

Clean TeQ Sunrise Project Blast Management Plan

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29 March 2019

REVISION 1

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1. INTRODUCTION

The Clean TeQ Sunrise Project (the Project) is situated near the village of Fifield, approximately 350 kilometres (km) west-northwest of Sydney, in New South Wales (NSW) (Figure 1).

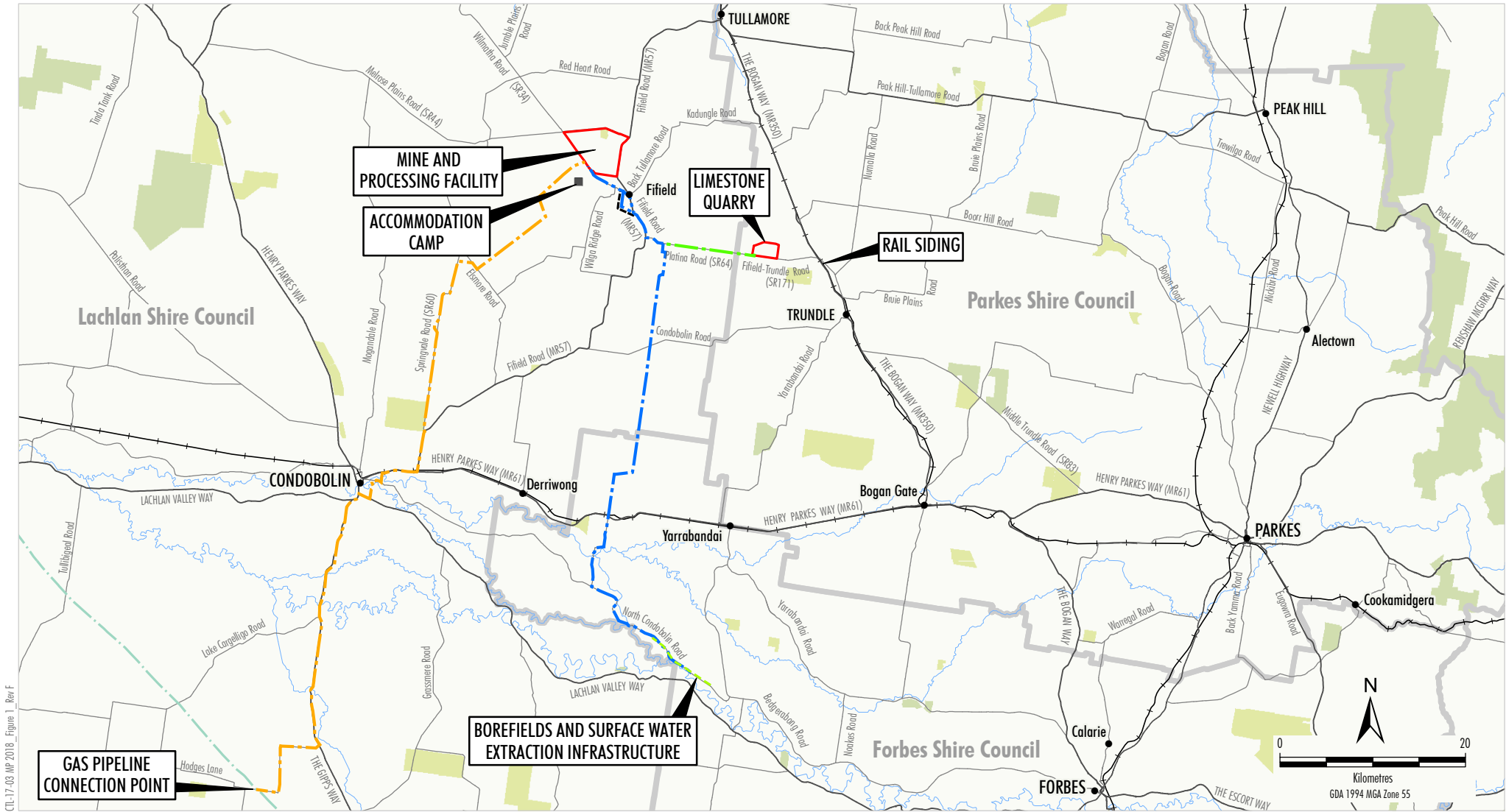
The Project includes the establishment and operation of the following (Figure 1):

- mine (including the processing facility);
- limestone quarry;
- rail siding;
- gas pipeline;
- borefields, surface water extraction infrastructure and water pipeline;
- accommodation camp; and
- associated transport activities and transport infrastructure (e.g. the Fifield Bypass, road and intersection upgrades).

Clean TeQ Sunrise Pty Ltd owns the rights to develop the Project. Clean TeQ Sunrise Pty Ltd is a wholly owned subsidiary of Clean TeQ Holdings Limited (Clean TeQ).

Development Consent DA 374-11-00 for the Project was issued under Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) in 2001. Six modifications to Development Consent DA 374-11-00 have since been granted under the EP&A Act:

- 2005 – to allow for an increase of the autoclave feed rate, limestone quarry extraction rate and adjustments to ore processing operations;
- 2006 – to allow for the reconfiguration of the borefields;
- 2017 – to allow for the production of scandium oxide;
- 2017 – to amend hazard study requirements;
- 2018 – to relocate the accommodation camp; and
- 2018 – to implement opportunities to improve the overall efficiency of the Project.



CTL-17-03 MP 2018_Figure 1_Rer F



- LEGEND**
- National Park/Conservation Area
 - State Forest
 - Local Government Boundary
 - Railway
 - Existing Gas Pipeline
 - Mining Lease Boundary (ML)
 - Fifiel Bypass
 - Gas Pipeline
 - Water Pipeline
 - Limestone Quarry Water Pipeline
 - Borefield Infrastructure Corridor

Source: Black Range Minerals (2000); Clean TeQ (2017, 2018);
NSW Department of Industry (2018); NSW Land & Property Information
(2017); Office of Environment and Heritage NSW (2017)

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CLEAN TEQ SUNRISE PROJECT
Regional Location

Figure 1

1.1 Purpose and Scope

This Blast Management Plan (BMP) has been prepared by Clean TeQ in accordance with the requirements of Conditions 16 and 17, Schedule 3 of Development Consent DA 374-11-00 (Table 1).

Table 1 – Specific BMP Requirements in Development Consent DA 374-11-00

Development Consent DA 374-11-00 Schedule 5	Section Where Addressed in this EMS
16. <i>Prior to carrying out any blasting at the mine site or limestone quarry, the Applicant must prepare a Blast Management Plan for the development to the satisfaction of the Secretary. This plan must:</i>	This BMP
a) <i>describe the measures that would be implemented to ensure compliance with the blasting criteria and operating conditions of this consent;</i>	Section 8
b) <i>propose and justify any alternative ground vibration limits for any public infrastructure in the vicinity of the site (if relevant); and</i>	Section 8
c) <i>include a monitoring program for evaluating and reporting on compliance with the blasting criteria and operating conditions.</i>	Section 9
17. <i>Applicant must implement the approved Blast Management Plan for the development.</i>	-

On 5 July 2018, the Secretary of the Department of Planning & Environment (DP&E) approved the progressive submission of environmental management plans for the Project in accordance with Condition 12, Schedule 2 of Development Consent DA 374-11-00. The scope of this BMP is specifically related to the following initial Project construction activities:

- development of the mine, including:
 - site establishment and earthworks;
 - construction of site access roads and haul roads;
 - processing facility earthworks;
 - establishment of temporary facilities required for construction activities (e.g. offices, lay down areas, communications infrastructure);
 - construction of the mine infrastructure area including the offices, workshops, warehouse, laboratory and amenities buildings, fuel storage areas, potable water treatment plant and car parking facilities;
 - construction of the tailings storage facility and evaporation pond;
 - construction of water management infrastructure including the raw water dam, water storage dam and sediment dams;
 - construction and operation of the concrete batch plant;
 - development of gravel and clay borrow pits (including blasting and crushing);
 - installation of appropriate fencing and barriers for public safety and security for mining and construction; and
 - other associated minor infrastructure, plant, equipment and activities;
- development and operation of the accommodation camp;

- development and operation of the borefields, surface water extraction infrastructure and water pipeline; and
- road upgrades.

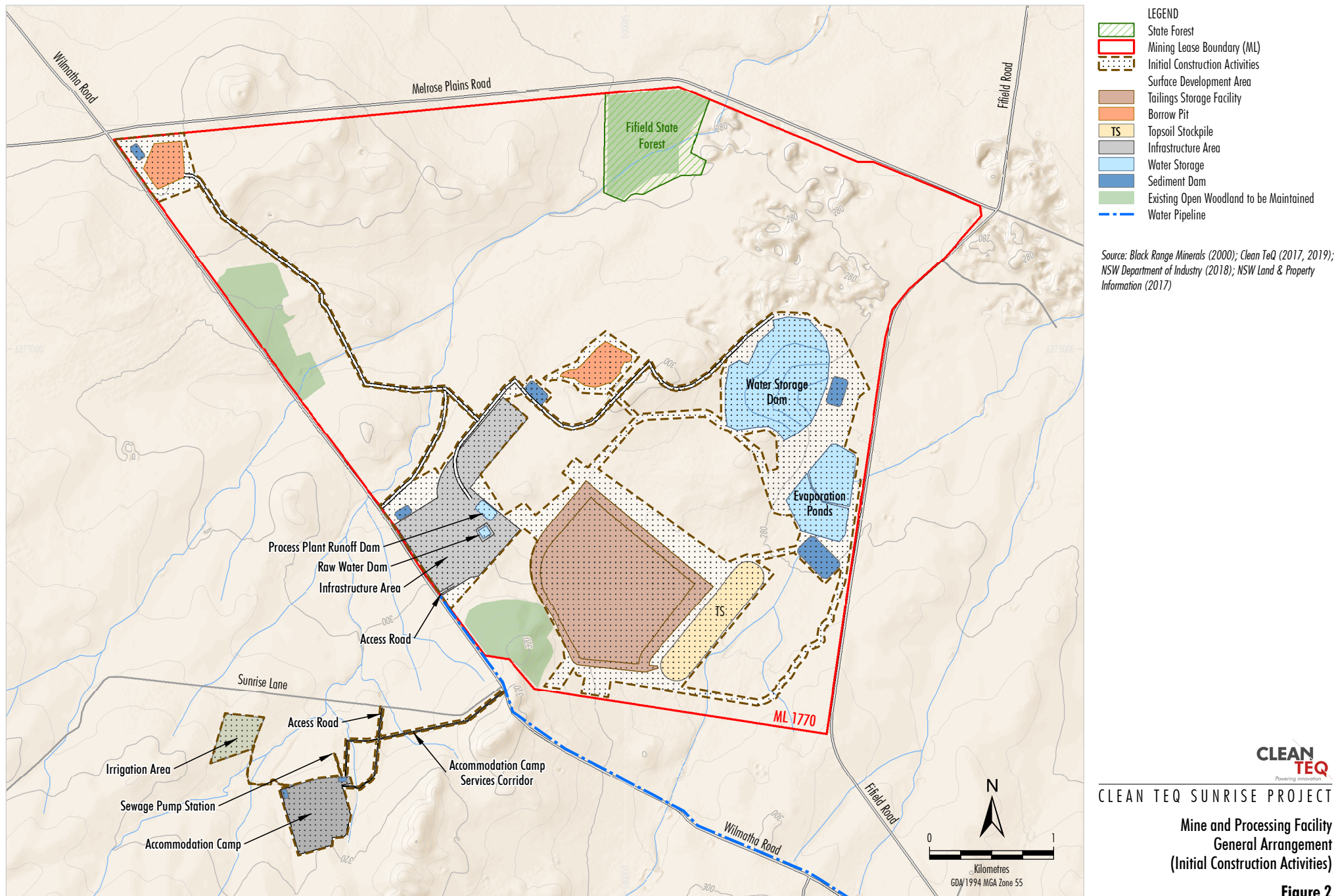
The approximate extent of the initial Project construction activities is shown on Figure 2.

During the construction phase of the Project blasting at the mine site would be limited to small blasts for surface borrow pits. These blasts would be smaller in scale than blasts within the open cut pits during operations, which would have a Maximum Instantaneous Charge (MIC) of up to approximately 380 kilograms.

1.2 Structure of this Blast Management Plan

The remainder of this BMP is structured as follows:

- Section 2: Describes the review and update of this BMP.
- Section 3: Outlines the statutory requirements applicable to this BMP.
- Section 4: Outlines the existing environment including baseline data and sensitive receptors in the vicinity of the Project.
- Section 5: Outlines the relevant criteria applicable to the Project.
- Section 6: Details the specific performance indicators Clean TeQ proposes to use to guide the implementation of the blast management measures and judge their performance.
- Section 7: Describes the potential impacts of blasting and predictions of previous assessments.
- Section 8: Describes the management and control measures to be implemented, where relevant, at the Project.
- Section 9: Outlines the blast monitoring program components including locations, frequency and parameters.
- Section 10: Provides a contingency plan to manage unprecedented impacts and their consequences.
- Section 11: Describes the program to review and report on the effectiveness of management measures and improvement of environmental performance.
- Section 12: Describes the protocol for management and reporting of incidents, complaints and non-compliances with statutory requirements.
- Section 13: Provides references cited in this BMP.



2. BLAST MANAGEMENT PLAN REVIEW AND UPDATE

Consistent with the Secretary's approval for the progressive submission of environmental management plans, the BMP would be re-submitted and approved prior to the commencement of activities not included in the scope of this BMP.

In accordance with Condition 6, Schedule 5 of Development Consent DA 374-11-00, this BMP will be reviewed, and if necessary revised (to the satisfaction of the Secretary), within three months of the submission of:

- an Annual Review (Condition 5, Schedule 5);
- an incident report (Condition 8, Schedule 5);
- an independent environmental audit (Condition 10, Schedule 5); or
- any modification to the conditions of Development Consent DA 374-11-00 (unless the conditions require otherwise).

The reviews would be undertaken to ensure the BMP is updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the Project.

Within 4 weeks of conducting a review of the BMP, the Secretary will be advised of the outcomes of the review and any revised documents submitted to the Secretary for approval.

The revision status of this BMP is indicated on the title page of each copy.

The approved BMP will be made publicly available on the Clean TeQ website, in accordance with Condition 12, Schedule 5 of Development Consent DA 374-11-00.

3. STATUTORY REQUIREMENTS

Clean TeQ's statutory obligations relevant to blast management are contained in:

- the conditions of Development Consent DA 374-11-00;
- relevant licences and permits, including conditions attached to mining leases; and
- other relevant legislation.

Obligations relevant to this BMP are described below.

3.1 Development Consent DA 374-11-00

3.1.1 Blast Management Plan Requirements

Conditions 16 and 17, Schedule 3 of Development Consent DA 374-11-00 require the preparation of a BMP (refer Table 1).

3.1.2 Management Plan (General) Requirements

Condition 4, Schedule 5 of Development Consent DA 374-11-00 outlines the general management plan requirements that are also applicable to the preparation of this BMP. Table 2 presents these requirements and indicates where each is addressed within this BMP.

Table 2 – Management Plan (General) Requirements

Development Consent DA 374-11-00 Schedule 5	BMP Section
Management Plan Requirements	
4. <i>The Applicant must ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, are consistent with other plans prepared for other stakeholders, and include:</i>	
a) <i>detailed baseline data;</i>	Section 4
b) <i>a description of:</i> <ul style="list-style-type: none">• <i>the relevant statutory requirements (including any relevant approval, licence or lease conditions);</i>• <i>any relevant limits or performance measures/criteria;</i>• <i>the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;</i>	Section 3 Section 5 Section 6
c) <i>a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</i>	Section 8
d) <i>a program to monitor and report on the:</i> <ul style="list-style-type: none">• <i>impacts and environmental performance of the development;</i>• <i>effectiveness of any management measures (see c above);</i>	Sections 9, 10, 11 and 12
e) <i>a contingency plan to manage any unpredicted impacts and their consequences;</i>	Section 10
f) <i>a program to investigate and implement ways to improve the environmental performance of the development over time;</i>	Section 11

Table 2 – Management Plan (General) Requirements (Continued)

Development Consent DA 374-11-00 Schedule 5	BMP Section
g) a protocol for managing and reporting any: <ul style="list-style-type: none"> incidents; complaints; non-compliances with statutory requirements; and exceedances of the impact assessment criteria and/or performance criteria; and 	Section 12.1 Section 12.2 Section 12.3 Sections 10 and 11
h) a protocol for periodic review of the plan. <i>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i>	Section 2

3.2 Licences, Permits and Leases

In addition to the requirements of Development Consent DA 374-11-00, all activities at or in association with the Project will be undertaken in accordance with the following licences, permits and leases which have been issued or are pending issue:

- Mining Lease (ML) 1770 sought and issued by the NSW Minister for Resources under the *NSW Mining Act, 1992*.
- Mining Operations Plan(s) submitted and approved by the NSW Division of Resources and Geoscience.
- Environment Protection Licence (EPL) 21146 issued by the NSW Environment Protection Authority under the *NSW Protection of the Environment Operations Act 1997* (POEO Act).
- Water supply works, water use approvals and water access licences (WALs) issued by Department of Industry – Lands & Water under the *NSW Water Management Act 2000* including:
 - Water Supply Works Approval 70CA614098 for the Project borefields.
 - WAL 32068 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 3,154 share components under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.
 - WAL 39837 in the Upper Lachlan Alluvial Groundwater Source (Upper Lachlan Alluvial Zone 5 Management Zone) for 766 share components under the *Water Sharing Plan for the Lachlan Unregulated and Alluvial Water Sources 2012*.
 - WAL 28681 in the Lachlan Fold Belt Murray-Darling Basin (MDB) Groundwater Source (Lachlan Fold Belt MDB [Other] Management Zone), for 243 share components under the *Water Sharing Plan for the NSW Murray Darling Basin Fractured Rock Groundwater Sources 2011*.
 - WAL 6679 for 123 share components (General Security) under the *Water Sharing Plan for the Lachlan Regulated River Water Source 2016*.
- Aboriginal Heritage Impact Permits (AHIP #C0003049 and AHIP #C0003887) issued by the Office of Environment and Heritage (OEH) under the *NSW National Parks and Wildlife Act 1974*.

- Mining and workplace health and safety related approvals granted by the NSW Department of Industry and SafeWork NSW.

3.3 Other Legislation and Relevant Requirements

Clean TeQ will conduct the Project consistent with the requirements of Development Consent DA 374-11-00 and any other legislation that is applicable to an approved Part 4 Project under the EP&A Act.

In addition to the statutory obligations described in Sections 3.1 and 3.2, the following NSW Acts (and their Regulations) may be applicable to the conduct of the Project:

- *Aboriginal Land Rights Act, 1983;*
- *Biodiversity Conservation Act, 2016;*
- *Biosecurity Act, 2015;*
- *Crown Land Management Act, 2016;*
- *Contaminated Land Management Act, 1997;*
- *Dams Safety Act, 2015;*
- *Dangerous Goods (Road and Rail Transport) Act, 2008;*
- *Energy and Utilities Administration Act, 1987;*
- EP&A Act;
- *Fisheries Management Act, 1994;*
- *Forestry Act, 2012;*
- *Mining Act, 1992;*
- *National Parks and Wildlife Act, 1974;*
- *Pipelines Act, 1967;*
- POEO Act;
- *Rail Safety (Adoption of National Law) Act, 2012;*
- *Roads Act, 1993;*
- *Water Act, 1912;*
- *Water Management Act, 2000;*
- *Work Health and Safety Act, 2011; and*
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013.*

Commonwealth Acts which may also be applicable to the conduct of the Project include:

- Environment Protection and Biodiversity Conservation Act, 1999; and
- Native Title Act, 1993.

Relevant licences or approvals required under these Acts will be obtained as required.

4. EXISTING ENVIRONMENT

4.1 Baseline Data

As no blasting is undertaken in the vicinity of the mine site there is no existing blast overpressure or ground vibration data.

4.2 Sensitive Receptors

Relevant receptors that may experience blasting impacts associated with the construction phase of the Project are shown on Figure 3.

4.3 Meteorological Conditions

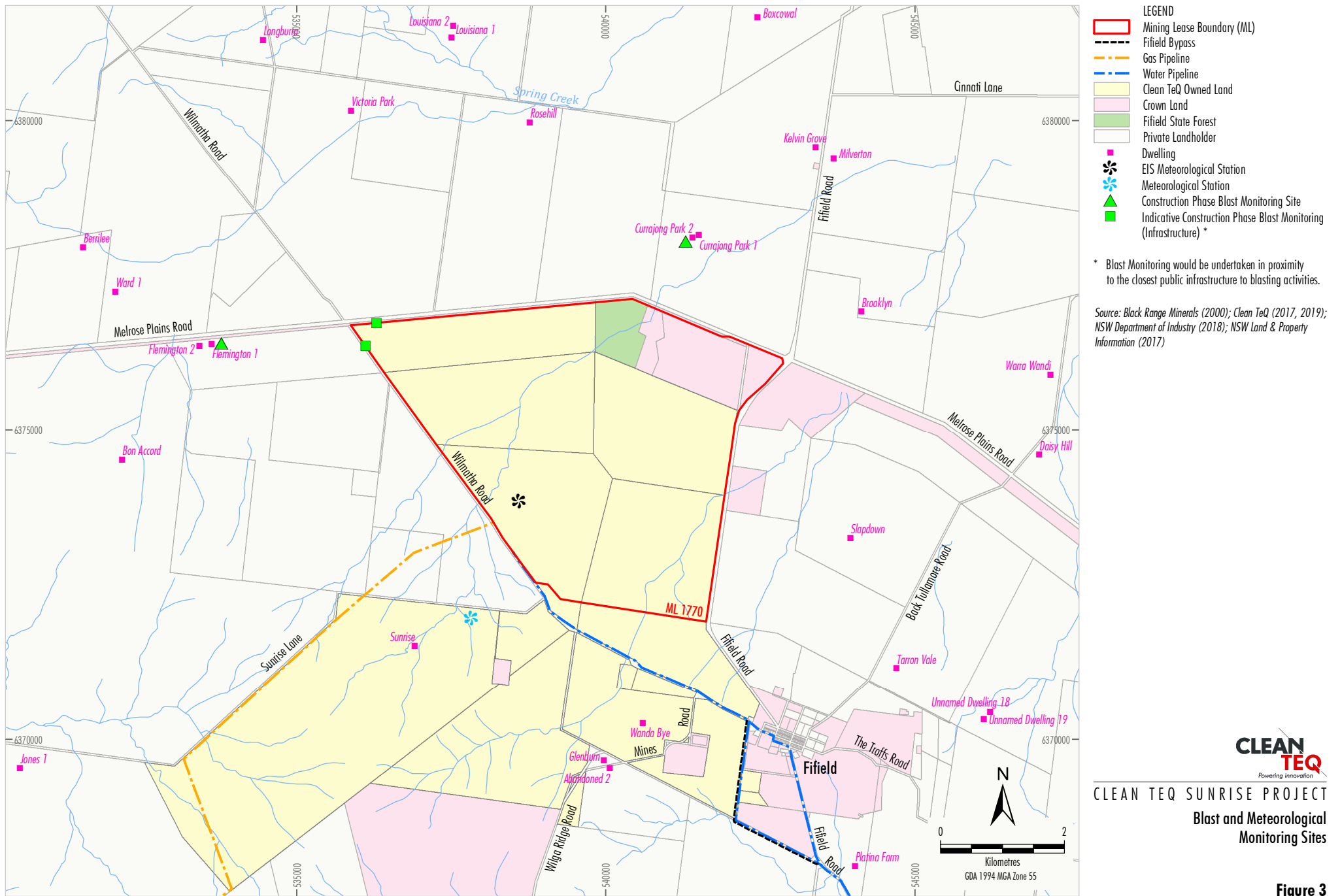
An on-site meteorological monitoring station was installed in September 1998 to provide baseline data for the Project EIS and was removed in 1999.

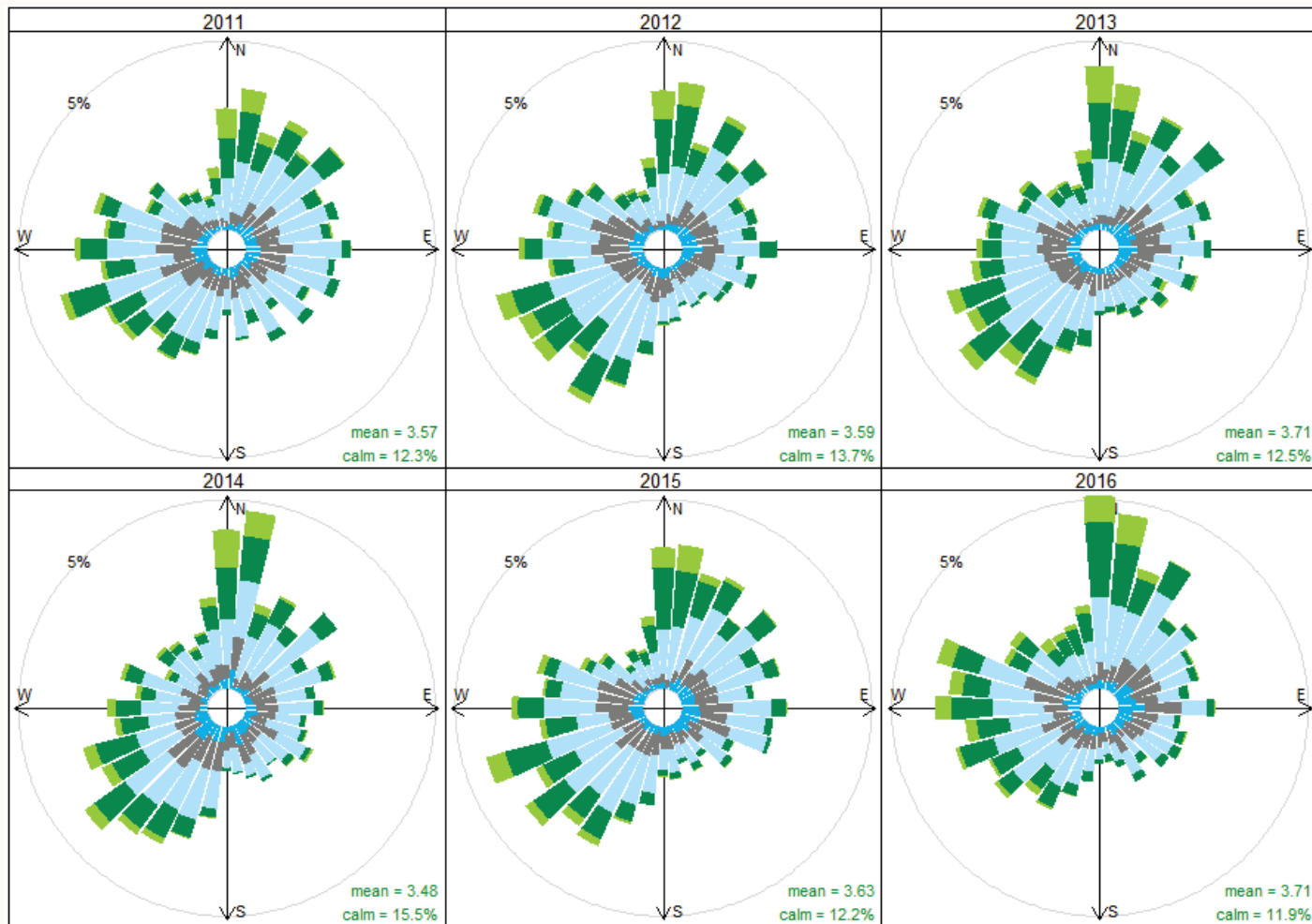
A new meteorological station was installed in November 2018 (Figure 3). At the time of writing this BMP, there was insufficient data to generate representative meteorological conditions for the mine site.

The closest Bureau of Meteorology Station (BoM) automatic weather station (AWS) site, Condobolin Airport AWS, located approximately 40 km south-southwest, has been reviewed to determine if the recorded data would be representative of the mine site.

The wind roses generated for the Condobolin Airport AWS present wind direction and wind speed as a percentage of time for 2011 to 2016 (Figure 4). The wind roses show similar wind patterns to those recorded while the on-site meteorological station was operating.

Winds are dominant from the north-northeast and south-west and to a lesser extent, winds from most other directions.





LEGEND
Frequency of Counts by Wind Direction (%)
(ms⁻¹)

- 0.5 to 1.5
- 1.5 to 3
- 3 to 5.5
- 5.5 to 8
- 8 to 16.9

Source: Ramboll Environ (2017)

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Wind Roses
2011 to 2016
(Condobolin Airport Automatic Weather Station)

Figure 4

5. BLAST CRITERIA

5.1 Development Consent DA 374-11-00

5.1.1 Blasting Criteria

Condition 12, Schedule 3 of Development Consent DA 374-11-00 requires that Clean TeQ must ensure that blasting at the mine site and limestone quarry does not cause exceedances of the criteria listed in Table 3.

However, these criteria do not apply if Clean TeQ has a written agreement with the relevant landowner, and has advised the Department in writing of the terms of this agreement.

Table 3 – Blasting Criteria (dBA)

Location	Airblast overpressure (db(lin peak))	Ground vibration (mm/s)	Allowable exceedance
<i>Residence on privately-owned land</i>	120	10	0%
	115	5	5% of total blasts over any 12 month period

mm/s = millimetres per second.

5.1.2 Blasting Hours

Condition 14, Schedule 3 of Development Consent DA 374-11-00 states Clean TeQ may only carry out blasting at the mine site and quarry between 9.00 am and 5.00 pm Monday to Saturday, inclusive. No blasting is allowed on Sundays, public holidays or at any other time without the written approval of the Secretary. This condition does not apply to blasts required to ensure the safety of the mine, its workers or the general public.

Condition L5.1 of EPL 21146 states that construction blasting may only be carried out at the premises between 9.00 am and 4.00 pm Monday to Friday and 9.00 am to 1.00 pm Saturdays where the overpressure and ground vibration levels are designed and predicted to not exceed 95 dB(A) and 1 millimetre per second respectively at all privately-owned buildings. No construction blasting is permitted on Sundays or Public Holidays.

Clean TeQ will therefore carry out construction blasting in accordance with the hours stated in EPL 21146 (specific to construction blasting), which are more stringent than the hours stated in Development Consent DA 374-11-00. Once operational, blasting will be carried out in accordance with the hours specified in Development Consent DA 374-11-00.

5.1.3 Operating Conditions

Condition 15, Schedule 3 of Development Consent DA 374-11-00 requires that Clean TeQ:

(a) *Implement best management practice to:*

- *protect the safety of people and livestock in the surrounding area;*
- *protect public or private infrastructure/ property in the surrounding area from damage from blasting operations; and*
- *minimise the dust and fume emissions from any blasting; and*

(b) *monitor and report on compliance with the relevant blasting conditions in this consent, to the satisfaction of the Secretary.*

5.2 Other License Conditions

There are no construction blasting criteria or other construction blast related conditions stipulated in ML 1770.

6. PERFORMANCE INDICATORS

The following blast related performance indicators will be used to judge the performance of the Project:

- results of monitoring are compliant with the blasting criteria in Section 5;
- no blasting occurs outside of the period 9.00 am to 4.00 pm Monday to Friday and 9.00 am to 1.00 pm Saturdays;
- no injury to people or livestock as a result of blasting;
- no damage to public or private infrastructure/property as a result of blasting; and
- complaints are minimised and appropriate management actions are implemented following receipt of a complaint (Section 12.2).

Section 10 details the Contingency Plan to be implemented to manage any unpredicted impacts. Sections 11 and 12 detail the reporting that will be undertaken by Clean TeQ.

7. BLAST IMPACTS AND PREDICTIONS

Blasting has the potential to result in the following hazards that may present a risk to public safety or property damage, if inappropriately managed:

- excessive ground vibration;
- airblast overpressure exceedances;
- flyrock, dust and debris;
- fumes; and
- misfires.

7.1 Ground Vibration

Energy released after a blast event can result in vibration that has the potential to damage infrastructure and buildings.

7.2 Airblast Overpressure

Blasting generates a transient air pressure greater than the surrounding atmospheric pressure, known as overpressure. Overpressure has the potential to damage infrastructure and buildings.

7.3 Flyrock, Dust and Debris

Flyrock is any rock material ejected from the blast by the force of the blast. Flyrock has the potential to damage infrastructure and buildings and poses a risk to public safety.

The amount of debris and dust emitted from the blast site post-blast depends on several factors including the blast design and the rock material being blasted. The debris and dust poses a risk to public safety.

7.4 Fumes

Blasting has the potential to generate post-blast gases (fumes) from the use of ammonium nitrate-based explosives. Such gases commonly include nitric oxide (NO) and nitrogen dioxide (NO₂) and are known as Oxides of Nitrogen or NO_x. While NO is invisible, NO₂ ranges from yellow to dark red depending on the concentration and size of the gas cloud (Australian Explosives Industry and Safety Group Inc, 2011).

7.5 Misfires

A blast misfire can occur when one (or more) hole(s) in a blast pattern fail to initiate, resulting in a blast event that is different to the blast design.

7.6 Blast Predictions

The Modification 4 Noise and Blasting Assessment (Renzo Tonin & Associates, 2017) determined that no exceedances of the relevant overpressure and ground vibration criteria for residences would occur as a result of blasting within the borrow pits.

8. BLAST MANAGEMENT AND CONTROL MEASURES

Clean TeQ will implement best management practice to protect the safety of people and livestock, protect public or private infrastructure/property from blasting damage and minimise dust and fume emissions from blasting in accordance with Condition 15, Schedule 3 of Development Consent DA 374-11-00.

The effectiveness of blast management and control measures at the Project will be assessed and continually improved through monitoring (Section 9).

8.1 Public Safety and Livestock

8.1.1 Private Landowners

The nearest private residence is located over two kilometres away from the location of construction blasting.

As described in Section 8.4.3, private landholders and residents on the pre-blast notification register will be notified prior to blasting.

In accordance with Condition L5.1 of EPL 21146, construction blasting will be designed so that the overpressure and ground vibration levels do not exceed 95 dBA and 1 mm/s respectively at all privately-owned buildings. The proposed MIC of up to 380 kilograms will be adjusted to comply with these criteria (Section 1.1).

8.1.2 Public Roads

Development Consent 374-11-00 and EPL 21146 do not include criteria for vibration levels on roadway infrastructure. Condition 16(b), Schedule 3 of Development Consent 374-11-00 states that this BMP must propose and justify any alternative ground vibration limits for any public infrastructure in the vicinity of the site. As there is currently no guidance on vibration limits for public infrastructure in Australia, the German Standard DIN 4150-3:1999 *Structural Vibration Part 3: Effects of vibration in structures* is commonly used in Australia and has been adopted in this BMP.

The German Standard DIN 4150-3:1999 provides guideline values for evaluating the effect of vibration on buried pipework. The recommended limits for short-term vibration Peak Component Particle Velocity (PCPV) to ensure minimal risk of damage to pipe materials are presented in Table 4.

Table 4 – Guideline Values for Vibration – Effects of Short-Term Vibration on Buried Pipework

Pipe Material	Vibration PCPV Measured on the Pipe
Steel (including welded pipes)	100 mm/s
Clay, concrete, reinforced concrete, pre-stressed concrete, metal (with or without flange)	80 mm/s
Masonry, plastic	50 mm/s

Roadway infrastructure mainly comprises of concrete and similar materials and, therefore, the vibration (PCPV) damage assessment criterion of 80 mm/s would be applicable. This is not predicted to be exceeded at public roads with the proposed MIC of up to 380 kilograms.

The construction blast criteria included in Condition L5.1 of EPL 21146 for privately-owned buildings (Section 8.1.1) are more stringent than the nominated blast criterion for public roads. Despite the nearest privately-owned building being further from blasts than the nearest public roads (i.e. Wilmatha Road and Melrose Plains Road), it is expected that compliance with the more stringent blast criteria for privately-owned buildings would also achieve compliance with the nominated criterion for public roads.

8.1.3 Livestock

If Clean TeQ receives a complaint from an owner of livestock within 1 km of an active blasting area regarding impacts on livestock, Clean TeQ will investigate and undertake monitoring (as required and in consultation with the landowner) to ensure the performance indicators are being achieved. Locations and monitoring requirements will be determined as required, in consultation with the landowner(s).

8.2 Residential Locations

No blasting will be undertaken within 500 m of a privately-owned residential location during the term of this BMP.

As described in Section 8.4.3, private landholders and residents on the pre-blast notification register will be notified prior to blasting.

8.3 Public Infrastructure

Development Consent DA 374-11-00 does not include blasting criteria for public infrastructure. Notwithstanding, as described in Section 8.1.2, recommended limits for short-term vibration for minimal risk of damage (to buried pipework) are described in the German Standard DIN 4150-3:1999 *Structural Vibration Part 3: Effects of vibration in structures*.

The recommended limit for concrete and reinforced concrete is 80 mm/s.

A ground vibration limit of 80 mm/s has therefore been adopted for proximal public infrastructure (i.e. roadways). While this is not predicted to be exceeded at any public infrastructure, Clean TeQ will undertake vibration monitoring at locations representative of the closest public infrastructure to the blast site (i.e. Wilmatha Road and Melrose Plains Road).

8.4 Blasting Controls/Procedures

Clean TeQ will design and manage blast events to meet all relevant statutory requirements to protect the safety of the public and livestock in the surrounding area and minimise the risk of impacts to residential locations and infrastructure.

- Blast management procedures will include:
- training relevant personnel on blast-related obligations and explosives management;
- use of appropriate blast loading, initiation and detonation systems;
- use of adequate burden and stemming to confine explosives;
- designing all blasts to comply with relevant overpressure and ground vibration criteria;
- monitoring all blasts (refer Section 9);
- implementation of procedures to mitigate the potential for blast fumes (refer Section 8.4.2);
- development of a blast records system to capture sufficient information to allow appropriate characterisation and comparison of blasts and meteorological conditions;
- periodic review of blasting procedures to evaluate performance (refer Section 11); and
- evaluation of alternative blasting methodologies and new technologies.

8.4.1 Pre-blast Assessments

Prior to each blast event, a pre-blast assessment will be prepared.

The pre-blast assessment will consider:

- establishing a minimum blast exclusion zone and monitoring traffic movements along Wilmatha Road and Melrose Plains Road;
- assessment of meteorological conditions (e.g. wind speed and direction) prior to the blast to identify potential impact zones;
- design of the blast (e.g. correct explosive product for the conditions); and
- notification of all relevant external stakeholders (including those on the pre-blast notification register) prior to blasting.

8.4.2 Dust and Fumes Strategy

Strategies to minimise dust associated with blasts include:

- blasting will be conducted within the applicable daylight hours when dispersion is favourable, unless otherwise required for safety reasons;
- blasting during strong temperature inversion conditions would be avoided;
- blast hole stemming will be used to prevent venting of gases;
- coarse stemming will be used (i.e. drill fines would not be used); and
- blast designs will avoid excessive throws.

As described in Section 1.1, blasts for surface borrow pits during construction would generally be smaller in scale than a typical open cut blast. The risks associated with blast fumes from these small scale blasts would therefore be significantly reduced compared to a full scale open cut blast.

Prior to blasting in the open cut pits, Clean TeQ will develop a Blast Fume Management Strategy based on the Australian Explosives Industry and Safety Group Inc (2011) *Code of Practice Prevention and Management of Blast Generated NO_x Gases in Surface Blasting*.

8.4.3 System to Notify Public of Blast Schedule

Up-to-date information on the blasting schedule will be made publicly available on the Clean TeQ website (<http://www.cleanteq.com/>).

Any private landholder or resident that registers an interest in being informed of the blasting schedule will be included in a pre-blast notification register (including contact details for notification via telephone, email or method otherwise agreed).

Private landholders and residents on the pre-blast notification register will be notified prior to all blasts and will be re-notified if a blast event is delayed by more than two hours.

Clean TeQ will maintain a Community Complaints Line (1800 952 277) and email address (community@cleanteq.com) for the sole purpose of receiving community contacts and complaints. The Community Complaints Line number will be available on the website and included in all Clean TeQ's advertising and community communication tools. The Community Complaints Line will be staffed 24 hours a day, seven days a week during construction and operations.

9. BLAST MONITORING PROGRAM

To assess compliance with the relevant criteria, the following monitoring will be undertaken for each blast:

- Overpressure and vibration monitoring at the closest privately-owned residence to the blast site (i.e. monitor relocated as required to a location representative of Flemington and Currajong Park) to monitor compliance with the blast criteria described in Table 3.
- Vibration monitoring in close proximity to construction blasting as an indicator for potential impacts at the nearest public infrastructure (i.e. Wilmatha Road and Melrose Plains Road) to monitor compliance with the blast criterion in Section 8.3. Following cessation of construction blasting, these monitors will be relocated to a location representative of the privately-owned residence Slapdown for monitoring during operational blasting.
- Visual monitoring for blast fumes.

The Project blast and meteorological monitoring system is shown on Figure 3.

10. CONTINGENCY PLAN

In the event a blast management performance measure for the Project (detailed in Section 5) may not have been met or a performance indicator is considered to have been exceeded, Clean TeQ will implement the following Contingency Plan:

- The Clean TeQ Environmental Superintendent will report the incident in accordance with Section 12.
- Clean TeQ will apply adaptive management (Section 10.1).
- Clean TeQ will identify the appropriate course of action with respect to the identified blast impact(s), in consultation with technical specialists, the DP&E and other relevant government agencies, as necessary. For example, contingency measures, such as, but not limited to, those described in Section 10.2.
- Clean TeQ will submit the proposed course of action to the DP&E for approval.
- Clean TeQ will implement the approved course of action to the satisfaction of the DP&E.

10.1 Adaptive Management

In accordance with Condition 3, Schedule 5 of Development Consent DA 374-11-00, Clean TeQ will assess and manage risks to comply with the criteria and/or performance measures outlined in Schedule 3 of Development Consent DA 374-11-00.

Where any exceedance of these criteria and/or performance measures occurs, at the earliest opportunity Clean TeQ will:

- take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur;
- consider all reasonable and feasible options for remediation and submit a report to the DP&E describing these options and preferred remediation measures; and
- implement remediation measures as directed by the Secretary of the DP&E.

10.2 Specific Contingency Measures

Potential contingency measures will be reviewed during future revisions of this BMP during the life of the Project. Key potential contingency measures to be implemented (following exceedance of blasting criteria) may include:

- Clean TeQ will notify (in writing) the affected landholders and tenants of the exceedance at the earliest opportunity and provide them with regular blast monitoring results, until the results show that blasting at the Project is complying with the blasting criteria.

- Clean TeQ, will, in the event that the exceedance is in relation to public infrastructure, undertake an investigation.
- Clean TeQ will re-evaluate blast designs (e.g. Project specific scaled distance equations) to mitigate the potential for future exceedances of blast criteria, if blast monitoring results indicate this is required.

Clean TeQ will also implement any preferred contingency measures identified to address an incident (Section 12.1).

11. REVIEW AND IMPROVEMENT OF ENVIRONMENTAL PERFORMANCE

11.1 Annual Review

In accordance with Condition 5, Schedule 5 of Development Consent DA 374-11-00, Clean TeQ will review the environmental performance of the Project by the end of March each year (for the previous calendar year) to the satisfaction of the Secretary.

In relation to blast management, the Annual Review will (where relevant):

- describe the development that was carried out in the relevant calendar year, and the development that is proposed to be carried out during the following calendar year;
- include a comprehensive review of the monitoring results and complaints records of the development over the past year, which includes a comparison of these results against the:
 - relevant statutory requirements, limits or performance measures/criteria;
 - monitoring results of previous years; and
 - relevant predictions in the Syerston Nickel Cobalt Project Environmental Impact Statement (Black Range Minerals, 2000) and subsequent environmental assessments;
- identify any non-compliance over the last year, and describe what actions were (or are being) taken to ensure compliance;
- identify any trends in the monitoring data over the life of the development;
- identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- describe what measures will be implemented over the next year to improve the environmental performance of the development.

11.2 Independent Environmental Audit

In accordance with Condition 10, Schedule 5 of Development Consent DA 374-11-00, an independent environmental audit of the Project will be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary.

The independent environmental audit will assess the environmental performance of the Project and review the adequacy of this BMP. If necessary, appropriate measures or actions to improve the environmental performance of the Project or this BMP will be recommended.

An independent environmental audit will be conducted within one year of the commencement of the development under this consent, after 6 May 2017.

The independent environmental audit, and Clean TeQ's response to the recommendations in the audit, will be made publicly available on the Clean TeQ website, in accordance with Condition 12, Schedule 5 of Development Consent DA 374-11-00.

12.REPORTING PROTOCOLS

In accordance with Condition 4(g), Schedule 5 of Development Consent DA 374-11-00, Clean TeQ has developed protocols for managing and reporting the following:

- incidents;
- complaints;
- non-compliances with statutory requirements; and
- exceedances of the impact assessment criteria and/or performance criteria.

These protocols are described in detail in Clean TeQ's Environmental Management Strategy.

In accordance with Condition 9, Schedule 5 of Development Consent DA 374-11-00, Clean TeQ will provide regular reporting on the environmental performance of the Project on the Clean TeQ website.

12.1 Incident Reporting

An incident is defined as a set of circumstances that causes or threatens to cause material harm to the environment and/or breaches or exceeds the limits or performance measures/criteria in Development Consent DA 374-11-00.

In the event that review of blasting monitoring data indicates an incident has occurred, the incident will be reported in accordance with Condition 8, Schedule 5 of the Development Consent DA 374-11-00. Clean TeQ will notify the Secretary and any other relevant agencies including the relevant Council immediately after it becomes aware of the incident.

Within seven days of the date of the incident, Clean TeQ will provide the Secretary and any other relevant agencies with a detailed report on the incident and such further reports as may be requested. The report will:

- describe the date, time and nature of the exceedance/incident;
- identify the cause (or likely cause) of the exceedance/incident;
- describe what action has been taken to date; and
- describe reasonable and feasible options to address the incident and identify the preferred option to address the incident (Section 10.1).

12.2 Complaints

Clean TeQ will maintain a Community Complaints Line (1800 952 277) and email address (community@cleanteq.com) for the sole purpose of receiving community contacts and complaints. The Community Complaints Line number will be available on the website and included in Clean TeQ's advertising and community communication tools. The Community Complaints line will be staffed 24 hours a day, seven days a week during construction and operations. Clean TeQ will respond to callers on the next business day. If the issue is urgent a member of the leadership team will be contacted immediately.

Clean TeQ has developed a procedure that outlines its commitment to receiving, resolving and recording complaints received from the community. Detailed records of each complaint resolution are kept in Clean TeQ's record management systems.

Complaints will be investigated within 24 hours of receipt. The cause of the complaint will be analysed and actions to resolve the complaint taken as soon as possible. In complex cases where resolution will take more than 48 hours, Clean TeQ will commit to updating the community member regularly until the complaint is resolved.

In accordance with Condition 12(a), Schedule 5 of Development Consent DA 374-11-00, a complaints register will be made available on the Clean TeQ website and updated monthly.

12.3 Non-Compliance with Statutory Requirements

A protocol for managing and reporting non-compliances with statutory requirements has been developed as a component of Clean TeQ's Environmental Management Strategy and is described below.

Compliance with all approvals, plans and procedures is the responsibility of all personnel (staff and contractors) employed on or in association with Clean TeQ and the Project.

The Clean TeQ Environmental Superintendent will undertake regular inspections, internal audits and initiate directions identifying any remediation/rectification work required, and areas of actual or potential non-compliance.

As described in Section 12.1, Clean TeQ will report incidents in accordance with Condition 8, Schedule 5 of Development Consent DA 374-11-00 and in accordance with the protocol for industry notification of pollution incidents under Part 5.7 of the POEO Act.

Clean TeQ will notify the Secretary and any other relevant agencies including the relevant Council immediately after the authorised person becomes aware of the incident which causes or threatens to cause material harm to the environment. Within seven days of the date of the incident, Clean TeQ will provide the Secretary and any other relevant agencies with a detailed report on the incident and such further reports as may be requested.

A review of compliance with all conditions in Development Consent DA 374-11-00, ML 1770 and all other approvals and licences will be undertaken prior to (and included within) each Annual Review (Section 11.1).

Additionally, in accordance with Condition 10, Schedule 5 of Development Consent DA 374-11-00, an independent environmental audit (Section 11.2) would be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary to assess whether Clean TeQ is complying with the requirements in Development Consent DA 374-11-00, and any other relevant approvals, EPLs, and/or mining leases.

13. REFERENCES

Australian Explosives Industry and Safety Group Inc (2011) *Code of Practice Prevention and Management of Blast Generated NO_x Gases in Surface Blasting*.

Black Range Minerals (2000) *Syerston Nickel-Cobalt Project Environmental Impact Statement*.
October 2000.

Renzo Tonin & Associates (2017) *Syerston Project Modification 4 Noise and Blasting Assessment*.
November 2017.

German Standard DIN 4150-3:1999 *Structural Vibration Part 3: Effects of vibration in structures*.