Tallawarra Stage B Gas Turbine Power Station

Noise and Air Quality Management Sub-Plan

EnergyAustralia Tallawarra Pty Ltd

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Revision: 2.4

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EnergyAustralia

LIGHT THE WAY

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Abbreviations

Abbreviation	Meaning
CCGT	Combined cycle gas turbine
CEMP	Construction environmental management plan
CoA	Conditions of Approval to Major Project MP07-0124
dB(A)	Decibel (A-weighted sound levels)
DPIE	Department of Planning, Industry and Environment
EA	Environmental Assessment (SKM, 2009)
EMS	Environmental management strategy
EP&A Act	Environment Planning and Assessment Act 1979
EPA	NSW Environment Protection Agency
EPL	Environment protection licence
ER	Environmental representative
EWMS	Environmental work method statements
GECL	GE Clough, engineering, procurement and construction contractor
HSSE	Health, safety, security and environment
kV	Kilovolts
LA90	A-weighted, sound level just exceeded for 90% of the measurement period
LAeq	A-weighted equivalent continuous sound level
Mod-1	Modification 1 to Major Project MP07-0124
Mod-2	Modification 2 to Major Project MP07-0124
MW	Megawatts
NAQMP	Noise and air quality management plan
NOx	Nitrogen oxides
OCGT	Open cycle gas turbine
RBL	Rating background level
SoC	Statement of Commitments within the Environmental Assessment and Submissions Report (SKM, 2009/2010)
SOx	Sulphur oxides
SWMP	Soil and water management plan

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1 Introduction

1.1 Document structure

The Tallawarra B open cycle gas turbine power station project (the Project) Environmental Management Strategy (EMS) provides the overarching strategic environmental management framework for the delivery (design, construction, commissioning and operation) of the Project.

Within the management framework provided by the EMS, a Construction Environment Management Plan (CEMP) has been developed by EnergyAustralia to provide a system of environmental management for the construction phase of the project. The CEMP includes procedures, policies, and processes to establish and maintain project compliance and best practice controls. Its implementation will ensure that potential environmental impacts are managed during the construction and commissioning of the Project.

The CEMP is structured to include a range of aspect specific management sub-plans, including this document, to translate the corresponding environmental management requirements, commitments, and conditions of approval into an actionable construction management plan.

This Noise and Air Quality management Sub Plan (NAQMP) has been prepared to supplement the CEMP. It should be read in conjunction with the EMS and CEMP. This NAQMP should be used to inform the development of activity specific Environmental Work Method Statements (EWMS).

This NAQMP is required to be implemented by EnergyAustralia and contractors that undertake construction and commissioning work on the Project.

1.2 Tallawarra B Power Station

The project involves the construction and operation of an open cycle gas turbine (OCGT) power station and associated infrastructure.

The Project will be constructed directly adjacent to the Tallawarra A power station. Areas subject to construction for the Project will include:

- Tallawarra B Power Station (turbine hall, transformer and associated infrastructure)
- Transmission line easement
- Gas receival station
- Gas feeder pipeline
- Construction ancillary sites, including site offices and laydown areas
- Construction vehicle carparking areas.

Under the Project Approval, construction of the project includes commissioning activities. For the avoidance of doubt, any refence in this NAQMP to activities undertaken as part of construction is taken to encompass commissioning activities.

1.3 Location and land use

The Project is located at Yallah Bay Road, Yallah approximately 13 km south of Wollongong and 60 km south of Sydney. The site was previously used for a coal-fired power station, which was decommissioned in 1989. The Project will be constructed immediately adjacent to the existing Tallawarra A closed cycle gas turbine power station. As a result of its previous uses, the majority of the land surrounding the Project site (Tallawarra Lands) is vacant and has been cleared of vegetation. Currently, cattle grazing and other rural activities constitute the primary land use beyond the power station site boundary.

1.4 Tallawarra A power station

The existing Tallawarra A combined cycle gas turbine power station is operated by EnergyAustralia. It will continue be operational throughout construction of the Project. The Project will utilise much of the existing Tallawarra Stage A power station equipment and infrastructure during construction, including but not limited to internal roads and carparking areas.

1.5 Objectives

The objectives of this NAQMP are to:

- To comply with Project approvals, policies and legislation
- To minimise noise impacts on sensitive receivers during construction
- To minimise vibration impacts on sensitive receivers during construction
- To minimise air and dust emissions during construction.

1.6 Performance objectives and targets

Noise, vibration and air quality performance outcomes and targets relevant to the NAQMP are identified below with details of how they will be achieved in **Table 1-1**.

Table 1-1: NAQMP performance objectives and targets

item	Objective	Target	Measurement tool
Construction compliance	Construction of the project in accordance with environmental approvals and licences	Compliance with all statutory approvals	Safeguards and management measures – Section 5 Audits – Section 7.5 Construction compliance reporting – CEMP Section 13 Management reviews – CEMP Section 13 and 14
Noise and vibration	To ensure that noise and vibration from construction activities does not cause environmental nuisance	No valid noise / vibration complaints resulting from construction works for the duration of the Project	Safeguards and management measures – Section 5 Noise monitoring Section 6.1 Audits – Section 7.5 Monitoring procedures in response to complaints - Section 6.2 Complaints Register – CEMP Section 10.3
Air quality	To ensure that air quality from construction activities does not cause an environmental nuisance	No exceedances of visual emissions of dust produced as a result of construction or operational activities	Safeguards and management measures – Section 5 Dust monitoring Section 6.1 Audits – Section 7.5 Complaints Register – CEMP Section 10.3 Management reviews – CEMP Section 13 and 14
Complaints	To ensure all noise, vibration and air quality complaints are investigated and responded to appropriately	All complaints investigated and management actions undertaken	Monitoring procedures in response to complaints - Section 6.2 Community consultation - Section 7.2 Complaints management - CEMP Section 11.1. Complaints Register – CEMP Section 11.3

2 Relevant legislation and guidelines

2.1 Relevant legislation

- *Environmental Planning and Assessment Act 1979* (EP&A Act) and Regulations
- *Protection of the Environment Operations Act 1997* (POEO Act)
  - POEO (Noise Control) Regulations 2000
  - POEO (Clean Air) Regulations 2002
  - Any conditions of licences or permits under the POEO Act and Regulations, including Environmental Protection License (EPL) 555 provisions.

2.2 Guidelines and policies

- NSW *Noise Policy for Industry* (EPA, 2017)
- NSW Road Noise Policy (DECC, 2011)
- NSW *Interim Construction Noise Guideline* (DECC, 2009)
- *Assessing Vibration: A Technical Guideline* (DEC, 2006)
- Australian Standard AS 2436-2010 *Guide to Noise Control on Construction, Maintenance and Demolition Sites*
- Australian Standard AS 1055:2018 *Acoustics – Description and Measurement of Environmental Noise*
- British Standard BS 7385-2:1993 - 'Evaluation and measurement for vibration in buildings
- German standard DIN4150-Part 3:1999 'Structural Vibration Part 3 – effects of vibration on structures
- NSW EPA, 2017, Approved Methods for the Modelling and Assessment of Air Pollutants in NSW.

2.3 Conditions of approval

The conditions of approval specifically relating to this NAQMP are provided in **Table 2-1** along with the responsibility for compliance. Where these conditions translate into an environmental safeguard or management measure, **Table 2-1** indicates where in this NAQMP (or other management plan) the condition is addressed.

2.4 Statement of commitments

The Environmental Assessment Statement of Commitments provides the mitigation measures and safeguards that have been developed to manage potential environmental impacts associated with the Project. The Environmental Assessment Statement of Commitments specifically applicable to this NAQMP are consolidated in **Table 2-2** along with the responsibility for compliance and a reference to where the requirement is addressed.

2.5 EPL conditions

EPL 555 includes requirements to be addressed in the construction of the Project. The EPL requirements relevant to the construction and commissioning of the project specifically applicable to this NAQMP are consolidated in **Table 2-3** along with the responsibility for compliance and a reference to where the requirement is addressed.

Table 2-1: Conditions of Approval relevant to the NAQMP

CoA#	Condition requirement	Responsibility	Where addressed
3.1	The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any sensitive receivers during the following hours: a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive; b) 8:00 am to 1:00 pm on Saturdays; and c) at no time on Sundays or public holidays. This condition does not apply in the event of a direction from police or other relevant authority for safety reasons, or to prevent environmental harm, the loss of property or risk to life.	HSSE Lead Contractor	Section 3.4 Section 5
3.2	The hours of construction activities specified under condition 3.1 of this approval may be varied with the prior written approval of the Secretary. Any request to alter the hours of construction specified under condition 3.1 shall be: a) considered on a case-by-case basis; b) accompanied by details of the nature and need for activities to be conducted during the varied construction hours; and *c)* accompanied by written evidence demonstrating consultation with the EPA in relation to the proposed variation in construction times (including the consideration of any comments made by the EPA).	HSSE Lead Contractor	Section 3.4 Section 5 Appendix B
3.3	The Proponent shall implement all reasonable and feasible mitigation measures with the aim of achieving the following construction noise and vibration goals: a) where audible at any sensitive receivers, the $L_{Aeq\ (15minute)}$ noise level from construction activities should not exceed the rating background level by more than 10 dB; and b) the vibration limits set out in the *Assessing Vibration: A Technical Guideline* (DEC, 2006) for human exposure.	HSSE Lead Contractor	Section 3.3 Section 3.5 Section 5 Section 6 Appendix B
3.4	During construction, the Proponent shall minimise noise emissions from plant and equipment, including bulldozers, cranes, graders, excavators and trucks, by installing and maintaining where reasonable and feasible, efficient silencers and low-noise mufflers (residential standard).	Contractor	Section 3.3 Section 5
3.5	The Proponent shall design, construct, operate and maintain the project to ensure that the total cumulative noise contribution from the combined operation of the Tallawarra Stage A and Tallawarra Stage B power stations to the background acoustic environment does not exceed the noise limits specified in Table 1 and Table 2 [of the Conditions of Approval].	Project Director Contractor	Section 5

CoA#	Condition requirement	Responsibility	Where addressed

Table 1|– Maximum Allowable Noise Limits Outside the Tallawarra Lands

Location	Day 7:00 am to 6:00 pm Mondays to Saturdays 8:00 am to 6:00 pm Sundays and public holidays	Evening 6:00 pm to 10:00 pm on any day	Night 10:00 pm to 7:00 am Mondays to Saturdays 10:00 pm to 8:00 am Sundays and public holidays	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	L_{Amax}
Locality T2 Any residence on Carlyle Close, Wollin Place, Coronet Place, and Crompton Street, in Koonawarra	35 dB(A)	35 dB(A)	35 dB(A)	45 dB(A)
Locality T4 Any residence on Wyndarra Way and Malonga Place in Koonawarra	35 dB(A)	35 dB(A)	35 dB(A)	45 dB(A)
Locality ML#9 Any residence on The Boulevarde, Park Crescent, Horsley Road and Newton Crescent in Oak Flats	38 dB(A)	38 dB(A)	38 dB(A)	45 dB(A)
Locality ML#10 Any residence on Reddall Parade and Henricks Parade in Mt Warrigal	38 dB(A)	38 dB(A)	38 dB(A)	45 dB(A)
Locality ML#11 Any residence in Haywards Bay	35 dB(A)	35 dB(A)	35 dB(A)	45 dB(A)

The localities set out in Table 1 are those described in Appendix E of the document listed in condition 1.1c). For the purpose of Table 1, “residence” is defined as any residential dwelling existing at the date of this approval and any residential dwelling, once constructed, on land zoned R2 - Low Density Residential under the Wollongong Local Environmental Plan 2009 at the identified locality.

Table 2 - Noise Limits for Tallawarra Lands Residential Areas

Location	Day 7:00 am to 6:00 pm Mondays to Saturdays 8:00 am to 6:00 pm Sundays and public holidays	Evening 6:00 pm to 10:00 pm on any day	Night 10:00 pm to 7:00 am Mondays to Saturdays 10:00 pm to 8:00 am Sundays and public holidays	
	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	L_{Amax}
Most affected residence - proposed northern residential area	If the *Noise Policy for Industry* (NSW EPA, 2017) Modification Factors for Low Frequency Noise apply – 40 dB(A), otherwise 38 dB(A)	If the *Noise Policy for Industry* (NSW EPA, 2017) Modification Factors for Low Frequency Noise apply – 40 dB(A), otherwise 38 dB(A)	If the *Noise Policy for Industry* (NSW EPA, 2017) Modification Factors for Low Frequency Noise apply – 40 dB(A), otherwise 38 dB(A)	50 dB(A)
Most affected residence - proposed central residential area	40 dB(A)	40 dB(A)	40 dB(A)	50 dB(A)
Most affected residence - proposed south-western residential area	41 dB(A)	41 dB(A)	41 dB(A)	51 dB(A)

The proposed residential areas set out in Table 2 are those illustrated in Appendix A of the Tallawarra Concept Plan Application – Preliminary Assessment Report prepared by Don Fox Planning and dated June 2009. For the purpose of Table 2, “residence” is defined as any residential dwelling once constructed, either prior to or post the construction and operation of the power station, on land zoned R2 - Low Density Residential or R5 - Large Lot Residential under the Wollongong Local Environmental Plan 2009 within the proposed residential areas.

If noise from an activity is substantially tonal, intermittent or impulsive in nature and contains major components within the low frequency range (as described in *Noise Policy for Industry* (EPA, 2017)), 5 dB(A) must be added to the measured noise level when

<table>
<tr><th>CoA#</th><th>Condition requirement</th><th>Responsibility</th><th>Where addressed</th></tr>
<tr><td></td><td>comparing the measured noise with the limits specified in Tables 1 and 2, in accordance with the requirements of the Noise Policy for Industry (EPA, 2017).

The noise limits set out in Table 1 and Table 2 [of the Conditions of Approval] do not apply under: wind speeds greater than 3 metres per second (measured at 10 metres above ground level); or under stability category G temperature inversion conditions; or under stability category F temperature inversion conditions and wind speeds greater than 2 metres per second at 10 metres above the ground.

Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in the Noise Policy for Industry (EPA, 2017).

The data to be used for determining meteorological conditions is that recorded by the meteorological weather station located at the Tallawarra Stage A power station.</td><td></td><td></td></tr>
<tr><td>3.19</td><td>The Proponent shall construct and operate the project in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all practicable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.</td><td>Contractor</td><td>Section 5</td></tr>
<tr><td>3.20</td><td>The Proponent shall not permit any offensive odour, as defined under section 129 of the Protection of the Environment Operations Act 1997, to be emitted beyond the boundary of the site.</td><td>HSSE Lead
Contractor</td><td>Section 5</td></tr>
<tr><td>3.21</td><td>Prior to the installation of any fuel burning equipment associated with the project, the Proponent shall submit the manufacturer’s performance guarantee for that equipment to the EPA. The documentation shall demonstrate to the EPA’s satisfaction that the equipment, when operating at design load, will comply with the air discharge limits specified in this approval under condition 3.24.</td><td>Project Director</td><td>Section 5</td></tr>
<tr><td>3.22</td><td>For the purpose of this approval, air discharge/monitoring points are identified in Table 7 [of the Conditions of Approval].

Table 7 - Identification of Air Monitoring and Air Discharge Points
<table><tr><th>EPA Identification Number</th><th>Type of Monitoring Point</th><th>Type of Discharge Point</th><th>Description of Location</th></tr><tr><td>1</td><td>Air emissions monitoring</td><td>Discharge to air</td><td>Stack Serving the Open Cycle Plant Turbine</td></tr><tr><td>2</td><td>Air emissions monitoring</td><td>Discharge to air</td><td>Stack Serving the Combined Cycle Plant Turbine</td></tr></table></td><td>Project Director</td><td>Section 5</td></tr>
<tr><td>3.23</td><td>The Proponent shall ensure that the design and construction of the project includes sampling positions that comply with TM-1 as set out in Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA, 2007), or its latest version.</td><td>Project Director
Contractor</td><td>Section 5</td></tr>
<tr><td>3.24</td><td>The Proponent shall design, construct, operate and maintain the project to ensure that for each turbine stack discharge/monitoring point identified in Table 7 [of the Conditions of Approval], the concentration of each pollutant listed in Table 8 [of the Conditions of</td><td>Project Director
Contractor</td><td>Section 5</td></tr>
</table>

<table>
<tr><th>CoA#</th><th>Condition requirement</th><th>Responsibility</th><th>Where addressed</th></tr>
<tr><td></td><td>Approval] is not exceeded at that point. The condition only applies to the normal operation of a turbine and, to avoid any doubt, does not apply during the start-up and shut-down period for a turbine. The condition continues to apply to other turbines if they are operational during these periods.

Table 8 – Maximum Allowable Discharge Concentration Limits (Air)
<table><tr><th>Pollutant</th><th>Unit of measure</th><th>100 percentile limit</th><th>Reference conditions</th><th>Averaging Period</th></tr><tr><td>Nitrogen dioxide (NO_2) or nitric oxide (NO) or both, as NO_2 equivalent</td><td>ppm</td><td>25</td><td>Dry, 273 K, 101.3 kPa, 15% O_2</td><td>1-hour</td></tr></table></td><td></td><td></td></tr>
<tr><td>3.25</td><td>The Proponent shall design, construct, operate and maintain the project to ensure that the total cumulative load of nitrogen dioxide or nitric oxide, or both as nitrogen dioxide, from the combined discharges from the Tallawarra Stage A and Tallawarra Stage B power stations does not exceed 900 tonnes per annum. This mass limit also applies to emissions during start-up and shut-down periods.</td><td>Project Director
Contractor</td><td>Section 5</td></tr>
<tr><td>4.14</td><td>The Proponent shall monitor the weather parameters in Table 12 [of the Conditions of Approval] on site in accordance with the specified sampling methods, units of measure, averaging periods and frequency.

Table 12 - Weather Monitoring
<table><tr><th>Parameter</th><th>Units of Measure</th><th>Frequency</th><th>Averaging Period</th><th>Sampling Method</th></tr><tr><td>Rainfall</td><td>mm</td><td>Continuous</td><td>1 hour</td><td>AM-4</td></tr><tr><td>Wind speed @ 10 metres</td><td>m/s</td><td>Continuous</td><td>15 minute</td><td>AM-2 & AM-4</td></tr><tr><td>Wind direction @ 10 metres</td><td></td><td>Continuous</td><td>15 minute</td><td>AM-2 & AM-4</td></tr><tr><td>Temperature @ 2 metres</td><td>°C</td><td>Continuous</td><td>15 minute</td><td>AM-4</td></tr><tr><td>Temperature @ 10 metres</td><td>°C</td><td>Continuous</td><td>15 minute</td><td>AM-4</td></tr><tr><td>Sigma theta @ 10 metres</td><td></td><td>Continuous</td><td>15 minute</td><td>AM-2 & AM-4</td></tr><tr><td>Solar radiation</td><td>W/m²</td><td>Continuous</td><td>15 minute</td><td>AM-4</td></tr><tr><td>Additional requirements
- Siting
- Measurement</td><td></td><td></td><td></td><td>
AM-1 & AM-4
AM-2 & AM-4</td></tr></table></td><td>HSSE Lead</td><td>Section 3.2
Section 5
Section 6</td></tr>
<tr><td>5.1</td><td>The Secretary must be notified in writing via the Major Projects website immediately after the Proponent becomes aware of an incident. The notification must identify the development (including the application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 1 [of the Conditions of Approval].</td><td>HSSE Lead</td><td>Section 7.6</td></tr>
</table>

CoA#	Condition requirement	Responsibility	Where addressed
5.2	The Secretary must be notified in writing via the Major Projects website within seven days after the Proponent becomes aware of any non-compliance.	HSSE Lead	Section 7.6
5.3	A non-compliance notification must identify the development and the application number for it, set out the condition of approval that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance.	HSSE Lead	Section 7.6
5.4	A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.	HSSE Lead	Section 7.6
5.5	Compliance Reports of the project must be carried out in accordance with the Compliance Reporting Requirements outlined in the Compliance Reporting Post Approval Requirements (2020).	HSSE Lead	Section 7.6
5.6	Compliance Reports must be submitted to the Department in accordance with the timeframes set out in the Compliance Reporting Post Approval Requirements (2020), unless otherwise agreed to by the Secretary.	HSSE Lead	Section 7.6
5.7	The Proponent must make each Compliance Report publicly available within 60 days of submitting it to the Secretary, unless otherwise agreed by the Secretary.	HSSE Lead	Section 7.6
7.2	The Proponent shall prepare a Construction Environmental Management Plan (CEMP) to outline environmental management practices and procedures to be followed during construction of the project. The CEMP shall be consistent with the Guideline for the Preparation of Environmental Management Plans (Department of Infrastructure, Planning and Natural Resources, 2004), or its latest version, and shall include, but not necessarily be limited to:	HSSE Lead	This plan CEMP Appendix A
	d) measures to monitor and manage dust emissions in consultation with the EPA.	HSSE Lead	Section 3.5 Section 5
7.3	As part of the CEMP for the project, required under condition 7.2 of this approval, the Proponent shall prepare and implement the following: (a) Noise Management Plan to detail measures to mitigate and manage noise during construction works, consistent with the *Interim Construction Noise Guideline* (Department of Environment and Climate Change, 2009), or its latest version. The Plan shall include, but not necessarily be limited to -	HSSE Lead Contractor	This plan Section 5
	i. procedures to ensure that all reasonable noise mitigation measures are applied during construction works,	HSSE Lead Contractor	Section 5
	ii. details of construction activities (including construction traffic) and equipment that have the potential to generate noise and/or vibration impacts on sensitive receivers,	HSSE Lead Contractor	Section 3.3

CoA#	Condition requirement	Responsibility	Where addressed
	iii. the construction noise and vibration objectives for the project and all reasonable and feasible noise and vibration mitigation measures that will be implemented to control construction noise and vibration impacts, particularly where the objectives are predicted to be exceeded	HSSE Lead Contractor	Section 1.4 Section 3.3 Section 3.4 Section 5 Section 6
	iv. procedures for assessing noise levels at sensitive receivers and compliance, and	HSSE Lead Contractor	Section 6
	v. procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity.	HSSE Lead Contractor	Section 7.2

Table 2-2: Statement of commitments relevant to the NAQMP

Purpose	Requirement	Responsibility	Where addressed
Manage hours of construction work	■ Proposed hours of construction for the project site are: – Monday to Friday – 7am to 6pm; – Saturday – 7am to 1pm if inaudible at residential premises, otherwise 8am to 1pm; and – No work on Sundays or public holidays. The Construction EMP will outline the procedures that need to be complied with before any work can be carried out on the project site outside these hours (e.g. approval of relevant authorities and notification of local residents).	Contractor	Section 3.4 Section 5 CEMP
Minimise impact of construction on surrounding area	A construction environmental management plan (CEMP) will be prepared and implemented to guide construction activities. The CEMP will cover the following areas: ■ traffic and transport; ■ air quality; ■ water; ■ noise and vibration; ■ heritage;	HSSE Lead Contractor	CEMP This plan

Purpose	Requirement	Responsibility	Where addressed
	■ ecology; ■ hazards and risk; ■ visual; ■ waste management; and ■ communication. Any plans and strategies contained in the CEMP will be developed in consultation with the relevant agencies.		
Minimise dust generation during construction	The following dust control procedures will be implemented during the construction phase of the project if there is a possibility of wind-blown dust affecting residential areas: ■ In dry, windy conditions, water carts will be used to dampen soils prior to excavation and handling. Exposed surfaces and stockpiles will be watered, sprayed and covered if required. ■ Vehicles will only be loaded to their carrying capacity and loads of fill will be covered or dampened during transport. Any soil adhering to the undercarriage and wheels of the trucks will be removed prior to departure from the site. ■ Any long-term stockpiles of soil will be stabilised using fast-seeding grass or synthetic cover spray. In addition, construction plant and equipment used on the site for the project will be well maintained and regularly serviced so that emissions from construction plant and vehicles remain within applicable air quality guidelines and standards.	Contractor	Section 3.6 Section 5
Minimise construction noise impact on surrounding residences	■ Construction will be carried out during the hours specified above under 'Environmental Management - Manage hours of construction work'. ■ Practical measures will be used to manage noise from construction equipment, particularly in instances where extended hours of operation are required. ■ Noise compliance monitoring will be carried out for all major equipment and activities on site and investigative monitoring of noise will be carried out in response to specific complaints. ■ Contractors will be required to comply with applicable noise criteria in the construction of the proposed plant. Noise limits will be given to suppliers of plant equipment so that the equipment can be designed to comply with project specific noise goals. ■ Suppliers of construction equipment will be required to comply with Australian Standard AS 2436-1981 Guide to Noise Control on Construction, Maintenance and Demolition Sites. All equipment used on-site will need to demonstrate compliance with the noise levels recommended within AS 2436-1981.	Contractor	Section 3.3 Section 3.4 Section 5 Section 6

Table 2-3: EPL conditions relevant to the NAQMP

Condition reference	Condition	Responsibility	Where addressed
E3.2 Construction Hours	1. "Unless permitted by another condition of this licence, construction works and activities related to the construction of the Tallawarra B Power Station must: (a) only be undertaken between the hours of 7:00 am and 6:00 pm Monday to Friday; (b) only be undertaken between the hours of 8:00 am to 1:00 pm on Saturday; and (c) not be undertaken on Sundays or public holidays"; and	Contractor	Section 3.4 Section 5 Appendix B
E3.2 Construction Hours	2. "The categories of works that may be undertaken outside the hours of operation permitted by the above condition are: a) construction work that causes LAeq(15 minute) noise levels that are no more than 5 dB above rating background levels at any residence; or b) the delivery of materials requested by police or other authorised authorities for safety reasons; or c) emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or d) other activities as agreed by the EPA; or e) works approved by the Secretary of the Department of Planning, Industry and Environment under condition 3.2 of approval 07_0124, provided the EPA is notified in advance of each out-of-hours work occurrence.	Contractor	Section 3.4 Section 5 Appendix B
E3.2 Construction Hours	3. The EPA must be consulted in to support any proposed variation in construction times. (Modified from Project Approval condition 3.2)	HSSE Lead Contractor	Section 3.4 Section 5 Appendix B
E3.3 Construction Noise	The licensee must ensure that all feasible and reasonable noise and vibration mitigation and management measures are implemented during construction work authorised by this licence for the Tallawarra B Power Station, in accordance with the Interim Construction Noise Guideline (DECC, 2009)".	Contractor	Section 3.3 Section 3.4 Section 5 Appendix B

3 Aspect and impacts

3.1 Project GeoPortal and sensitive area maps

The Project's environmentally sensitive areas and spatial data are identified and visually displayed in the project **GeoPortal**. The GeoPortal is a web-based geospatial mapping tool that digitally identifies site environmentally sensitive areas and key project features and ancillary facilities.

Works should consider avoidance, management and/or mitigation of these environmentally sensitive areas.

Further information is available in Section 6.4 of the CEMP.

Specific information available in the Project GeoPortal relevant to the NAQMP includes sensitive receivers and monitoring locations.

3.2 Weather station

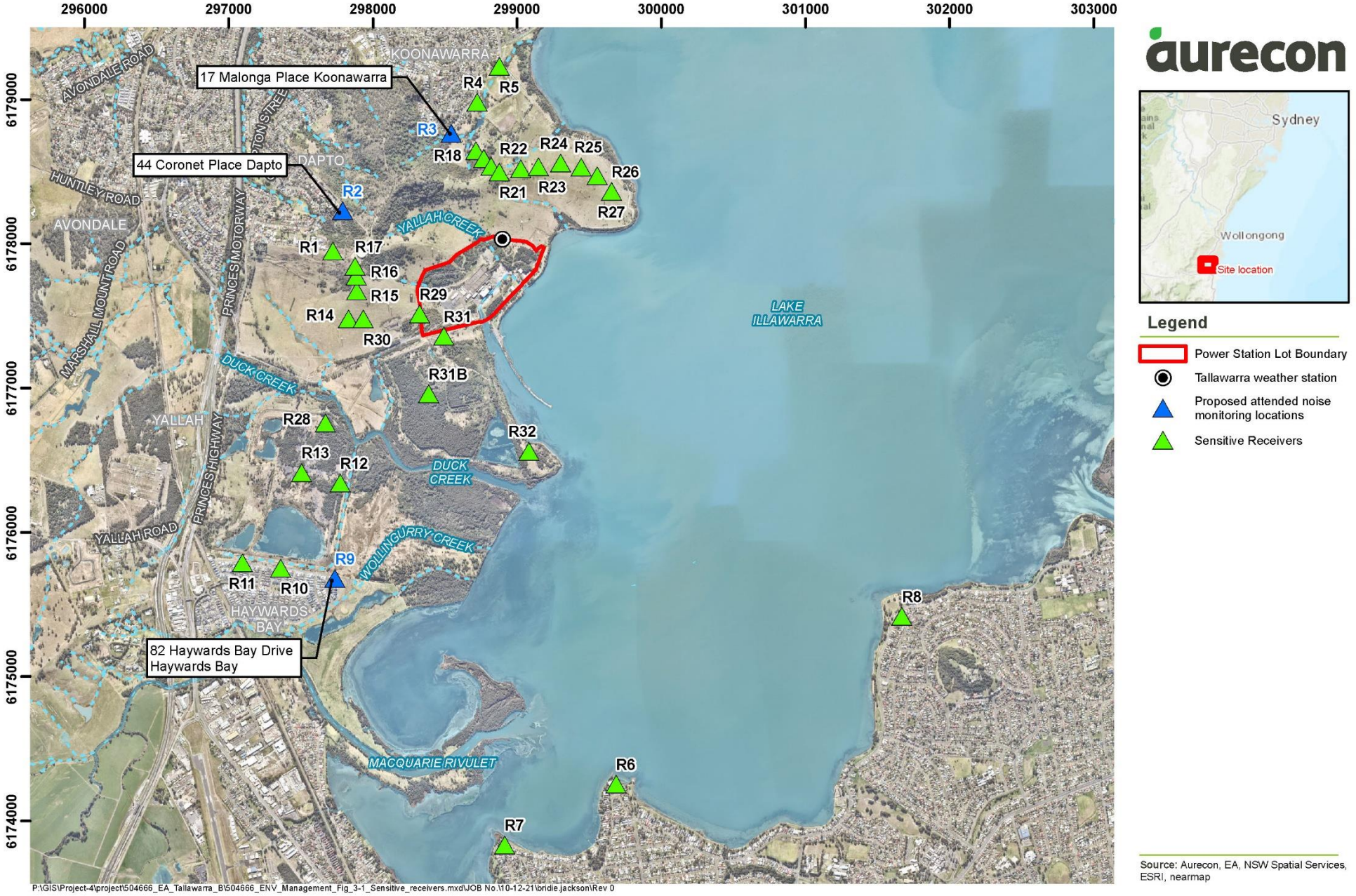
The existing Tallawarra A weather station will be used to provide the weather monitoring and weather data to comply with Condition of Approval 3.5 and 4.14. The location of the weather station is shown in Figure 3-1. The HSSE Lead will be responsible for maintenance, calibration and data management from the weather station.

3.3 Construction noise

3.3.1 Sensitive receivers

As part of Mod-2, EnergyAustralia commissioned Benbow Environmental to undertake a noise and vibration impact assessment. Benbow (2020) assessed construction noise at 32 locations, comprising 11 existing sensitive receivers and at 21 future sensitive receivers. **Figure 3-1** shows the locations of the noise sensitive receivers considered in the assessment. Figure 6.1 in the CEMP shows the location of construction activities (i.e., within the construction areas). The proposed attended noise monitoring locations noted in Figure 3.1 have their addresses and any monitoring access details specified below:

- R2: 44 Coronet Place, Dapto. The monitoring point is at the rear of the property, on the Mt Brown bomb shelter access track;
- R3: 17 Malonga Place, Koonawarra. Direct property access with no specific directions required;
- R9: 82 Haywards Bay Drive, Haywards Bay. Direct property access with no specific directions required.



Projection: GDA 1994 MGA Zone 56

Tallawarra B Power Station

FIGURE 3.1: Sensitive receivers and noise monitoring

3.3.2 Noise generating activities during standard working hours

Benbow (2020) assessed construction noise generating activities to include the following:

- Removal of existing concrete and minor earthworks
- Concreting works of the plant base, hardstand areas and driveways
- Structural works for the proposed plan.

Considering these construction activities, the noise modelling scenarios in **Table 3-1** for proposed construction activities were assessed.

Table 3-1: Noise modelling scenarios for proposed construction activities (Benbow, 2020)

Activity	Time of the day	Worst case scenario (all equipment running for 100% of 15-minute assessment period)
Concrete removal and earthworks	Standard hours	▪ Concrete saw ▪ Front End Loader ▪ Excavator
Concreting works	Standard hours	▪ Concrete mixer truck ▪ Concrete pump ▪ Hand tools
Structure works	Standard hours	▪ Truck ▪ Crane x 2 ▪ Hand Tools x 2

3.3.3 Noise generating activities outside of standard working hours

The Out of Hours Works Approval Protocol (Appendix B) provides details on anticipated out of hours construction work activities, activity durations, and typical equipment to be used. Anticipated noise generating activities and equipment anticipated to be used out of standard working hours is detailed in **Table 3-2**.

Table 3-2: Anticipated out of hours construction activities

Activity	Typical equipment used
Refuelling operations	Truck vehicle movements (with smart low noise movement alarms)
Maintenance activities	Power hand tools, air compressors, generator, truck and equipment movements
Concrete pours (including GT slab 800m3 monolithic pour)	Concrete agitators, concrete pumps, vibrators
Hot works (welding, grinding and steel fabrication)	Power tools
Line flushing	Electric pump
Pipe testing and mechanical works	Air compressor
Critical lifting	Cranes
Electrical works, cable pulling and terminations	Hand tools
Over size over mass deliveries	Over size over mass trucks

The Out of Hours Works Approval Protocol defines a process for assessment of impacts, management of impacts and processes to obtain approvals for out of hours work (Appendix B).

3.3.4 Plant and equipment sound power levels

The sound power levels for the relevant noise sources (**Table 3-3**) have been calculated from measurements of sound pressure levels undertaken by an acoustic engineer from Benbow Environmental at similar sites and sourced from the Benbow Environmental noise source database, AS 2436-2010 and the UK Department for Environmental Food and Rural Affairs (DEFRA) database, 'Update of noise database for prediction of noise on construction and open sites'.

Table 3-3: Sound Power Levels associated with construction plant and equipment (Benbow 2020)

Noise source	Sound power level (dBA)
Front End Loader	102
Excavator	101
Concrete saw	113
Truck	106
Hand tools	100
Concrete mixer truck	103
Concrete pump truck	105
Crane	103

3.3.5 Construction noise management levels

Table 2 of the Interim Construction Noise Guideline (DECC, 2009) sets out construction noise management levels for noise at residences and how they are to be applied. The management noise levels for residential property within standard working hours for construction activities are:

- Noise affected – RBL + 10dB
- Highly noise affected – 75dB(A).

Restrictions to the hours of construction may apply to activities that generate noise at residences above the 'highly noise affected' noise management level.

Noise levels apply at the property boundary that is most exposed to construction or commissioning noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m from the residence.

The construction noise management levels for the project were determined by Benbow (2020). Construction noise management levels also apply to commissioning activities. Construction noise criterion for standard working hours for the Project are provided in **Table 3-4**.

Table 3-4: Construction noise criterion for standard working hours dB(A) (Benbow 2020)

Receiver	Land use	Period	RBL L_{A90}	Noise management level $L_{Aeq\ (15\ minute)}$
R1-5	Residential	Day	36	46
R6-13, R18-28*	Residential	Day	35	45

Receiver	Land use	Period	RBL L_{A90}	Noise management level $L_{Aeq\ (15\ minute)}$
R14, R17*	Residential	Day	38	48
R29, R30*	Commercial	Day	-	70
R31, R31B*	School	Day	-	55
R32*	Holiday accommodation	Day	-	58

** Note that R12-R32 have been considered in Benbow (2020) as 'future' sensitive receivers. At the time of writing the NAQMP R12 -R32 have not been constructed. Unless these receivers are constructed and occupied prior to operation, the NMLs for these receivers will not apply.*

Outside of standard construction working hours the evening and night time NMLs and night time sleep disturbance levels that are provided in **Table 3-5**, derived from Benbow (2020) will be applied. These NMLs have been calculated based on Noise Affected RBL + 5 dB and will be considered in any out of works work activities in accordance with the protocol provided in Appendix B.

Table 3-5: Construction noise criterion for work out of standard working hours dB(A) Benbow (2020)

Receiver	Land use	Period	RBL L_{A90}	Noise management level $L_{Aeq\ (15\ minute)}$	Sleep disturbance level L_{Amax}
R1-2	Residential	Evening	36	41	-
R3-5	Residential	Evening	34	39	-
R6-11	Residential	Evening	35	40	-
R1-2	Residential	Night	34	39	52
R3-5	Residential	Night	30	35	52
R6-11	Residential	Night	34	39	52

** Note that R12-R32 have been considered in Benbow (2020) as 'future' sensitive receivers. At the time of writing the NAQMP R12 -R32 have not been constructed. Unless these receivers are constructed and occupied prior to operation, the NMLs for these receivers will not apply.*

In accordance with the NPfI (2017), if noise from a construction activity is substantially tonal, intermittent or impulsive in nature and contains major components within the low frequency range (10-160 Hz) of the frequency spectrum, a 5 dB correction will be applied to the measured or predicted noise level when comparing to the NMLs provided in **Table 3-4** and **Table 3-5** (Benbow (2020). Any attended monitoring undertaken for the project, including out of hours work, will assess annoying noise characteristics (particularly tonal and low frequency noise) in accordance with methods detailed in the NPfI.

3.3.6 Road traffic noise

Benbow (2020) assessed the Project road traffic noise in accordance with the NSW Road Noise Policy (RNP). Road traffic noise considering the potential Project related vehicle movements are predicted to comply with the NSW Road Noise Policy. No additional mitigation strategies will be applied for road traffic noise.

3.3.7 Construction noise assessment conclusions

Benbow (2020) concluded that construction noise would be:

- Compliant with the noise criteria is predicted at all receivers, during all assessed construction scenarios undertaken during standard working hours.
- Well below the highly noise affected criteria of 75 dB(A) at all receivers, during all assessed construction scenarios undertaken during standard working hours.

- Specific control measures are not required to achieve compliance with noise or vibration criteria for assessed construction scenarios undertaken during standard working hours.
- Compliant with the NSW Road Noise Policy.
- Benbow (2020) did not include detailed impact assessment, noise predictions or management strategies for out of hours work, however the relevant NMLs for evening work, night work and night-time sleep disturbance criteria have been calculated. Assessment and management of out of hours work is required in accordance with the Out of Hours Work Approval Protocol provided in Appendix B.

3.4 Construction working Hours

3.4.1 Standard construction working hours

In accordance with Condition of Approval 3.1 construction work that would generate an audible noise at any sensitive receivers will only be undertaken during the following hours:

a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive;

b) 8:00 am to 1:00 pm on Saturdays; and

c) at no time on Sundays or public holidays.

This condition does not apply in the event of a direction from police or other relevant authority for safety reasons, or to prevent environmental harm, the loss of property or risk to life.

3.4.2 Out of hours construction work

In accordance with Condition of Approval 3.2 the standard construction working hours specified in Section 3.4.1 may be varied with the prior written approval of the DPIE Secretary. Any request to alter the hours of construction specified under Condition of Approval 3.1 must be:

a) considered on a case-by-case basis;

b) accompanied by details of the nature and need for activities to be conducted during the varied construction hours; and

c) accompanied by written evidence demonstrating consultation with the EPA in relation to the proposed variation in construction times (including the consideration of any comments made by the EPA).

In accordance with EPL 555 Condition E3.2 works may be undertaken outside the hours of operation as permitted by the EPL provided:

a) construction work that causes LAeq (15 minute) noise levels that are no more than 5 dB above rating background levels at any residence; or

b) the delivery of materials requested by police or other authorised authorities for safety reasons; or

c) emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or

d) other activities as agreed by the EPA; or

e) works approved by the Secretary of the Department of Planning, Industry and Environment under condition 3.2 of approval 07_0124, provided the EPA is notified in advance of each out-of-hours work occurrence.

The Out of Hours Works Approval Protocol (Appendix B) provides the process to comply with the Project Approval, EPL and associated commitments in relation to construction work undertaken outside of standard construction working hours. Any works undertaken out of standard construction hours must follow the Out of Hours Works Approval Protocol (Appendix B).

All out of hours activities will need to be undertaken in accordance with an activity specific EWMS prepared to include appropriate measures to address safeguards and management measures identified in Section 5,

the Out of Hours Works Approval Protocol (Appendix B) and any requirements of the out of hours works approval.

3.5 Vibration

Vibration during construction was not an identified impact assessed in the EA (SKM, 2009). Benbow (2020) considered vibration impacts from the project during construction in support of Mod-2.

3.5.1 Vibration criteria

Benbow (2020) references the following guidelines to apply to setting limits for vibration from the project during construction:

- The British Standard BS 7385–Part 2:1993 'Evaluation and measurement for vibration in buildings' provides vibration limits to avoid cosmetic damage on surrounding structures. Limits are set at the lowest limits where cosmetic damage has previously been shown. Refer to Section 5.5.3 of Benbow (2020) for details.
- The guideline Assessing Vibration – A Technical Guideline (DEC, 2006) describes preferred criteria for human exposure. The limits describe values where occupants of buildings would be impacted by construction work. Refer to Section 5.5.5 of Benbow (2020) for details.

The Project must comply with the vibration criteria identified in Benbow (2020) as summarised in Table 3-6 and Table 3-7.

Table 3-6: Vibration criteria for building cosmetic damage (BS 7385:2 1993)

Type of building	Peak component particle velocity in frequency range of predominant pulse		
	4 Hz to 15 Hz	**15 Hz to 40 Hz**	**40 Hz and above**
Reinforced or framed structures. Industrial and heavy commercial buildings.	50 mm/s at 4 Hz and above		
Unreinforced or light framed structures. Residential or light commercial type buildings	15 to 20 mm/s	20 to 50 mm/s	50 mm/s

Table 3-7: Vibration criteria for human exposure - preferred and maximum weighted rms z-axis values, 1-80 Hz

Location	Daytime		Night time	
	Preferred	Maximum	Preferred	Maximum
Continuous Vibration (weighted root mean square (rms) vibration levels for continuous acceleration (m/s2) in the vertical direction)				
Residences	0.01	0.02	0.007	0.014
Impulsive Vibration (weighted root mean square (rms) vibration levels for impulsive acceleration (m/s2) in the vertical direction)				
Residences	0.3	0.6	0.1	0.2

Intermittent Vibration (m/s)				
Residences	0.2	0.4	0.13	0.26

3.5.2 Vibration assessment

In the *NSW TfNSW Construction Noise Strategy* document and *Assessing Vibration – a Technical Guideline*, construction equipment that may cause vibration impacts includes hydraulic hammers, vibratory pile drivers, pile boring, jackhammers, wacker packers, concrete vibrators and pavement breakers, amongst other equipment. It is understood that no equipment likely to cause significant vibration, is proposed as part of the works.

Furthermore, the nearest off-site buildings and receivers are located well over 30 m from any part of the project. Given this distance, there is no prospect of either cosmetic damage (as per BS 7385) or human response (OH&E Vibration Guideline) given the proposed construction activities (Benbow 2020).

Due to the proximity of the site to nearest receivers and limited vibration generating activities, no vibration impacts are expected from the proposed construction or operational activities (Benbow 2020).

3.6 Construction air quality

Dust and combustion emissions will be generated from construction activities associated with the Project. The impact of these sources of pollution on air quality will be minor and temporary with implementation of the mitigation measures in this NAQMP.

3.6.1 Dust

During the construction phase of the project, the primary potential impact on air quality would be the generation of particulate (dust) emissions. Dust generating activities may include:

- Removal of existing concrete
- Excavation, levelling and clearing of Project work areas
- Stockpiling of material, including spoil
- Vehicle movements, particularly on unsealed roads
- Wind-erosion in cleared areas.

The EA (SKM, 2009) indicated that during the construction phase of the project, the primary potential impact on air quality would be the generation of dust as a result of construction activities such as excavation. Dust control procedures will be implemented during the construction phase of the project if there is a possibility of windblown dust affecting residential areas. These measures are included in Section 5.

3.6.2 Greenhouse gas emissions

Sources of greenhouses gas emissions during construction would include combustion of fuels by construction equipment and vehicular movements. Equipment that would be used during construction include excavators, front-end loaders, backhoes, graders, semi tipper trucks, scrapers, bull dozers, rollers, water trucks, cranes and compactors. The quantity of greenhouse gas emissions is dependent on the distances travelled and work done by this equipment, which is dependent on the construction method and timetable, location of pick-up and drop-off points, and many other factors. Greenhouse gases emitted during the construction phase would be relatively short term and would not be considered significant provided that equipment and vehicles are properly maintained.

Commissioning activities would contribute particulate matter, ozone, NOx and SOx to the local airshed. Commissioning activities fall outside of operational air quality requirements for the project (refer to Conditions

of Approval, Schedule 2 – Definitions). As such, construction phase air quality requirements will be applied to manage commissioning phase air quality emissions from the Project.

Katestone (2020) has considered the greenhouse gas impacts of the Project for Mod-2. It concluded that construction activities will be minor and short-lived. Preliminary estimates indicate that greenhouse gas emissions associated with the construction of the project will be insignificant on an annual basis.

Measures to manage construction phase greenhouse gas generation have been included in Section 5.

4 Roles and responsibilities

Project personnel roles and responsibilities are described in the CEMP. Responsibilities for the implementation of specific environmental mitigation measures are indicated in Section 5.

5 Safeguards and management measures

The Project environmental safeguards and management measures are presented in this section, over page in **Table 5-1**.

5.1 Conditions of approval

The conditions of approval specifically relating to this NAQMP are provided in **Table 2-1** along with the responsibility for compliance. Where these conditions translate into an environmental safeguard or management measure, they are included in **Table 5-1**.

5.2 Statement of commitments

The Environmental Assessment Statement of Commitments (EA, 2009) provides the mitigation measures and safeguards that have been developed to manage potential environmental impacts associated with the Project. The Environmental Assessment Statement of Commitments specifically applicable to this NAQMP are addressed in **Table 5-1**.

The Submissions Report Statement of Commitments (EA, 2010) modified and augmented several of the Environmental Assessment Statement of Commitments. None of the Submissions Report Statement of Commitments relate to the management of potential noise or air quality impacts.

5.3 Commitments made in Project modifications

No commitments relevant to the management of potential noise, vibration or air quality impacts have been made in Modification 1, Modification 2, submissions reports associated with these modifications, or technical specialist studies that prepared to support the modification applications.

5.4 Environmental protection licence

Licence conditions relevant to the management of potential noise, vibration and air quality impacts are required by the environmental protection licence (EPL). The EPL conditions specifically applicable to this NAQMP are addressed in **Table 5-1**.

Table 5-1: Consolidated conditions, commitments, safeguards and management measures

Objective	Action	Timing	Responsibility	Evidence	Reference
To comply with Project approvals, policies and legislation	The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any sensitive receivers during the following hours: a) 7:00 am to 6:00 pm, Mondays to Fridays, inclusive; b) 8:00 am to 1:00 pm on Saturdays; and c) at no time on Sundays or public holidays. This condition does not apply in the event of a direction from police or other relevant authority for safety reasons, or to prevent environmental harm, the loss of property or risk to life.	During construction Commissioning	Project Director Contractor	■ Inspections ■ Audits ■ EWMS	CoA 3.1 Statement of Commitments (EnergyAustralia 2009) EPL E3.1(1)
To comply with Project approvals, policies and legislation	The categories of works that may be undertaken outside the hours of operation permitted by the above condition [EPL E3.1] are: a) construction work that causes LAeq(15 minute) noise levels that are no more than 5 dB above rating background levels at any residence; or b) the delivery of materials requested by police or other authorised authorities for safety reasons; or c) emergency work to avoid the loss of lives, property, and/or to prevent environmental harm; or d) other activities as agreed by the EPA; or e) works approved by the Secretary of the Department of Planning, Industry and Environment under condition 3.2 of approval 07_0124, provided the EPA is notified in advance of each out-of-hours work occurrence.	During construction Commissioning	HSSE Lead Contractor	■ Inspections ■ Audits ■ EWMS ■ OOHW approvals	EPL E3.2(2) EPA consultation requirements
To comply with Project approvals, policies and legislation	The hours of construction activities specified under condition 3.1 of this approval may be varied with the prior written approval of the Secretary. Any request to alter the hours of construction specified under condition 3.1 shall be: a) considered on a case-by-case basis; b) accompanied by details of the nature and need for activities to be conducted during the varied construction hours; and accompanied by written evidence demonstrating consultation with the EPA in relation to the proposed variation in construction times (including the consideration of any comments made by the EPA).	During construction Commissioning	HSSE Lead Contractor	■ Inspections ■ Audits ■ EWMS ■ OOHW approvals	CoA 3.2 EPL E3.2(3) – modifying CoA3.2

Objective	Action	Timing	Responsibility	Evidence	Reference
	The EPA must be consulted in to support any proposed variation in construction times. (Modified from Project Approval condition 3.2)				
To minimise noise impacts on sensitive receivers during construction To minimise vibration impacts on sensitive receivers	The Proponent shall implement all reasonable and feasible mitigation measures with the aim of achieving the following construction noise and vibration goals: a) where audible at any sensitive receivers, the $L_{Aeq\ (15minute)}$ noise level from construction activities should not exceed the rating background level by more than 10 dB; and b) the vibration limits set out in the *Assessing Vibration: A Technical Guideline* (DEC, 2006) for human exposure.	During construction Commissioning	HSSE Lead Contractor	▪ Monitoring records ▪ Inspections ▪ Audits ▪ EWMS ▪ OOHW approval applications	CoA 3.3
To minimise noise impacts on sensitive receivers	During construction, the Proponent shall minimise noise emissions from plant and equipment, including bulldozers, cranes, graders, excavators and trucks, by installing and maintaining where reasonable and feasible, efficient silencers and low-noise mufflers (residential standard).	During construction	Contractor	▪ Inspections ▪ Maintenance records	CoA 3.4 Statement of Commitments (EnergyAustralia 2009)
To minimise noise impacts on sensitive receivers (OOHW)	During construction, particularly for out of hours work, the Proponent shall minimise noise emissions from plant, equipment and activities by apply additional reasonable and feasible noise mitigation measures such as: • Operating behind barriers or natural shielding; • Orientating equipment so that noise emissions are directed away from any sensitive areas; • Scheduling noisy work for less sensitive times; • Training/education of operators on quiet work practices; and • Scheduling noisy equipment to be used separately rather than concurrently.	During construction	Project Director Contractor	▪ Monitoring records ▪ Inspections ▪ Audits ▪ EWMS ▪ OOHW approval applications	CoA 3.3 CoA 7.3(a)
To minimise noise impacts on sensitive receivers	Contractors will be required to comply with applicable noise criteria in the construction of the proposed plant. Noise limits will be given to suppliers of plant equipment so that the equipment can be designed to comply with project specific noise goals.	During construction	HSSE Lead Contractor	▪ Manufacturers or supplier specifications ▪ Audits	Statement of Commitments (EnergyAustralia 2009)
To minimise noise impacts on sensitive receivers	Suppliers of construction equipment will be required to comply with Australian Standard AS 2436-2010 *Guide to Noise Control on Construction, Maintenance and Demolition Sites*. All equipment used on-site will need to demonstrate compliance with the noise levels recommended within AS 2436-2010.	During construction	HSSE Lead Contractor	▪ Manufacturers or supplier specifications ▪ Audits	Statement of Commitments (EnergyAustralia 2009)

<table>
<tr><th>Objective</th><th>Action</th><th>Timing</th><th>Responsibility</th><th>Evidence</th><th>Reference</th></tr>
<tr><td>To minimise noise impacts on sensitive receivers</td><td>Noise compliance monitoring will be carried out for all major equipment and activities on site and investigative monitoring of noise will be carried out in response to specific complaints.</td><td>During construction
Commissioning</td><td>HSSE Lead
Contractor</td><td>■ Monitoring records
■ Complaints register</td><td>Statement of Commitments (EnergyAustralia 2009)</td></tr>
<tr><td>To minimise noise and vibration impacts on sensitive receivers</td><td>The licensee must ensure that all feasible and reasonable noise and vibration mitigation and management measures are implemented during construction work authorised by this licence for the Tallawarra B Power Station, in accordance with the Interim Construction Noise Guideline (DECC, 2009).</td><td>During construction
Commissioning</td><td>HSSE Lead
Contractor</td><td>■ Inspections
■ Audits
■ EWMS
■ OOHW approval applications
■ Monitoring records</td><td>EPL E3.3</td></tr>
<tr><td>To minimise noise impacts on sensitive receivers</td><td>The Proponent shall design, construct, operate and maintain the project to ensure that the total cumulative noise contribution from the combined operation of the Tallawarra Stage A and Tallawarra Stage B power stations to the background acoustic environment does not exceed the noise limits specified in Table 1 and Table 2 [of the Conditions of Approval].

Table 1|– Maximum Allowable Noise Limits Outside the Tallawarra Lands
<table><tr><th>Location</th><th>Day
7:00 am to 6:00 pm Mondays to Saturdays
8:00 am to 6:00 pm Sundays and public holidays</th><th>Evening
6:00 pm to 10:00 pm on any day</th><th colspan="2">Night
10:00 pm to 7:00 am Mondays to Saturdays
10:00 pm to 8:00 am Sundays and public holidays</th></tr><tr><th></th><th>$L_{Aeq(15\ minute)}$</th><th>$L_{Aeq(15\ minute)}$</th><th>$L_{Aeq(15\ minute)}$</th><th>L_{Amax}</th></tr><tr><td>Locality T2
Any residence on Carlyle Close, Wollin Place, Coronet Place, and Crompton Street, in Koonawarra</td><td>35 dB(A)</td><td>35 dB(A)</td><td>35 dB(A)</td><td>45 dB(A)</td></tr><tr><td>Locality T4
Any residence on Wyndarra Way and Malonga Place in Koonawarra</td><td>35 dB(A)</td><td>35 dB(A)</td><td>35 dB(A)</td><td>45 dB(A)</td></tr><tr><td>Locality ML#9
Any residence on The Boulevarde, Park Crescent, Horsley Road and Newton Crescent in Oak Flats</td><td>38 dB(A)</td><td>38 dB(A)</td><td>38 dB(A)</td><td>45 dB(A)</td></tr><tr><td>Locality ML#10
Any residence on Reddall Parade and Henricks Parade in Mt Warrigal</td><td>38 dB(A)</td><td>38 dB(A)</td><td>38 dB(A)</td><td>45 dB(A)</td></tr><tr><td>Locality ML#11
Any residence in Haywards Bay</td><td>35 dB(A)</td><td>35 dB(A)</td><td>35 dB(A)</td><td>45 dB(A)</td></tr></table>
The localities set out in Table 1 are those described in Appendix E of the document listed in condition 1.1c). For the purpose of Table 1, “residence” is defined as any residential dwelling existing at the date of this approval and any residential dwelling,</td><td>During design</td><td>Project Director
Contractor</td><td>■ Benbow (2020) operational noise assessment sound power levels
■ Manufacture specifications and guarantees
■ Design specifications
■ Audits
■ Weather monitoring data / reports</td><td>CoA 3.5</td></tr>
</table>

Objective	Action	Timing	Responsibility	Evidence	Reference
	once constructed, on land zoned R2 - Low Density Residential under the Wollongong Local Environmental Plan 2009 at the identified locality. **Table 2 - Noise Limits for Tallawarra Lands Residential Areas** | Location	Day 7:00 am to 6:00 pm Mondays to Saturdays 8:00 am to 6:00 pm Sundays and public holidays	Evening 6:00 pm to 10:00 pm on any day	Night 10:00 pm to 7:00 am Mondays to Saturdays 10:00 pm to 8:00 am Sundays and public holidays	| |---|---|---|---|---| |	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	$L_{Aeq(15\ minute)}$	L_{Amax} | | Most affected residence - proposed northern residential area | If the *Noise Policy for Industry* (NSW EPA, 2017) Modification Factors for Low Frequency Noise apply – 40 dB(A), otherwise 38 dB(A) | If the *Noise Policy for Industry* (NSW EPA, 2017) Modification Factors for Low Frequency Noise apply – 40 dB(A), otherwise 38 dB(A) | If the *Noise Policy for Industry* (NSW EPA, 2017) Modification Factors for Low Frequency Noise apply – 40 dB(A), otherwise 38 dB(A) | 50 dB(A) | | Most affected residence - proposed central residential area | 40 dB(A) | 40 dB(A) | 40 dB(A) | 50 dB(A) | | Most affected residence - proposed south-western residential area | 41 dB(A) | 41 dB(A) | 41 dB(A) | 51 dB(A) | The proposed residential areas set out in Table 2 are those illustrated in Appendix A of the Tallawarra Concept Plan Application – Preliminary Assessment Report prepared by Don Fox Planning and dated June 2009. For the purpose of Table 2, “residence” is defined as any residential dwelling once constructed, either prior to or post the construction and operation of the power station, on land zoned R2 - Low Density Residential or R5 - Large Lot Residential under the Wollongong Local Environmental Plan 2009 within the proposed residential areas. If noise from an activity is substantially tonal, intermittent or impulsive in nature and contains major components within the low frequency range (as described in *Noise Policy for Industry* (EPA, 2017)), 5 dB(A) must be added to the measured noise level when comparing the measured noise with the limits specified in Tables 1 and 2, in accordance with the requirements of the *Noise Policy for Industry* (EPA, 2017). The noise limits set out in Table 1 and Table 2 [of the Conditions of Approval] do not apply under: wind speeds greater than 3 metres per second (measured at 10 metres above ground level); or under stability category G temperature inversion conditions; or under stability category F temperature inversion conditions and wind speeds greater than 2 metres per second at 10 metres above the ground. Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in the *Noise Policy for Industry* (EPA, 2017).				

Objective	Action	Timing	Responsibility	Evidence	Reference
	The data to be used for determining meteorological conditions is that recorded by the meteorological weather station located at the Tallawarra Stage A power station.				
To minimise dust emissions	The Proponent shall construct and operate the project in a manner that minimises dust emissions from the site, including wind-blown and traffic-generated dust. All activities on the site shall be undertaken with the objective of preventing visible emissions of dust from the site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all practicable dust mitigation measures, including cessation of relevant works, as appropriate, such that emissions of visible dust cease.	During construction	Contractor	■ Inspections ■ Audits ■ EWMS ■ Monitoring records	CoA 3.19
To minimise dust emissions	The following dust control procedures will be implemented during the construction phase of the project if there is a possibility of wind-blown dust affecting residential areas: ■ In dry, windy conditions, water carts will be used to dampen soils prior to excavation and handling. Exposed surfaces and stockpiles will be watered, sprayed and covered if required. ■ Vehicles will only be loaded to their carrying capacity and loads of fill will be covered or dampened during transport. Any soil adhering to the undercarriage and wheels of the trucks will be removed prior to departure from the site. ■ Any long-term stockpiles of soil will be stabilised using fast-seeding grass or synthetic cover spray.	During construction	Contractor	■ Inspections ■ Audits ■ EWMS ■ Monitoring records	Statement of Commitments (EnergyAustralia 2009)
To minimise greenhouse gas emissions	Construction plant and equipment used on the site for the project will be well maintained and regularly serviced so that emissions from construction plant and vehicles remain within applicable air quality guidelines and standards.	During construction	Contractor	■ Inspections ■ Audits ■ EWMS ■ Maintenance records	Statement of Commitments (EnergyAustralia 2009)
To manage asbestos containing materials appropriately	Any works that requires the disturbance of confirmed or suspected asbestos containing materials shall be undertaken in accordance with Hazmat Services (2011) Asbestos Management Plan, Version 7 to prevent the spread of asbestos containing particulate matter.	During construction	HSSE Lead Contractor	■ Inspections ■ Audits ■ EWMS	EPA consultation
To minimise air emissions	The Proponent shall not permit any offensive odour, as defined under section 129 of the *Protection of the Environment Operations Act 1997*, to be emitted beyond the boundary of the site.	During construction Commissioning	HSSE Lead Contractor	■ Inspections ■ Audits ■ EWMS	CoA 3.20

<table>
<tr><th>Objective</th><th>Action</th><th>Timing</th><th>Responsibility</th><th>Evidence</th><th>Reference</th></tr>
<tr><td>To minimise air emissions</td><td>Prior to the installation of any fuel burning equipment associated with the project, the Proponent shall submit the manufacturer's performance guarantee for that equipment to the EPA. The documentation shall demonstrate to the EPA's satisfaction that the equipment, when operating at design load, will comply with the air discharge limits specified in this approval under condition 3.24.</td><td>During design</td><td>Project Director</td><td>■ Manufacture specifications and guarantees
■ Design documentation</td><td>CoA 3.21</td></tr>
<tr><td>To minimise air emissions</td><td>For the purpose of this approval, air discharge/monitoring points are identified in Table 7 [of the Conditions of Approval].

Table 7 - Identification of Air Monitoring and Air Discharge Points
<table><tr><th>EPA Identification Number</th><th>Type of Monitoring Point</th><th>Type of Discharge Point</th><th>Description of Location</th></tr><tr><td>1</td><td>Air emissions monitoring</td><td>Discharge to air</td><td>Stack Serving the Open Cycle Plant Turbine</td></tr><tr><td>2</td><td>Air emissions monitoring</td><td>Discharge to air</td><td>Stack Serving the Combined Cycle Plant Turbine</td></tr></table></td><td>During design</td><td>Project Director</td><td>■ Design documentation</td><td>CoA 3.22</td></tr>
<tr><td>To minimise air emissions</td><td>The Proponent shall ensure that the design and construction of the project includes sampling positions that comply with TM-1 as set out in Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (EPA, 2007)[1], or its latest version.</td><td>During design
During construction</td><td>Project Director
Contractor</td><td>■ Design documentation</td><td>CoA 3.23</td></tr>
<tr><td>To minimise air emissions</td><td>The Proponent shall design, construct, operate and maintain the project to ensure that for each turbine stack discharge/monitoring point identified in Table 7 [of the Conditions of Approval], the concentration of each pollutant listed in Table 8 [of the Conditions of Approval] is not exceeded at that point. The condition only applies to the normal operation of a turbine and, to avoid any doubt, does not apply during the start-up and shut-down period for a turbine. The condition continues to apply to other turbines if they are operational during these periods.

Table 8 – Maximum Allowable Discharge Concentration Limits (Air)
<table><tr><th>Pollutant</th><th>Unit of measure</th><th>100 percentile limit</th><th>Reference conditions</th><th>Averaging Period</th></tr><tr><td>Nitrogen dioxide (NO_2) or nitric oxide (NO) or both, as NO_2 equivalent</td><td>ppm</td><td>25</td><td>Dry, 273 K, 101.3 kPa, 15% O_2</td><td>1-hour</td></tr></table></td><td>During design
During construction</td><td>Project Director
Contractor</td><td>■ Manufacture specifications and guarantees
■ Design documentation</td><td>CoA 3.24

Statement of Commitments (EnergyAustralia 2009)</td></tr>
</table>

[1] The conditions cite EPA 2016; however, no such document exists. It is noted that the EPA is currently reviewing the Approved methods for the sampling and analysis of air pollutants in New South Wales

<table>
<tr><th>Objective</th><th>Action</th><th>Timing</th><th>Responsibility</th><th>Evidence</th><th>Reference</th></tr>
<tr><td>To minimise air emissions</td><td>The Proponent shall design, construct, operate and maintain the project to ensure that the total cumulative load of nitrogen dioxide or nitric oxide, or both as nitrogen dioxide, from the combined discharges from the Tallawarra Stage A and Tallawarra Stage B power stations does not exceed 900 tonnes per annum. This mass limit also applies to emissions during start-up and shut-down periods.</td><td>During design
During construction</td><td>Project Director
Contractor</td><td>■ Manufacture specifications and guarantees
■ Design documentation</td><td>CoA 3.25</td></tr>
<tr><td>To monitor the weather</td><td>The Proponent shall monitor the weather parameters in Table 12 [of the Conditions of Approval] on site in accordance with the specified sampling methods, units of measure, averaging periods and frequency.

Table 12 - Weather Monitoring
<table><tr><th>Parameter</th><th>Units of Measure</th><th>Frequency</th><th>Averaging Period</th><th>Sampling Method</th></tr><tr><td>Rainfall</td><td>mm</td><td>Continuous</td><td>1 hour</td><td>AM-4</td></tr><tr><td>Wind speed @ 10 metres</td><td>m/s</td><td>Continuous</td><td>15 minute</td><td>AM-2 & AM-4</td></tr><tr><td>Wind direction @ 10 metres</td><td></td><td>Continuous</td><td>15 minute</td><td>AM-2 & AM-4</td></tr><tr><td>Temperature @ 2 metres</td><td>°C</td><td>Continuous</td><td>15 minute</td><td>AM-4</td></tr><tr><td>Temperature @ 10 metres</td><td>°C</td><td>Continuous</td><td>15 minute</td><td>AM-4</td></tr><tr><td>Sigma theta @ 10 metres</td><td></td><td>Continuous</td><td>15 minute</td><td>AM-2 & AM-4</td></tr><tr><td>Solar radiation</td><td>W/m²</td><td>Continuous</td><td>15 minute</td><td>AM-4</td></tr><tr><td>Additional requirements
- Siting
- Measurement</td><td></td><td></td><td></td><td>
AM-1 & AM-4
AM-2 & AM-4</td></tr></table></td><td>During construction</td><td>HSSE Lead</td><td>■ Weather monitoring data and reports</td><td>CoA 4.14</td></tr>
<tr><td>To comply with Project approvals, policies and legislation</td><td>The Proponent shall prepare a Construction Environmental Management Plan (CEMP) …

e) details of how the environmental performance of the construction works will be monitored, and what actions will be taken to address identified potential adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the Plan -

i) measures to monitor and manage dust emissions in consultation with the EPA…</td><td>Pre-construction</td><td>HSSE Lead</td><td>■ CEMP
■ This plan</td><td>CoA 7.2

Statement of Commitments (EnergyAustralia 2009)</td></tr>
<tr><td>To comply with Project approvals, policies and legislation</td><td>As part of the CEMP for the project, required under condition 7.2 of this approval, the Proponent shall prepare and implement the following:

…a Noise Management Plan to detail measures to mitigate and manage noise during construction works, consistent with the Interim Construction Noise Guideline</td><td>Pre-construction</td><td>HSSE Lead
Contractor</td><td>■ CEMP
■ This plan</td><td>CoA 7.3

Statement of Commitments</td></tr>
</table>

Objective	Action	Timing	Responsibility	Evidence	Reference
	(Department of Environment and Climate Change, 2009), or its latest version. The Plan shall include, but not necessarily be limited to -				(EnergyAustralia 2009)
	i. procedures to ensure that all reasonable noise mitigation measures are applied during construction works,	Pre-construction	HSSE Lead Contractor	▪ This plan ▪ Out of Hours Work Approval Protocol	
	ii. details of construction activities (including construction traffic) and equipment that have the potential to generate noise and/or vibration impacts on sensitive receivers,	Pre-construction	HSSE Lead Contractor	▪ This plan	
	iii. the construction noise and vibration objectives for the project and all reasonable and feasible noise and vibration mitigation measures that will be implemented to control construction noise and vibration impacts, particularly where the objectives are predicted to be exceeded	Pre-construction	HSSE Lead Contractor	▪ This plan	
	iv. procedures for assessing noise levels at sensitive receivers and compliance, and	Pre-construction	HSSE Lead Contractor	▪ This plan	
	v. procedures for notifying sensitive receivers of construction activities that are likely to affect their noise and vibration amenity.	Pre-construction	HSSE Lead Contractor	▪ This plan	
To comply with Project approvals, policies and legislation	Prior to the commencement of construction, the licensee must prepare and submit a Construction Environmental Management Plan (CEMP) to the EPA.	Pre-construction	HSSE Lead	▪ CEMP ▪ This plan	EPL

6 Monitoring

6.1 Environmental monitoring requirements

Monitoring, measurement, analysis and evaluation for the project is detailed and maintained as part of the EMS, Section 7.5. Specific monitoring requirements that apply to this NAQMP are provide in **Table 6-1**.

The Conditions of Approval require operational monitoring which will be addressed in the OEMP. This NAQMP only addresses monitoring specifically required for the construction and commissioning phases of the Project.

Table 6-1: NAQMP monitoring requirements

Type	Purpose	Frequency	Responsibility
Dust monitoring	To assess compliance with dust management measures and adjust operations to manage impacts if required.	Daily visual monitoring during construction	Contractor
Noise monitoring – construction and commissioning activities	To assess compliance with noise management levels at sensitive receivers, to adjust construction and commissioning practices to manage noise impacts or to response to complaints, if required.	Attended noise monitoring in accordance with the procedure outlined in Section 6.2 should be undertaken at the nearest sensitive receiver to construction works: ■ Monthly during construction ■ During out of hours activities as required by an out of hours work activity approval (refer to Appendix B) ■ In response to any construction noise complaints	Contractor
Noise monitoring – major equipment	To assess compliance of major construction equipment to meet Australian Standard AS 2436-2010 to help prevent noise impacts and complaints. Major equipment is defined as equipment listed under Table A1 of AS2436-2010.	Major equipment noise monitoring must be undertaken: ■ As soon as is reasonably practical after the establishment of major equipment on site. ■ If major equipment is observed to be emitting higher than typical noise. ■ If relevant to the investigation of any noise complaints.	Contractor
Vibration monitoring	To respond to vibration complaints, if required.	In response to vibration complaints, if required.	Contractor
Odour monitoring	To comply with conditions of approval and EPL To respond to odour complaints, if required.	In response to odour complaints, if required. To respond to odour detected through olfactory inspections	Contractor

6.2 Procedure for dust monitoring

Dust monitoring is to be undertaken by the Contractor, Project engineers and HSSE Lead during daily site inspections. Dust monitoring is to be undertaken visually (qualitatively) to assess dust generation from disturbed areas and to assess dust generation from vehicles travelling on unsealed access tracks.

If monitoring for dust identifies visual dust generation appropriate measures identified in Section 5 to manage dust generation should be applied.

6.3 Procedure for vibration monitoring

In the event of a complaint regarding Project vibration:

- Complaints should also be conducted according to the complaints management procedure in Section 11 of the CEMP.
- Prior to implementing vibration monitoring the contractor and HSSE Lead will investigate the likely source of the vibration and cease or modifying the vibration causing activity to alleviate the sensitive receiver concern.
- If the source of the vibration cannot be identified or the resolution for managing the vibration implemented is unsuccessful, attended vibration monitoring will be undertaken by a suitably qualified specialist in accordance with:
  - Vibration criteria for building cosmetic damage in BS 7385:2 1993.
  - Human exposure criteria in the guideline Assessing Vibration – A Technical Guideline (DEC, 2006).
- Following monitoring, the recommendations of the vibration specialist will be addressed in consultation with the Contractor, HSSE Lead and complainant.

6.4 Procedure for attended noise monitoring

The methodology and conclusions of predictive noise modelling of the construction activities are provided in Benbow (2020) and are summarised in Section 3.3. Compliance with the noise criteria adopted for receivers should be verified during construction monthly at the nearest sensitive receiver to where the construction works being undertaken.

Any construction noise complaints will be investigated promptly in accordance with the complaints management procedure in Section 11 of the CEMP.

Attended noise monitoring shall be initiated in response to construction noise complaints. Measures to reduce impacts to affected sensitive receivers should be applied where appropriate.

Attended noise monitoring shall follow the following procedures:

- Noise levels should be monitored in accordance with the Interim Construction Noise Guideline (DECC, 2009).
- Noise monitoring devices should be appropriately serviced and calibrated.
- Noise Management Levels provided in Section 3.3 of this NAQMP.
- Noise monitoring will be undertaken during periods of no rainfall and when average wind speeds are less than 5 m/s at microphone height.
- Stability category temperature inversion conditions are to be determined by the sigma-theta method referred to in the *Noise Policy for Industry* (EPA, 2017).
- Noise levels should be measured at the complainant's location and/or at the nearest sensitive receiver(s) (shown in Figure 3-1) to the active construction works. Wind speed, wind direction and other relevant weather events should be considered in the timing and selection of monitoring locations.
- Noise levels apply at the property boundary that is most exposed to construction noise, and at a height of 1.5 m above ground level. If the property boundary is more than 30 m from the residence, the location for measuring or predicting noise levels is at the most noise-affected point within 30 m from the residence.
- Monitoring should cover the time of day when construction works are being undertaken or at the time of day that impacts were reported to occur.

- Noise monitoring results should be reported as required by Section 7.5 and acted on in accordance with the requirements of **Table 5-1** requirements.

If Project noise at sensitive receivers is found to exceed the NMLs detailed in Section 3.3, measures will be put in place immediately to reduce construction noise generation. Measures may include stopping work or modifying work practices so that compliance with NMLs is achieved.

6.5 Procedure for major equipment noise monitoring

All equipment used on site will be required to comply with and demonstrate compliance with *Australian Standard AS24360-2010 Guide to Noise Control on Construction, Maintenance and Demolition Sites*. Major equipment noise monitoring should be undertaken:

- As soon as is reasonably practical after the establishment of major equipment on site.
- If major equipment is observed to be emitting higher than typical noise.
- If relevant to the investigation of any noise complaints.
- For all major equipment used during construction, defined as any equipment that is listed in Table A1 of AS2436-2010.
- To verify the sound pressure levels of major equipment used on the site are within the limits specified for major equipment identified in Table A1 of AS2436-2010.
- Measured as A-weighted sound pressure levels at 10 metres distance and mid-point from the major equipment while in normal operation if practical, otherwise under static testing conditions.

If major equipment noise is found to exceed the specified limits in AS2436-2010 measures will be put in place immediately to reduce construction noise generation. Measures may include retiring the equipment or modifying work practices so that compliance with NMLs is achieved.

6.6 Procedure for odour monitoring

Odours can be generated from a number of construction and commissioning sources such as excavations, stockpiles, vehicle emissions and commissioning of the gas turbine. Odour monitoring is to be undertaken by the Contractor, Project engineers and HSSE Lead during daily site inspections. Odour monitoring is to be undertaken qualitatively via olfactory inspections to assess odour generation from project activities. Areas to be inspected include excavation faces, stockpile locations and both internal and external roads. Odour complaints should also be conducted according to the complaints management procedure in Section 11 of the CEMP.

If monitoring for odour identifies odour generation, appropriate measures such as changes to air flow, housekeeping and vehicle maintenance, increasing or decreasing moisture or operational changes will be put in place in consultation with the HSSE Lead to ensure compliance with Condition of Approval 3.20.

6.7 Procedure for weather monitoring

The existing Tallawarra A weather station will be used to provide the weather monitoring and weather data to comply with Condition of Approval 3.5 and 4.14. The location of the weather station is shown in Figure 3-1. The Tallawarra A Power Station OEMP outlines the procedures for the management of the weather monitoring equipment and data. The HSSE Lead will be responsible for maintenance, calibration and data management from the weather station.

7 Compliance

7.1 Communication

Communication shall be undertaken as outlined in the CEMP Section 10.

7.2 Community consultation

Ongoing consultation with nearby residents will be maintained during construction (see CEMP).

Sensitive receivers predicted to be affected by construction noise above the management levels identified in Section 3.2, or by out of hours works activities shall be consulted with at least one week prior to the scheduled activity. Consultation must include:

- Details of the nature of the works
- Predictions of the extent or level of likely impact
- Timing of the works
- Duration of the works
- Measures that are being undertaken to minimise impact
- Contact details for further discussion or complaints.

In accordance with CoA 7.3(a)(v) any construction noise complaints will be investigated promptly and appropriate action, including noise monitoring will be initiated to reduce impacts to affected sensitive receivers (see Section 6.2).

7.3 Agency consultation

Consultation requirements with agencies or Public Authorities where relevant to the NAQMP are identified in **Table 7-1**. Appendix A contains a detailed agency consultation log.

Table 7-1: NAQMP agency consultation

Agency	Purpose of consultation
EPA	■ To comply with EPL condition E3.2, i.e. to support any proposed variation in construction times ■ Notified in advance of each out-of-hours work occurrence ■ In accordance with CoA 4.3 to agree on alternative acceptable noise assessment methods, if required ■ To discuss measures to monitor and manage dust emissions, as required by CoA 7.2(c)(i)

7.4 Training and competency

All project personnel are required to undergo site induction training which incorporates NAQMP measures in accordance with Section 8 of the CEMP.

7.5 Auditing and reporting

Regular audits are to be completed in accordance with Section 12 of the CEMP. Audits will assess NAQMP compliance, to identify any issues of noncompliance, and to confirm licence and approval conditions are being met. Audits shall also consider how following targets that apply to this NAQMP are being addressed:

- Adherence to relevant legislation, statutory requirements, permit and/or licenses

- Monitoring outcomes
- No verified complaints received in relation to noise, dust or odours during construction.

Reporting on audit, compliance monitoring, incident and complaint outcomes is to be undertaken in accordance with Section 13 (particularly Table 13.1) of the CEMP, and the specific noise reporting detail is replicated below:

Type	Purpose	Frequency	Responsibility
Noise reporting	To assess compliance with noise management levels at sensitive receivers, to adjust operations to manage noise impacts or to response to complaints., if required.	Attended noise monitoring in accordance with the procedure outlined in the NAQMP (Section 6.2) should be undertaken at the nearest sensitive receiver to construction works: - Monthly during construction - During out of hours activities as required by an out of hours work activity approval (refer to NAQMP Appendix B) - In response to any construction noise complaints.	Contractor

EnergyAustralia has engaged an approved independent auditor to undertake independent audits in accordance with the *Independent Audit Post Approval Requirements* (DPIE, 2020). Further information on the independent auditing schedule and requirements is found in the EMS Section 7.22.

7.6 Incident management and corrective actions

The management, investigation, reporting and notification process for environmental incidents is to be undertaken in accordance with:

- GECL Emergency Response Plan for Tallawarra B (where related to the construction of the project)
- EnergyAustralia TQMS12-HSE-L001 - Emergency Response Plan (where related to the broader project site or Tallawarra A operations)
- Conditions of Approval incident reporting requirements
- EPL 555 requirements.

If an incident does occur, project personnel in the immediate area are required to promptly cease works and follow the processes in line with the EnergyAustralia TQMS12-HSE-L001 - Emergency Response Plan, and notification and reporting requirements outlined in the following sections.

If the incident is under the control of GECL during construction, then the GECL Emergency Response Plan for Tallawarra B must be followed.

Generally environmental incident notification and reporting would ensure that all environmental incidents and non-compliances must be immediately reported to the HSSE Lead and Construction Manager. Verbal notification must occur immediately on becoming aware of the incident or non-compliance. EnergyAustralia will notify NSW EPA immediately of all pollution incidents that cause or threaten material harm to the environment. EnergyAustralia will also notify the ER of any environmental incident within 24 hours of becoming aware of the incident.

EnergyAustralia will notify the Secretary in writing via the Major Projects website immediately after it becomes aware of an environmental incident following the requirements of CoA 5.1 and Appendix 1 of the major project approval. The major project approval Appendix 1 incident reporting requirements are replicated in Appendix C of this NAQMP.

For full details of incident and non-compliance management requirements, refer to Section 10 of the CEMP. Similarly, complete details for compliance reporting under Condition 5.5 are found in Section 13 of the CEMP.

7.7 Review

This plan will be subject to continuous review throughout the construction and pre-operational stage of the Project, aimed at identifying areas for improvement. Review will be carried out in accordance with procedures described in the Section 14 of the CEMP.

This plan will be subject to continuous review throughout the construction stage of the Project, aimed at identifying areas for improvement.

Specific review of this plan is required to comply with Condition of Approval 7.7. This condition requires that within 3 months, unless the Secretary agrees otherwise, of:

a) the submission of an incident report under condition 5.1 of this approval;

b) the submission of an Independent Environmental Audit report under condition 5.11 of this approval;

c) the approval of any modification to the conditions of this approval; or

d) a direction from the Secretary under condition 1.3 of this approval;

EnergyAustralia must review and, if necessary, revise the studies, strategies or plans required under the conditions of approval to the satisfaction of the Secretary.

Where this review leads to revisions in any such document, then within 4 weeks of the review the revised document must be submitted to the Secretary for approval, unless otherwise agreed with the Secretary.

In accordance with project condition of approval 7.8, to ensure the studies, strategies and plans for the project are updated on a regular basis and incorporate any required measures to improve the environmental performance of the project, EnergyAustralia may submit revised studies, strategies or plans required for the project under the conditions of approval at any time.

With the agreement of the Secretary, EnergyAustralia may also submit any study, strategy or plan required under the conditions of this approval on a staged basis. The Secretary may approve a revised strategy or plan required under the conditions of approval, or the stage submission of these documents, at any time.

With the approval of the Secretary, EnergyAustralia may prepare the revised or staged strategy or plan without undertaking consultation with all parties nominated under the applicable condition in this approval.

8 References

Aurecon. (2020). *Tallawarra Stage B Gas Turbine Power Station: Modification Environmental Assessment. Report prepared for EnergyAustralia.* Sydney: EnergyAustralia.

Aurecon. (2021). *Tallawarra Stage B Gas Turbine Power Station: Environmental Management Strategy. Report prepared for EnergyAustralia Tallawarra Pty Ltd.* Sydney: Aurecon Australasia.

Benbow Environmental. (2020). *Noise and Vibration Impact Assessment for Tallawarra-B Power Station Modification. Report prepared for EnergyAustralia.* Sydney: Benbow Environmental.

DEC. (2006). *Assessing Vibration: a technical guideline.* Sydney: NSW Department of Environment and Conservation. Retrieved from https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/assessing-vibration

DECC. (2009). *Interim Construction Noise Guideline.* Sydney: Department of Environment and Climate Change NSW. Retrieved from https://www.environment.nsw.gov.au/resources/noise/09265cng.pdf

DECC (2011) NSW Road Noise Policy: Department of Environment and Climate Change NSW. Retrieved from https://www.epa.nsw.gov.au/~/media/EPA/Corporate%20Site/resources/noise/2011236nswroadnoisepolicy.ashx

DIPNR. (2004). *Guideline for the Preparation of Environmental Management Plans.* Sydney: NSW Department of Infrastructure, Planning and Natural Resources. Retrieved from https://www.planning.nsw.gov.au/~/media/Files/DPE/Guidelines/guideline-for-the-preparation-of-environmental-management-plans-2004.ashx?la=en

DPIE. (2020a). *Compliance Reporting Post Approval Requirements.* NSW Department of Planning, Industry and Environment. Retrieved from https://www.planning.nsw.gov.au/Assess-and-Regulate/About-compliance/Inspections-and-enforcements/Compliance-reporting-post-approval-requirements

DPIE. (2020b). *Independent Audit Post Approval Requirements.* NSW Department of Planning, Industry and Environment. Retrieved from https://www.planning.nsw.gov.au/-/media/Files/DPE/Other/Assess-and-regulate/About-Compliance/independent-audit-post-approval-requirements-2020-05-19.pdf

EPA. (2007). *Approved methods for the sampling and analysis of air pollutants.* Department of Environment and Conservation. Environment Protection Authority. Retrieved from https://www.epa.nsw.gov.au/your-environment/air/industrial-emissions/sampling-analysing-air-emissions/approved-methods-sampling-analysing-air-pollutants

EPA. (2017). *Noise Policy for Industry.* State of NSW and the Environment Protection Authority. Retrieved from https://www.epa.nsw.gov.au/your-environment/noise/industrial-noise/noise-policy-for-industry-(2017)

Katestone (2020), Tallawarra B Permit Modification: Air Quality Assessment, EnergyAustralia, June 2020, Final, Katestone Environmental Pty Ltd

Minister for Planning. (2020, December 7). *State Significant Infrastructure: Tallawarra B (MOD2) - Consolidated Project Approval.* Retrieved from Department of Planning, Industry and Environment: https://www.planningportal.nsw.gov.au/major-projects/project/16696

SKM. (2009). *Tallawarra Stage B Gas Turbine Power Station: Environmental Assessment. Report prepared for TRUenergy.* Sydney: Sinclair Knight Merz.

Appendix A: Agency consultation log

Consultation undertaken for this NAQMP is summarised below.

Agency	Date	Method	Actions and responses
NSW EPA	*26/08/21*	*Phone call to Greg Newman from the NSW EPA*	• *Greg indicated that a TEAMs/virtual meeting was preferred to walk through the water management controls planned for the works/activities* • *Also discussed dust measures including dust monitoring, water/quality / erosion and sediment measures*
NSW EPA	*28/08/21*	*Email: request by NSW EPA of project contacts*	• *Email sent by NSW EPA to confirm/request the project contacts between EnergyAustralia and the NSW EPA for the purposes of consultation*
NSW EPA	*30/08/21*	*Email: confirmation by EnergyAustralia of contacts*	• *EnergyAustralia confirming main contact as Kirsten Lee* • *Confirmation of project contacts*
NSW EPA	*02/09/21*	*Phone call to Greg Newman*	• *Phone call made to follow-up on pre-construction consultation for the Project*
NSW EPA	*02/09/21*	*Email: follow-up email on pre-construction consultation and draft NAQMP and SWMP for review/comment*	• *Email to follow up on pre-construction consultation for the Project* • *Introduction of the CoA requirement for consultation of the CEMP and sub-plans with NSW EPA* • *Attached to the email is the draft NAQMP and the SWMP for review/comment* • *Note that erosion and sediment control plans still under preparation* • *Confirmation of agreed TEAMs/virtual meeting time for 10/09/21*
NSW EPA	*07/09/21*	*Email: NSW EPA reviewed/comments on draft NAQMP and SWMP*	• *Email from NSW EPA confirming receipt and review of NAQMP and SWMP* • *Marc Cooper from NSW EPA provided key points/information to include in the management plans:* • ***Comment**: NAQMP to include;* *a. Details on fill – sourcing and QA/QC,* *b. Details on stockpiles including Long term stockpile management,* *c. Dust suppression e.g. water carts,* *d. Asbestos management,* *e. Unexpected finds* *f. Details of any monitoring* • ***Response**:* *a. The SWMP will be updated with a management measure: "Any imported material used in the capping layer should be certified as virgin excavated natural material (VENM) or excavated natural material (ENM), and should be sampled to confirm that it is suitable for the ongoing use of the site."* *b. Statement of commitment requirements addressing stockpile management, including long term stockpile management are included in Section 5 of the NAQMP* *c. Statement of commitment requirements addressing dust suppression safeguards are included in Section 5 of the NAQMP* *d. Added a new safeguard to Section 5: "Any works that requires the disturbance of confirmed or suspected asbestos containing materials shall be undertaken in accordance with Hazmat Services (2011) Asbestos Management Plan,*

Agency	Date	Method	Actions and responses
			Version 7 to prevent the spread of asbestos containing particulate matter." *e. Unexpected finds procedures are provided in the WMP, SWMP and ACHMP.* *f. Monitoring requirements are specific and detailed in Section 6.* • ***Comment**: Noise – consultation in advance of Out of hours works – not notification but consultation.* • ***Response**: Section 7.2 has been updated to require 'consultation' in advance of out of hours work, rather than 'notification'. Further detail has also been provided on the nature of the consultation required.*
NSW EPA	*15/09/21*	*Email: To NSW EPA*	• *Email to NSW EPA to provide a draft PESCP that has been signed off by a registered soil conservationist to address comments received from EPA 07/09/2021*
NSW EPA	*21/09/2021*	*Email from EPA*	• *EPA advises they have reviewed the PSECP and have no further comments (in relation to the NAQMP or SWMP).*
NSW EPA	*12/10/2021*	*MS teams meeting with the EPA*	• *EPA didn't have any concerns to raise over the OOHW procedure and noted that they did not expect any/many complaints from residents* • ***Comment**: EPA requested the environment line to be notified to advise of forward looking out of hours works via the info@epa email address with reference in the message to the appointed EPA officer to the project (currently Marc Cooper).* • ***Response**: The requirement to notify the EPA in advance of out of hours works has been included as a management action in Section 5 of the NAQMP and is included in the Out of Hours Works Approval Protocol in Appendix B of the NAQMP.*

Appendix B: Out of Hours Works Approval Protocol

Out of Hours Works Approval Protocol

1 Distribution

There are no restrictions on the distribution/circulation of this Protocol within the Tallawarra B Project.

2 Purpose

This Procedure provides GECL an approval process to conduct out of hours works (OOHW) on a case by case or activity specific basis outside of the approved standard hours in accordance with Condition 3.2 of the Project Approval and Condition E3.2 of the EPL.

This procedure applies to out of hours construction activities that may be undertaken outside the approved standard construction hours.

In accordance with the Project EPL and Project Approval, the approved standard construction hours are:

(a) 7:00am to 6:00pm, Monday to Friday's, inclusive;
(b) 8:00am to 1:00pm on Saturday's; and
(c) at no time on Sunday's or public holiday's

3 Induction/Training

All GECL personnel are to be inducted in the approved hours of work, Project Approval, EPL and out of hours works requirements during the project induction, site inductions and regular toolbox talks.

4 Scope

This OOHW procedure has been developed with consideration of relevant legislation, guidelines, specifications and policy documents outlined in the Noise and Air Quality Management Plan.

Specifically the Interim Construction Noise Guidelines (ICNG) (DECC, 2009) outlines five categories of works that may be undertaken outside the recommended standard hours. These are:

- The delivery of oversized plant or structures that police or other authorities determine require special arrangements to transport along public roads.
- Emergency work to avoid the loss of life or damage to property, or to prevent environmental harm.
- Maintenance and repair of public infrastructure where disruption to essential services and/or considerations of worker safety do not allow work within standard hours.
- Public infrastructure works that shorten the length of the project and are supported by the affected community.
- Works where a proponent demonstrates and justifies a need to operate outside the recommended standard hours

The EPL also permits constructions works that causes LAeq(15minute) noise levels that are no more than 5dB above rating background levels at any residence.

5 Adopted Project Noise Management Levels

The noise management levels (NMLs) prescribed in the Noise and Air Quality Management Plan (NAQMP) will be adopted as defined in Table 5.1 in this Protocol. The criteria for out of hours is provided in Section 6.2.3 of the NAQMP. For works proposed to occur during night time the sleep disturbance screening criteria from the NSW Noise Policy for Industry will be applied.

Receiver	Land use	Period	RBL L_{A90}	Noise management level $L_{Aeq\ (15\ minute)}$
R1-5	Residential	Day	36	46
R6-13, R18-28*	Residential	Day	35	45
R14, R17*	Residential	Day	38	48
R29, R30*	Commercial	Day	-	70
R31, R31B*	School	Day	-	55
R32*	Holiday accommodation	Day	-	58

Figure 5.1 Construction noise criteria for standard working hours dB(A)

6 Out of Hours Works approval process

This section outlines the process for OOHW identification, assessment, consultation and approval. The steps involved in the process are outlined in Figure 1 and detailed further below.

6.1 Step 1 – Identify need for OOHW

GECL Project team will identify the need to undertake out of hours works as per program and schedule.

6.2 Step 2 – Prepare OOHW works application

6.2.1 Identify scope and justification for OOHW

The OOHW Application would be completed by GECL. This includes details on:

- the proposed scope of works
- location of works
- duration of works
- justification for OOHW
- The out of hours works noise assessment described in Section 6.2.2

6.2.2 Out of hours works noise assessment

A construction noise assessment will be undertaken to assess the noise impacts for activities proposed outside standard construction hours. A range of plant and equipment will be required to undertake activities associated with OOHW. In accordance with the ICNG (DECC, 2009), items to consider during these assessments include:

- All noise sources related to the proposed construction works, including vehicles that operate on site
- Location and height of noise sources on site
- Type of noise, such as airborne or ground-borne noise
- Proposed movement alarms on plant and vehicles
- Alternative work methods (including noise mitigation measures) and justification of the selected work methods
- Equipment or plant noise levels – references should be provided for all noise source levels in the assessment
- All stages of the construction works
- All residences and other sensitive land uses potentially impacted
- Site features (including topography, buildings and surrounding land uses) that affect noise propagation
- Noise enhancement due to both daytime and night time weather conditions
- Proposed construction hours and the percentage of time the equipment operates
- Other concurrent construction works in the vicinity that may contribute additional noise.
- Extent of community consultation required (as described in Section 6.3)
- The approvals required before works can proceed (as described in Section 6.4)
- Noise monitoring procedures (as described in Section 6.5)

6.2.3 Out of hours work noise impact categories

With consideration of the EPL, the following two noise impact categories have been adopted in this OOHW assessment process.

Category 1: Out of hours noise levels are no more than 5dB above RBL at any residence

Category 2: Out of hours noise levels are greater than 5dB above RBL at any residence

6.3 Anticipated Out of Hours Construction Works

Construction works are due to commence from January 2022 and be completed by December 2023. Table 6.3 provides an out of hours schedule anticipated during the construction period.

Activity	Typical Equipment Used	Expected Working Hours Outside Standard Hours	Indicative timing+
Refuelling operations	Truck vehicle movements (with smart low noise movement alarms)	24 hours	As required
Maintenance activities	Power hand tools, air compressors, generator, truck and equipment movements	24 hours	Occasional
Concrete pours (including GT slab 800m3 monolithic pour)	Concrete agitators, concrete pumps, vibrators.	24 hours	24 hours (GT slab) 1st and 2nd quarter 2022
Hot works (welding, grinding and steel fabrication)	Power tools	7pm to 6am inclusive	3rd and 4th quarter 2022
Line flushing	Electric Pump	24 hours	3rd and 4th quarter 2022 1st quarter 2023
Pipe testing and mechanical works	Air compressor	Saturdays 6am to 6pm Sunday 8am to 5pm (occasional)	3rd and 4th quarter 2022
Critical lifting (including oversize over mass activities)	Cranes	7pm to 6am Monday to Friday inclusive Saturday 6am to 6pm Sunday 8am to 5pm (occasional)	3rd and 4th quarter 2022 As required
Electrical works, cable pulling and terminations	Hand tools	7pm to 6am including weekends	3rd and 4th quarter 2022

+ Dependent on weather and other variables including disruption in supply chains

Note: Closest sensitive receiver to the Project Boundary is minimum 600 meters

Predicted sound pressure levels at the closest sensitive receivers will be determined during the out of hours application assessment process. During the commissioning phase, power plant operations will be assessed against the EPL and Project Approval operational noise conditions.

6.4 Consultation

In accordance with EPL E3.2 (3), the EPA will be consulted to support any proposed variation to construction times via the nominated email address (info@epa.nsw.gov.au) also copying in the Project nominated local EPA Officer.

Where the out of hours works impact other stakeholders, including TfNSW or Wollongong Council, consultation will be undertaken by GECL before the commencement of these works including obtaining any additional permits or approvals.

6.5 Community Notification

Community notifications will be issued as a mitigation measure. GECL will provide a monthly lookahead of upcoming works including out of hours works. EA are responsible for direct community consultation as part of the overall Energy Australia Community Consultation Framework.

Where OOHW have been scheduled, Energy Australia's Community Liaison Representative will notify the potentially affected noise sensitive receivers of upcoming OOHW. A minimum of 5 business days' notice before the proposed out of hours works will be provided to Energy Australia.

As part of the out of hours notification, all potentially impacted sensitive receivers will be provided the 1300 community hotline, Project email address and postal address (to be established by Energy Australia). The community hotline will be available 24 hours per day and 7 days per week.

6.6 Approval

This Protocol seeks to authorise the Environmental Representative to approve Category 1 out of hours works applications, noting the current Project Approval Condition 3.2 requires written approval of the Secretary for any variation of construction hours. DPIE is responsible for approving and Category 2 out of hours works applications. All OOHW will be carried out in consultation with the EPA, and DPIE will be notified of all OOHW prior to undertaking the work. Figure
1 provides a flowchart summarising this process.

GECL will prepare the OOHW application which will summarise the equipment, location, duration and justification for the works, including predicted noise levels and any mitigation measures where required to ensure compliance with Project Approval Condition 3.3. Section 5 of the NAQMP outlined mitigation measures that may be deployed during OOHW.

6.7 Monitoring

As per Section 6.4 of the NAQMP, out of hours monitoring will be undertaken to determine the predicted levels are consistent with the actual noise monitoring at the closest sensitive receiver. Attended noise monitoring of commencement of a new out of hours construction activity to verify predicted levels will occur. Complaint monitoring will also be undertaken should a complaint be received.

6.8 Complaints management

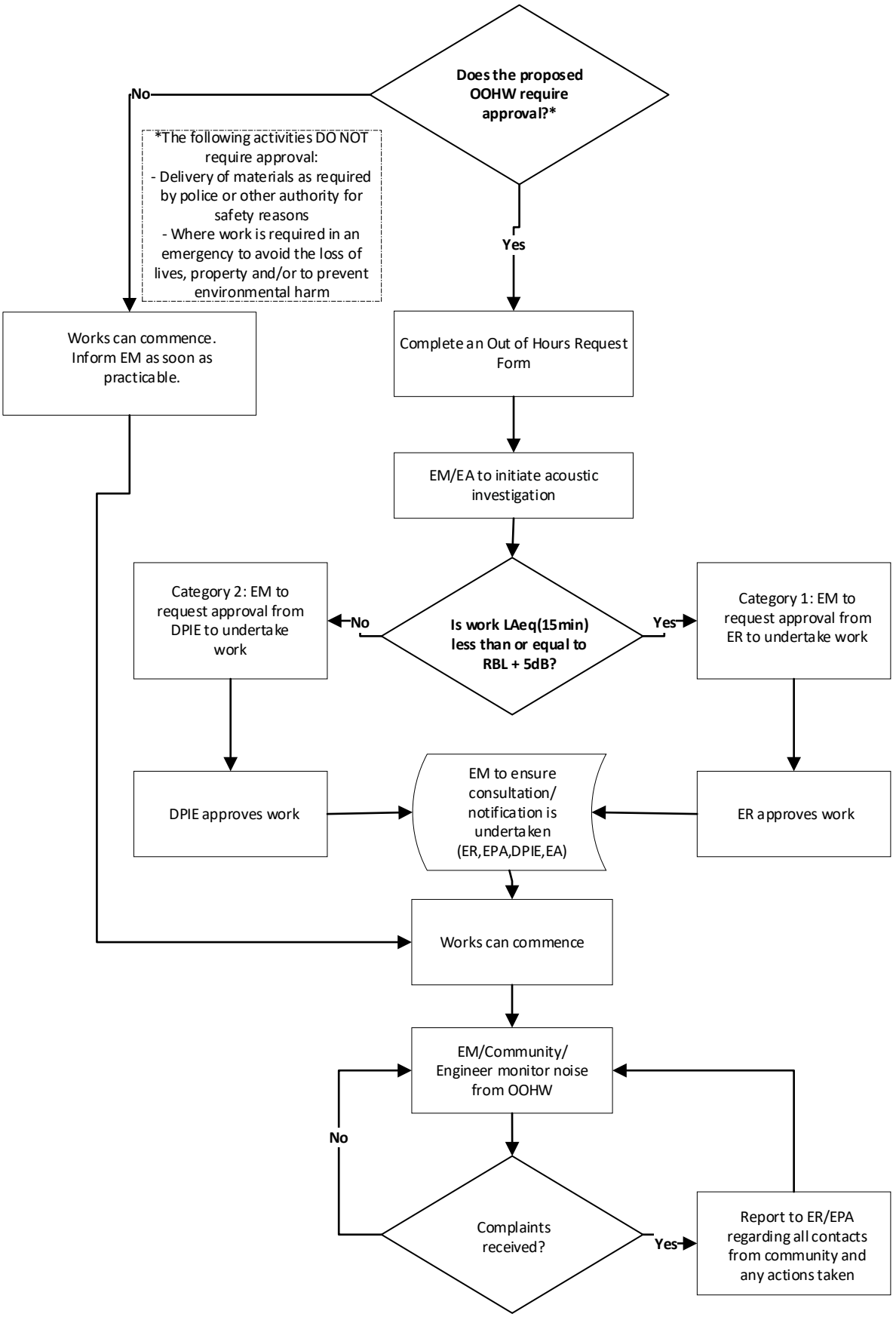
In accordance with Project Approval Condition 6.3 and EPL Condition M5.2, a complaints register will be established and maintained by Energy Australia Community Relations Representative.

The Register shall record, but not necessarily be limited to:

(a) The date and time of the complaint;
(b) The means by which the complaint was made (telephone, mail or email);
(c) Any personal details of the complainant that were provided, or if no details were provided, a note to that effect;
(d) The nature of the complaint;
(e) Any action(s) taken by the Proponent in relation to the complaint, including any follow-up contact with the complainant; and
(f) If no action was taken by the Proponent in relation to the complaint, the reason(s) why no action was taken.

Should the Project receive a complaint relating to OOHW works via the community hotline which will be available 24 hours a day and 7 days per week, the Project will investigate and adopt additional mitigation measures as required. GECL will have a nominated supervisor for each out of hours works activities.

Figure 1 Out of Hours Works Procedure Flow Chart



Appendix C: Incident notification requirements (major project approval, Appendix 1)

Written incident notification requirements:

1. A written incident notification addressing the requirements set out below must be submitted to the Secretary via the Major Projects website within seven days after the Proponent becomes aware of an incident. Notification is required to be given under this condition even if the Proponent fails to give the notification required under condition 5.1 or, having given such notification, subsequently forms the view that an incident has not occurred.

2. Written notification of an incident must:

    a. identify the development and application number;
    b. provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
    c. identify how the incident was detected;
    d. identify when the Proponent became aware of the incident;
    e. identify any actual or potential non-compliance with conditions of approval;
    f. describe what immediate steps were taken in relation to the incident;
    g. identify further action(s) that will be taken in relation to the incident; and
    h. identify a project contact for further communication regarding the incident.

3. Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Secretary, the Proponent must provide the Secretary and any relevant public authorities (as determined by the Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested.

4. The Incident Report must include:

    a. a summary of the incident;
    b. outcomes of an incident investigation, including identification of the cause of the incident;
    c. details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
    d. details of any communication with other stakeholders regarding the incident.

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