant heat, smoke and remain within their vehicle / plant with the engine running and air conditioning on.

Combustible Material - any material that, in the form in which it is used under windfarm normal operational conditions or is part of the site landscape / environment including fine fuels, grass, scrub, tress and any other vegetation type that could ignite and burn.

Dangerous goods (DGs) - are substances capable of causing harm to people and property because of their *hazardous* properties. They may be corrosive, flammable, combustible, explosive, oxidising or water-reactive or have other *hazardous* properties.

Deputy Emergency Controller. Is delegated by the *emergency controller* some or all of his/her roles and responsibilities detailed within this BP&ERP.

Dynamic Risk Assessment – is a continuous mental process of identifying *hazards*, assessing *risk*, taking action to eliminate or reduce *risk*, monitoring and reviewing, in the rapidly changing circumstances of a bushfire.

Emergency – is 'an incident affecting one or more of the site offices or sites and includes fire, explosion, death or serious injury, interruption of the electricity network as a result of the project actions, damage to existing infrastructure, collapse of buildings, engulfment by soil or other material, major release of contaminants, riot or civil commotion and terrorist activities such as a bomb threat'.

Emergency controller – the project site manager or a member of employees nominated and authorised by project site manager to have fire and *emergency* management planning and operational responsibilities including but not limited to the management and implementation of sections 1.1 – prevention, 1.2 - readiness, and 1.3 - response of this BP&ERP.

Exposure – is *combustible material*, vegetation, vehicles, plant and equipment, site buildings and other structures, dangerous goods, LPGas cylinders, or any other element or material that if exposed to *radiant heat*, direct flame, could ignite, cause a fire, explosion, emit toxic gases etc

Fire Behaviour - The most important measure of *fire behaviour* is fire intensity and spread. Fire intensity represents the *radiant heat* energy released per meter of fire front (kW/m of fire) and the rate of spread horizontally and vertically.

Fire Danger Period - is a declared period by the fire services for each municipality when climate conditions and vegetation (grass scrub, forest etc) changes to the point that there exists an increased *risk* of ignition and difficulty of 'contain', 'control' or 'extinguish' during days of high temperature, low humidity and medium to strong winds.

Fire front - the part of a fire within which continuous flaming combustion is taking place. Unless otherwise specified, the fire front is assumed to be the leading edge of the fire perimeter. In ground fires, the fire front may be mainly smouldering combustion.

Fire protection system

In relation to premises, means the fire protection equipment and firefighting equipment used to combat or mitigate any fire *emergency* occurring at the premises.

Hazard - a source of potential harm.

Hazardous substances – is any biological, chemical, radiological or physical nature, will cause harm to humans, animals or the environment. This can be the result of its interaction with other factors or its own properties.

Ignition source - a source of energy sufficient to ignite a flammable atmosphere and includes:

- (a) a naked flame, exposed incandescent material, an electrical welding arc or a mechanical or static spark; and
- (b) any electrical or mechanical equipment that is not specifically designed to be used in a *hazardous* area.

Practicable – means practicable having regard to-

- the severity of the *hazard* or *risk* in question; and
- the state of the knowledge about that *hazard* or *risk* and any ways of removing or mitigating that *hazard* or *risk*; and
- the availability and suitability of ways to remove or mitigate that *hazard* or *risk*; and
- the cost of removing or mitigating that *hazard* or *risk*.

Rate of Spread – Is the expansion of the *bushfire* in all direction. Can be computed in km/h when the grass curing, temperature, relative humidity, wind speed and fuel weight is known. Grassfire rate of spread can be calculated using McArthur Grassland Fire Danger Meter Mk5. The meter is available for manual field operations on the following link
<https://gympieweather.com/mcarthur5.htm?inputbox1=&inputbox2=&inputbox3=&inputbox4=&inputbox5=&outputbox1=&outputbox2=&outputbox3=>

Radiant Heat – is the heat energy you feel from fire and travels in straight lines but not through solid objects such as wall and other similar barriers.

Risk - the chance of something happening that will have an impact on the objectives.

Safety data sheet (SDS) - a document which provides information on the identification, *hazards*, precautions for use and safe handling of a specific chemical product, and which complies with relevant legislation.

Appendices

Appendix A - Risk assessment methodology

Introduction

The method used in this Assessment is based on the National *Emergency Risk Assessment Guidelines (NERAG)* as it provides a contextualised *emergency-related risk* assessment method which is structured to align broadly with relevant sections of *ISO 31000:2018 Risk management guidelines*.

NERAG provides a method to contextualise, assess and manage *emergency risks* so that action can be taken, and good decisions made to minimise harm and loss through *risk* and evidence-based treatments and controls to an *acceptable level*.

NERAG's purpose is to support the achievement of objectives and to:

- create and protect value, and to improve performance and encourage innovation,
- provide a whole-of-society, rigorous, customisable, scalable, common approach to *emergency risk* assessments,
- facilitate the creation of a broad knowledge base of those *hazards* that have the potential to cause most harm,
- accounts for what is being done to mitigate the *risks* and take harm out of the system,
- improve the evidence base on *emergency risks* and associated varying levels of confidence in assessments².

This type of assessment method, within the established *risk* context, provides a holistic approach to integrating proposed *fire protection systems* with the development of an *Emergency Management Plan (EMP)*. These should be supported by a training program to feed into the fire prevention, preparedness and response continuum of the identified *hazards* and *risks* within the Assessment.

Initial and detailed *risk* assessment

NERAG can be used for both initial and detailed assessments of potential fire and other *emergency* events.

Initial assessment

Is used to identify and screen *risks* quickly and is usually based on qualitative methods and summary information at a broad scale. The intent is to broadly assist in prioritising the *hazards* and *risks* for the context of the *risk* assessment, and to focus on those *risks* where more detailed assessment is of most benefit.

Detailed assessment

Focuses on high-priority *risks* and *risks* where the potential for treatments has the greatest benefits. This involves a more detailed assessment, allocate a *risk* rating to guide the identification and implementation of *risk* treatments and controls.

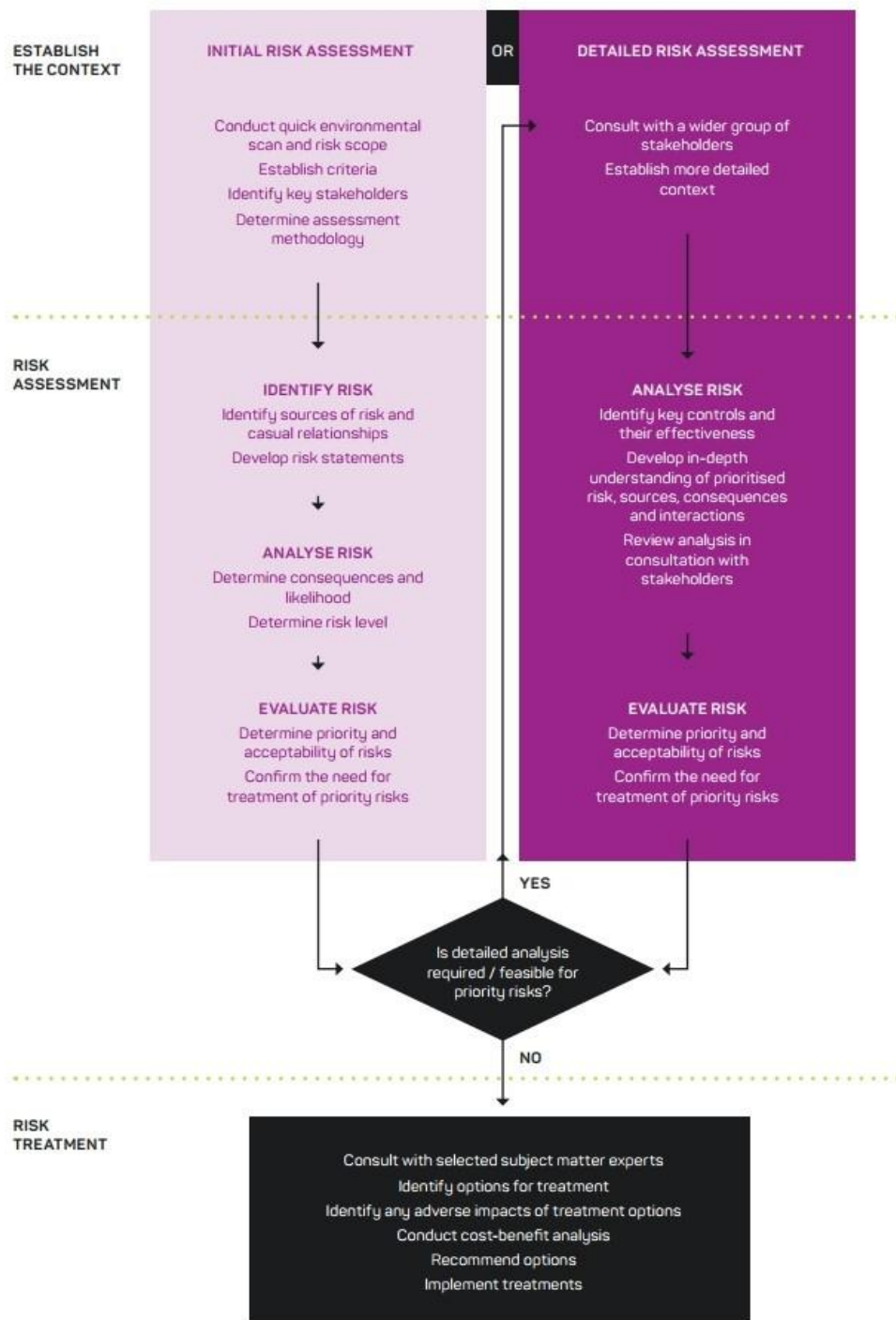
Figure 1 illustrates the two assessment pathways (initial and detailed) which has been used to guide the *risk* assessment process used for this project.

Assessment applied

For the purpose of this project, the detailed *risk* assessment pathway was used.

^{2 2} National Emergency Risk Assessment Guidelines: Second edition 2015 (updated 2020) – Page 2.

Figure 1.



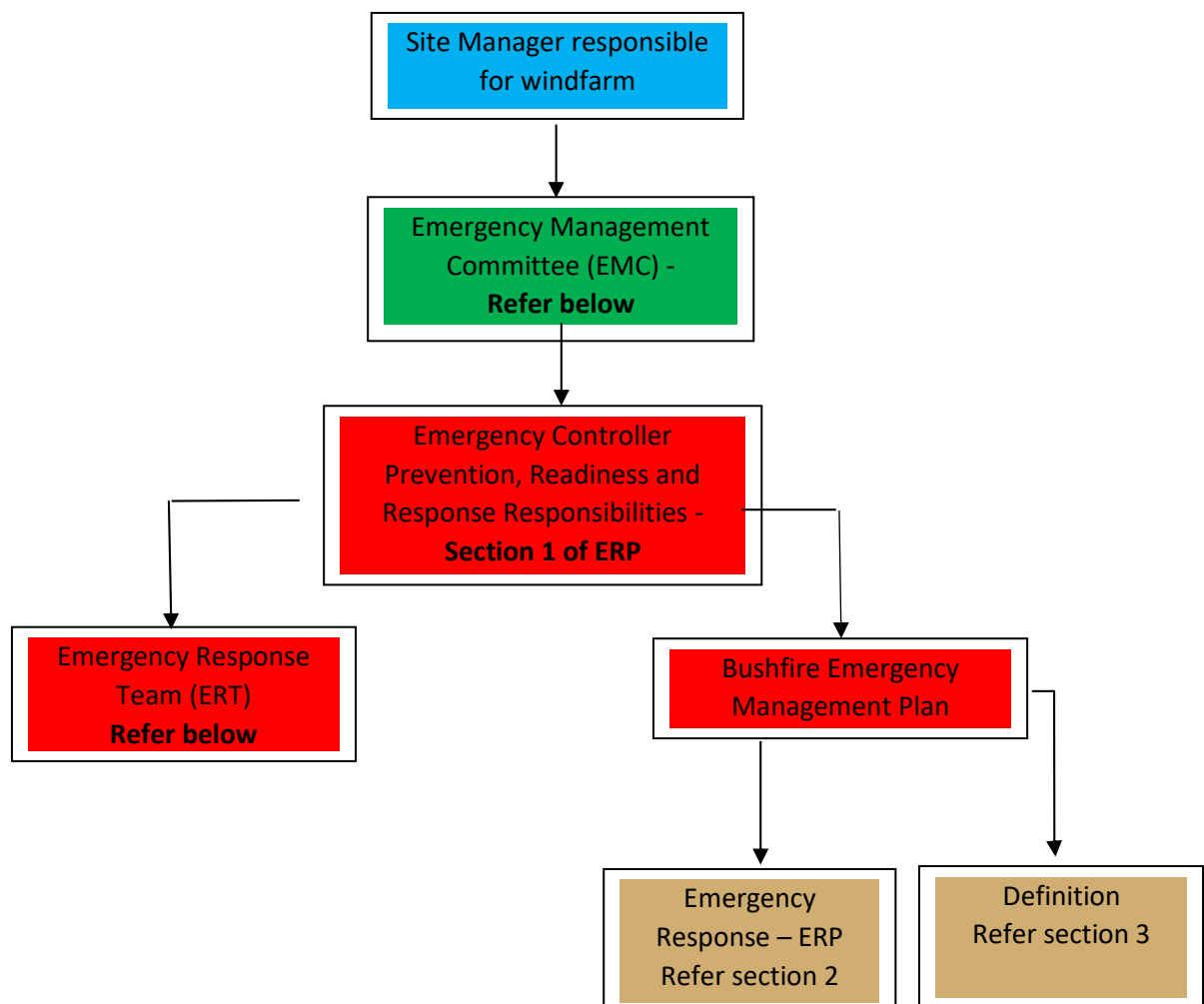
Appendix B - Emergency Management Planning

This section provides the structure and process required to achieve *risk* and evidence based BP&ERP across the prevention, readiness and response continuum for this windfarm.

Once the BP&ERP has been endorsed, it is important to ensure it is a CONTROLLED DOCUMENT and should not be copied for use by any persons. The use of unauthorised or improperly constructed versions can cause confusion during *emergencies* and result in administrative failure to update all copies of the plan within the windfarm.

Structure of Emergency Management

The structure below refers to the relevant sections within the BP&ERP and provides details regarding roles, responsibilities and administration.



Emergency Management Committee (EMC)

Forming of the EMC

The EMC shall be formed in accordance with the BP&ERP under the authority of the Site manager who has overall responsibility for the EMC which is charged with *bushfire* and other *emergency* prevention, preparedness and response at the windfarm.

The EMC membership will be staffed by project personal and reflect the level of *bushfire hazards* and *risks* at the Site and is charged with implementing this BP&ERP which, as previously mentioned, is a sub-plan of the Ryan Corner Windfarm Environmental Management Plan.

Responsibilities

The duties of the EMC in relation to *emergency* management shall include but not limited to the following:

1. Identifying credible events/scenarios that could reasonably cause a *bushfire* and other *emergencies*,
2. Be responsible for future development, review, implementation including testing and exercising of the BP&ERP,
3. Ensuring that resources and training are provided to enable the implementation of the BP&ERP, *fire protection systems* and procedure,
4. Ensuring the BP&ERP is readily identifiable and available to the appropriate person/s and agencies,
5. Establishing an *Emergency Response Team (ERT)* to operate in accordance with the BP&ERP,
6. Authorizing or having authorized the release and implementation of the BP&ERP,
7. The following shall apply to the implementation process:
 - a. Awareness of the *emergency* response procedures – information about the procedures shall be disseminated to all relevant staff, contractors and ERT,
 - b. Training – A formalised training schedule shall be developed, based on a training need and gap analysis by the EMC to ensure that *risk-based emergency* training and exercising is provided.
 - c. Training program - Shall be based on credible worst-case scenarios and should include components of *emergency* with a focus on *bushfire* prevention, readiness and response,
 - d. Review of procedures – The effect of the procedures on the windfarm shall be monitored by the EMC during the implementation process. Amendments shall be made to rectify any deficiencies or inaccuracies that are identified in the procedures.
8. Establishing ongoing arrangements and procedures to ensure the continuing operation of the ERT in the safest and most efficient way, i.e. to deal with resignation, holidays, etc,
9. Ensuring the register of ERT members is current and readily available,
10. Establishing strategies to ensure all visitors and temporary / short terms contractors are made aware of *bushfire* FDR and response procedures in the event of an *emergency*,
11. Ensuring *bushfire* and other *emergency* prevention, readiness and response procedures remain viable and effective by reviewing and testing the BP&ERP and response procedures prior to each *fire danger period*,
12. Ensuring the BP&ERP has a full and detailed review at the end of the validity period, after an *emergency*, an exercise, or any changes that affect the BP&ERP such as windfarm alterations, significant change of work practices, etc,

13. Ensuring that a permanent record of events for each *emergency* is compiled and retained,
14. Continually look to identify and rectify deficiencies and opportunities for continuous improvement in the BP&ERP as part of the ongoing site *risk* management monitor and review process.

EMC Meetings

The EMC shall meet as determined in the Ryan Corner Wind Farm Senior Manager. A record of EMC meetings shall be made and retained in accordance with BP&ERP policy and procedural requirements and provided to authorised agencies upon request, i.e. Work Safe, Moyne Shire Council and CFA.

NOTE: This may include minutes of meetings, communication, reports and specialist advice.

Emergency Response Team (ERT)

Forming of the ERT

An ERT shall be appointed by the EMC, provide direction and control of the implementation of the *emergency* response procedures under the direction of the *emergency controller* or his/her delegate.

The ERT shall consist of the *emergency controller* or his/her delegate and nominated trained project employees and contractors and include.

- (a) *Emergency controller*,
- (b) *Deputy emergency controller/s*,
- (c) ERT team members.

Note, there can be a number of *deputy emergency controllers* if required to ensure there is one at the windfarm at all times, particularly during the *fire danger period* or when the FDR for the Site and surrounding area reaches 'Severe' or above or during significant weather events (i.e. local severe weather warnings).

Where there is more than one deputy, a 'duty *deputy emergency controller* rostering system should be considered to ensure a *deputy emergency controller* knows when he/she is on duty to avoid confusion and to ensure a controller is at the windfarm at all times during the *fire danger period* and/or on days the FDR is 'Severe' and above.

An up-to-date register of all ERT members shall be kept readily available from the *emergency controller*.

6.3.2 Authority

During *emergencies*, instructions given by the *emergency controller* or his/her delegate shall take precedence over the normal management structure. Once the *emergency* service arrives at the windfarm, the *emergency controller* or *deputy emergency controller* must meet the Incident Controller at the relevant entry point of the windfarm, provide a briefing on the *bushfire* situation and seek direction for the ongoing role of the ERT.

Appendix C - Training and Exercising Requirements

All employees and contractors shall undergo training and exercising by a qualified and experienced trainer in *bushfire* and other *emergency* prevention, readiness and response application of the BP&ERP and in the use of all *fire protection systems* available at the windfarm. The local volunteer brigades should be invited to participate in Site familiarisation, fire suppression equipment and techniques for dealing with turbine fires shortly after the windfarm has been commissioned and prior to each *fire danger period*.

It must be stressed the basic principle of fire and *emergency* management practices is that no person should be placed in greater danger through fire and *emergency* actions and that no person should attempt tasks for which they are not equipped; either physically, psychologically or by way of training. To attempt a task outside one's competence and confidence creates the *risk* of escalating a situation rather than mitigating it.

To assist with this, an all *hazard* and *risk*-based training analysis should be undertaken by the EMC to identify training needs and any skills gaps of all employees and contractors who will become *emergency controller*, *deputy emergency controllers* and *emergency* response team members at the windfarm. This will ensure the appropriate training and exercising is provided.

The Occupational Health and Safety Act recognises that the value of a site BP&ERP is greatly enhanced by the incorporation of fire safety training and exercises.

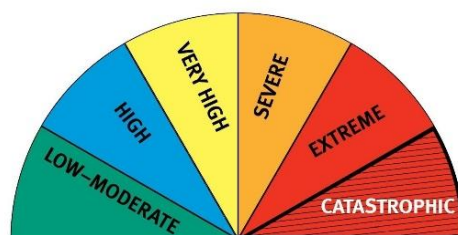
The type of training and exercises required for this windfarm to ensure the safe and efficient implementation of this BP&ERP includes but not limited to:

- Basic first aid in relation to burns, foreign material in eyes,
- Understanding fuel *hazards* and fire behaviour associated with managed and unmanaged vegetation during a *bushfire* event,
- *Bushfire* behaviour under the influences of different FDR's,
- Safe response to *bushfires* and other emergencies,
- *Bushfire* and *emergency* prevention, readiness and response,
- *Bushfire* protection equipment readiness, use and maintenance,
- When to use a *bushfire protection area* / safe assembly point or evacuate,
- How to conduct a *dynamic risk assessment*,
- Emergency command and control,
- Fire response principles of contain, control and extinguish,
- Administrative and recording process.

Once training has been conducted, it is important a training report is completed to ensure a monitoring process is in place and to keep a record of who has undergone training, type of training, when and by whom.

At least one training exercise will be conducted prior to each *fire danger period* involving all employees and contractors to ensure the BP&ERP is tested and updated, all *fire protection systems* are tested under exercise conditions, and the local CFA fire brigades are invited to allow them to become familiar with the windfarm, water supplies, fire protection measures and ensure they have full access to all areas by their fire appliances.

Appendix D – Fire Danger Rating & Potential Fire Behaviour



Fire Danger Rating	Potential Fire Behaviour and Impact
CATASTROPHIC (CODE RED) FDI 100+	- Fires will be uncontrollable, unpredictable and fast moving – flames will be higher than roof tops. - People will die and be injured. Thousands of homes and businesses will be destroyed. - Well prepared, well constructed and defended homes may not be safe during the fire. Construction standards do not go beyond a Fire Danger Index of 100. - Thousands of embers will be blown around. - Spot fires will move quickly and come from many directions, up to 20 km ahead of the fire. • Leaving is the best option.
EXTREME FDI 75-99	- Fires will be uncontrollable, unpredictable and fast moving – flames will be higher than roof tops. - People will die and be injured. Hundreds of homes and businesses will be destroyed. - Only well prepared, well constructed and actively defended houses are likely to offer safety during a fire. - Thousands of embers will be blown around. - Spot fires will move quickly and come from many directions, up to 6 km ahead of the fire. • Leaving is the safest option for your survival.
SEVERE FDI 50-74	- Fires will be uncontrollable and move quickly– flames may be higher than roof tops. - There is a chance people may die and be injured. Some homes and businesses will be destroyed. - Well prepared and actively defended houses can offer safety during a fire. - Expect embers to be blown around. - Spot fires may occur up to 4 km ahead of the fire • Leaving is the safest option for your survival. Your home will only offer safety if it and you are well prepared and you can actively defend it during a fire.
VERY HIGH FDI 25-49	- Fires can be difficult to control – flames may burn into the tree tops. - There is a low chance people may die or be injured. Some homes and businesses may be damaged or destroyed. - Well prepared and actively defended houses can offer safety during a fire. - Embers may be blown ahead of the fire. - Spot fires may occur up to 2 km ahead of the fire. • Your home will only offer safety if it is and you are well prepared and you can actively defend it during a fire.
HIGH FDI 12-24	- Fires can be controlled - Loss of life is highly unlikely and damage to property will be limited - Well prepared and actively defended houses can offer safety during a fire. - Embers may be blown ahead of the fire. - Spot fires can occur close to the main fire. • Know where to get more information and monitor the situation for any changes
LOW-MODERATE FDI 0-11	- Fires can be easily controlled - Little to no risk to life and property • Know where to get more information and monitor the situation for any changes

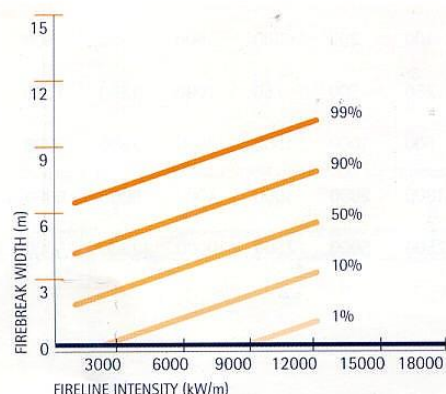
Appendix E – Grass fire research into the performance of fire breaks

1. Relevant research to the site regarding fire break performance was conducted by scientists from the CSIRO National Bush Fire Research Unit in 1988 including an investigation into grass fire behaviour.
2. The aim of the research was to develop a relation between the probability of fuel break failure and variables such as fuel break width and fire line intensity, (that is the quantity of heat released per metre of fire front).
3. The aim was achieved by lighting experimental fires over large uninhabited areas during periods of very high fire danger.
4. Fuel types involved mostly kerosene grass, kangaroo grass and sorghum, which are similar to many found in the open grasslands of southern Australia including Victoria. These grasses were almost fully cured and low eucalyptus and paperbarks and occurred sparsely on the test site, (average 10 trees per hectare).
5. Systematic measurements of fuel characteristics found most fuel fell between 2 and 5 tonnes per hectare and grass height was usually between 0.15 and 0.55 m.
6. During the experiment, wind speed varied from 3 to 30 km per hour, relative humidity from 13 to 55% and air temperature from 19 to 36 degrees Celsius. Using the Macarthur meter, this equates to Grassland Fire Danger Index of 'Extreme' using CSIRO – modified McArthur Mk 4 Grassland Fire Danger Meter.
7. The test site was divided into 170 blocks, (200 x 200m or 100 x 100m in size). Fuel breaks were constructed 5, 10, or 15m wide by grading or burning strips of grass so that no flammable material remained.
8. To test the effectiveness of fuel breaks, 113 fires, either at a single point or in a line 60 to 200m in length were lit. The head fires burned 20 to 200m before reaching a fuel break. Their speed ranged from 0.4 to 8.0 km per hour. No trees stood within 20m of the fuel break for 58% of fires lit, for the remainder, the number of trees present was generally less than four, and almost always less than eight.

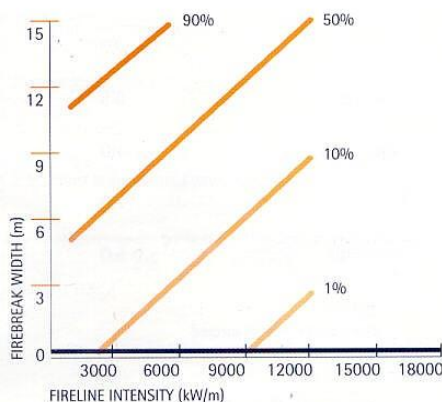
Research results were:

- When trees were absent, none of the 4.5 to 15m wide fuel breaks were breached while 83% of those 1 to 3.5m wide were. Fuel breaks of 1 to 3.5m mainly failed because of direct flame contact, the fire actually 'reaching' across the barrier. All except the least-intense fires easily breached such breaks.
 - When trees were present within 20m of a fuel break, only 45% of the 4.5 to 15m wide fuel breaks managed to stop fires. These fires invariably jumped the fuel breaks directly opposite trees and firebrands (such as burning bark or leaves that are capable of starting spot fires) were the main cause.
 - Fuel breaks performance became less effective as fire line intensity increased. Of the 20 fires approaching breaks 1.0 to 3.5m wide with intensities less than 7,000 kW/m, 6 (30%) stopped; while of the 15 approaching breaks with an intensity of 7,000 kW/m or greater, none stopped.
12. To put these results to practical use, CSIRO researcher Andrew Wilson developed a statistical model that assists in calculating the probability of fuel break breach under given conditions.
 13. This model involved taking into account fire line intensity, the presence or absence of trees within 20m, and fuel break width. Generally, the model predicts the fires breaks becomes less effective with increasing fire intensity, closer proximity of trees and / or decreasing fuel break width.

14. More specifically, the model as shown in Figures 1 and 2, predicts the following results:
- A 3m wide fuel break has only a 50% probability of stopping a grass fire (no trees within 20m) that approaches head-on with an intensity of 5,000 kW/m
 - A 5m fuel break has a 90% probability of stopping the same fire.
 - A 9m wide fuel break has only a 50% probability of stopping a grass fire with trees within 20m of the break that approaches head-on with an intensity of 5,000 kW/m.
 - A 15m wide fuel break has a 90% probability of stopping the same fire.
15. Finally, it is important to remember that Wilson's work does not include consideration of the effect of slope, but this does not detract from the value of his work because, in the absence of any other similar research data, it provides useful information to help us better understand potential fire behaviour.



No Trees Present Within 20m of the Break



Trees Present Within 20m of the Break

Source: Cheney and Sullivan 1997, P70

Fig 1 Probability of a head fire being controlled with no trees within 20m of the break

Fig 2 Probability of a head fire being controlled with trees present within 20m of the break

16. Deductions from this research relevant to the site:
- The fuel type and conditions under which CSIRO research was undertaken were:
 - Kerosene grass, kangaroo grass and sorghum which has a Heat yield of between 16,900 and 18,600 kJ/kg based on a moisture content (% Oven-dry weight) of 10 and a fuel load of 5 tonnes per hectare.
 - The grass land surrounding the proposed site is grazed pastures (i.e. Phalaris) which has a heat yield of between 13,700 and 13,900 kJ/kg based on a moisture content of 10 with a fuel load of 5 tonnes per hectare.
 - **The assessed grass fuel loads within paddocks around the Site and along road reserves will vary between 5 and 2 tonnes per hectare depending on the time of year.**

Appendix F - 50 Required safety features of motor vehicles driven during fire danger period near crops

(1) In the country area of Victoria, a person shall not drive or operate a vehicle propelled by internal combustion (other than a vehicle referred to in subsection (2)) so that the vehicle is in contact with any crop, grass, stubble, weeds, undergrowth or other vegetation unless the vehicle is fitted with an efficient silencing device so constructed that all the exhaust from the engine of the vehicle passes through the silencing device.

Penalty: 10 penalty units.

(2) In the country area of Victoria, a person must not drive or operate a tractor or a self-propelled farm machine or a traction engine or an earth-moving, excavating or road-making machine propelled by or incorporating a heat engine within nine metres of or in contact with any crop, grass, stubble, weeds, undergrowth or vegetation unless the tractor, traction engine or machine—

(a) is free from faults and mechanical defects which would tend to cause an outbreak of fire, and

(b) is fitted with a spark arrester, and

(c) carries the prescribed fire suppression equipment during a fire danger period.

Penalty: 10 penalty units.

(3) A person operating a tractor, traction engine or machine referred to in subsection (2) must maintain the spark arrester in proper working order so as to prevent the discharge of exhaust particles which may tend to cause an outbreak of fire.

Penalty: 10 penalty units.

(4) A person must not fit a spark arrester to a tractor, traction engine or machine referred to in subsection (2) unless the spark arrester complies with the standard prescribed under subsection (5).

Penalty: 10 penalty units.

(5) A person must not sell a tractor, traction engine or machine unless it is fitted with a spark arrester which complies with the relevant Standards Association of Australia standard prescribed for the purposes of this subsection.

Penalty: 10 penalty units.

(6) The Chief Officer may exempt a person from compliance with subsection (2)(c) where in the opinion of the Chief Officer the circumstances surrounding the operation of the tractor, traction engine or machine warrant it.

(7) Nothing in this section requires a tractor, engine or machine referred to in subsection (2) which is fitted with a turbocharger or an exhaust aspirated air-cleaner to be fitted with a spark arrester.

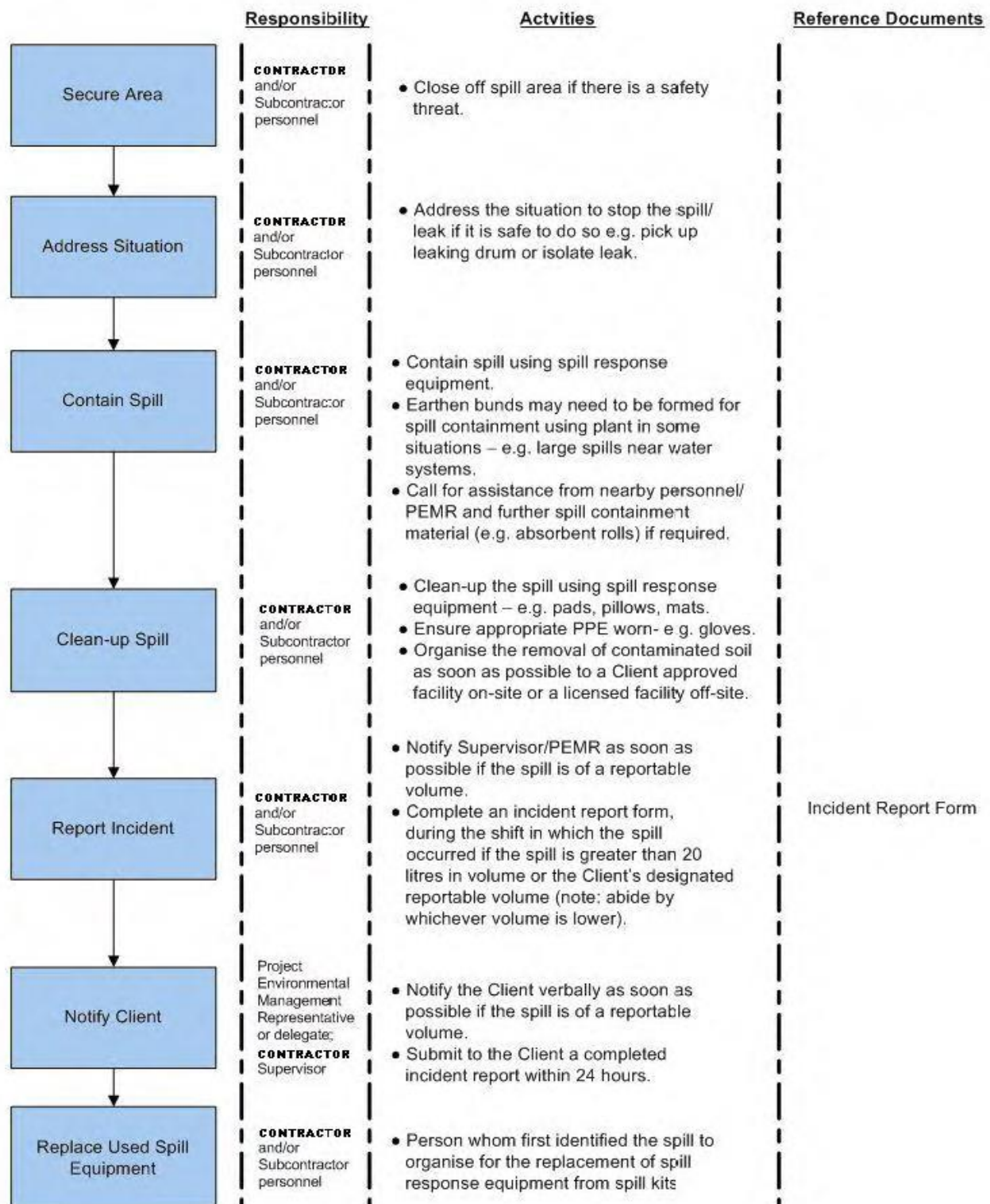
Vehicular heat engines

- (1) For the purposes of section 50(2)(c) of the Act, the prescribed fire suppression equipment is—
 - (a) at least one water spray pump of the knapsack pattern that—
 - (i) is in proper working order, and
 - (ii) is fully charged with water, and
 - (iii) has a tank capacity of not less than 9 litres, and
 - (iv) complies with AS 1687, or
 - (b) at least one water (stored pressure) fire extinguisher that—
 - (i) is in proper working order, and
 - (ii) is fully charged with water and maintained at the correct pressure, and
 - (iii) has a tank capacity of not less than 9 litres, and
 - (iv) complies with AS/NZS 1841.1.
- (2) For the purposes of section 50(5) of the Act, a spark arrester must comply with AS 1019.

Appendix G - Dangerous Goods spill response process

Hydrocarbon / Chemical Spill Response Flowchart

PROCESS OWNER: Quality & Environmental Manager



Rev 2

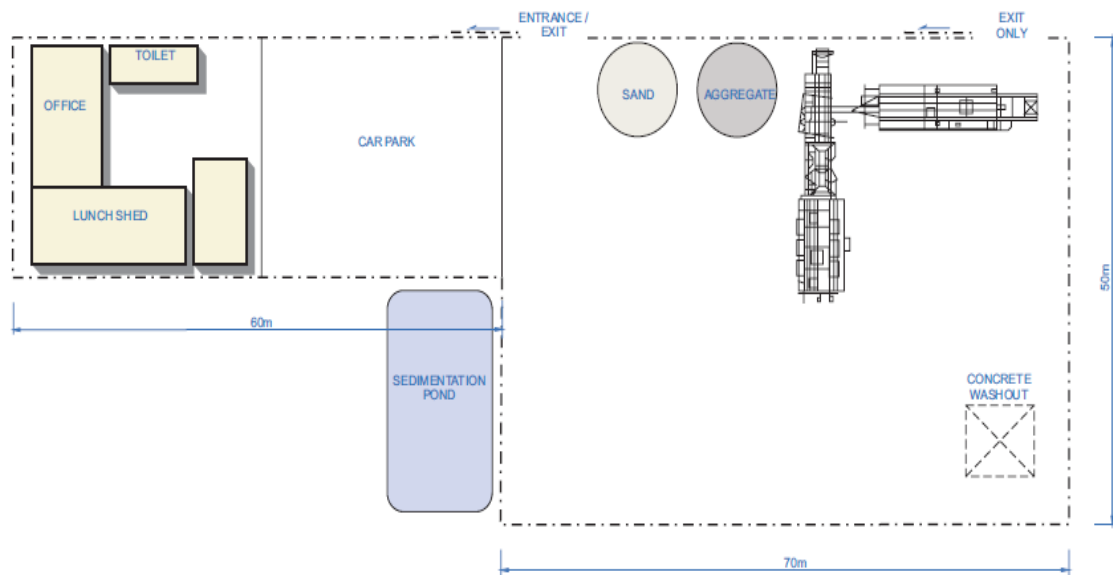
Appendix H – Batching Plan Layout Plan

LAYOUT PLAN

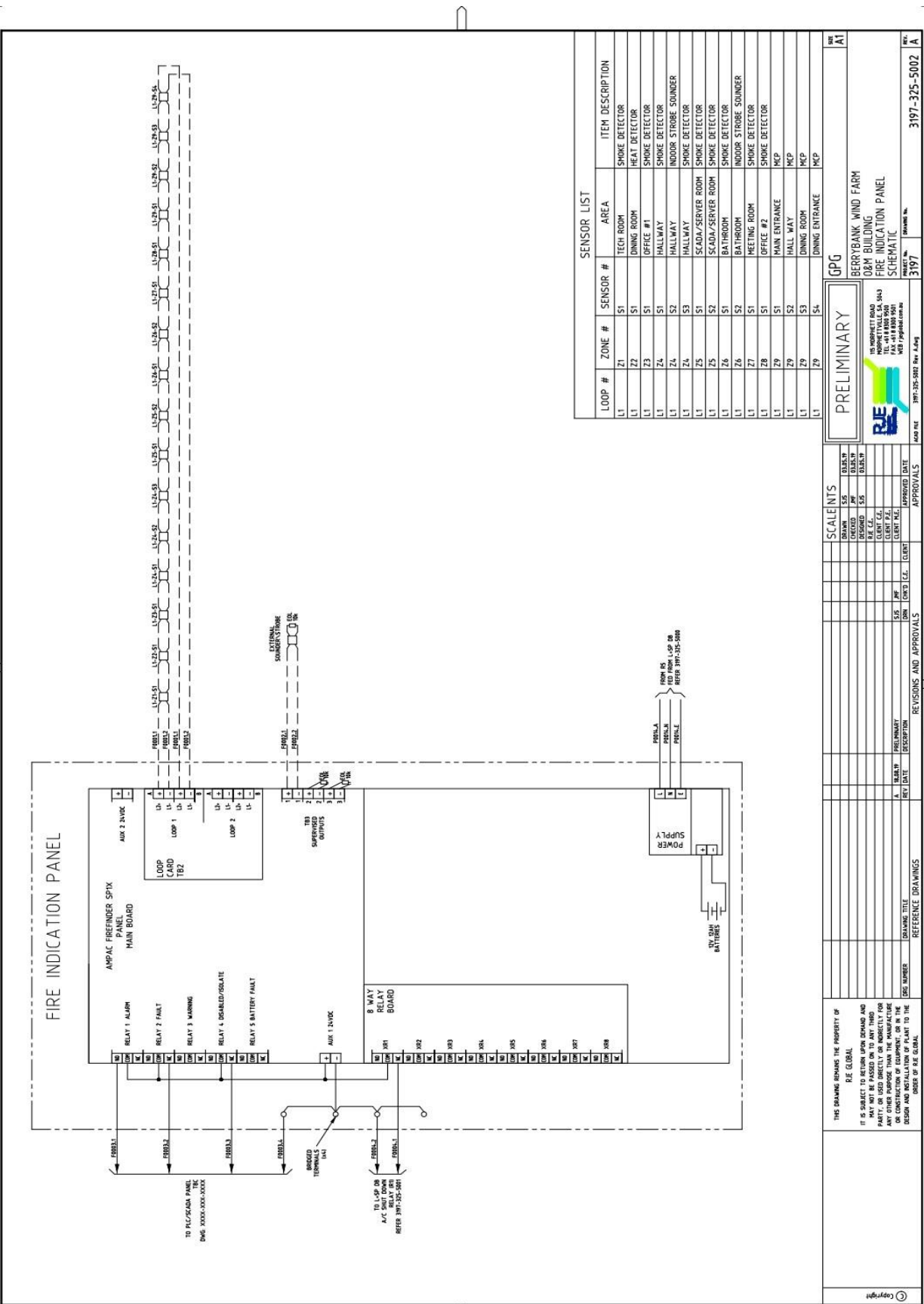
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MINISTER FOR PLANNING
SHEET 8 OF 12



Appendix I – Fire indication panel schematic





2 System Overview

The **FireFinder Series II** is an Intelligent Analogue / Addressable and / or Conventional Fire Alarm Control Panel capable of supporting:

- Apollo Discovery and XP95 Intelligent Detectors, Multisensor, Photoelectric, Ionisation, Thermal (heat) and CO detectors.
- Addressable Initiating Devices: Modules that monitor any conventional normally open contact such as supervisory switches and flow switches.
- Conventional two wire zone detector circuits
- Multiple input/outputs
- High Level Interfaces
- **SmartGraphics**
- **SmartTerminal**
- Remote LED mimics
- Peer to Peer networking
- Master Slave (Main - Sub) networking
- Main panel plus Data Gathering Panels networking

The panel is built to comply with the following standard:

- Australian Standard: AS 4428 parts 1 & 5

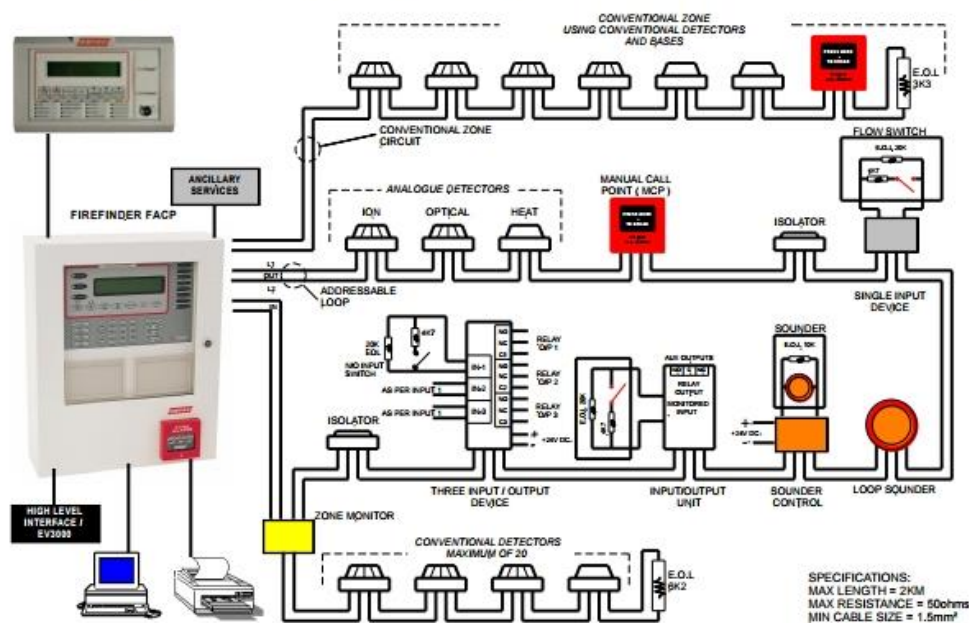


Figure 1: Typical Application



Annex J – Timetable for Implementation of All Programs

Construction Commencement Assumption: 26/04/2022	RYAN CORNER WIND FARM				
	PRE CONSTRUCTION				
	Document	Reference Number	Section	Timeline	Requirement
		Planning Permit			
Planning Permit	17.E.I	BUSHFIRE	26/05/2022	Provide and install static water supplies.	
Planning Permit	17.E.V	BUSHFIRE	10/05/2022	Emergency services visit to site for familiarisation before fire period.	
Planning Permit	17.F	Archeological	26/04/2022	Check archeological MP for training and site preparation requirements.	
Planning Permit	17.G	Pest and Animal	26/04/2022	Check requirements in proper section.	
Planning Permit	17.I	EMP	26/04/2022	Training program for construction workers and permanent employees or contractor. Condition 6 EMP.	
Planning Permit	17.J	EMP	10/05/2022	Establish reporting program and registers	
Planning Permit	38	CIRP	26/04/2022	Put on website a copy of the CIRP and have a toll free number and email for complaints.	
Planning Permit	39	CIRP	26/04/2022	Establish a complaints register	
Planning Permit	8.2.1	Archive of Records	26/04/2022	Establish an archiving of records: all project environmetal records will be archived for a minimum period of 7 years.	
Planning Permit	8.2.2	Correspondence and filing	26/04/2022	Need a correspondence register system (document controller)	
Planning Permit	9	Incident and Emergency Planning	23/10/2022	Contractor to establish an emergency committee and do an emergency drill within first 6 months	
		PRE - EMP			
EMP	1.3		26/04/2022	Review DECMLs EMP to be compliant with GPG's	
EMP	2.2.2.4	Delivery of OSOM	24/08/2022	NVHR permit should be provided by Vestas prior to delivery of turbine components	
EMP	2.2.3	Access	27/03/2022	Give Construction Notice to each landowner 1 month prior construction	
EMP	3.1	Legislation	26/04/2022	Water Act 1989: Review that all waterways permits are correct.	
EMP	3.1	Legislation	26/05/2022	CROWN LAND RESERVES ACT 1978: Works within Road Reserve are in place by DECML AND RJE prior to construction Riverside crossing and cabling.	
EMP	3.3	Secondary Approvals	Ongoing	FFG Act 1988: If Black Wattle Trees and Plans Grassland is removed, need ask for this permit.	
EMP	Table 3.3	Secondary Approvals		Wildlife Act 1975 - A permit required to remove or destory wildlife (if required)	
EMP	3.3	Secondary Approvals	24/08/2022	Road Management Act 2004: Check that Rex Andrews has their permits of OD loads from NHVR and RRV including TX crossings. Approval required if any proposed transmission lines are located within an Arterial road	
EMP	4.3	Risk Register	10/05/2022	Undertake a new HAZCON workshop with Decmil and RJE.	
EMP	4.3	Risk Register	10/05/2022	Undertake a new HAZCON workshop with AUSNET	
EMP	4.3	Risk Register	10/05/2022	Undetake a new interface meeting with AUSNET AND DECML	
EMP	4.3	Risk Register	25/07/2022	Prior to site mobilisation, a new HAZCON with Vestas and Decmil	
EMP	4.3	Risk Register	25/07/2022	Prior to site mobilisation, a new HAZCON with Vestas and AUSNET	
EMP	4.3	Risk Register	10/05/2022	Provide Risk Register to MSC	
EMP	4.4	EMP objectives and Targets	10/05/2022	Establish a checklist for EMP objectives and targets (IAuditor)	
EMP	4.5	Access	26/04/2022	Prior to subcontractors mobilisation, check their SWMS	
EMP	5	Training	26/04/2022	Review principal contractors Site Inductions for adequacy against GPG'S EMP and subplans. Condition 17.I Planning Permit	
EMP	6.3	Distribution of contact details	12/04/2022	2 weeks prior construction advertise in local newspaper the contact details	
EMP	6.4	Distribution of contact details	12/04/2022	Check correct info on website	
EMP	7.2	EMP Audit Schedule	26/05/2022	Need to appoint a external auditor to audit EMP on the first 6 months of contruction, then annually	

Construction Commencement Assumption: 26/04/2022	RYAN CORNER WIND FARM				
	PRE CONSTRUCTION				
	Document	Reference Number	Section	Timeline	Requirement
EMP	11.6	Management and mitigation measures	26/04/2022	Create template for iAuditor prior to construction	
EMP	11.6	Management and mitigation measures : Provisional and disposal of sanitary facilities	26/05/2022	Table 11.1 Ensure that the Principal Contractor has engaged a subcontractor on an ongoing basis to managed the onsite toilet facilities including alarms for septic tank getting to full	
EMP	11.6	Management and mitigation measures : Construction Activities	26/04/2022	• Install an emergency information container which is painted red and marked 'EMERGENCY INFORMATION' in white contrasting lettering not less than 25 mm high at all main access points installed at a height of 1.2m – 1.5m. Ensure the containers have a Site plan and up to date Dangerous Goods manifest and SDS's • Ensure the windfarm emergency warning system (i.e. UHF/CB radio system) is working and tested regularly as determined by the emergency controller; • Ensure all portable fire extinguishers installed around Site offices, storage containers etc are in place, easily accessible and checked monthly to ensure they are in working order, i.e. check extinguisher body and hose for damage, pressure gauge etc; • Ensure all static fire water tanks for firefighting are full at all times, are easily accessible and CFA connections valves are regularly checked and maintained; • Ensure water access point signage is in place and easily visible; • Ensure CFA has a map with the location of all fire water tanks and their access tracks; Reference BERP Site Access	
EMP	11.8	Construction Noise Objectives	12/04/2022	As part of the Pre construction communication to neighbours, include Noise construction notice.	
EMP	11.8	CONSTRUCTION NOISE OBJECTIVES	26/04/2022	Install and maintain a site information board at the front of the site with contact details,after hours emergency contact details, and regular information updates. Locate the board so it's visible from the outside boundary.	
EMP	12.1	MANAGEMENT AND MITIGATION MEASURES	26/04/2022	Prior to mobilisation, storage facilities for hydrocarbons and hazardous susbtances will be located away from watercourses and areas prone to flooding or tidal areal	
EMP	12.1	MANAGEMENT AND MITIGATION MEASURES: Prevention of Hydrocarbon and Hazardous Substance Spillages	10/05/2022	The spill response flowchart will be prominently displayed in key areas such as lunch rooms, maintenance workshops and spill response stations. Fuel and oil storage facilities will be established in accordance with the requirements of the Australian Standard AS1940: The Storage and Handling of Flammable and Combustible Liquids. Storage facilities will be located away from watercourses and areas prone to flooding or tidal areas. If a fuel storage tank is required on-site it will be placed on an impervious bunded pad, or have integral secondary containment (self-bunding) in accordance with EPA guidelines.	
EMP	13.5	BLASTING MP: MANAGEMENT AND MITIGATION MEASURES	26/05/2022	Develope pre-blasting checklist as per table 13.1	
			ARCHEOLOGICAL CHMP		

Construction Commencement Assumption: 26/04/2022	RYAN CORNER WIND FARM				
	PRE CONSTRUCTION				
	Document	Reference Number	Section	Timeline	Requirement
CHMP	6.1.2	Recommendations to avoid harming aboriginal	26/05/2022	Fencing aboriginal sites must be done prior to construction. 10 m buffer required.	
CHMP	6.1.2	Recommendations to avoid harming aboriginal	26/04/2022	Register the aboriginal sites as no go zones in DECMILS gps.	
CHMP	6.1.7	Recommendations: Training.	26/04/2022	The booklet should be given to all workers as they are inducted and a Pre training session will be held with RAPs.	
CHMP	6.1.8	Contingency Plan	26/04/2022	The contingency plan should be kept on site.	
CHMP	Annex H	Compliance Review Checklist	3/05/2022	Do the compliance Review Checklist	
		Pest Animal Management Plan			
PEST ANIMAL	6.1.1	Management actions	10/05/2022	Pest plant control contractors with demonstrated experience working in ecologically sensitive environments will be engaged to undertake pest plant control of the African Boxthorn habitat	
PEST ANIMAL	6.1.1	Management actions	26/05/2022	If invasive fauna is found to be inhabiting the construction footprint a qualified and experienced Pest Controller will be engaged to address the infestation	
PEST ANIMAL	6.1.1	Management actions	Ongoing	If European Rabbit or Red Fox warrens are identified within the construction footprint, it must be collapsed post the removal of topsoil to ensure that invasive species do not take up residence;	
PEST ANIMAL	6.1.1	Management actions	10/05/2022	A wash down area will be established within the study area for periodic cleaning of excess soil and organic matter to avoid the spread of noxious weeds and soil pathogens. Contaminated water from the wash down area should not be discharged into drainage lines or flow into areas of environmental sensitivity. Sediment from the wash down area should be retained in wash down bays and prevented from spreading over the site. Sediment and wash down water may not leave the site until decontaminated; and	
PEST ANIMAL	6.1.1	Management actions	Ongoing	All equipment and machinery to be thoroughly cleaned off site prior to commencing works.	
		Pest Plant Management Plan			
PEST PLANT	6.3	Pre - Construction	26/05/2022	Control of any noxious weeds in construction area by a licensed contractor and prepared for next surveys	
		Bushfire Emergency Response Plan			
BERP	Table 1	Mobilisation	26/05/2022	Install water tanks as per CFA guidelines (see pg. 10 and 11 of BERP)	
BERP	Site Access	Mobilisation	26/04/2022	An emergency information container (painted red and marked 'EMERGENCY INFORMATION' in white) contrasting lettering will be located at each of the two points and installed at a height of 1.2m – 1.5m and be accessible with a fire brigade standard 003 key. Refer to EMP 11.6	
BERP	Policy Aim and Authority	Pre-Construction	12/04/2022	Sign Usage authorisation form for BERP within document (pg. 16)	
BERP	2	Pre-Construction	17/05/2022	Ensure Decmil has appointed correct personnel and has systems to comply with emergency procedures	
BERP	Appendix C -	Pre-Construction	26/05/2022	Check Decmil/Vestas have capability to provide adequate fire and emergency management training	
		Sediment Erosion and Water Quality Management Plan			
SEWQP	4.6		10/05/2022	Ensure that hazardous substances and chemical controls are in place upon mobilization	
SEWQP	4.8	Access Roads.	12/04/2022	Bitumen sealing of internal access track for a distance 50 m into the site from the intersections with external roads would the requirement for stabilised access. Alternative options include the use of cattle grid type shaker ramp in conjunction with a submerged wheel bath or wheel wash within a section of aggregate-capped pavement. Detailed design of these measures would be required.	
SEWQP	6.2	Concrete batching plant	26/05/2022	Check the location of the overtopping point of the turkey's nest and how it connects/interacts with the rest of the drainage system	
SEWQP	7.1.1	Revegetation	25/06/2022	Establish seed mixes to be used for revegetation in consultation with farmers	

Construction Commencement Assumption: 26/04/2022	RYAN CORNER WIND FARM			
	CONSTRUCTION			
	Document	Reference Number	Section	When?
	Requirement			
	Planning Permit			
Planning Permit	41	CIRPS	27/03/2023	Every year from the Planning Permit anniversary, a copy of the Complaints Register must be provided along with a reference map of complaint locations to the Minister for Planning
	EMP			
EMP	1.5	General	11/04/2022	Update organisational structure and provide MSC
EMP	3.1	Legistaltion	26/04/2023	Renewable Energy (Jobs and Investements) Act 2017 (Vic): Generate registration for Renewable Energy certificates prior generation
EMP	3.3	Secondary Approvals	24/08/2022	EPA 1970: Prior to installation of Substation septic tank, apply for onsite Waste Water Application.
EMP	5.1	Induction	Monthly	Audit WHSE monthly
EMP	6.1	Internal communication	Monthly	Maintaning monthly correspondace for discussing project-wide lessons
EMP	6.1	internal communication	Weekly/monthly	Weekly toolbox records will be capture in monthly WHSE monthly report and daily prestart.
EMP	6.1	Internal communication	six weekly	CEC as agreed with Council
EMP	6.1	Internal communication	25/07/2022	Management Review 3 months and 9 months after construcion and annually after.
EMP	6.2	Distribution of Contact details	Weekly	Check in WHSE site inspections that al the site signage are correct.
EMP	6.2	Distribution of Contact details	Monthly	Monthly community news letter
EMP	6.5	Distribuiton of contact details	Weekly	Weekly construction reports for community engagement
EMP	7.1	Site inspections	Weekly	Weekly site construction inspections
EMP	7.1	Monitor requirements		Go to table 7.1
EMP	7.2	EMP Audit Schedule	First 6 months and then annually	External auditor to audit EMP on the first 6 months and then annually.
EMP	7.2	EMP Audit Schedule		Go to table 7.2
EMP	7.4	Internal Auditing	11/04/2022	Prior construction, establish a Site EMP audit scope.
EMP	7.7	Internal Reporting	Monthly	Monthly Project Reports (including enviromental performance)
EMP	7.8	External Reporting	Monthly	Share the Monthly Project Report to MSC within 5 days of completion
EMP	8.1.1	Controlled Copy	Ongoing	Have a proper document controller available on the RC and centralized document repository

Construction Commencement Assumption: 26/04/2022	RYAN CORNER WIND FARM			
	CONSTRUCTION			
	Document	Reference Number	Section	When?
EMP	9	Incident and Emergency Planning	23/10/2022	Contractor to establish an emergency committee and do an emergency drill within first 6 months
EMP	10	Review and improvement of the EMP	End of contruction / prior to operation	Review EMP at the end of construction and prior to operation
EMP	11.4	Post-Construction Rehab	Post contruction	Refer to Pest Plant Management plant for post construction rehabilitation.
EMP	11.6	Management and mitigation measures	Weekly	Refer to table 11.1
EMP	11.6	Management and mitigatrion measures: Weed control	Post contruction	Weed control after completion of construction
EMP	13	Blasting	Prior to Blasting	Prior to Blasting, license/qualification and personal details of the person conducting the Blast will be shared with the department and Council.
	Cultural Heritage Management Plan			
CHMP	Annex H	Compliance Review Checklist	Monthly	Do the compliance Review Checklist MONTHLY
	Pest Animal Management Plan			
PEST ANIMAL MP	7.1	Monitoring	1/03/2022	A regular monitoring program for pest animals should be done 4 times a year: early spring, late spring, summer and autumn during construction and 2 years post construction, an audit will be held.
	Pest Plant Management Plan			
PEST PLANT	6.5.1	Table 3	Ongoing	Table 3: Summary of mitigation measures
PEST PLANT	7.1.1	Logbooks	Ongoing	Weed control logbook
PEST PLANT	7.1.1	Logbooks	Ongoing	Washdown logbook and importation/exportation of materials logbook
PEST PLANT	7.3	Timeframes	26/05/2022	General monitoring to be ongoing and during 2 years post contruction
	Bushfire Emergency and Response Plan			
BERP	Table 1		26/04/2023	Site familiarisation visit Country Fire Authority, Rural Ambulance Victoria, Moyne Shire Council's Municipal Emergency Management Committee and Victoria Police.

RYAN CORNER WIND FARM

Construction
Commencement
Assumption:
26/04/2022

CONSTRUCTION

Document	Reference Number	Section	When?	Requirement
BERP	Bushfire Prevention and Readiness Works		24/11/2022	To improve the performance of the road networks as a fire break within and around the Site, a roadside slashing program of 6m slashing or burning of 6m from the road pavement on the Site side will be undertaken prior to each fire danger period.
BERP	Bushfire Prevention and Readiness Works		Ongoing	Ensure Bushfire prevention and readiness conditions are met (pg 10-13 of BERP).
BERP	Monitor and Review		23/10/2022	Risk assessment review and emergency drills
BERP	Monitor and Review		26/04/2023	Review BERP with MSC and CFA and submit for reendorsement if warranted
BERP	1.1 Prevention		Monthly	Monthly site checklist
BERP	1.3 Response		23/10/2022	Emergency drill
	Sediment Erosion and Water Quality Management Plan			
SEWQP	4.3/4.4	Staging of work	10/05/2022	Check SEWMP controls of any are in place for each new construction area
SEWQP	4.6	Staging of work	24/07/2022	Check that sediment controls are in place before the batching plant starts
SEWQP	8.1	During	Weekly	Table 8.1 to be comply with
SEWQP	9	Requirement for	Prior to work in each area	Sediment control plans prior to work in each area

