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*Adelaide Brighton Cement Ltd*

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## **Dust Management Plan**

**Adelaide Brighton Cement Limited**

**Licence number: 1126**

**Premises Address: Victoria & Elder Roads, Peterhead  
(Birkenhead Site)**

**June 2018**

## Glossary

Term	Definition
$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
$\mu\text{m}$	micrometre
$^{\circ}\text{C}$	degrees Celsius
m	metre
$\text{m}^3$	cubic metres
$\text{m}^3/\text{s}$	cubic metres per second

Nomenclature	Definition
$\text{PM}_{10}$	particulate matter with a diameter less than 10 micrometres
$\text{PM}_{2.5}$	particulate matter with a diameter less than 2.5 micrometres

Abbreviations	Definition
ABC	Adelaide Brighton Cement
Air EPP	Environment Protection (Air Quality) Policy 2016
DMP	Dust Management Plan
EPA	Environment Protection Authority
GLPMRP	Ground Level Particulate Monitoring and Reporting Plan
SPMP	Stack Particulate Management Plan
TARP	Trigger Action Response Plan

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# Dust Management Plan

## 1.0 Purpose

The purpose of this Dust Management Plan (DMP) is to facilitate the ongoing implementation of dust control measures to minimise offsite dust from the Facility.

## 2.0 Scope

The plan addresses

- Objectives of the plan
- Dust management practices
- Development of trigger action response plans
- Reporting methodology
- Public access to reports and plan

## 3.0 Objectives of Dust Management Plan

The objectives of this plan are to:

- Develop triggers based on ambient monitoring data, meteorological and visual observations
- Develop trigger action response plans to prevent or minimise off site particulate dust impacts and in particular ensure compliance with Air EPP criteria of :
  - PM<sub>10</sub> of 50 µg/m<sup>3</sup> (24 hour average)
  - PM<sub>2.5</sub> of 25 µg/m<sup>3</sup> (24 hour average)
- Facilitate on going implementation of dust control measures
- Provide public access to quarterly, annual reports and this plan

## 4.0 Background

ABC has a network of onsite and offsite, ground level particulate monitors that continuously measure particulate size fractions (PM<sub>10</sub>, PM<sub>2.5</sub> and TSP), wind speed and direction.

The Ground Level Particulate Monitoring and Reporting Plan provides the framework for the measurement, monitoring and reporting of ground level particulate concentrations from the monitors.

The monitors provide data that facilitate the ongoing implementation of dust control measures, development of trigger action response plans (TARP's) and strategies to reduce fugitive particulate emissions from activities on the site.

## 4.1 Sources of dust

Fugitive dust emissions may occur from the following sources at the site:

- Unloading of limestone from ships
- Onsite transfers of limestone, gypsum, shale, black sand, mill scale, bauxite and slag
- Wind erosion of stockpiles
- Wind erosion of cleared areas
- Vehicle movements on paved and unpaved areas
- Combustion emissions from vehicles onsite
- Dust collectors that are vented to the environment.

## 4.2 Details of the receiving environment and dust monitoring locations

- Plant is located adjacent to the Port River, Northern side of the Birkenhead Bridge
- Plant is adjacent to a residential area
- Proximity of sensitive receptors to the site is shown in figure 1

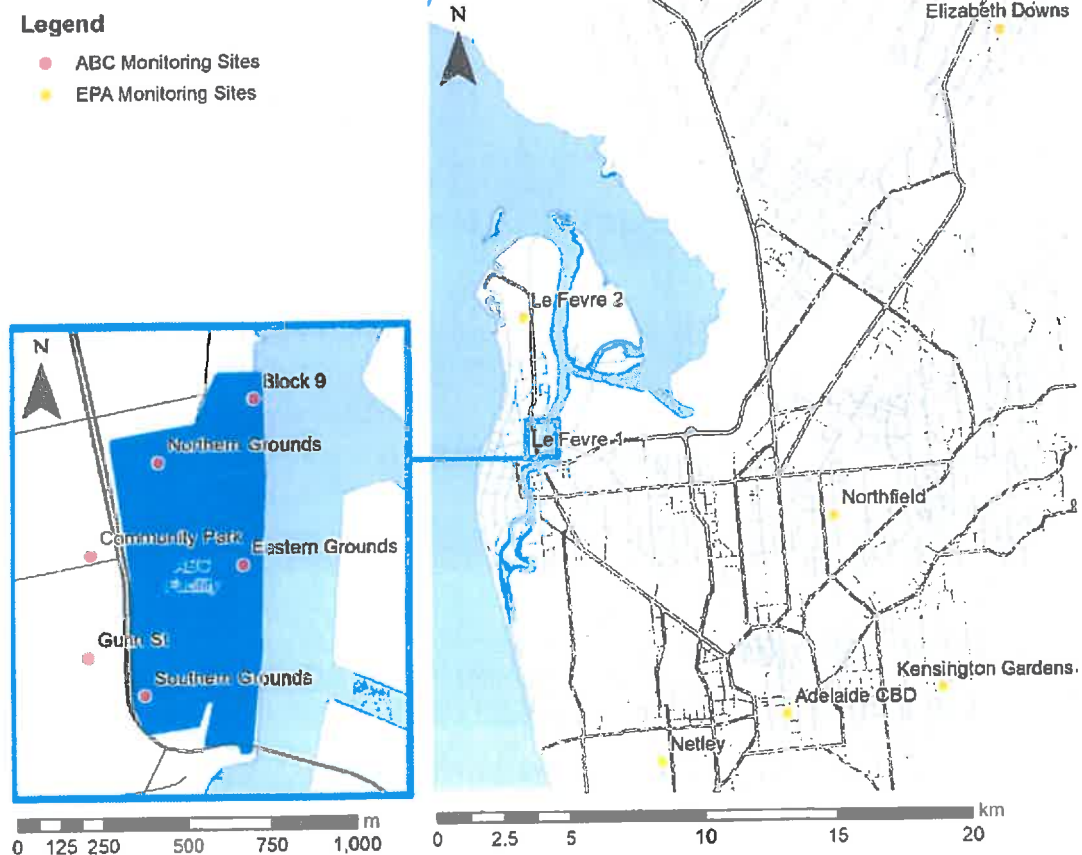
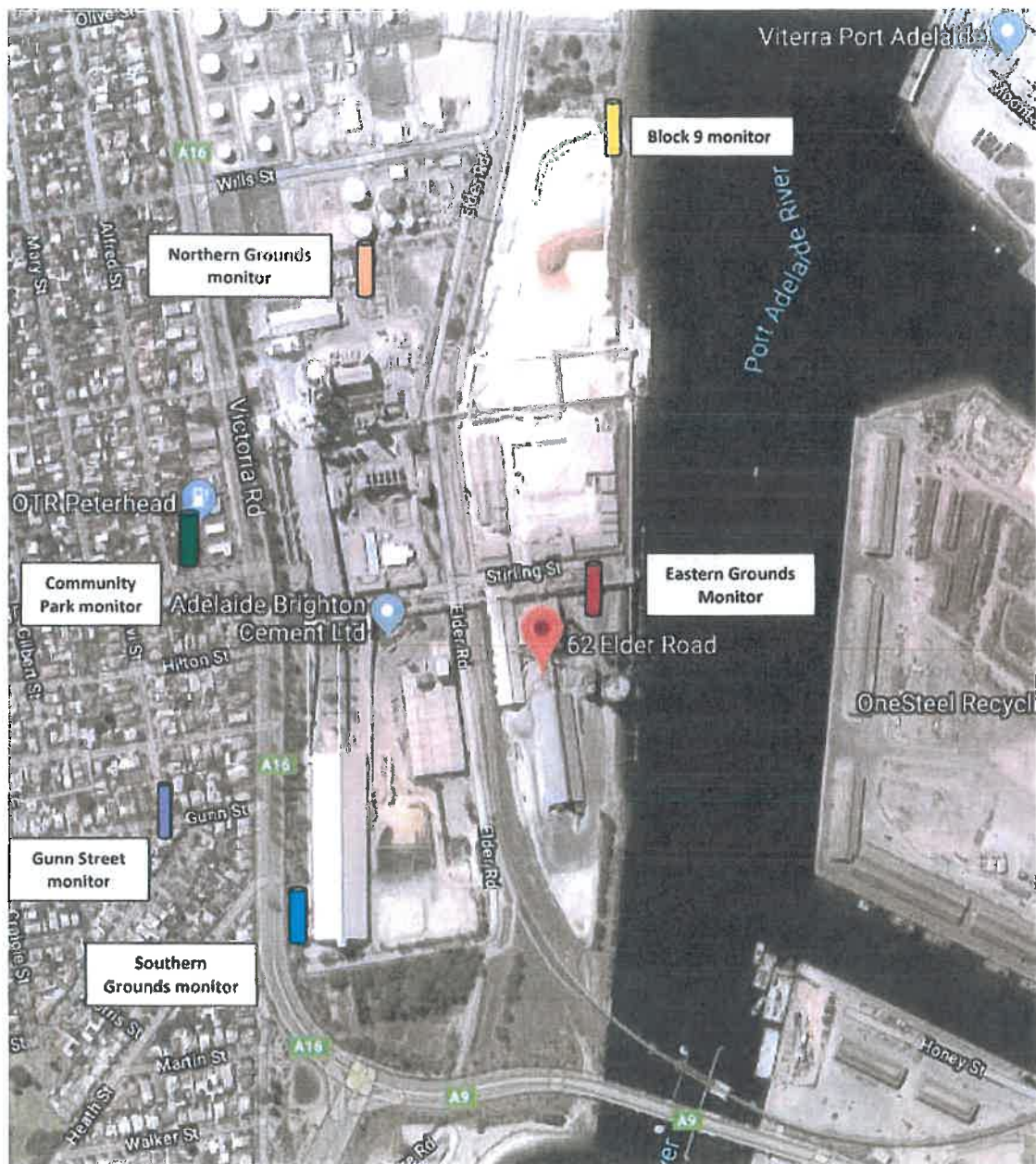


Figure 1:

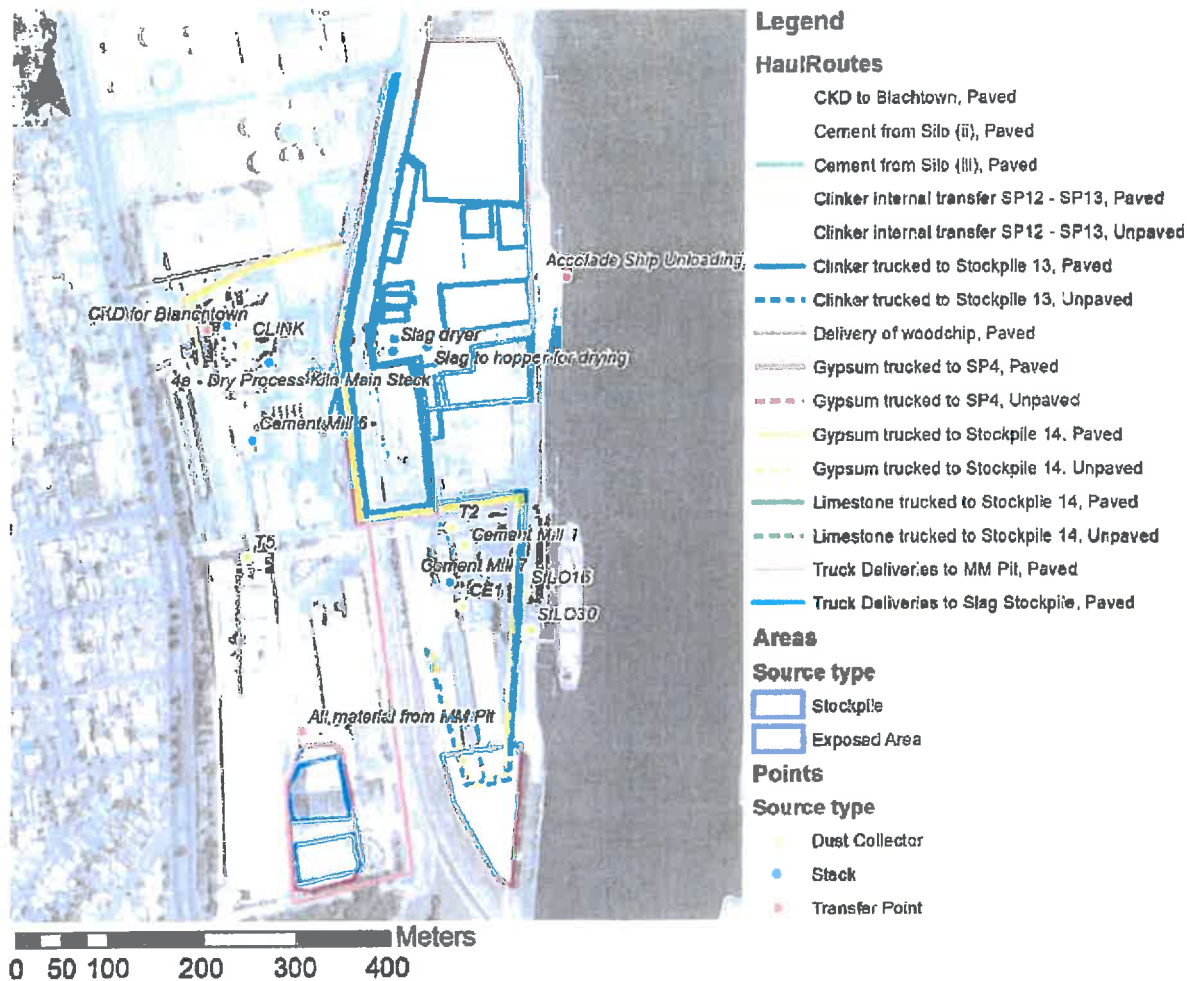
- Dust Monitoring locations are indicated by colour coded points on the aerial photograph below



On-site dust monitors are located strategically around the site to allow ABC to manage dust emissions from site operations. Offsite dust monitors are located at 31 Gunn Street, Birkenhead, 5015 and at the Community Park, located on the corner of Alfred Street and Hargrave Street, Peterhead, 5016.

Location of fugitive dust sources as well as the stacks and significant dust collectors are shown in Figure 2: Schematic of the facility showing locations of stacks, dust collectors and fugitive dust sources.





### 4.3 Dust controls

ABC has implemented a range of fixed measures to reduce or eliminate the potential sources of fugitive dust across the Facility, including the following:

- Stockpiling and handling of material largely occurs inside sheds (limestone blend building, Wallaroo shed, clinker gantries)
- Rapid raise doors
- Miscellaneous Materials (MM) and slag stockpiles enclosed in 3-sided bunkers
- Transfer points are enclosed
- Conveyors are enclosed
- Water sprays on ship unloader
- Sprinklers on MM bunkers
- Foam dust suppressant (MM receival system)

- Shade cloth installed around most of the site to reduce wind speed and trap dust
- Vegetation barriers to reduce wind speed and trap dust
- Truck washes
- Wheel washes
- Dust collectors
- Sealing of exposed areas to eliminate dust lift-off

#### 4.4 Assessment of dust emissions and controls

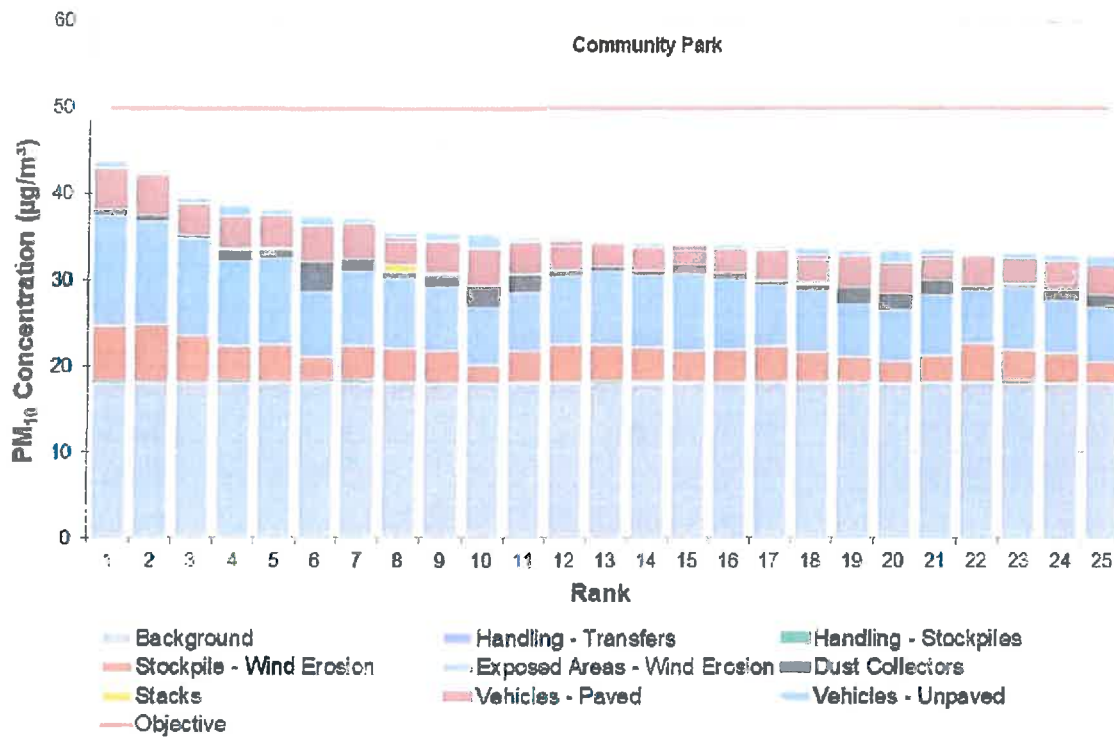
A comprehensive air quality assessment of the Adelaide Brighton Cement Birkenhead site was undertaken by Katestone Environmental Pty Ltd. (Katestone), in 2017 and documented in the Katestone report "Air Quality Assessment of the Birkenhead Cement Plant" dated September 2017. The air quality assessment was undertaken in accordance with the EPA's guidance for air quality assessments, formed part of the site licence renewal process. The report, accepted by the EPA, details, dust sources, activities and control measures in place to mitigate dust emissions and quantifies the off-site impacts of dust emissions. Table 1 summarises the identified dust emissions from normal operations.

**Table 1 : Summary of normal operations emissions inventory**

Activity	Emission rate (g/s)			Emission rate (kg/year)		
	TSP	PM <sub>10</sub>	PM <sub>2.5</sub>	TSP	PM <sub>10</sub>	PM <sub>2.5</sub>
Handling - Transfer points	0.003	0.001	0.000	51	24	4
Handling - Stockpiles	0.012	0.006	0.001	272	128	19
Stockpile wind erosion	0.156	0.078	0.012	4,907	2,454	368
Exposed areas wind erosion	0.293	0.147	0.022	9,248	4,624	694
Dust collectors	0.508	0.170	0.132	16,011	5,363	4,164
Vehicle movements - unpaved	0.077	0.021	0.002	2,415	666	67
Vehicle movements - paved	0.398	0.076	0.018	12,554	2,410	583
Combustion emissions – vehicles/stationary engines	0.039	0.039	0.035	1,233	1,233	1,118
Stacks	4.749	3.049	1.199	149,775	96,164	37,822
<b>Total</b>	<b>6.2</b>	<b>3.6</b>	<b>1.4</b>	<b>196,466</b>	<b>113,066</b>	<b>44,839</b>

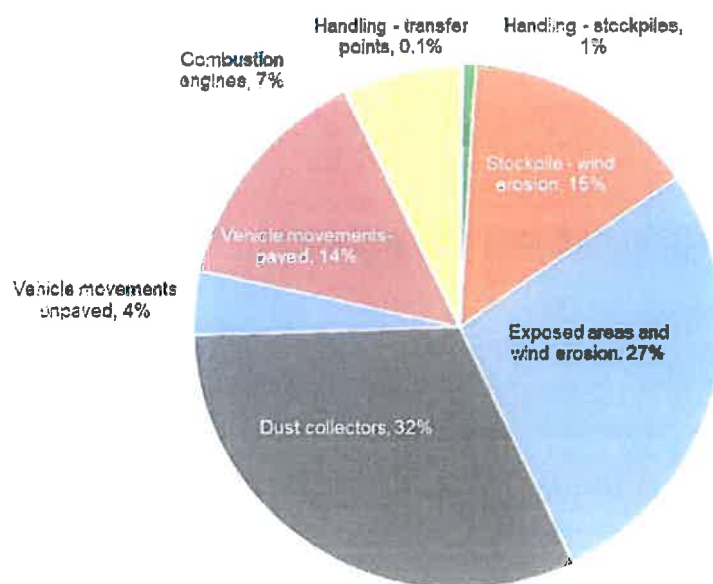
Predicted contributions of each source group to PM<sub>10</sub> concentrations at the Community Park were estimated in the Air Quality Assessment and are reproduced in Figure 3. The Community Park is located between the site and the residential area to the west. It is therefore representative of the maximum potential concentrations of fugitive particulates within the residential area. Figure 3: Source contributions for the top 25 predicted 24-hour average concentrations of PM<sub>10</sub> at the Community Park, shows that the stack contribution to ground level concentrations of dust are very low and contributions of sources during each of the 25 highest days are relatively consistent.





**Figure 3** Source contributions for the top 25 predicted 24-hour average concentrations of PM<sub>10</sub> at the Community Park

The proportions of PM<sub>10</sub> emissions by source are shown graphically in Figure 4. To focus attention on the contribution of fugitive emissions, the kiln stacks 4A and 4B have not been included.



**Figure 4:** Emissions of PM<sub>10</sub> by source for normal operations (excluding stacks)

The air quality assessment is a comprehensive risk assessment of the existing dust sources that takes into consideration the controls that are in place and predicts the off-site impact from these sources. The controls that were included in the assessment are detailed in Table 2: Dust controls included in the assessment

**Table 2: Dust controls in the assessment**

Control	Activities	Control efficiency
4-sided enclosure with water sprays	Ship unloading	95%
3-sided hopper	Limestone hopper, Slag hopper	90%
Enclosure with dust suppression	Transfer of miscellaneous materials (MM)	98%
3-sided bunkers with wind canopies	MM Pit stockpiles	90%
3-sided bunkers with hard stand base	Slag stockpile	90%
Chemical suppressant	Stockpiles (limestone, slag, bauxite, gypsum), exposed areas	80%
Chemical suppressant	Unpaved roads	80%
Water cart	Paved roads	75%
Watering	Limestone stockpile	50%
Shade cloth – reduce wind speed and collect dust	Whole of site	Unquantified
Wheel wash & truck washes	Import/export of bulk material in pneumatic tankers	Unquantified

Not all control measures are able to be quantified. The following controls measures have been put in place by ABC but have not been accounted for in the model:

- Shade cloth – reduce wind speed and collect dust
- Truck wash

A risk assessment identifying the level of risk associated with each dust source and control is included in Appendix A.

## 5.0 Applicable Legislative requirements and guidance

South Australian Environment Protection Act 1993

South Australian Environment Protection Regulations 2009

South Australian Environment Protection (Air Quality) Policy 2016 (Air EPP)

The air quality criteria that are relevant to dust emissions from the site are reproduced in Table 3.

**Table 3: Relevant criteria from the Air EPP Schedule 2 (unless noted otherwise)**

Pollutant	Classification	Averaging time	Maximum concentration (µg/m³)
Particles as PM <sub>10</sub>	Toxicity	24 hours	50
Particles as PM <sub>2.5</sub>	Toxicity	24 hours	25
		12 months	8

**1.1 Dust Management Plan (U-755)**

*The licensee must:*

**1.1.1** *develop and submit to the satisfaction of the EPA a Dust Management Plan by the date listed below;*

**1.1.2** *ensure that the Dust Management Plan includes, but is not limited to:*

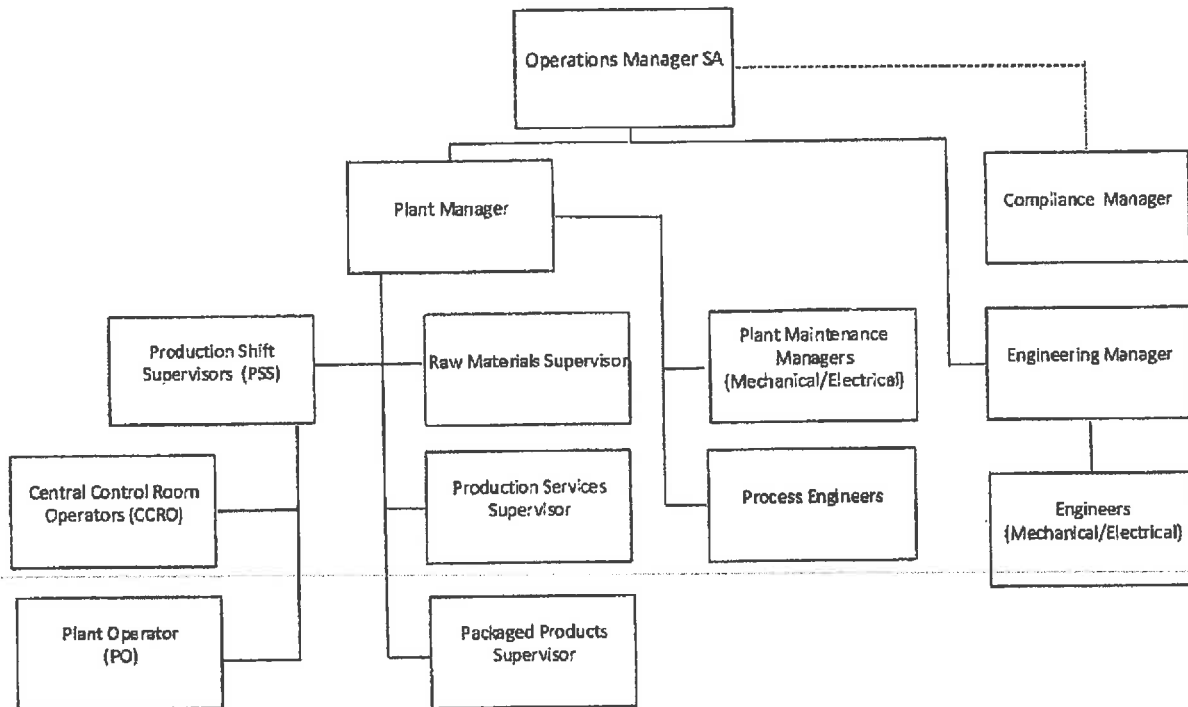
- a specification of trigger values to prevent and minimise particulate emissions;*
- b specification of trigger values required by sub paragraph 2(a) of this condition should have regard to the following items*
  - i existing monitoring data;*
  - ii data collected as part of conditions U-729, U-749;*
  - iii meteorological conditions; and*
  - iv visual observations;*
- c detailed action and response strategies that will be taken when the trigger values, identified under sub paragraph 2(a) of this condition are reached, to prevent and minimise particulate emissions;*
- d a methodology and framework for the provision of quarterly reports on the implementation of the Dust Management Plan to the EPA that includes but is not limited to;*
  - i the date, time and trigger value exceeded;*
  - ii action and response strategies implemented;*
  - iii summary of events notified under condition U-765;*
- e a methodology and framework for the provision of an annual report to the EPA which includes the following but is not limited to:*
  - i a review of all the trigger values identified in subparagraph 2(a) of this condition;*
  - ii a review of the effectiveness of all action and response strategies identified in sub paragraph 2(c) of this condition;*
  - iii a trend analysis of data collected;*
  - iv a review and analysis of community complaints recorded in condition 300-9 with the exceedance of trigger values reported under sub paragraph 2(d) of this condition; and*
  - v opportunities for improvement in dust management;*
- f a methodology and framework for providing public access to the Dust Management Plan (or any revised plan approved by the EPA) and to quarterly and annual reporting;*

**1.1.3** *implement the Dust Management Plan approved in writing by the EPA (or any revised plan approved in writing by the EPA).*

**Compliance Date:** 28-Feb-2018

## 6.0 Responsibilities

The organisation chart presented in **Figure 1** shows personnel with roles that have been assigned under the dust management plan.



**Figure 1: Organisation chart showing positions at the Facility with responsibilities under the DMP**

All employees are responsible for complying with this plan, which includes:

- Taking action to minimise or prevent dust incidents
- Identifying and reporting dust incidents.

Responsibilities for key roles assigned in the dust management plan have been detailed in Table 4: General Responsibilities

**Table 4: General Responsibilities**

Plant Maintenance Managers (Electrical / Mechanical)	<p>Responsibility and authority to ensure</p> <ul style="list-style-type: none"> <li>• Timely plant and equipment maintenance to minimise dust emissions</li> <li>• Maintenance and calibration of particulate monitors (refer to GLPMRP)</li> </ul>
Central Control Room Operators (CCRO) Plant Operators (PO)	<p>Responsible for minimisation of fugitive particulate emissions this includes:</p> <ul style="list-style-type: none"> <li>• Responding to and investigating TARP trigger threshold alerts</li> <li>• Initiating action to minimise particulate emissions</li> <li>• TARP reporting and recording</li> </ul>
Production Shift Supervisor (PSS)	<p>Responsible for minimisation of fugitive particulate emissions this includes:</p> <ul style="list-style-type: none"> <li>• Responding to, investigating and recording dust complaints</li> <li>• Responding to and investigating TARP trigger alerts</li> <li>• Initiating action to minimise particulate emissions</li> <li>• TARP reporting and recording</li> </ul>
Production Services Supervisor	<p>Responsible for:</p> <ul style="list-style-type: none"> <li>• Responding to and investigating TARP trigger alerts</li> <li>• Water cart and street sweeper operations</li> <li>• Application and maintenance of chemical dust suppressant</li> <li>• Application of water</li> <li>• Clean up of spilled materials to reduce dust emissions</li> </ul>
Raw Material Supervisor	<p>Responsible for:</p> <ul style="list-style-type: none"> <li>• Responding to and investigating TARP trigger alerts</li> <li>• Ensuring availability of water cart and street sweeper for campaign movement of materials</li> <li>• Ensuring employees and contractors involved in material transfers and movements are trained with respect to dust awareness, responsibilities, instructions, procedures</li> </ul>
Plant Manager	<p>Responsible for:</p> <ul style="list-style-type: none"> <li>• Implementation of Dust Management Plan and TARP</li> <li>• Ensuring employees and contractors are trained with respect to dust awareness, responsibilities, instructions, procedures</li> <li>• Ensuring timely maintenance of plant and equipment to reduce dust emissions</li> </ul>
Compliance Manager	<p>Responsible for:</p> <ul style="list-style-type: none"> <li>• Annual and quarterly reporting requirements of this plan</li> <li>• Annual Review and effectiveness of Dust Management Plan and TARP</li> <li>• Reporting requirements under the GLPMRP</li> <li>• Review of TARP trigger thresholds</li> <li>• Management of dust complaints (response, investigation, recording)</li> <li>• Identifying opportunities for improvement</li> <li>• Ensuring dust management awareness is included in site inductions and environmental training</li> </ul>
Operations Manager	<p>Responsible for:</p> <ul style="list-style-type: none"> <li>• Ensuring compliance with this Dust Management Plan and TARP</li> <li>• Ensuring employees are aware of the site EPA licence conditions and reporting requirements relating to this Dust Management Plan and TARP</li> <li>• Provision of resources to reasonably and practically implement this Dust Management Plan and TARP</li> </ul>

## 7.0 General Dust Management Practices

The following dust mitigation practices outlined in Table 5 General Dust Management Practices, shall be implemented on an ongoing basis at the site. Additional dust mitigation practices may be required in response to trigger levels being reached and these are outlined in Section 8.

**Table 5: General Dust Management Practices**

Parameter	Action	Frequency	Responsibility
<b>Administrative actions</b>			
Induction	Inductions for all employees and contractors shall include information on: <ul style="list-style-type: none"> <li>Potential sources of dust</li> <li>Monitoring program and licence conditions</li> <li>Minimising or eliminating dust impacts</li> <li>Environmental incident reporting</li> <li>Individual staff/contractor responsibilities</li> </ul>	At beginning of employment and renewed annually (contractors) or biennially (employees)	Compliance Manager
Reassignment of responsibility	When staff that are normally responsible for dust management are unavailable (e.g. on leave), reassign responsibilities to another staff member	Prior to staff unavailability	Operations Manager / Plant Manager
Maintenance – plant and equipment	All plant and equipment shall be maintained in a proper and efficient manner, to ensure that dust emissions are minimised.	Maintenance schedule or when identified	Plant Maintenance Managers
Maintenance – ambient and meteorological monitors	Maintained as recommended by manufacturer to ensure reliable data collection.	As recommended by manufacturer	Plant Maintenance Manager - Electrical
<b>Routine (baseline) dust mitigation practices</b>			
Sealed roads	Watercart and/or street sweeper	Dayshift - Monday to Friday & during any other periods of high traffic activity)	Production Services Supervisor
Unsealed roads	Watercart	During transfer of materials	Production Services Supervisor
	Apply chemical dust suppressant	Weekly checks & apply to unsealed areas	
Stockpiles and exposed areas	Apply water	During transfer of materials	Production Services Supervisor
	Apply chemical dust suppressant	Weekly checks & apply to unsealed areas	
Spillages	Spilled materials to be cleaned immediately after they occur	Clean up immediately after spill occurs	Production Services supervisor
Ship unloading of limestone	Apply water sprays	During unloading to limestone stockpile holding pad	Raw Materials /Shift Supervisor
Bulk material import / export in pneumatic tankers	Ensure all 'bulk' pneumatic tankers use truck wash	All pneumatic tankers on exit	Plant Manager
Shade cloth	Ensure shade cloth is in place and in good condition	At all times, review annually	Compliance Manager
Campaign movement of materials	Ensure watercart availability Ensure road sweeper availability	Prior to & during entire campaign	Raw Materials Supervisor
Buildings	Ensure all doors are closed Ensure all buildings are sealed	At all times	Plant Manager
<b>Routine practices to ensure implementation of TARP</b>			
Continuous observations	Assess whether any visible dust or build-up of deposited dust is present	At all times	All staff
Routine review of dust management and TARP	Annual review of <ul style="list-style-type: none"> <li>Dust management activities</li> <li>Trigger levels</li> <li>Compliance</li> <li>Opportunities for improvement</li> </ul>	Review annually	Compliance Manager
Formal site inspections	SH&E inspections by area	Quarterly	Plant Manager

## 8.0 Trigger Action Response Plan (TARP)

Triggers have been defined to assist ABC to meet its dust management obligations by identifying circumstances when:

- Ground-level concentrations at offsite receptors are likely to be elevated due to activities onsite
- Activities onsite are generating dust outside of the normal range

The following three levels of trigger/response have been defined:

1. **Low trigger (Watch and wait).** This is an early warning level put in place to increase awareness of potential dust issues before they arise.
2. **Medium trigger (Investigate).** A medium trigger indicates that there may be a potential dust issue and specific investigation is warranted.
3. **High trigger (Escalate).** A high trigger indicates that dust concentrations are outside of the normal range and that an action is warranted.

The TARP has been designed to provide as much warning as possible to allow proactive management of fugitive dust. Therefore, a trigger, particularly a low or medium trigger, does not indicate the presence of a dust impact.

Triggers and responses have been defined for the following data sources:

- Ambient dust monitoring data
- Meteorological parameters
- Visual observations

Triggers and responses based on stack monitoring are included as part of the separate Stack Particulate Management Plan (SPMP).

### 8.1 Trigger values and responses for ambient dust monitoring data

The trigger values presented in table 6 are based on an analysis of monitor-specific real-time ambient monitoring data. The analysis considered the range of typical concentrations of PM<sub>10</sub> at each monitor between 1 January 2015 to 30 November 2017. Trigger values have been set at the 90<sup>th</sup>, 95<sup>th</sup> and 99<sup>th</sup> percentile values for low, medium and high respectively. These trigger values have been set to achieve compliance with Air EPP criteria in the community.

To ensure that the triggers are relevant to the Facility, the trigger levels include a reference to measured wind direction. If the wind direction is not blowing from the general direction of the Facility, that is the wind direction is between 180° and 360°, the trigger level will be downgraded by one, i.e. Medium to Low.

The responses that are triggered by ambient monitoring concentrations exceeding the values in table 6 are presented in table 7.



**Table 6: Trigger values for 1-hour average concentrations of PM10 µg/m3**

Trigger Level	Block 9	Northern Grounds	Eastern Grounds	Southern Grounds
Low	35	20	22	19
Medium	41	27	28	26
High	66	47	48	44

**Table 7: Actions and responses for ambient monitoring data triggers – onsite, 1-hour average**

Trigger Level	Action required	Responsibility
Low	<ul style="list-style-type: none"> <li>Alert relevant operators that dust levels are elevated therefore, heightened awareness to sources of dust is required</li> </ul>	Shift supervisor
Medium	<ul style="list-style-type: none"> <li>Alert relevant operators that dust levels are elevated therefore, heightened awareness to sources of dust is required</li> <li>Ensure all routine dust management practices have been implemented, as per Table 5</li> <li>Visual observations on site to check if there are any significant visible dust emissions in the region of the exceeding monitor</li> </ul>	Shift supervisor
High	<ul style="list-style-type: none"> <li>Alert relevant operators that dust levels are elevated therefore, heightened awareness to sources of dust is required</li> <li>Ensure all routine dust management practices have been implemented as per Table 5</li> <li>Visual observations on site to check if there are any significant visible dust emissions in the region of the exceeding monitor</li> <li>Reduce the relevant dust producing activities or reschedule to more suitable meteorological conditions</li> <li>If dust mitigation equipment is unavailable, or at fault, investigate temporary alternative management practices</li> <li>Mobilise water cart or apply additional water sprays</li> </ul>	Shift supervisor

## 8.2 Trigger values and responses for meteorological parameters

The trigger values in Table 8 are based on meteorological conditions that are known to have the potential to generate dust. The responses that are triggered by exceeding the values in Table 8 are presented in Table 9 and are proactive based on forecast meteorological conditions.

**Table 8: Trigger values for meteorological parameters**

Trigger level	Trigger
Low	Forecast of high temperatures (>30 °C) and north-easterly winds (0° – 90°) Or Forecast of strong winds (> 6 m/s as a 3-hour average) from the Facility towards receptor areas (wind direction between 0° and 180°)
Medium	Forecast of strong winds (> 7 m/s as a 3-hour average) from the Facility towards receptor areas (wind direction between 0° and 180°) Or Extended dry period indicated by less than 1 mm of rain over a 20-day period
High	Forecast of strong winds (> 8 m/s as a 3-hour average) from the Facility towards receptor areas (wind direction between 0° and 180°)

**Table 9: Actions and responses for meteorological data triggers**

Trigger Level	Action required	Responsibility
Low	<ul style="list-style-type: none"> <li>Alert shift employees that dust potential is elevated</li> <li>Assess potential for shifting operations to more favourable conditions</li> <li>Ensure water truck is on standby to apply water</li> <li>Pre-emptive watering of stockpiles before handling</li> <li>Visual observations of site every 3 hours</li> </ul>	Shift supervisor
Medium	<ul style="list-style-type: none"> <li>Alert shift employees that dust potential is elevated</li> <li>Assess potential for shifting operations to more favourable conditions</li> <li>Ensure water truck is on standby to apply water</li> <li>Pre-emptive watering of stockpiles before handling</li> <li>Visual observations of site every 3 hours</li> <li>Visual observations of major stockpiles</li> <li>Additional watering if warranted</li> </ul>	Shift supervisor
High	<ul style="list-style-type: none"> <li>Alert shift employees that dust potential is elevated</li> <li>Assess potential for shifting operations to more favourable conditions</li> <li>Ensure water truck is on standby to apply water</li> <li>Pre-emptive watering of stockpiles before handling</li> <li>Visual observations of site every 3 hours</li> <li>Visual observations of major stockpiles</li> <li>Additional watering if warranted</li> <li>Review ambient monitoring PM<sub>10</sub> levels &amp; implement the action response if the high level trigger is activated</li> </ul>	Shift supervisor

### 8.3 Trigger values and responses for visual observations

Table 10 presents visual observation triggers and table 11 the corresponding trigger action.

**Table 10 Trigger values for visual observations**

Trigger level	Trigger
Low	General build-up of deposited dust on non-worked areas at the Facility, e.g. carparks, alongside buildings etc
Medium	Visible dust plume generated by Facility activity above normal/acceptable levels
High	Visible dust plume crossing the Facility boundary

**Table 11: Actions and responses for visual observations triggers**

Trigger Level	Action required	Responsibility
Low	<ul style="list-style-type: none"> <li>Inspect site to determine source of dust</li> <li>Check whether routine (baseline) dust management practices have been applied to that source as specified in Table 5</li> </ul>	Shift supervisor
Medium	<ul style="list-style-type: none"> <li>Inspect site to determine source of dust</li> <li>Check routine (baseline) dust management practices have been applied to that source as specified in Table 5</li> <li>If relevant, apply water and/or chemical suppressant to source of dust</li> <li>If dust mitigation equipment is unavailable, or at fault, investigate temporary alternative management practices</li> <li>Repair any faulty dust mitigation equipment / plant</li> </ul>	Shift supervisor
High	<ul style="list-style-type: none"> <li>Inspect site to determine source of dust</li> <li>Check routine (baseline) dust management practices have been applied to that source as specified in Table 5</li> <li>If relevant, apply water and/or chemical suppressant to source of dust</li> <li>If dust mitigation equipment is unavailable, or at fault, investigate temporary alternative management practices</li> <li>Repair any faulty dust mitigation equipment/plant</li> <li>Minimise activity rate of dust producing activity</li> <li>Apply water/suppressant immediately</li> </ul>	Shift supervisor

#### 8.4 Dust management dashboard and control system

Management of the TARPs shall be performed through an internal Dust Management Dashboard, to ensure that all triggers and associated responses are recorded for subsequent reporting and analysis. The Dust Management Dashboard displays the following information:

- Real time ambient monitoring data collected at all ABC monitoring sites
- Trigger status of all ABC monitoring sites
- Meteorological data.

A trigger can be activated automatically, in response to monitoring data, or manually, by an operator in response to visual observations. Once a trigger has been activated, the dashboard will display a list of recommended responses. The trigger will remain active until the operator has recorded the action(s) taken and optionally, any additional comments regarding the trigger/response.

On approval of this plan the internal dust management dashboard and control system, will be developed by a third party. A Dust Management Dashboard Handbook will provide more detail of the system and a resource for operator training. The internal dust management dashboard, control system and handbook has been quoted with a delivery timeframe of 14 weeks.

## **9.0 Reporting Methodology**

All reports will clearly identify the EPA licence number, name and address where the licence activity is conducted, name and contact details of the person submitting the report.

### **9.1 Quarterly reporting**

The following information will be included in quarterly reports submitted to the EPA within one month of the end of the calendar quarter:

- the date, time and trigger value exceeded
- action and response strategies implemented
- summary of 24 hour exceedance of  $PM_{10}$  and  $PM_{2.5}$  Air (EPP) criteria on ambient monitors in the community (licence condition U-765)

### **9.2 Annual reporting**

The following information will be included in annual reports submitted to the EPA within 45 days of the end of the calendar year:

- a review of all trigger values
- a review of the effectiveness of all action and response strategies
- a trend analysis of data collected
- a review and analysis of community complaints with the exceedance of trigger values and 24 hour exceedance of  $PM_{10}$  and  $PM_{2.5}$  Air (EPP) criteria
- a review and analysis of data collected from conditions U-729 and U-749
- opportunities for improvement in dust management

### **9.3 Public access**

Following acceptance of the quarterly and annual reports by the EPA, the reports will be made available within 7 days on the ABC Community web site.

The current version of this Plan, as approved by the EPA will be made available within 7 days on the ABC Community web site.

## 10.0 TARP and DMP Review and Revision

The TARP will be reviewed to ensure ongoing effectiveness when:

- a) An analysis of monitoring data from off-site particulate monitors demonstrates that ABC operations are resulting in non-compliance with Air EPP criteria of:
  - $PM_{10}$  of  $50 \mu\text{g}/\text{m}^3$  (24 hour average)
  - $PM_{2.5}$  of  $25 \mu\text{g}/\text{m}^3$  (24 hour average)
- b) On an annual basis

The TARP review may include the following analysis:

- Frequency of trigger occurrence
- Correlation between triggers and measured onsite and offsite dust levels, including an analysis of false positives and misses (false negatives)
- Correlation between triggers and complaints
- Revision of trigger level values as a result of improvements made in dust controls and practices
- Improvement in dust management controls and practices considering site experience and innovations
- a review and analysis of data collected from conditions U-729 and U-749

The DMP will be reviewed and updated to reflect changes in the TARP and incorporate improvement in dust management practices.

## Appendix A

### Fugitive Dust Risk Assessment

An aspects and impacts assessment for fugitive dust sources (excluding combustion engine emissions) has been prepared by ABC based on particulate emission rates of modelled activities during normal operations contained in Katestone Environmental Pty Ltd "Air Quality Assessment of the Birkenhead Cement Plant September 2017 – Appendix C1 .

The risk assessment is documented in Table A1 Aspects and impacts risk assessment for fugitive dust sources based on particulate emission rates of modelled activities during normal operations.

The rating methodology that has been used is documented in the risk rating matrix below.

#### Risk Rating Matrix

Parameter	Units	Low	Medium	High
Tonnes of material handled	Tonnes/year (t/yr)	< 200,000	200,000 - 500,000	> 500,000
Stockpile area	Hectares (ha)	< 0.1	0.1 - 0.3	> 0.3
Exposed area	Hectares (ha)	< 0.1	0.1 - 0.3	> 0.3
Distance travelled – paved	Vehicle kilometres travelled/year (VKT/yr)	< 1250	1250 - 6000	> 6000
Distance travelled – unpaved	Vehicle kilometres travelled/year (VKT/yr)	< 300	300 - 1200	> 1200
PM <sub>10</sub> emissions	Kg/year	< 200	200 - 700	> 700

**Table A1: Aspects and impacts risk assessment for fugitive dust sources based on particulate emission rates of modelled activities during normal operations<sup>1</sup>**

Aspects		Uncontrolled Dust Impact		Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate		Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units	Value	Description	%	PM <sub>10</sub>
<b>Handling- Transfer Points</b>						
Limestone Delivery (Accolade - Ship Unloading)	Material handled	t/yr	H		4-sided enclosure with sprays <sup>b</sup>	L
Open Hopper (transfer of Limestone to CM6)	Material handled	t/yr	L		3-sided hopper	L
Enclosed Hopper (Moculta shale from MM Pit/Truck)	Material handled	t/yr	L		Enclosure and dust suppression <sup>c</sup>	L
Enclosed Hopper (Black sand from MM Pit/Truck)	Material handled	t/yr	L		Enclosure and dust suppression <sup>c</sup>	L
Enclosed Hopper (Mill scale from MM Pit/Truck)	Material handled	t/yr	L		Enclosure and dust suppression <sup>c</sup>	L
Enclosed Hopper (Bauxite from MM Pit/Truck)	Material handled	t/yr	L		Enclosure and dust suppression <sup>c</sup>	L
Loading of Slag into Hopper for Drying	Material handled	t/yr	L		3-sided hopper with roof	L

<sup>1</sup> ABC assessment based on Katestone Environmental Pty Ltd "Air Quality Assessment of the Birkenhead Cement Plant September 2017 – Appendix C1



Aspects				Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate		Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)	
	Parameter	Units		Value	Description		%
Handling - Stockpiles							
Shell Block – (Limestone)	Material handled	t/yr	L	L		0%	L
Truck Loading at Block 9 to go to Shell Block – (Limestone)	Material handled	t/yr	L	L		0%	L
Slag Stockpile 9B	Material handled	t/yr	L	L		0%	L
Stockpile 3 (Bauxite)	Material handled	t/yr	L	L		0%	L
Block 9 (Limestone Stockpile)	Material handled	t/yr	L	L		0%	L
Stockpile 4 (Gypsum)	Material handled	t/yr	L	L		0%	L
Stockpile 4A (Limestone)	Material handled	t/yr	L	L		0%	L
Slag Stockpile 9	Material handled	t/yr	L	L		0%	L
MM Pit (Shale)	Material handled	t/yr	L	L		0%	L
MM Pit (Black Sand)	Material handled	t/yr	L	L		0%	L
MM Pit (Mill Scale)	Material handled	t/yr	L	L		0%	L

Aspects				Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate			Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units	Value		Description	%	
MM Pit (Bauxite)	Material handled	t/yr	L	L		0%	L
Stockpile wind erosion							
Shell Block (Limestone)	Stockpile area	ha	H	H	Dust suppression	80%	H
Emergency (Limestone)	Stockpile area	ha	M	M	Dust suppression	80%	L
Angaston Scalps (Limestone)	Stockpile area	ha	L	L	Dust suppression	80%	L
Slag Stockpile 9B	Stockpile area	ha	M	M	Dust suppression	80%	L
Stockpile 3 (Bauxite)	Stockpile area	ha	M	M	Dust suppression	80%	L
Block 9 (Limestone Stockpile)	Stockpile area	ha	H	H	Watering	50%	M
Swigg Street (Limestone Stockpile)	Stockpile area	ha	H	H	Dust suppression	80%	M
Stockpile 4 (Gypsum)	Stockpile area	ha	L	L	Dust suppression	80%	L
Stockpile 4A (Limestone)	Stockpile area	ha	L	L		0%	L

Aspects				Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate			Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units	Value		Description	%	
Slag Stockpile 9	Stockpile area	ha	H	H	Enclosed on 3 sides, hard stand base	90%	L
MM Pit	Stockpile area	ha	H	H	3 sided bunkers fitted with wind canopies	90%	L
<b>Wind erosion – exposed areas</b>							
Exposed Area - North (near Shell block)	Exposed area	ha	H	H	Chemical suppressant / hard stand <sup>d</sup>	8%	H
Exposed Area - Southeast (near Stockpile 13 shed)	Exposed area	ha	H	H	Chemical suppressant /hard stand <sup>d</sup>	24%	L
Exposed Area - Southwest (Swigg St)	Exposed area	ha	M	M	Chemical suppressant <sup>f</sup>	40%	M
<b>Vehicle movements - unpaved</b>							
FEL - Block 9 to Truck (for Shell Block)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
FEL - Stockpile 4 to Hopper	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
FEL - Block 9 to SP10 reclaim	Distance travelled	VKT/yr	M	M	Polymer dust suppressant	80%	L

Aspects			Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate		Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units	Value	Description	%	PM <sub>10</sub>
FEL - Shell Block, Stockpile 3	Distance travelled	VKT/yr	L	Polymer dust suppressant	80%	L
FEL - MM Pit (Moculta Shale)	Distance travelled	VKT/yr	M	Polymer dust suppressant	80%	L
FEL - MM Pit (Black Sand)	Distance travelled	VKT/yr	L	Polymer dust suppressant	80%	L
FEL - MM Pit (Mill Scale)	Distance travelled	VKT/yr	L	Polymer dust suppressant	80%	L
FEL - MM Pit (Bauxite)	Distance travelled	VKT/yr	L	Polymer dust suppressant	80%	L
Truck movements between Block 9 and Shell block (limestone) (12t truck)	Distance travelled	VKT/yr	H	Polymer dust suppressant	80%	L
Limestone trucked to Stockpile 14 - unpaved (12t truck)	Distance travelled	VKT/yr	H	Polymer dust suppressant	80%	L
Gypsum trucked to Stockpile 14 - unpaved (40t)	Distance travelled	VKT/yr	M	Polymer dust suppressant	80%	L
Gypsum trucked to SP4 - unpaved (12t truck)	Distance travelled	VKT/yr	L	Polymer dust suppressant	80%	L

Aspects				Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate			Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units	Value		Description	%	
Clinker (Angaston) trucked to Stockpile 13 - unpaved (40t truck)	Distance travelled	VKT/yr	L	M	Polymer dust suppressant	80%	L
Clinker (from SP12) trucked to Stockpile 13 - unpaved (12t truck)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
Clinker (imported) trucked to Stockpile 13 - unpaved (25t truck)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
Truck deliveries to Swigg St/MM Pit (Moculta Shale) (40t truck)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
Truck deliveries to Swigg St/MM Pit (Black Sand) (40t truck)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
Truck deliveries to Swigg St/MM Pit (Mill Scale) (40t truck)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L

Aspects				Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate		Value	Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units			Description	%	
Truck deliveries to Swigg St/MM Pit (Bauxite) (12t truck)	Distance travelled	VKT/yr	L	L	Polymer dust suppressant	80%	L
<b>Vehicle movements - paved</b>							
FEL - Slag Stockpile	Distance travelled	VKT/yr	M	M	Water cart	75%	L
Wood Chip Deliveries (25t truck)	Distance travelled	VKT/yr	L	L	Water cart	75%	L
Limestone trucked to Stockpile 14 - paved (12t truck)	Distance travelled	VKT/yr	H	M	Water cart	75%	L
Gypsum trucked to Stockpile 14 - paved (40t)	Distance travelled	VKT/yr	M	H	Water cart	75%	L
Gypsum trucked to SP4 - paved (12t truck)	Distance travelled	VKT/yr	M	L	Water cart	75%	L
Clinker (Angaston) trucked to Stockpile 13 - paved (40t truck)	Distance travelled	VKT/yr	M	M	Water cart	75%	L

Aspects				Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate			Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units	Value		Description	%	
Clinker (from SP12) trucked to Stockpile 13 - paved (12t truck)	Distance travelled	VKT/yr	M	L	Water cart	75%	L
Clinker (Imported) trucked to Stockpile 13 - paved (25t truck)	Distance travelled	VKT/yr	M	M	Water cart	75%	L
Truck Deliveries to Slag Stockpile	Distance travelled	VKT/yr	M	M	Water cart	75%	L
CKD to Blanchtown	Distance travelled	VKT/yr	M	L	Water cart	75%	L
Truck deliveries to Swigg St/MM Pit (Moculta Shale) (40t truck)	Distance travelled	VKT/yr	H	H	Water cart	75%	M
Truck deliveries to Swigg St/MM Pit (Black Sand) (40t truck)	Distance travelled	VKT/yr	M	M	Water cart	75%	L
Truck deliveries to Swigg St/MM Pit (Mill Scale) (40t truck)	Distance travelled	VKT/yr	L	L	Water cart	75%	L



Aspects			Uncontrolled Dust Impact	Dust Mitigation Measures		Controlled Dust Impact
Activity	Activity rate		Emission rate (kg/year)	Control <sup>a</sup>		Controlled Emission rate (kg/year)
	Parameter	Units		Description	%	
Truck deliveries to Swigg St/MM Pit (Bauxite) (12t truck)	Distance travelled	VKT/yr	L	Water cart	75%	L
	Distance travelled	VKT/yr	H	Water cart	75%	H
Cement trucked from Silo (ii)	Distance travelled	VKT/yr	M	Water cart	75%	M

Table notes:

<sup>a</sup> Control efficiencies from the NPI Emission Estimation Technique Manual for Cement v2.1 (NPI, 2008) Table 3 and Table 4 unless otherwise stated.

<sup>b</sup> 90% control for enclosure, 50% control for water sprays

<sup>c</sup> 90% control for enclosure, 80% control for dust suppression

<sup>d</sup> 80% control for dust suppression, assumed to be applied to 10% of total exposed area

<sup>e</sup> 80% control for dust suppression, assumed to be applied to 30% of total exposed area

<sup>f</sup> 80% control for dust suppression, assumed to be applied to 50% of total exposed area

