STRATFORD MINING COMPLEX
Air Quality Management Plan

STRATFORD MINING COMPLEX
(STRATFORD EXTENSION PROJECT)

AIR QUALITY MANAGEMENT PLAN

STRATFORDCOAL
Part of the Yancoal Australia Group

Revision Status Register

Section/Page/ Annexure	Revision Number	Amendment/Addition	Distribution	DPIE Approval Date
All	AQMP-R01-A	Original	EPA, DP&E	22 March 2018
All	AQMP-R02-A	Updated to cover Stratford East Pit	EPA, DP&E	17 October 2018
All	AQMP-R03-A	Updated to cover Roseville West Pit	EPA, DP&E	16 June 2019
All	AQMP-R04-A	Updated to describe current status of SMC and include relevant contemporisations	EPA, DPIE	TBC

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1 INTRODUCTION

1.1 STRATFORD MINING COMPLEX

Stratford Coal Pty Ltd (SCPL), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), owns the Stratford Coal Mine (SCM), which is located approximately 100 kilometres (km) north of Newcastle, New South Wales (NSW) (Figure 1). SCPL also owns the Bowens Road North Open Cut (BRNOC), located to the immediate north of the SCM. The SCM and BRNOC are collectively referred to as the Stratford Mining Complex (SMC).

Yancoal also owns the Duralie Coal Mine (DCM), which is located approximately 20 km south of the SMC (Figure 1). Run-of-mine (ROM) coal from the DCM is transported by rail to the SMC for processing and export.

Mining activities approved under the SCM Development Consent and the BRNOC Development Consent were suspended in mid-2014, however, processing of ROM coal from the DCM and the export of product coals continued under the SCM Development Consent.

Development Consent SSD-4966 for the Stratford Extension Project (SEP) was granted on 29 May 2015 under Part 4 of the *Environmental Planning and Assessment Act,* 1979 (EP&A Act) and involves the extension and continuation of mine operations at the SMC[1], including (among other things) (Figure 2):

- mining of up to 2.6 million tonnes of ROM coal per annum;
- continuation of mining in the BRNOC and the extension of mining into three additional open cut mining areas:
  - Roseville West Pit Extension;
  - Avon North Open Cut; and
  - Stratford East Open Cut.
- progressive backfilling of mine voids with waste rock behind the advancing open cut mining operations;
- continued and expanded placement of waste rock in the Stratford Waste Emplacement and Northern Waste Emplacement;
- coal processing at the existing coal handling and preparation plant (CHPP);
- stockpiling and loading of product coal to trains for transport on the North Coast Railway to Newcastle;
- disposal of CHPP rejects via pipeline to the existing co-disposal area in the Stratford Main Pit and, later in the mine life, the Avon North Open Cut void;
- continued use of existing water storages/dams and progressive development of additional sediment dams, pumps, pipelines, irrigation infrastructure and other water management equipment and structures;
- other associated minor infrastructure, plant, equipment and activities and minor modifications to existing structure, plant and equipment and activities; and
- rehabilitation of the site.

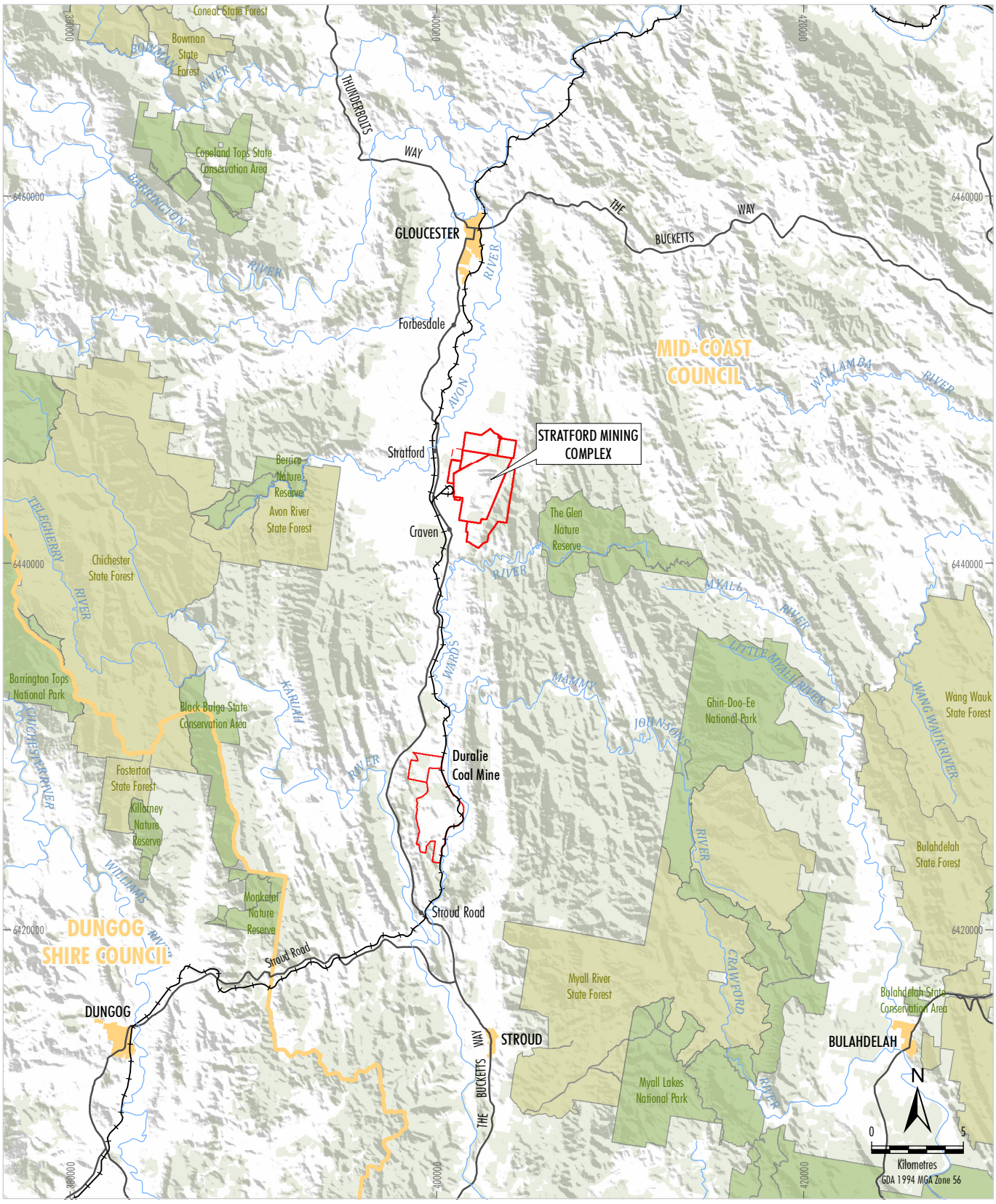
The general arrangement of the approved SMC is provided in Figure 2.

Current Status of SCM

Mining activities approved under the SEP Development Consent (SSD-4966) commenced on 4 April 2018. Current mining operations at the SMC are associated with:

- completion of mining in the Roseville West Open Cut Pit followed by progressive backfilling with waste rock material;
- completion of mining in the BRNOC followed by progressive backfilling with waste rock material;
- continued development and mining of the Stratford East Open Cut; and
- continued development and mining of the Avon North Open Cut.

[1] A copy of Development Consent SSD-4966 (and other statutory State and Federal licenses and approvals) is available on the Stratford Coal website (www.stratfordcoal.com.au).



YAN-21-40 MP2021 CF_201A

LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary *
- NSW State Forest
- National Park, Nature Reserve or State Conservation Area
- Local Government Area Boundary

**MLA1 is a proposed future Mining Lease Application (MLA) area and has not yet been lodged.*

Source: Geoscience Australia (2006); Yancoal (2019); NSW Department of Planning & Environment (2017)

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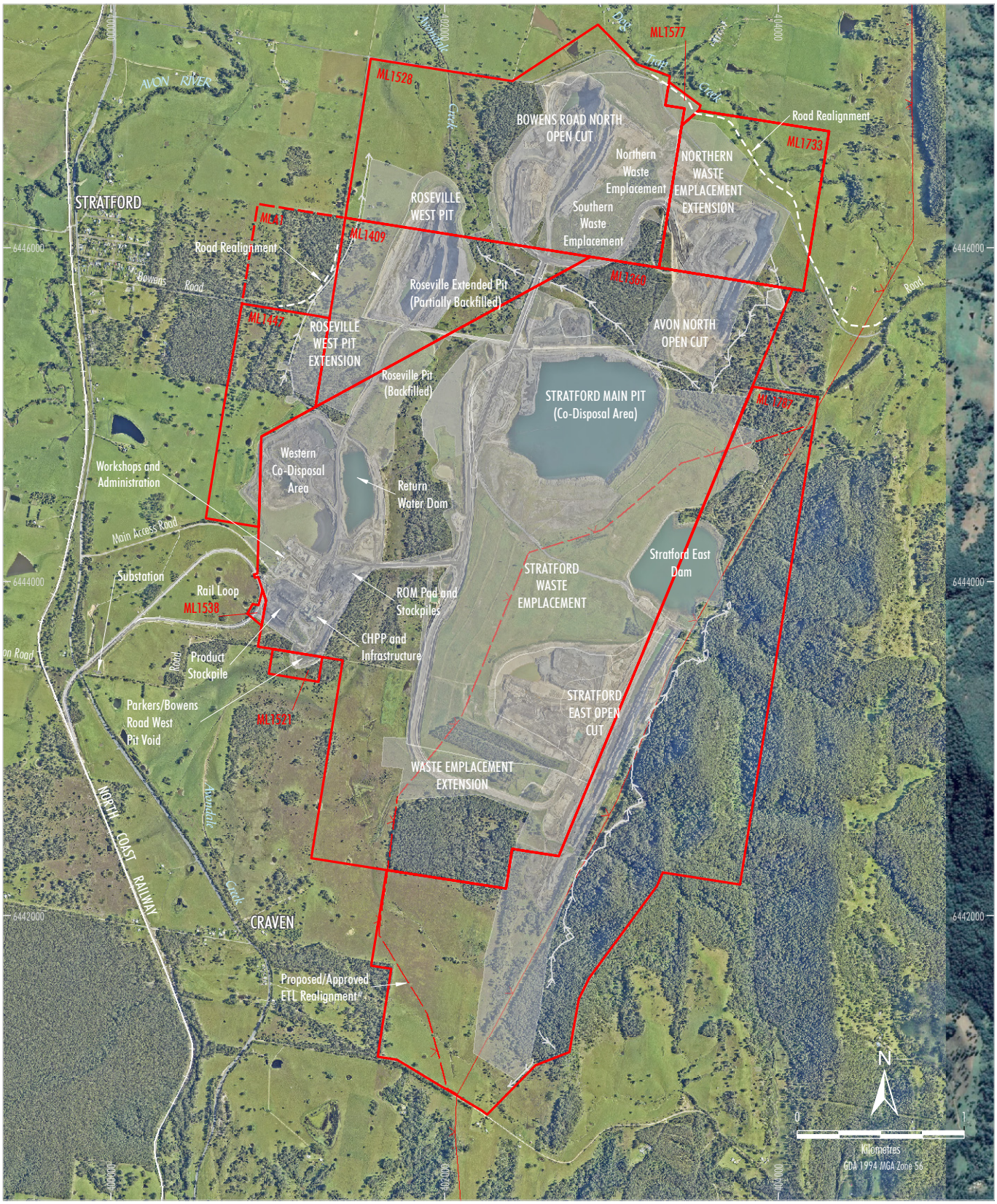
STRATFORD EXTENSION PROJECT

Regional Location

Figure 1



YAN-21-40 MP2021 CF_202A

LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary*
- Electricity Transmission Line
- Approximate Extent of Existing/Approved Surface Development
- Conceptual Up-Catchment Diversion

**MLA1 is a proposed future Mining Lease Application (MLA) area and has not yet been lodged.*

 # Not yet Constructed

Source: Orthophoto - Yancoal (2021); LPI (2016); NSW Department of Planning & Environment (2017)

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STRATFORD EXTENSION PROJECT

Approved General Arrangement

Figure 2

Condition 5, Schedule 2 of the SMC's Development Consent (SSD_4966) authorises mining operations to be carried at the SMC until 31 December 2025. As the SMC progresses towards the end of its approved mine life, operations and activities at the SMC over the next four years will progressively change to reflect this and will generally involve the following:

- **Reduction of open cut pit mining and total mobile plant fleet**: Open cut mining operations will progressively reduce with mining of the SMC's remaining operational pits (Avon North Open Cut and Stratford East Open Cut) to reduce sequentially over the next four years. Consequently, total mobile plant fleet operating at the SMC will also reduce.
- **Progressive open cut pit backfilling activities**: As mining of the open cut pits is progressively completed, backfilling of some of the pits with waste rock material, including Roseville West Open Cut Pit and BRNOC, will also occur either concurrently with mining or after the completion of mining.
- **Progressive rehabilitation of completed areas**: Rehabilitation of backfilled open cut pits, completed areas of the waste emplacements and other disturbed areas will continue to be progressed in accordance with the SMC's Rehabilitation Management Plan.
- **Reduction and then cessation of vegetation clearance activities**: The proposed extent of development of the remaining open cut pits and ancillary mining activities will be reached over the next four years, and subsequently after this time, no new disturbance areas (within the approved surface disturbance areas) are proposed.
- **Closure Planning**: SCPL will continue to implement the SMC's Mine Closure Planning Program (described in the SMC Mining Operations Plan and Rehabilitation Management Plan [and in future Rehabilitation Management Plans]) which includes technical assessments and works that will be undertaken and implemented as the SMC progresses towards the mine closure phase. As these assessments and works are completed, the SMC's environmental management plans will be reviewed and revised as required to reflect progression of the SMC towards mine closure, in consultation with relevant regulatory agencies.

Following the cessation of mining operations on 31 December 2025 and the key activities contributing to air emissions, and subsequently after bulk rehabilitation and the establishment of revegetation, the requirement for air quality controls, management measures and monitoring would reduce as the potential impact pathway no longer exists. At this stage, SCPL would seek to rationalise the SMC air quality monitoring program to reflect the scale of potential emissions from the SMC. SCPL would consult with the EPA prior to rationalising the monitoring program.

1.2 PURPOSE AND SCOPE

This Air Quality Management Plan (AQMP) has been prepared by SCPL to address the requirements of Condition 23, Schedule 3 of Development Consent SSD-4966 and relevant conditions of Environment Protection Licence (EPL) 5161.

This AQMP has been prepared to outline the procedures and strategies for air quality management at the SMC in the Avon North Open Cut, Stratford East Open Cut, Roseville West Pit and BRNOC only.

This AQMP will be updated prior to commencing operations in the Roseville West Pit Extension, in accordance with Condition 15, Schedule 2 of SSD-4966.

This revision of the AQMP has been prepared by SCPL to:

- describe the current status of operations at the SMC;
- describe anticipated changes to SMC operations and air quality management and monitoring as the site progresses towards mine closure;
- augment air quality management measures relevant to odour management; and
- include other administrative changes to contemporise the plan.

1.3 STRUCTURE OF THIS AQMP

The remainder of this AQMP is structured as follows:

Section 2: Outlines the statutory requirements applicable to this AQMP.

Section 3: Describes key sources of emissions.

Section 4: Details the criteria and performance indicators that will be used to assess air quality impacts at the SMC.

Section 5: Provides detailed baseline data.

Section 6: Describes the air quality management system.

Section 7: Describes the air quality monitoring program.

Section 8: Provides a contingency plan to manage any unpredicted impacts and their consequences.

Section 9: Describes the Annual Review and improvement of environmental performance process.

Section 10: Describes the management and reporting of incidents, complaints and non-compliances.

Section 11: Lists the references cited.

2 STATUTORY REQUIREMENTS

SCPL's statutory obligations are contained in:

(i) the conditions of Development Consent SSD-4966;

(ii) the conditions of Commonwealth Approval EPBC 2011/6176;

(iii) the conditions of EPL 5161;

(iv) other relevant licences and permits, including conditions attached to the SMC mining leases; and

(v) other relevant legislation.

Obligations relevant to this AQMP are described below.

2.1 EP&A ACT DEVELOPMENT CONSENT

The conditions of Development Consent SSD-4966 relevant to air quality management are described below.

2.1.1 Air Quality Management Plan Requirements

Condition 23, Schedule 3 of Development Consent SSD-4966 requires the preparation of an AQMP for the SMC. Table 1 presents these requirements and indicates where they are addressed within this AQMP.

Air quality criteria and operating conditions prescribed by Development Consent SSD-4966 are described in Section 4.

Table 1
Development Consent SSD-4966 Requirements Relevant to this AQMP

Development Consent SSD-4966 Condition	AQMP Section
Condition 23, Schedule 3	
23. The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary. This plan must:	
(a) be prepared in consultation with the EPA, and submitted to the Secretary for approval prior to 31 December 2015, unless otherwise agreed by the Secretary;	Section 2.1.3
(b) describe the measures that would be implemented to ensure compliance with the relevant air quality criteria and operating conditions of this consent;	Sections 6 and 7
(c) describe the proposed air quality management system; and	Section 6
(d) include an air quality monitoring program that:	
• *uses a combination of real-time monitors and supplementary monitors to evaluate the performance of the development against the air quality criteria in this consent;*	Section 7.3
• *adequately supports the proactive and reactive air quality management system;*	Sections 6.1.1 and 6.1.2
• *evaluates and reports on:*	
- *the effectiveness of the air quality management system; and*	Section 9
- *compliance with the air quality operating conditions; and*	Section 9
• *defines what constitutes an air quality incident, and includes a protocol for identifying and notifying the Department and relevant stakeholders of any air quality incidents.*	Section 10

2.1.2 Management Plan Requirements

Condition 3, Schedule 5 of Development Consent SSD-4966 outlines the management plan requirements that are applicable to the preparation of this AQMP. Table 2 presents these requirements and indicates where they are addressed within this AQMP.

Table 2
Management Plan Requirements

Development Consent SSD-4966 Condition	AQMP Section
Condition 3, Schedule 5	
3. The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:	
a) detailed baseline data;	Section 5
b) a description of:	
• *the relevant statutory requirements (including any relevant approval, licence or lease conditions);*	Section 2
• *any relevant limits or performance measures/criteria;*	Section 4
• *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;*	Section 4
c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;	Sections 6
d) a program to monitor and report on the:	
• *impacts and environmental performance of the development;*	Sections 7.1 to 7.3
• *effectiveness of any management measures (see c above);*	Section 9
e) a contingency plan to manage any unpredicted impacts and their consequences;	Section 8
f) a program to investigate and implement ways to improve the environmental performance of the development over time;	Section 9
g) a protocol for managing and reporting any;	Section 10 and SMC Environmental Management Strategy and PIRMP
• *incidents;*	
• *complaints;*	
• *non-compliances with statutory requirements; and*	
• *exceedances of the impact assessment criteria and/or performance criteria; and*	
h) a protocol for periodic review of the plan.	Section 9

2.1.3 Consultation

In accordance with Condition 23(a), Schedule 3 of the NSW Development Consent SSD-4966, the AQMP is to be prepared in consultation with the EPA. The original AQMP was prepared and approved in 2018, in consultation with the EPA. The revision status of this AQMP is included on the title of this plan.

This revised AQMP was provided to the EPA for comment on 2 November 2021. On 11 November 2021 the EPA recommended SCPL consider the site specific findings and management commitments made in the *Stratford Coal Mine – Particulate Matter Control Best Practice Pollution Reduction Program* report prepared by PAE Holmes (2012a) and the *Stratford Coal Mine EPL 5161 PRP U2 & EPL 11745 PRP U1: Monitoring Program Results – Wheel Generated Dust* report prepared by Pacific Environment Limited (PEL) (2014a). A record of the EPA's correspondence is provided in Appendix 1 of this AQMP.

The findings and management commitments from these Pollution Reduction Program studies and reports (and other Pollution Reduction Program studies) were incorporated into the original version of the AQMP prepared in 2018. All Pollution Reduction Program requirements/conditions have now been removed from the SMC's EPL 5161 due to successful completion of the Pollution Reduction Program requirements. A summary of the Pollution Reduction Program studies and reports, key findings/conclusions and their status is provided in Section 4.2.1.

2.2 LICENCES, PERMITS AND LEASES

In addition to Development Consent SSD-4966 and Commonwealth Approval EPBC 2011/6176, all activities at, or in association with, the SMC will be conducted in accordance with a number of licences, permits and leases which have been issued or are pending issue.

Key licences, permits and leases pertaining to the SMC include:

- The conditions of EPL 5161 administered by the EPA under the NSW *Protection of the Environment Operations Act, 1997* (POEO Act).
- The conditions of the Mining Leases (MLs) 1360, 1409, 1447, 1538, 1521, 1577, 1528, 1733 and 1787 issued under the NSW *Mining Act, 1992* [2].
- The SMC Mining Operations Plan (and/or Rehabilitation Management Plan) approved by the NSW Resources Regulator, within the Minerals, Exploration and Geoscience division of the Department of Regional NSW.
- Water supply works, water use approvals and water access licences issued by Water under NSW the NSW *Water Management Act, 2000*.

A detailed register of current licences, permits and approvals is maintained on-site by SCPL personnel and a summary of current approvals is presented in the SMC Annual Review.

2.3 GREENHOUSE GAS AND ENERGY LEGISLATION

Yancoal is registered on the National Greenhouse and Energy Register (established under section 16 of the Commonwealth *National Greenhouse and Energy Reporting Act, 2007* [NGER Act]), which is publicly available on the Commonwealth Clean Energy Regulator website (www.cleanenergyregulator.gov.au). Yancoal will continue to assess and report the following for the SMC in accordance with NGER Act reporting requirements:

- Annual scope 1 greenhouse gas (GHG) emissions, which are the direct result of activities at a facility under the operational control of Yancoal and its subsidiaries (i.e. SCPL), such as onsite diesel combustion.
- Annual scope 2 GHG emissions, which are the emissions associated with the generation of electricity that is purchased by Yancoal. These emissions are not under the operational control of Yancoal.
- Annual energy consumption, such as diesel and electricity consumption.
- Annual energy production, such as the energy in the extracted coal.

Assessment and reporting of the above will be conducted in accordance with the following legislation subordinate to the NGER Act:

- *National Greenhouse and Energy Reporting Regulations, 2008*; and
- *National Greenhouse and Energy Reporting (Measurement) Determination, 2008.*

2.4 NATIONAL POLLUTANT INVENTORY

SCPL also provides annual National Pollutant Inventory (NPI) reports to the EPA (established under the *National Environment Protection (National Pollutant Inventory) Measure, 1998*). Emissions data for the SMC is publicly available on the Commonwealth NPI website (www.npi.gov.au) and is also reported in the Annual Reviews (Section 9.1).

[2] Mining Lease Application (MLA) area 1 is a proposed Mining Lease area and has not yet been lodged.

2.5 OTHER LEGISLATION

SCPL will operate the SMC consistent with the Development Consent SSD-4966, the Commonwealth Approval (EPBC 2011/6176) and any other legislation that is applicable to an approved Part 4 Project under the EP&A Act.

Other NSW legislation that may be applicable to air quality management at the SMC include, but are not limited, the:

- *Biodiversity Conservation Act, 2016*;
- *Biosecurity Act, 2015;*
- *Contaminated Land Management Act, 1997*;
- *Crown Land Management Act, 2016*;
- *Electricity Supply Act, 1995;*
- *Local Land Services Act, 2013;* and
- *Work Health and Safety (Mines and Petroleum Sites) Act, 2013*.

3 SOURCES OF AIR EMISSIONS

3.1 PARTICULATE MATTER

Development Consent SSD-4966 provides criteria for the particulate matter emissions which have the potential to affect the general health and amenity of the local community and surrounding environment. The particulate matter emissions requiring specific management are:

- total suspended particulate matter (TSP);
- particulate matter less than 10 micrometres (µm) (PM_{10}); and
- deposited dust (DD).

As part of the *Stratford Coal Mine – Particulate Matter Control Best Practice Pollution Reduction Program* (PAE Holmes, 2012a) the particulate matter generating activities associated with SMC were identified and evaluated.

The main sources of particulate matter emissions generated as a direct result of SMC operations include:

- hauling of waste rock and ROM coal in trucks on unpaved roads;
- dozer and excavator operations;
- wind erosion of exposed areas;
- handling and loading/unloading of ROM and product coal from the DCM and the SMC; and
- backfilling of waste rock material in completed open cut pits and emplacement within SMC waste rock emplacements.

Particulate matter emissions will also be generated by other activities at the SMC, including:

- topsoil stripping and handling;
- drilling and blasting;
- coal processing activities within the CHPP; and
- short term construction activities such as public road realignments.

PAE Holmes (2012a) *Stratford Coal Mine – Particulate Matter Control Best Practice Pollution Reduction Program* investigation also involved analysis of dust emissions from the transportation of coal between the SMC and the Port of Newcastle. This study concluded that dust lift-off from product coal during transportation by rail is likely to be minimal (i.e. as the moisture levels of the coal remains above or equal to the dust extinction moisture level) (PAEHolmes, 2012a).

3.2 GREENHOUSE GASES

SCPL reports the following greenhouse gases in accordance with the requirements of the *National Greenhouse and Energy Reporting (Measurement) Determination, 2008*:

- carbon dioxide (CO_2);
- methane (CH_4); and
- nitrous oxide (N_2O).

These are determined and reported as follows:

- fuel consumption (diesel) during mining operations – scope 1 emissions;
- emissions associated with the loss of carbon through vegetation clearing – scope 1 emissions;
- release of fugitive CH_4 during mining – scope 1 emissions; and
- indirect emissions associated with on-site electricity use – scope 2 emissions.

3.3 ODOUR AND FUME

Spontaneous combustion events and self-heating of potentially acid forming (PAF) material have the potential to give rise to odour emissions. The Glenview Seam is a feature of the Avon North Open Cut and, therefore, there is some potential for spontaneous combustion events if the seam is exposed in the final highwall or end wall (SCPL, 2012). Stratford East Open Cut waste rock material is also expected to be generally PAF with PAF-low-capacity and non-acid forming materials present, and therefore has the potential to give rise to odours if self-heating occurs.

Measures to manage spontaneous combustion and PAF materials to minimise odour and fume emissions are outlined in Section 6.3.

Blasting has the potential to generate nitrogen oxide (NOx) fumes and result in fugitive fume emissions (e.g. when the explosive product is incorrectly formulated [Australian Explosives Industry and Safety Group Inc., 2011]). The management of blast fume is described in the SMC Blast Management Plan (the Blast Management Plan) and associated SMC Blast Fume Management Procedure (Attachment 2 of the SMC Blast Management Plan).

4 AIR QUALITY CRITERIA AND PERFORMANCE INDICATORS

4.1 NSW DEVELOPMENT CONSENT CONDITIONS

4.1.1 Air Quality Criteria and Air Quality Acquisition Criteria

Air quality criteria and air quality acquisition criteria are provided in Conditions 18 and 21, Schedule 3 of Development Consent SSD-4966. These conditions are reproduced below.

Air Quality Criteria

18. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 6 at any residence on privately-owned land.

Note:
"Reasonable and feasible avoidance measures" includes, but is not limited to, the operational requirements in conditions 23 and 24 to develop and implement a real-time air quality management system that ensures operational responses to the risks of exceedance of the criteria.

Table 6: Air quality criteria

Pollutant	***Averaging Period***	***Criterion***	
Particulate matter <10 µm (PM_{10})	*Annual*	*[a,d] 30 µg/m³*	
Particulate matter <10 µm (PM_{10})	*24 hour*	*[b] 50 µg/m³*	
Total suspended particulates (TSP)	*Annual*	*[a,d] 90 µg/m³*	
[c] Deposited dust	*Annual*	*[b] 2 g/m²/month*	*[a,d] 4 g/m²/month*

Notes to Table 6:

[a] Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).

[b] Incremental impact (ie increase in concentrations due to the development alone, with zero allowable exceedances of the criteria over the life of the development).

[c] Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

[d] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

Air Quality Acquisition Criteria

21. If particulate matter emissions generated by the development exceed the criteria, or contribute to an exceedance of the cumulative criteria, in Table 7 at any residence on privately-owned land, or on more than 25% of any privately-owned land where there is an existing dwelling or where a dwelling could be built under existing planning controls, then upon receiving a written request for acquisition from the landowner the Applicant shall acquire the land in accordance with the procedures in conditions 5-6 of Schedule 4.

Table 7: Air quality land acquisition criteria

Pollutant	***Averaging Period***	***Criterion***	
Particulate matter <10 µm (PM_{10})	*Annual*	*[a,d] 30 µg/m³*	
Particulate matter <10 µm (PM_{10})	*24 hour*	*[b] 50 µg/m³*	
Total suspended particulates (TSP)	*Annual*	*[a,d] 90 µg/m³*	
[c] Deposited dust	*Annual*	*[b] 2 g/m²/month*	*[a,d] 4 g/m²/month*

Notes to Table 7:

a Cumulative impact (ie increase in concentrations due to the development plus background concentrations due to all other sources).

b Incremental impact (ie increase in concentrations due to the development alone, with up to 5 allowable exceedances of the criteria over the life of the development.

c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: Methods for Sampling and Analysis of Ambient Air - Determination of Particulate Matter - Deposited Matter - Gravimetric Method.

d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents or any other activity agreed by the Secretary.

4.1.2 Yancoal-owned Land

Condition 20, Schedule 3 of Development Consent SSD-4966 states the requirements for SCPL to ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the SMC do not cause exceedances of the air quality criteria in Condition 18, Schedule 3 at any occupied residence on Yancoal-owned land *viz*.:

20. The Applicant shall ensure that all reasonable and feasible avoidance and mitigation measures are implemented so that particulate matter emissions generated by the development do not cause exceedances of the criteria in Table 6 at any occupied residence on mine-owned land unless:

(a) the tenant and landowner (if the residence is owned by another mining or petroleum company) has been notified of any health risks associated with such exceedances in accordance with the notification requirements under Schedule 4 of this consent;

(b) the tenant of any land owned by the Applicant can terminate their tenancy agreement without penalty at any time, subject to giving reasonable notice;

(c) air mitigation measures such as those listed in condition 20 are installed at the residence, if requested by the tenant or landowner (if the residence is owned by another mining or petroleum company);

(d) air quality monitoring is regularly undertaken to inform the tenant or landowner (where owned by another mining or petroleum company) of the actual particulate emissions at the residence; and

(e) data from this monitoring is presented to the tenant in an appropriate format for a medical practitioner to assist the tenant and/or landowner (where owned by another mining or petroleum company) in making informed decisions on health risks associated with occupying the property,

to the satisfaction of the Secretary.

4.1.3 Greenhouse Gas Emissions

Condition 22(b), Schedule 3 of Development Consent SSD-4966 states the requirements for SCPL to minimise the release of greenhouse gas emissions from the SMC, as follows:

The Applicant shall … implement all reasonable and feasible measure to minimise the release of greenhouse gas emissions from the site;

4.1.4 Odour

Condition 17, Schedule 3 of Development Consent SSD-4966 states the requirements for SCPL to prevent the release of offensive odours from the SMC, as follows:

Odour

17. The Applicant shall ensure that no offensive odours, as defined under the POEO Act, are emitted from the site.

4.1.5 Blast Fume

Condition 16(e), Schedule 3 of Development Consent SSD-4966 requires a blast fume management protocol to minimise the risk of blast fume emissions. This is addressed in the SMC Blast Management Plan.

4.1.6 Operating Conditions

The operating conditions relating to air quality required under Development Consent SSD-4966 are detailed in Condition 22, Schedule 3:

Operating Conditions

22. The Applicant shall:

(a) implement best practice management to minimise the off-site odour, fume and dust emissions of the development;

(b) implement all reasonable and feasible measure to minimise the release of greenhouse gas emissions from the site;

(c) minimise the surface disturbance of the site;

(d) minimise any visible off-site air pollution generated by the development;

(e) operate a comprehensive air quality management system that uses a combination of predictive meteorological forecasting, predictive and real-time air dispersion modelling and real-time air quality monitoring data to guide the day-to-day planning of mining operations and implementation of both proactive and reactive air quality mitigation measures (such as relocate, modify and/or suspend) to ensure compliance with the relevant conditions of this consent; and

(f) minimise the air quality impacts of the development during adverse meteorological conditions and extraordinary events (see note d to Tables 6 and 7 above),

to the satisfaction of the Secretary.

4.2 ENVIRONMENT PROTECTION LICENCE 5161 CONDITIONS

In relation to air quality, EPL 5161 for the SMC states the following:

Condition O3.1:

All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.

Condition L5.1:

The licensee must not cause or permit the emission of offensive odour beyond the boundary of the premises.

4.2.1 Pollution Reduction Programs

In 2011, the EPA commissioned the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining* (Katestone Environmental Pty Ltd [Katestone], 2010) (the Best Practice Report). As an outcome of the Best Practice Report, the EPA developed a series of Pollution Reduction Programs (PRPs) for coal mines which involved incorporating conditions within coal mine EPLs requiring coal mining companies to conduct studies and prepare reports on the practicability of implementing best practice measures to reduce particle emissions. Latter PRPs required review of best practice measures to manage and monitor particle emissions from wheel-generated dust, the handling of overburden and wind erosion on exposed land.

The SMC's EPL 5161 was subsequently varied on several occasions to include conditions (former Conditions U1, U2, U3 and U4) requiring SCPL to conduct PRPs relevant to:

- Coal Mine Particulate Matter Control Best Practice;
- PRP 2 – Stage 1 – Modernise particulate monitoring;
- Particulate Matter Control Best Practice Implementation - Wheel Generated Dust;
- Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions;
- Particulate Matter Control Best Practice Implementation - Trial of Best Practice Measures for Disturbing and Handling Overburden; and
- Coal Mine Wind Erosion of Exposed Land Assessment.

A summary of the above PRP requirements, the associated studies and reports prepared by SCPL and the status of PRPs as relevant to the SMC, is provided in Appendix 2.

5 BASELINE DATA

5.1 AIR QUALITY MONITORING DATA

A detailed description of baseline air quality data is provided in the *Stratford Extension Project - Air Quality and Greenhouse Gas Assessment* (PAEHolmes, 2012b), which is available on the Stratford Coal website (www.stratfordcoal.com.au).

Since the commencement of the Development Consent SSD-4966, air quality monitoring results have been reported in the SMC Annual Reviews (Section 9.1). SMC Annual Reviews are made available on the Stratford Coal website.

5.2 METEOROLOGICAL MONITORING

A detailed description of baseline meteorology is provided in the *Stratford Extension Project - Air Quality and Greenhouse Gas Assessment* (PAEHolmes, 2012b) which is available on Stratford Coal's website (www.stratford coal.com.au).

6 MANAGEMENT MEASURES

6.1 AIR QUALITY

Air quality management at the SMC will continue to involve a combination of proactive and reactive management strategies, as well as at-source control measures. These measures will continue to be supported by a network of dust monitoring stations (refer to Section 7).

6.1.1 Proactive Measures and Dust Controls

Proactive dust management measures and dust emissions controls will continue to be implemented to minimise dust emissions from the following key dust-generating activities:

- wind blown dust from exposed areas; and
- dust generated from mining activities.

Current air quality mitigation and management measures employed at the SMC are summarised in Table 3. These measures include the measures and/or recommended actions from the PRP studies conducted during 2012 and 2014 (Appendix 2) and consider site-specific operational factors relevant to the SMC (which includes implementation of the reactive measures in Section 6.1.2).

Table 3
Management Measures and Controls

Source	Activity	Management Measure
Wind Blown Dust Sources	Areas disturbed by mining	• Only the minimum area necessary for mining will be disturbed. • Exposed areas will be reshaped, topsoiled and revegetated as soon as practicable.
	Waste rock emplacement areas	• Exposed waste emplacement surfaces that are hauled on will be watered to suppress dust. • Progressive rehabilitation (i.e. reshaping, topsoil placement and revegetation) of waste emplacement areas will continue throughout the life of the SMC, as far as practicably possible.
	Coal handling areas	• Water carts will be used in coal handling areas to minimise wind blown and traffic generated dust. • Water sprays are installed on the Stamler feeder/breaker and raw coal conveyors.
	Coal stockpiles	• Automatic sprinklers are installed in the existing SMC product coal stockpile area and are activated when wind speeds exceed 5 metres per second (m/s), except during rain events.
Mining Generated Dust Sources	Haul road dust	• All roads and trafficked areas will be regularly maintained and watered using water carts to minimise the generation of dust. • Obsolete roads will be rehabilitated. • Hauling distances will be optimised through the use of satellite ROM pads.
	Minor roads	• Development of minor roads will be limited and the locations of these will be clearly defined. • Regularly used minor roads will be watered. • Obsolete roads will be rehabilitated.
	Topsoil stripping	• Access tracks used for topsoil stripping during the loading and unloading cycle will be watered.
	Topsoil stockpiling	• Long term topsoil stockpiles will be revegetated with a cover crop.
	Material handling	• Truck overloading and spillage onto haul roads will be minimised.
	Drilling	• Dust aprons will be lowered during drilling. • Water injection or dust suppression sprays will be used when high levels of dust are being generated.

Table 3 (Continued)
Management Measures and Controls

Source	Activity	Management Measure
Mining Generated Dust Sources (Cont.)	Blasting	• Fine material collected during drilling will not be used for blast stemming, but may be used to backfill uncharged drill holes. • Adequate stemming will be used at all times. • Blasting will only occur following an assessment of weather conditions by the Environment and Community Superintendent to ensure that wind speed and direction will not result in excess dust emissions from the site towards adjacent residences (refer to the Blast Management Plan for further information). No blasting will occur in the SMC open cut when wind speeds exceed 5 m/s in a direction that would be likely to carry dust to a nearby receptor.

The following additional best practice management measures will be implemented at the SMC consistent with the findings of the studies and specialist reports prepared in response to the SMC PRPs (as described in Section 4.2.1) (SCPL, 2012):

- vehicle speed restriction to 60 kilometres per hour;
- watering of wind erosion areas prone to dust lift off during adverse meteorological conditions;
- real-time monitoring with alarm triggers set to enable implementation of reactive dust control management measures; and
- a predictive meteorological forecasting system to enable implementation of proactive dust control management measures.

A summary of the equipment used for at-source dust control is provided in Table 4. These controls are generally consistent with best practice dust controls identified by PAEHolmes (2012a) in their *Stratford Coal Mine - Particulate Matter Control Best Practice Pollution Reduction Program* report.

Table 4
At-source Control Equipment

Equipment Type	Typical Control Area
Water trucks	• Haul roads. • Other trafficked surfaces (including minor roads). • Waste rock emplacements. • Coal handling areas. • During temporary road realignment construction activities.
Water sprays	• ROM coal bin. • Primary crusher. • Stamler feeder/breaker. • Train loading bin.
Dust collection system	• Drill rigs.
Automated sprinklers	• Product coal stockpiles.

The above mitigation/management measures are generally in accordance with the Best Practice Report (Katestone, 2010). The Best Practice Report also lists other potential mitigation measures (e.g. the use of chemical agents to assist with dust suppression watering), however PAE Holmes (2012a) concluded that this is not considered to be necessary at the SMC given the strong historical record of compliance with criteria. The findings of Katestone's Best Practice Report (Katestone, 2010) and the findings of the PRP studies conducted subsequent to release of the Best Practice Report (Section 4.2.1) were considered during development of the original AQMP and its revisions.

6.1.2 Reactive Measures

The implementation of the measures listed in Section 6.1.1 will minimise dust generation and the need for responsive management measures. In instances where proactive management measures and dust controls, as described in Tables 3 and 4 respectively, fail to prevent significant dust generation (as identified by dust monitoring [Section 7] or by visual observation), the following steps will be taken, consistent with the recommended actions stated in PEL's (2014b) *Stratford Coal Mine PRP – U3 Overburden Handling in Adverse Weather – Report on Actions and Results*:

1. The Operations Manager and/or Environment and Community Superintendent (or delegate) will determine if excessive dust is being generated, or is likely to be generated if operations continue (i.e. dust levels are approaching the criteria).
2. The Operations Manager and/or Environment and Community Superintendent (or delegate) will issue an instruction for the particular mining activity causing the excessive generation of dust to reduce the intensity of the activity (e.g. less vehicle movements, reduced vehicle speed and/or utilising a travel surface less prone to produce dust) or if necessary cease the activity immediately.
3. The Environment and Community Superintendent (or delegate) will assess what additional mitigation measures can be applied, including watering of the exposed or active surfaces, installation of mechanical measures (e.g. dust extractors on drill rigs) or continue the activity at a reduced intensity. This assessment will include consideration of wind speed and direction in relation to receptors.
4. If the Environment and Community Superintendent (or delegate) is not satisfied that the additional measures will reduce dust emissions to an acceptable level (due to the prevailing weather conditions) the activity will not recommence until the additional measures have been implemented and/or more favourable weather conditions occur.
5. The Environment and Community Superintendent (or delegate) will be responsible for monitoring the activity once it recommences to measure the effectiveness of control measures and to ensure dust emissions are acceptable.

Details as to how activities at the SMC may be further modified to reduce dust emissions, in addition to those presented above, will be issue-specific, and where necessary developed in consultation with an air quality expert. The development of dust control measures is expected to be an iterative process based on observations and empirical data.

6.2 GREENHOUSE GAS EMISSIONS

SCPL has implemented a number of measures to minimise GHG emissions from the SMC. These measures are described below:

- Maximising energy efficiency as a key consideration in the development of the mine plan. For example, significant savings of GHG emissions (through increased energy efficiency) are achieved by mine planning decisions which minimise haul distances for ROM coal and waste rock transport, and therefore fuel use.
- In 2006, SCPL prepared and implemented an Energy Savings Action Plan (ESAP) in accordance with the former NSW *Energy Administration Amendment (Water and Energy Savings) Act, 2005* (now repealed). SCPL has conducted a comprehensive analysis of energy usage and management strategies at the SMC, and has identified cost-effective energy saving opportunities, including:
  - installation of power factor correction equipment to reduce the maximum electricity demand at the SMC by an estimated 10%;
  - replacement of existing pumps in the CHPP with more efficient models;
  - potential replacement of an existing compressor in the CHPP with a more efficient model;
  - potential replacement of the CHPP rejects pipeline to increase pumping efficiency; and
  - potential adjustment of the number and location of lights in mining and infrastructure areas.

In addition, the following measures will be implemented:

- Regular maintenance of plant and equipment to minimise fuel consumption.
- Consideration of energy efficiency during selection of plant and equipment.

The effectiveness of these measures to reduce SCPL's GHG emissions (and energy consumption) will be monitored, as SCPL will annually estimate GHG emissions and energy consumption in accordance with NGER Act requirements (refer to Section 2.3). The results of NGER Act reporting will also be used internally to identify the major sources of GHG emissions and energy consumption, and to inform future management measures.

The revegetation of previously cleared areas at the SMC as part of the biodiversity offset areas and biodiversity enhancement areas will also assist with reducing net greenhouse gas emissions from the SMC. The revegetation in the biodiversity offset areas and biodiversity enhancement areas will be in addition to the extensive on-site revegetation of the mine development areas as part of the rehabilitation strategy. Specific revegetation measures and proposed timing will be described in the Mining Operations Plan to be prepared for the SMC.

6.3 ODOUR AND FUME MANAGEMENT

Spontaneous combustion has the potential to generate odours. Proactive management measures are undertaken for the control of spontaneous combustion at the SMC. Any instances of spontaneous combustion will be managed in accordance with the SMC's Spontaneous Combustion Management Plan. Management and mitigation practices generally involve reducing the interaction of potentially reactive materials with water and oxygen by appropriate dumping practices, profiling and capping any materials likely to heat, and reducing the time coal faces are exposed prior to mining. There have been very few occurrences of spontaneous combustion at the SMC during its 20 years of operation.

Self-heating of PAF material also has the potential to generate odours. The proactive management of PAF material is undertaken in accordance with the PAF material management measures described in the SMC's Surface Water Management Plan. SCPL will continue to undertake PAF material rehandling activities to emplace all identified PAF material either in pit below the predicted post-mining groundwater table level, or within dedicated PAF containment cells within the Stratford Waste Emplacement.

The SMC's Blast Management Plan (including the SMC Blast Fume Management Procedure in Attachment 2 of the Blast Management Plan) describes the measures for the prevention of fumes from blasting activities at the SMC.

7 AIR QUALITY MONITORING PROGRAM

The SMC's air quality monitoring network consists of:

- Seven static dust fallout gauges, measuring dust deposition rates over the period of a month.
- Five high volume air samplers (HVASs), measuring suspended PM_{10} concentrations
- Two tapered element oscillating microbalance (TEOM) analysers.
- A meteorological monitoring station (i.e. weather station).

The above program has been developed to ensure that potential air quality impacts are quantified to assist with the continued improvement of control measures.

The results from these monitoring networks will be used to assess compliance with the criteria in Section 4.1.1 for dust deposition and concentrations of particulate matter.

Concentrations of TSP will be calculated, based on the results of the PM_{10} monitoring and the site-specific correlation between PM_{10} and TSP described in Section 7.2. The calculated rolling annual average TSP concentrations will be used to assess compliance with the annual TSP criteria detailed in Section 4.1.1.

An additional TEOM measuring PM_{10} and $PM_{2.5}$ levels has been installed between the SMC and the village of Craven (Figure 3). (Note, $PM_{2.5}$ levels will be monitored for guidance and baseline purposes only, i.e. not for compliance).

7.1 DUST DEPOSITION

Dust deposition will continue to be monitored on monthly basis using the network of static dust gauges. The dust gauges are located in all directions around the SMC, as shown in Figure 3.

Dust deposition monitoring will continue to be conducted in accordance with the methods detailed in the *Approved Methods for the Sampling and Analysis of Air Pollution in New South Wales* (DEC, 2007) (or amended version). Deposited dust will be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580.10.1:2003: *Methods for Sampling and Analysis of Ambient Air – Determination of Particulate Matter – Deposited Matter – Gravimetric Method*.

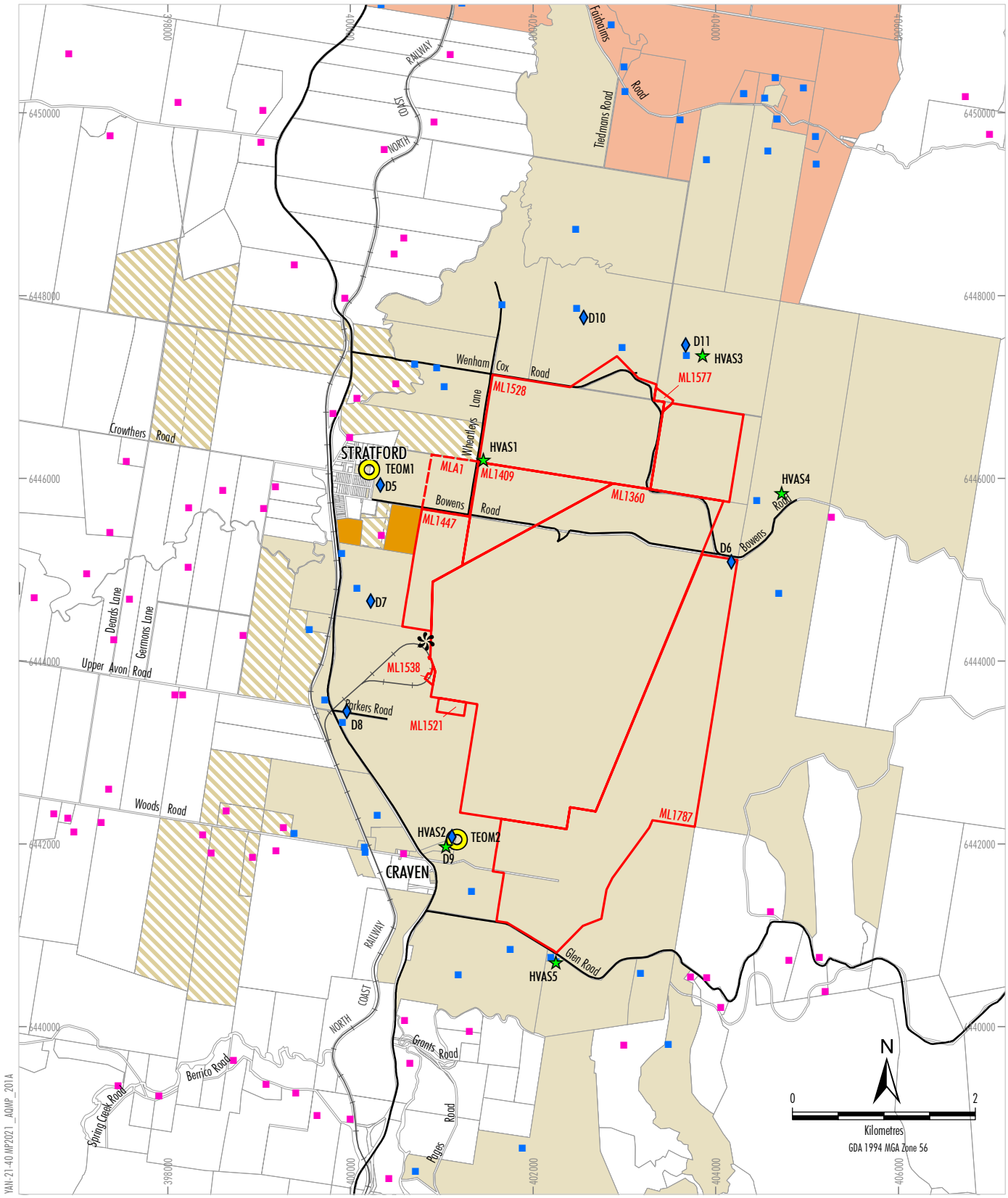
The dust collected in the dust deposition gauges will be analysed monthly for ash content, combustible matter and insoluble solids. The results will be compared with the dust deposition criteria in Section 4.1.1.

7.2 HVAS

PM_{10}

A network of five HVASs will continue to measure PM_{10} concentrations as shown in Figure 3.

Sampling will continue to be undertaken over a 24-hours per day, six days per week cycle, in accordance with the procedure *AM-18 in Approved Methods for the Sampling and Analysis of Air Pollution in New South Wales* (DEC, 2007) (or amended version).



YAN-21-40 MP2021_AQMP_201A

LEGEND

- Mining Lease Boundary
- Mining Lease Application Boundary [1]
- Yancoal Owned Land
- GRL Owned Land or Under Option
- Private Landholders - Yancoal Agreement
- Crown Land
- Privately Owned Dwelling
- Resource Company Owned Dwelling
- Meteorological Station
- Static Dust Gauge
- High Volume Air Sampler
- TEOM

[1] *MLA1 is a proposed future Mining Lease Application (MLA) area has not yet been lodged.*

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STRATFORD EXTENSION PROJECT

Meteorological and Air Quality Monitoring Sites

Source: LPI (2016); NSW Department of Planning & Environment (2017)

Figure 3

HVAS results will be used to determine compliance with the 24-hour PM_{10} concentration criteria in Section 4.1.1. The rolling annual average will also be determined and recorded, to determine compliance with annual PM_{10} criteria.

TSP

HVAS measurements are also used to calculate TSP concentrations, based on a correlation between TSP and PM_{10} concentrations developed from site-specific TSP and PM_{10} monitoring.

Prior to the commencement of mining operations at the Stratford East Open Cut area, HVAS5 was relocated approximately 1 km north to the location shown on Figure 3.

7.3 REAL-TIME MONITORING

TEOMs located in Stratford Village and in close proximity to Craven will monitor real-time PM_{10} and $PM_{2.5}$ concentrations. The TEOMs will monitor PM_{10} concentrations in accordance with AS 3580.9.8-2008 *Determination of suspended particulate matter – PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser*. $PM_{2.5}$ concentrations will be monitored in accordance with AS 3580.9.13-2013 *Determination of suspended particulate matter – $PM_{2.5}$ continuous direct mass method using a tapered element oscillating microbalance monitor*.

The TEOMs record five minute instantaneous (i.e. real-time) PM_{10} and $PM_{2.5}$ concentrations and rolling 24-hour average PM_{10} and $PM_{2.5}$ concentrations.

7.3.1 Real-time Triggers

Real-time air quality monitoring data is used to identify when ambient PM_{10} levels in the surrounding environment are elevated and require contingency action. Real-time response triggers (Table 5) have been established and are designed to provide a system to warn operation personnel (via SMS) when dust levels are approaching a relevant criterion and to provide management/control actions.

The triggers have been developed based on predictive dispersion modelling as well as measured particulate matter concentrations (Todoroski Air Sciences, 2013). The alarm triggers and positions of real-time air quality monitoring locations will be reviewed annually (i.e. as mining progresses) or as part of a contingency response, if required.

Triggers are reported to the area supervisor and actions included in shift reports.

Table 5
Real-time Response Triggers

No.	Trigger	Management/Control Actions	Responsibility
1	**Stratford TEOM** • Winds from NE to SSE (45 to 157.5 degrees); and • Rolling 24 hour PM_{10} level >25 µg/m³ and 5 minute average PM_{10} level is >100 µg/m³ for one reading. **Craven TEOM** • Winds from NNW to E (337.5 to 90 degrees); and • Rolling 24 hour PM_{10} level >25 µg/m³ and 5 minute average PM_{10} level is >100 µg/m³ for one reading.	• Review weather data and trends (e.g. wind direction and speed). • Review weather predictions. • Review current operations and locations of dust generating activities. • Review current dust management controls. • Check that standard mitigation measures are in place. • Continue to monitor PM_{10} until decreasing trend observed.	Environment and Community Superintendent (or delegate).

Table 5 (Continued)
Real-time Response Triggers

No.	Trigger	Management/Control Actions	Responsibility
2	**Stratford TEOM** • Winds from NE to SSE (45 to 157.5 degrees); and • Rolling 24 hour PM_{10} level >25 µg/m³ and 5 minute average PM_{10} level is >100 µg/m³ for three or more consecutive readings; or • 5 minute average PM_{10} level is >200 µg/m³ for one reading. **Craven TEOM** • Winds from NNW to E (337.5 to 90 degrees); and • Rolling 24 hour PM_{10} level >25 µg/m³ and 5 minute average PM_{10} level is >100 µg/m³ for three or more consecutive readings; or • 5 minute average PM_{10} level is >200 µg/m³ for one reading.	• Actions as per Trigger 1. • Mine Production Environmental Assistant to inspect and monitor downwind areas for dust and report to supervisor. • Ensure relevant dust control measures (refer Table 3) are in place and performing effectively. • Make temporary operational changes as appropriate (e.g. relocate overburden dumping to wind protected areas; increase haul road watering rate; ensure operators use best endeavours to minimise dust lift off during loading; or selectively shutting down mobile fleet or diggers). • Temporarily pause and modify any activity generating excessive visible dust plumes.	Environment and Community Superintendent (or delegate).
3	**Stratford TEOM** • Winds from NE to SSE (45 to 157.5 degrees); and • Rolling 24 hour PM_{10} level >45 µg/m³ for three or more consecutive hours. **Craven TEOM** • Winds from NNW to E (337.5 to 90 degrees); and • Rolling 24 hour PM_{10} level >45 µg/m³ for three or more consecutive hours.	• Actions as per Trigger 1. • Actions as per Trigger 2. • Make operational changes (including temporarily shutting down mobile fleet and diggers where appropriate) until decreasing PM_{10} trend observed.	Environment and Community Superintendent (or delegate).

7.4 METEOROLOGICAL MONITORING

SCPL operate an automated meteorological monitoring station at the SMC (Figure 3) capable of monitoring:

- air temperature;
- wind direction and speed;
- rainfall;
- relative humidity; and
- solar radiation and evaporation.

Wind speed and wind direction data will be used in conjunction with all dust monitoring data, as described above, to further minimise the potential for dust emissions, and to provide useful information for review of the effectiveness of dust management practices.

7.4.1 Meteorological Forecasting System

A meteorological forecasting system will be used at the SMC to predict meteorological conditions for the coming day to determine, one day in advance, where the risk of dust-enhancing meteorological conditions may occur (e.g. based on wind speed, direction, rainfall and atmospheric stability).

The predictive meteorological forecasting system will work in conjunction with the real-time monitoring system, providing an alert for the appropriate personnel to review the real-time data and manage the intensity of activities for that day, increase controls (e.g. haul truck watering) or limit activity to various areas of the site.

7.5 ASSESSMENT OF DATA VALIDITY

Where monitoring indicates a potential exceedance of Development Consent SSD-4966 criteria it is necessary to assess the potential for the influence of the following factors:

- Extreme events, such as:
  - bushfires;
  - prescribed burning;
  - dust storms and other extraordinary regional meteorological events;
  - fire incidents;
  - illegal activities; and
  - other activities agreed by the Secretary of the DPIE.
- Irregular activities near monitoring sites such as:
  - exposed areas of soil around the monitoring site;
  - agricultural activities in the immediate and wider area, include lime and fertiliser spreading and ploughing;
  - adjacent land use activities; and
  - contamination from bird droppings, insects, etc.
- Reasonableness of data (e.g. is the equipment operating properly and providing expected data).

7.6 PROTOCOL FOR DETERMINING EXCEEDANCES

Monitoring results from the dust gauges and HVASs will be used to assess dust emissions from the SMC against the criteria detailed in Section 4.1.1.

If data analysis indicates that a criterion has been exceeded, an assessment will be made of the data validity (refer to Section 7.5) prior to being determined an exceedance. Dust deposition gauge and HVAS data will be assessed monthly following receipt of results.

A verified exceedance of the criteria detailed in Section 4.1.1 will be considered to be an air quality incident and will be responded to within 24 hours in accordance with the contingency plan in Section 8. The management of incidents is described in the SMC Pollution Incident Response Management Plan (Section 10).

The real-time TEOM air quality monitoring is used for management purposes to assist with operational responses to air emissions and the TEOM triggers (Table 5) will be responded to as soon as practicable.

7.7 REVIEW OF MONITORING RESULTS

The results of dust and meteorological monitoring will be recorded in a database. This data will be available to determine potential relationships between short-term variations in dust levels and the number and distribution of any dust-related complaints, where required. A review of dust emission level monitoring results against the air quality criteria detailed in Section 4.1.1 and dust-related complaints will be used to inform future revisions of the air quality monitoring program and this AQMP where required.

Monitoring results will be reported annually in the Annual Review.

8 CONTINGENCY PLAN

In the event that air quality criteria described in Section 4.1.1 are considered to have been exceeded, as per the protocol described in Section 7.6, SCPL will implement the following Contingency Plan:

- The breach of the air quality criteria will be reported to the Operations Manager and Environment and Community Superintendent (or delegate) within 24 hours of assessment completion.
- SCPL will report the breach as a non-compliance of the air quality criteria to the EPA and the DPIE as soon as practicable (i.e. once confirmed as an air quality exceedance and within 7 days of assessment completion).
- SCPL will identify an appropriate course of action with respect to the identified impact(s), in consultation with the DPIE, as necessary. For example contingency measures, such as, but not limited to, those described in Section 8.1 of this AQMP.
- SCPL will, on request, submit the proposed course of action to the DPIE for approval.
- SCPL will implement the approved course of action to the satisfaction of the DPIE.

8.1 POTENTIAL CONTINGENCY MEASURES

Potential contingency measures will be reviewed during revisions of this AQMP. Key potential contingency measures to be implemented following a verified exceedance of the air quality criteria identified in Section 4.1.1 (and described above) may include the following:

- SCPL will notify the affected landholder or tenant (for privately-owned property) of the validated exceedance and provide them with regular air quality monitoring results, until the results show the SMC is compliant with the relevant criteria, and provide a copy of the NSW Health fact sheet entitled “Mine Dust and You”.
- SCPL will implement additional at-source controls including re-running the dispersion model to confirm the effectiveness of controls.

9 REVIEW AND IMPROVEMENT OF AIR QUALITY MANAGEMENT PLAN

9.1 ANNUAL REVIEW

In accordance with Condition 4, Schedule 5 of Development Consent SSD-4966, SCPL will conduct an Annual Review of the environmental performance of the SMC by the end of March each year, or other timing as may be agreed by the Secretary of the DPIE.

The Annual Review will specifically address the following aspects of Condition 4, Schedule 5, which are directly relevant to air quality management:

- include a comprehensive review of the monitoring results and complaints records for the SMC over the previous calendar year, including 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 SEP EIS;
- identify any non-compliance over the past 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 SMC;
- identify any discrepancies between the predicted and actual impacts of the SMC, 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 SMC.

The Annual Review will be made publicly available on the Stratford Coal website, in accordance with Condition 11, Schedule 5 of Development Consent SSD-4966.

9.2 AQMP REVIEW AND UPDATE

In accordance with Condition 5, Schedule 5 of Development Consent SSD-4966, this AQMP will be reviewed to the satisfaction of the Secretary of the DPIE within three months of the submission of:

- an Annual Review under Condition 4, Schedule 5 of Development Consent SSD-4966;
- an incident report under Condition 7, Schedule 5 of Development Consent SSD-4966;
- an audit under Condition 9, Schedule 5 of Development Consent SSD-4966; or
- any modification to the conditions of Development Consent SSD-4966.

Where this review leads to revisions of this AQMP, then within 4 weeks of the review, the revised AQMP will be submitted for the approval of the Secretary of the DPIE. The revision status of this AQMP is indicated on the title page of each copy.

This AQMP will be made publicly available on the Stratford Coal website in accordance with Condition 11, Schedule 5 of Development Consent SSD-4966. A hard copy of the AQMP will also be kept at the SMC.

The AQMP will be revised at the earliest possible time of a modification application for the Stratford Extension Project Development Consent SSD-4966. Matters to consider include the removal of deposited dust monitoring, updating the PM_{10} annual criterion to 25 ug/m^3, and requiring the reporting of environmental incidents within 24 hours, rather than 7 days.

10 REPORTING AND MANAGEMENT PROTOCOLS

In accordance with Condition 3, Schedule 5 of Development Consent SSD-4966, SCPL 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.

The management of incidents is described in the SMC Pollution Incident Response Management Plan. The management of complains and non-compliances is described in detail in the SMC Environmental Management Strategy. The management of exceedances of performance criteria is detailed in Sections 7 and 8 of this AQMP. In accordance with Condition 8, Schedule 5 of NSW Development Consent SSD-4966, SCPL will provide regular reporting on the environmental performance of the SMC on the SMC's website.

11 REFERENCES

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

Department of Environment and Conservation NSW (2007) *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales*.

Katestone Environmental Pty Ltd (2010) *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining*, prepared for the New South Wales Department of Environment, Climate Change and Water, December 2010.

Pacific Environment Limited (2013a) *Stratford Coal Mine PRP U2 Monitoring Plan – Wheel Generated Dust*.

Pacific Environment Limited (2013b) *Stratford Coal Mine PRP U3 Monitoring Plan - Overburden Handling in Adverse Weather*.

Pacific Environment Limited (2014a) *Stratford Coal Mine EPL 5161 PRP U2 & EPL 11745 PRP U1: Monitoring Program Results – Wheel Generated Dust*.

Pacific Environment Limited (2014b) *Stratford Coal Mine PRP – U3 Overburden Handling in Adverse Weather – Report on Actions and Results*.

Pacific Environment Limited (2014c) *Coal Mine Pollution Reduction Program Condition U3 Assessment*.

Pacific Environment Limited (2015) *Supporting Study for Stratford Coal's Pollution Reduction U2/U3: Coal Mine Wind Erosion of Exposed Land Assessment*.

PAEHolmes (2012a) *Stratford Coal Mine - Particulate Matter Control Best Practice Pollution Reduction Program.*

PAEHolmes (2012b) *Stratford Extension Project – Air Quality and Greenhouse Gas Assessment.* Report prepared for Stratford Coal Pty Ltd.

Stratford Coal Pty Ltd (2012) *Stratford Extension Project Environmental Impact Statement*.

Stratford Coal Pty Ltd (2015) *Stratford Coal Mine EPL 5161 & 11745, Pollution Reduction Program, Coal Mine Wind Erosion of Exposed Land Assessment*.

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APPENDIX 1

RECORD OF CONSULTATION WITH EPA

DOC21/971269-2;EF13/3637

Planning and Assessment Division
Department of Planning, Industry and Environment
Locked Bag 5022
PARRAMATTA NSW 2124

Attention: The Planning Officer

11 November 2021

EPA Submission on Planning Advice Request

Dear Sir/Madam,

Thank you for the request for advice for Post Approval Consultation (PAE-31174496), requesting a review by the NSW Environment Protection Authority (EPA) of the Stratford Mining Complex (SMC) Air Quality Management Plan (AQMP), dated October 2021. The document was prepared in accordance with Condition 23, Schedule 3 of the Stratford Extension Project Development Consent (SSD-4966) and updated to reflect current operations at the Stratford Mining Complex.

The EPA understands that Condition 5, Schedule 2 of SSD-4966 authorises mining operations to be carried at the SMC until 31 December 2025. Accordingly, Stratford Coal Pty Ltd (SCPL) is planning for the mine closure phase and has revised the AQMP to reflect the current stage of operations and to describe proposed changes to operations as SMC progresses towards mine closure and the resultant changes to the air quality monitoring program. Other administrative updates have also been included to contemporise the plan.

Key changes as a result of the progression toward mine closure include:

- Open cut mining operations will progressively reduce over the next four years. The total mobile plant fleet operating at the SMC will therefore reduce also.
- Progressive open cut pit backfilling activities: As mining of the open cut pits is progressively completed, backfilling of some of the pits with waste rock material will also occur either concurrently with mining or after the completion of mining.
- Rehabilitation of completed areas will continue to be progressed in accordance with the SMC's Rehabilitation Management Plan.
- Reduction and then cessation of vegetation clearance activities. No new disturbance areas (within the approved surface disturbance areas) are proposed.
- Closure Planning through implementation of the SMC's Mine Closure Planning Program (described in the SMC Mining Operations Plan and Rehabilitation Management Plan

The EPA has reviewed the documentation and has the following comments and recommendations:

1. Matters to be addressed prior to determination

a. Section 6.1 Air Quality – Section 6.1.1 Proactive Measures and Dust Controls

This section outlines the proactive dust management measures and dust emission controls that will continue to be implemented to minimise dust emissions from the premises.

The final paragraph of this section states:

> "the mitigation/management measures are generally in accordance with the *NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (Katestone Environmental Pty Ltd [Katestone], 2010)*. The findings of Katestone (2010) will be considered in future revisions of this AQMP and in consideration of monitoring data".

The Katestone study was commissioned by the EPA in 2010 to review coal mining activities in the Greater Metropolitan Region (GMR) of NSW. The report was finalised in June 2011 and made the following key conclusions:

- Significant reductions in emissions of particulate matter could be achieved through the application of best practice control measures that are both technically and economically feasible;
- The top five sources of PM_{10} from GMR coal mines include wheel generated dust, wind erosion of overburden, bulldozers on overburden, blasting and trucks loading and dumping overburden;
- PM_{10} emissions from GMR coal mines could be reduced by almost 50% with application of best practice, but at significant cost;
- Haul roads account for almost 40% of PM10 emissions from mines. The greatest reduction would be achieved by the application of suppressants to haul roads, which has the potential to reduce emissions by 21% at a cost of $59 million per year.

One of the key recommendations of the Katestone report was that each mine should carry out a site-specific determination of best management practice to reduce particulate emissions from the mine site. This recommendation was implemented by the EPA through a series of pollution reduction programs attached to each coal mine licence.

Each PRP required the mines to:

- prepare a report comparing their current operation with international best practice; and
- report on the practicability of implementing each best practice measure and provide a timetable for implementing suitable measures.

The reports submitted by open cut coal mines, including SMC, supported the findings in the Katestone benchmarking report that wheel-generated dust in the mines was the biggest source of fine dust particles on most mine sites.

This resulted in the EPA issuing additional pollution reduction programs (PRP's) on all open cut mines, including the Wheel Generated Dust PRP. The Wheel Generated Dust PRP required all open cut coal mines to achieve 80% control of wheel generated dust; and to monitor and report on their results. This level of control is generally achieved by watering haul roads and by applying chemical dust suppressants.

SMC submitted a report in response to the requirements of the Wheel Generated Dust PRP. This report stated that SMC was able to achieve a wheel generated dust control efficiency of 80% or more through regular watering of the haul roads alone (i.e without the use of dust suppressants).

Recommendation:

The EPA recommends that SCPL update the AQMP to consider the site-specific findings and management commitments made in the documents titled:

- Stratford Coal Mine - Particulate Matter Control Best Practice Pollution Reduction Program Gloucester Coal Limited Report No: 6479, Prepared by PAE Holmes and Dated 6 February 2012; and
- Stratford Coal Mine EPL 5161 PRP U2 & EPL 11745 PRP U1: Monitoring Program Results – Wheel Generated Dust, Job No 7933, prepared by Pacific Environment Limited and dated 24 July 2014.

2. Matters to be addressed post approval

a. Licence Variation May Be Required

The EPA notes that the Updated AQMP and appendices do not currently propose any amendments that will immediately impact on the monitoring undertaken in accordance with Environment Protection Licence (EPL) 5161.

SCPL state that following the cessation of mining operations on 31 December 2025 and the key activities contributing to air emissions, and subsequently after bulk rehabilitation and the establishment of revegetation, the requirement for air quality controls, management measures and monitoring would reduce as the potential impact pathway no longer exists. At this stage, SCPL would seek to rationalise the SMC air quality monitoring program to reflect the scale of potential emissions from the SMC. SCPL would consult with the EPA prior to rationalising the monitoring program.

The EPA is supportive of this approach.

Recommendation:

The EPA recommends that upon determination of PAE-31174496, and prior to reducing the air quality monitoring undertaken at the premises, that consultation is undertaken with the EPA regarding rationalisation of the air quality monitoring and variation of EPL 5161 to reflect any agreed changes.

This concludes the EPA's submission on the proposal.

If you have any questions about this request, please contact Emma Coombs on (02) 4908 6831 or via email at info@epa.nsw.gov.au.

Yours sincerely

SCOTT ENSBEY
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Environment Protection Authority

APPENDIX 2

SUMMARY OVERVIEW OF SMC POLLUTION REDUCTION PROGRAMS

Table A2-1
Summary Overview of SMC Pollution Reduction Programs

Former PRP	Summary of PRP Requirement	Study/Report Prepared	Key Findings/Conclusion	Status
Coal Mine Particulate Matter Control Best Practice	The Coal Mine Particulate Matter Control Best Practice PRP required SCPL to conduct a site specific investigation to identify the highest ranking particulate generating activities and determine the Best Management Practice measures most practicable to reduce particle emissions.	*Stratford Coal Mine – Particulate Matter Control Best Practice Pollution Reduction Program* (PAE Holmes, 2012a).	PAE Holmes (2012a) report: • identified the highest ranking particulate generating activities at the Stratford Coal Mine; • identified the potential Best Management Practice measures to reduce particulate emissions from those activities; • evaluated the practicality of implementing the Best Management Practice measures; and • recommended select Best Practice Measures for implementation at the Stratford Coal Mine. The Best Practice Measures recommended were (PAE Holmes, 2012a): • Vehicle speed restriction to 60 km/hr. • Use of larger vehicles. • Increase intensity of haul road sprays. • Watering of wind erosion areas. • Vegetative groundcover on wind erosion areas. These Best Practice Measures were incorporated into this AQMP following approval of the SEP in 2018 (refer Section 6.1). The EPA reviewed PAE Holmes (2012a) report and found it to be generally compliant with the requirements of Condition U1 of EPL 5161 and subsequently removed Condition U1 titled *Coal Mine Particulate Matter Control Best Practice* from EPL 5161 following its satisfactory completion.	**Complete.** Condition U1 *Coal Mine Particulate Matter Control Best Practice* removed from EPL 5161 on 21 March 2013.
PRP 2 – Stage 1 – Modernise Particulate Monitoring	PRP 2 required SCPL to undertake a review of current air quality monitoring sites to ensure that current best practice information on ambient air quality and PM_{10} was being obtained. SCPL was also required to install a Tapered Element Oscillating Microbalance (TEOM) analyser to enable continuous monitoring of PM_{10} in the Stratford Village.	Review conducted prior to 31 December 2012.	AS a result of the review undertaken SCPL installed an additional two high volume air samplers (HVAS) around the Stratford Coal Mine boundary and installed a TEOM analyser in the Stratford Village to enable continuous measurement of PM_{10}. As provided in Section 7 of this AQMP, SCPL has now installed five (5) HVASs and two TEOMs in the local area surrounding the SMC. EPL 5161 was varied to include the two additional HVAS monitoring points and the requirement for continuous monitoring from TEOM analyser in the Stratford Village. The requirement to monitor with dust deposition gauges was removed from EL 5161.	**Complete – 11 January 2018[1].** Condition U2 *PRP U2 – Stage 1 – Modernise Particulate Monitoring* removed from EPL 5161 on 19 January 2018.

[1] EPL 5161 Licence Summary (EPA website accessed December 2021).

Table A2-1 (Continued)
Summary Overview of SMC Pollution Reduction Programs

Former PRP	Summary of PRP Requirement	Study/Report Prepared	Key Findings/Conclusion	Status
Particulate Matter Control Best Practice Implementation – Wheel Generated Dust	The former Particulate Matter Control Best Practice Implementation – Wheel Generated Dust PRP required that SCM must achieve and maintain a dust control efficiency of 80% or more on its haul roads. To satisfy the requirements of the EPL, a Monitoring Plan was developed which outlined the proposed monitoring method to determine the site wide haul road control efficiency.	*Stratford Coal Mine PRP U2 Monitoring Plan – Wheel Generated Dust* (Pacific Environment Limited [PEL], 2013a). *Stratford Coal Mine EPL 5161 PRP U2 & EPL 11745 PRP U1: Monitoring Program Results – Wheel Generated Dust* (PEL, 2014a).	The Monitoring Program developed is outlined in the *Stratford Coal Mine PRP U2 Monitoring Plan – Wheel Generated Dust* (PEL, 2013a). This report also describes the haul road monitoring system to be implemented and the key performance indicators that are to be used to demonstrate compliance. The *Stratford Coal Mine EPL 5161 PRP U2 & EPL 11745 PRP U1: Monitoring Program Results – Wheel Generated Dust* (PEL, 2014a) describes the results from three rounds of haul road monitoring to measuring PM_{10} emissions over Spring, Summer and Autumn periods (when meteorological conditions are most likely to result in elevated levels of dust). The report showed control efficiencies above 90% over each seasonal monitoring round at the Stratford Coal Mine (PEL, 2013a). EPL 5161 was varied on 5 December 2014 to remove the conditions relevant to PRPs 1 and 2 from EPL 5161 due to their successful completion. Section 6.1 of this AQMP considers and includes the outcomes from this PRP.	**Complete – 15 August 2014**[1] Condition U2 *Particulate Matter Control Best Practice Implementation – Wheel Generated Dust* removed from EPL 5161 on 5 December 2014.
Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions	Former Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions PRP required SCPL to alter or cease the use of equipment on overburden and the loading and dumping of overburden during adverse weather conditions to minimise the generation of particulate matter from 22 March 2013. The PRP also required SCPL to prepare and implement a Monitoring Program to assess its compliance with Condition U3.1 and submit a written report to the EPA providing the results of the Monitoring Program.	*Stratford Coal Mine PRP U3 Monitoring Plan - Overburden Handling in Adverse Weather* (PEL, 2013b). *Stratford Coal Mine PRP – U3 Overburden Handling in Adverse Weather – Report on Actions and Results* (PEL, 2014b).	The Monitoring Program developed to assess its compliance with Condition U3.1 is outlined in the *Stratford Coal Mine PRP U3 Monitoring Plan - Overburden Handling in Adverse Weather* (PEL, 2013b). This report also describes the key performance indicators that were to be used to demonstrate compliance with Condition U3.1. The *Stratford Coal Mine PRP – U3 Overburden Handling in Adverse Weather – Report on Actions and Results* (PEL, 2014b) describes the results from implementation of the monitoring program during adverse conditions and the results from measuring PM_{10} concentrations at Stratford Village, to determine if adverse conditions are resulting in elevated dust concentrations beyond the site boundary and also to determine if the alteration / cessation of operations decreased these dust levels. The *Stratford Coal Mine PRP – U3 Overburden Handling in Adverse Weather – Report on Actions and Results* (PEL, 2014b) report concluded: *A review of meteorological data for SCM identifies a small percentage of time when adverse conditions for overburden handling occur. A review of the resultant dust levels during these conditions indicate that although short term peaks are observed, concentrations generally decrease immediately afterwards and the resultant 24-hour average PM_{10} concentration does not exceed compliance criteria.*	**Complete – 15 August 2014**[1] Condition U3 *Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions* removed from EPL 5161 on 5 December 2014.

[1] EPL 5161 Licence Summary (EPA website accessed December 2021).

Table A2-1 (Continued)
Summary Overview of SMC Pollution Reduction Programs

Former PRP	Summary of PRP Requirement	Study/Report Prepared	Key Findings/Conclusion	Status
Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions (continued)	Continued.	Continued.	Continued: *From the investigation into dust levels during adverse weather conditions it appears peak PM_{10} concentrations are generally not related to mine operations and influenced by external factors. Analysis of the 1 hour PM_{10} concentration data shows little relationship with wind direction and no clear signal from SCM.* *Going forward, SCM will document the procedural response measures, undertaken during adverse conditions, as part of the TARP for overburden handling during adverse weather.* As a result of these studies/reports, SCPL incorporated into this AQMP (following approval of the SEP in 2018) a number of reactive measures for dust control, based on site-specific dust monitoring or visual observations (Section 6).	**Complete – 15 August 2014**[1] Condition U3 *Particulate Matter Control Best Practice Implementation - Disturbing and Handling Overburden under Adverse Weather Conditions* removed from EPL 5161 on 5 December 2014.
Particulate Matter Control Best Practice Implementation - Trial of Best Practice Measures for Disturbing and Handling Overburden	The former Particulate Matter Control Best Practice Implementation - Trial of Best Practice Measures for Disturbing and Handling Overburden PRP required SCPL to submit a report documenting an investigation and trial of best practice measures for the control of particulate matter from the use of equipment on overburden and the loading and dumping of overburden. Best practice measures may include, but should not be limited to, use of foggers and water sprays and reduction of drop heights. The PRP also required the report to document the investigation and trial of each best practice measure, and quantify the particulate matter control effectiveness and discuss the practicability of each best practice measure.	*Coal Mine Pollution Reduction Program Condition U3 Assessment* (PEL, 2014c).	PEL's (2014c) *Coal Mine Pollution Reduction Program Condition U3 Assessment* report documents the results from the investigation. Following discussion at a workshop with mining industry representatives on 29 October 2014, the EPA agreed that the requirements of the PRP had been satisfied by this report. The PRP was therefore removed from EPL 5161. As a result of this study, SCPL incorporated into this AQMP (following approval of the SEP in 2018) management measures and controls specific to SMC operations, including at-source controls (refer Tables 3 and 4 in Section 6.1).	**Complete – 17 April 2014**[1] *Condition U4 Particulate Matter Control Best Practice Implementation - Trial of Best Practice Measures for Disturbing and Handling Overburden* was removed from EPL 5161 on 5 December 2014.

[1] EPL 5161 Licence Summary (EPA website accessed December 2021).

Table A2-1 (Continued)
Summary Overview of SMC Pollution Reduction Programs

Former PRP	Summary of PRP Requirement	Study/Report Prepared	Key Findings/Conclusion	Status
Coal Mine Wind Erosion of Exposed Land Assessment	The former Coal Mine Wind Erosion of Exposed Land Assessment PRP required SCPL to undertake an assessment of its exposed surface area and compare it to the predictions made in the Stratford Coal Mine's relevant Environmental Assessment.	*Stratford Coal Mine EPL 5161 & 11745, Pollution Reduction Program, Coal Mine Wind Erosion of Exposed Land Assessment* (SCPL, 2015). *Supporting study for Stratford Coal's Pollution Reduction U2/U3: Coal Mine Wind Erosion of Exposed Land Assessment* (PEL, 2015) (Attachment 1 of SCPL [2015]).	SCPL's (2015) *Stratford Coal Mine, EPL 5161 & 11745, Pollution Reduction Program, Coal Mine Wind Erosion of Exposed Land Assessment* and PEL's (2015) *Coal Mine Pollution Reduction Program Condition U3 Assessment* report documents the results of the wind erosion of exposed land assessment. EPL 5161 was varied on 19 June 2018 to remove Condition U3 relevant to Coal Mine Wind Erosion of Exposed Land Assessment. As a result of this study, SCPL incorporated into this AQMP (following approval of the SEP in 2018) management measures and controls for exposed surfaces, including reactive measures/procedures (refer Section 6.1).	**Complete – 31 August 2015[1].** *Condition U3 Coal Mine Wind Erosion of Exposed Land Assessment* was removed from EPL 5161 on 19 June 2018.

[1] EPL 5161 Licence Summary (EPA website accessed December 2021).