



## Department initiated Amendment

### Part V Division 3 of the *Environmental Protection Act 1986*

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<b>Licence Number</b>	L6942/1997/13
<b>Licence Holder</b>	BHP Billiton Iron Ore Pty Ltd
<b>ACN</b>	008 700 891
<b>File Number</b>	DER2013/000329-1~6
<b>Premises</b>	Eastern Ridge Iron Ore Mine
	Legal description – Mining Tenement M244SA as defined by the coordinates in Schedule 1 of the Revised Licence
<b>Date of Report</b>	16 January 2023
<b>Decision</b>	Revised licence granted

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an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

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## 1. Decision summary

Licence L6942/1997/13 is held by BHP Billiton Iron Ore Pty Ltd (Licence Holder) for the Eastern Ridge Iron Ore Mine (the Premises), located approximately 4.5km northeast of Newman in Western Australia's Pilbara Region.

This Amendment Report documents the assessment of potential risks to the environment and public health during the operation of the Premises. As a result of this assessment, Amended Licence L6942/1997/13 has been granted.

## 2. Scope of assessment

### 2.1 Regulatory framework

In completing the assessment documented in this Amendment Report, the Department of Water and Environmental Regulation (the Department or DWER) has considered and given due regard to its Regulatory Framework and relevant policy documents which are available at <https://dwer.wa.gov.au/regulatory-documents>.

### 2.2 Risk review summary – dust

On 6 October 2020, the Department notified the Licence Holder that it will be reviewing the licences for the Premises (L6942/1997/13); and Mt Whaleback/Orebody 29/30/35 Iron Ore Mine (Mt Whaleback Operations) (L4503/1975/14). This review will focus on dust emissions and impacts from the Premises, to ensure that the impacts of dust are well understood and regulated to the appropriate levels.

While the Pilbara is a naturally dusty environment and there are numerous sources of local and regional dust, BHP operates two nearby large iron ore mines that each have the potential to significantly contribute to ambient dust at Newman, being Mt Whaleback Operations and Eastern Ridge, located approximately 2km and 4.5km respectively from the nearest resident.

Potential dust generating activities and sources at either mine site include ore crushing, screening, blasting, truck movements on mine roads, open/unsealed areas and clearing and rehabilitation works. Of these activities, the Licence (L6942/1997/13) regulates ore processing activities, which includes crushing and screening of ore.

This Amendment Report review will consider prescribed premises activities only. This includes all associated dust sources, emissions, pathways and management measures, in addition to historic monitoring results and the findings of the recent dust study. Activities and dust sources that are beyond the scope of assessment within this Amendment Report are discussed in Section 2.3.

Existing and additional controls have been placed on the amended licence and are justified in section 7.1.

No changes to the approved Premises production, design capacity or throughput authorised through the Existing Licence have been considered in this Amendment Report, or authorised in the Amended Licence (Table 1). Following the implementation of additional controls through the Amended Licence the Department expects that the risk of dust emissions will be reduced from the Premises and that overall dust emission will likely be acceptable. In the event that unacceptable dust emission are identified in the future, the Licence may be modified or further amended to require additional controls.

**Table 1: Approved design or throughput capacity under the Licence**

<b>Classification of Premises</b>	<b>Description</b>	<b>Approved Premises production or design capacity or throughput</b>
Category 5	Processing or beneficiation of metallic or non-metallic ore: premises on which — (a) metallic or non-metallic ore is crushed, ground, milled or otherwise processed; or (b) tailings from metallic or non-metallic ore are reprocessed; or (c) tailings or residue from metallic or non-metallic ore are discharged into a containment cell or dam.	41 000 000 tonnes per annual period  <b>No change</b>
Category 6	Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore.	19 gigalitres (GL) per annual period  <b>No change</b>
Category 63	Class I inert landfill site: premises on which waste (as determined by reference to the waste type set out in the document entitled “Landfill Waste Classification and Waste Definitions 1996” published by the Chief Executive Officer and as amended from time to time) is accepted for burial.	10 000 tonnes per annual period  <b>No change</b>
Category 85	Sewage facility: premises — (a) on which sewage is treated (excluding septic tanks); or (b) from which treated sewage is discharged onto land or into waters.	52 cubic metres per day  <b>No change</b>

This review has been informed by supporting information submitted to DWER by the Licence Holder including monitoring data, along with the findings of the recent dust study and multiple site visits by DWER and other Government officers. A full list of supporting information and reference documents is provided in the references section at the end of this Amendment Report.

## 2.3 Beyond scope

### 2.3.1 Non-dust generating activities

All activities that are not expected to generate dust including mine dewatering (Category 6) and wastewater treatment (Category 85).

Conditions in the Existing Licence relating to the regulation of these activities have been transferred to the Amended Licence with only administrative changes made where necessary.

The risk assessment of emissions and discharges associated with these prescribed premises activities may be reviewed at a later date but are not considered within this review document.

### 2.3.2 Non-prescribed premises activities

The focus of this Amendment Report is on dust emissions from prescribed premises activities only, as defined by the *Environmental Protection Regulations 1987* (EP Regulations). Therefore dust generated from clearing of vegetation and waste rock management including storage and landform rehabilitation works are not within scope of this Amendment Report (Licence review). Although carried out for the purpose of processing and beneficiation of ore, mining activities

such as blasting and extraction do not satisfy the definition of Category 5 of the EP Regulations (refer to Table 1). Similarly the dust generated from ore haulage and open areas created from mining are considered beyond the scope of this Amendment Report.

**Key findings and determinations:**

- 1) The scope of review for the licences issued under Part V of the *Environmental Protection Act 1986* (EP Act) will only:
  - a. consider the emissions of dust from the prescribed premises category descriptions as defined in Schedule 1 of the EP Regulations;
  - b. assessment of dust management controls in relation to prescribed premises activities; and
  - c. establishment of a fit-for-purpose air quality monitoring network and response framework (as licence conditions), which aims to provide beneficial data and to proactively respond to high dust events to limit the degree and duration of impacts on the town of Newman.
- 2) The Department of Jobs, Tourism, Science and Innovation (DJTSI) is responsible for facilitating the approvals process for major resource projects, including BHP's Newman Operations under the *Iron Ore (Mount Newman) Agreement Act 1964* (State Agreement – refer to section 3.5.1).
- 3) The Department of Mines, Industry Regulation and Safety (DMIRS) takes active steps to regulate occupational health at the premises, maintaining a focus on dust levels where workers are present. The scope of this assessment has a focus on ambient air quality experienced by the sensitive receptors living in Newman. DMIRS regulatory oversight of the Newman Operations does not extend to the management of dust for the protection of the community.
- 4) The Shire of East Pilbara also plays an important role in managing local dust sources in or near to residential areas of Newman through the establishment of industry zones appropriate to the prevailing land use (Shire of East Pilbara Local Planning Strategy 2020). The Shire may also require the use of dust controls as conditions on approvals for certain activities conducted in close proximity to sensitive receptors.
- 5) There exist numerous dust sources at the Premises that are beyond the scope of this assessment including dust from waste rock dumps, blasting, excavation and haulage activities beyond the processing areas. These activities are not directly related or physically connected to ore processing or beneficiation, or landfill activities as defined under the EP regulations although controls have been implemented by the Licence Holder for the management of dust.
- 6) DWER will work with the Environmental Protection Authority (EPA) to identify opportunities for the effective regulation of dust emissions from the operations subject to existing Ministerial Statements (refer to section 3.5.6) and impacts from those sources not within the scope of this Amendment Report.
- 7) DWER will continue to engage with DJTSI, DMIRS, EPA and the Department of Health (DOH) to develop an inter-Departmental approach to managing broader dust impacts on the town of Newman.

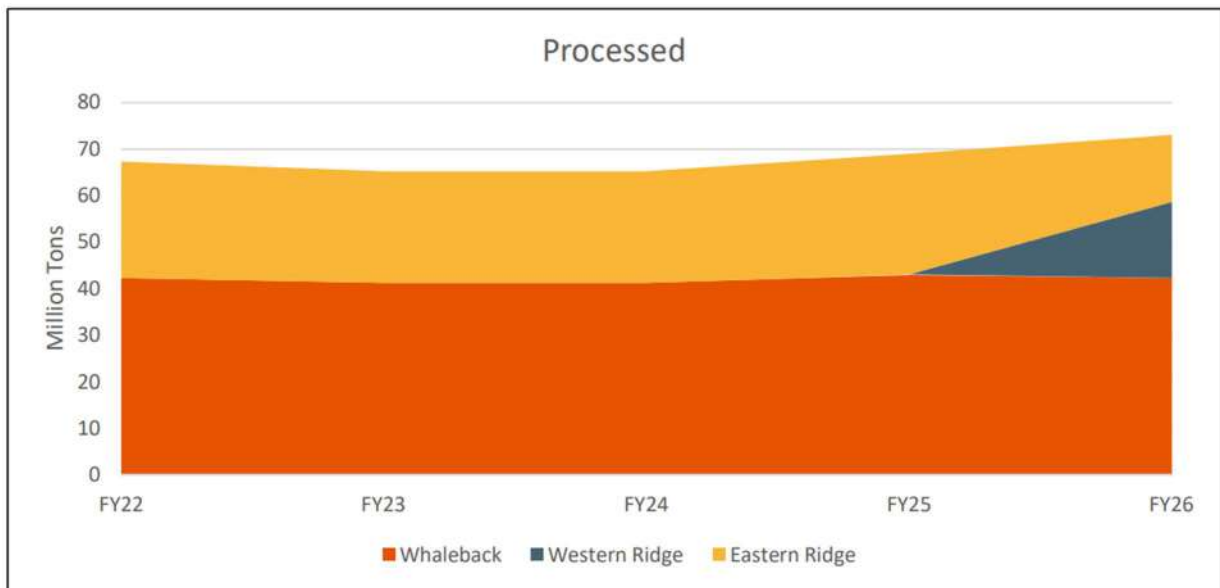
### 3. Overview of the Premises

The Premises is comprises Orebodies (OB) 23, 24, 25 and 32 and is part of the Licence Holder's Newman Operations. Iron ore at the Premises is mined using conventional open cut methods at a design rate of 41 million tonnes per annum (Mtpa). In the 2020/21 annual period the Licence Holder produced 30.4 million tonnes of iron ore, with 17.6 million tonnes of this

being transported to the Mt Whaleback Operations for blending and reprocessing.

Ore at Eastern Ridge is drilled and blasted and then loaded onto haul trucks using an excavator and front-end loaders. Ore is then transported to one of two ore handling plants (OHP): OB25 OHP; and OB24 OHP.

Figure 1 illustrates the contribution of Eastern Ridge orebodies to the overall throughput from the Licence Holder's Newman Operations, including future projections. Orebody 24 is depleting and will be progressively replaced by new Marra Mamba orebodies to the west, including OB26, OB28 and OB36. It is possible that these orebodies will continue to be handled at OB24 OHP.



**Figure 1: Anticipated tonnages of processed ores across the Newman Operations**

Table 2 demonstrates each ore type that is handled at the Premises. Ore is only primary crushed at OB24 OHP from where it is railed to OHP4 at the Fixed Plant West for further blending prior to transport to Port Hedland. All ores at either OB24 OHP or OB25 OHP are stockpiled at run of mine pads prior being crushed and re-stockpiled before train load out.

**Table 2: Ore source and type (current) (BHP, 2021b)**

Orebody Name/Number	Ore Type
OB24	Brockman
OB25 P1	Brockman
OB25 P3	Brockman
OB25 P4	Brockman
OB25W	Brockman
OB25W	Marra Mamba
OB32	Marra Mamba
OB33	Marra Mamba

### 3.1 OB25 OHP

The OB25 OHP is situated on the southern boundary of the Premises (Figure 4) and processes



ore from OB25 and OB24; both from the Brockman Formation. Ore is received into the hopper via front end loader from a stockpile for primary crushing before being conveyed to secondary crushers and screens for further sizing. Therefore 100% of ore is double handled as it is hauled via truck and stockpiled near to the OHP. Front end loaders then load the ore into the OHP.

Fines materials is delivered to Main Fines Stockyard (consisting of eight conical piles) via a gantry stacker (Fines Tipper Stacker) and lump transferred to a single stockpile via a radial stacker. Fines material may also be transferred via front end loader to separate stockpiles outside of the stockyard to create “buffer piles”, referred to as “Dead stockpiles”, which can remain for up to one month prior to train load out.

Each rail car is pre-loaded to approximately two third’s capacity using front end loaders and then fully loaded and profiled by the train load out system. Front end loaders are used to load stockpiled ore into trains either directly onto the rail wagons or into a hopper that feeds a surge bin located above the train load-out system. Front end loaders fill the Existing Train Loadout (Figure 3) surge bin via Reclaimer Hopper Cars that can track along a conveyor to shorten the distance to the stockpile.

Ore is then transported to Port Hedland where it is blended with other ores at either Nelson Point or Finucane Island prior to being loaded onto a vessel for export.

Until recently, the Licence Holder also operated a mobile crushing plant near to OB25 but has since decommissioned the facility. The Licence Holder has also advised DWER officers of plans to operate OB25 OHP only on a contingency basis where processing at OB24 OHP is not possible. Therefore this Amendment Report assesses the risk for dust from both OHPs operating at capacity.

### **3.2 OB24 OHP**

The OB24 OHP is situated approximately 3km north of OB25 OHP and consists of a primary crusher that receives ore from OB24, OB25 and OB32. Ore is dumped from haul trucks into the crusher via a hopper and conveyed to a course ore stockpile for train load out. Approximately 35% of ore is rehandled from a secondary stockpile with the remainder directly loaded via haul truck from the pit.

Ore from the course ore stockpile is loaded into shuttle trains via reclaim tunnel chutes and transported to the Fixed West Plant (Mt Whaleback Operations) for further processing/blending. Train loading takes approximately 1 hour with on average 8 trains loaded per day.

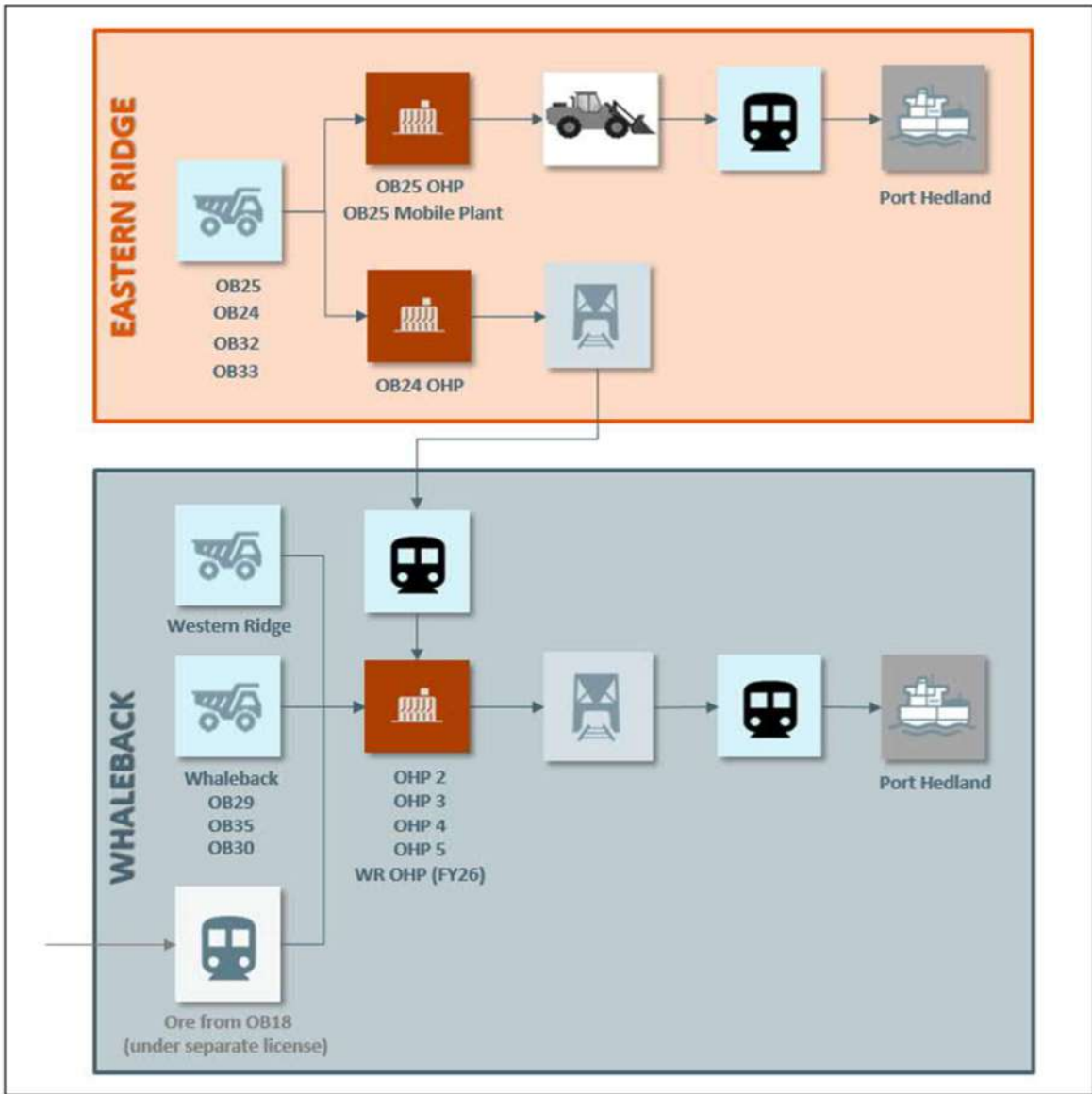


Figure 2: Process flow chart at the Mt Whaleback premises and Eastern Ridge (the Premises) operations (BHP,2021)

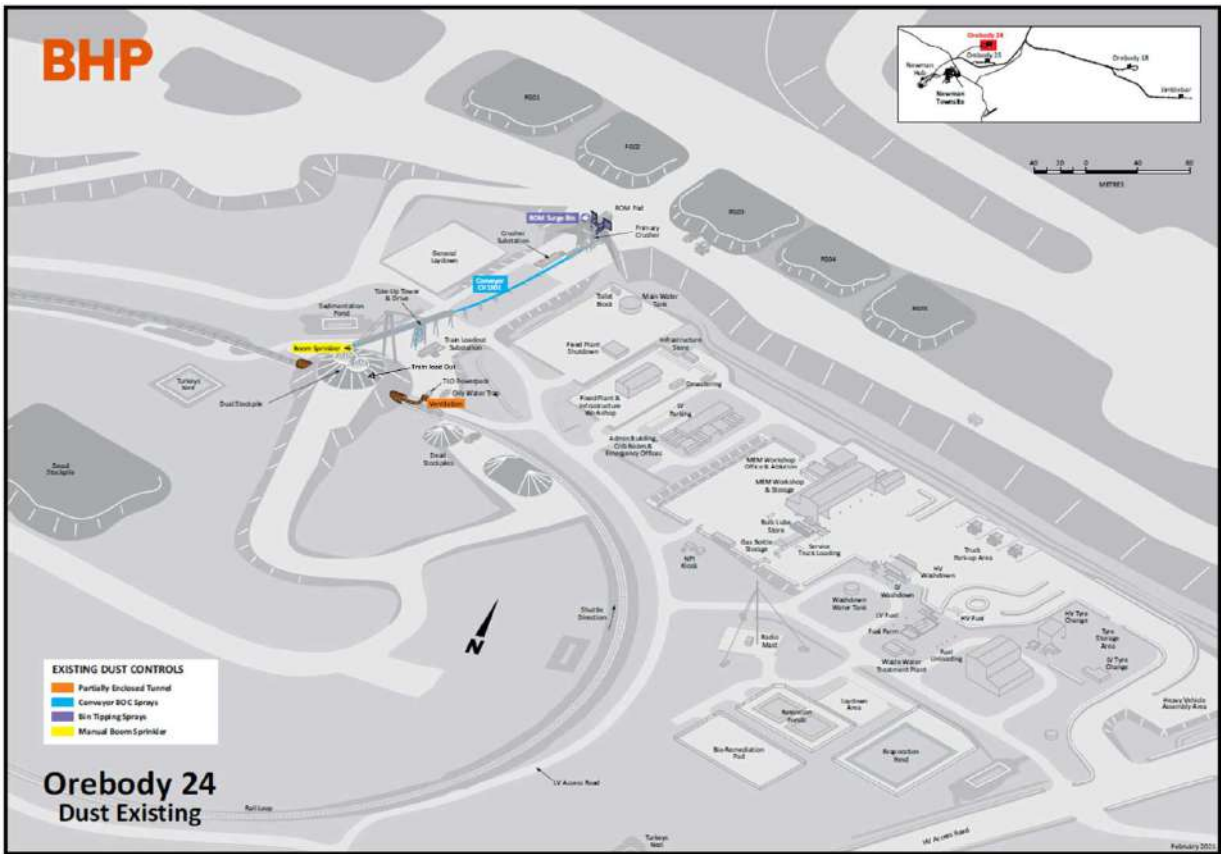


Figure 3: OB24 ore processing infrastructure and associated dust controls

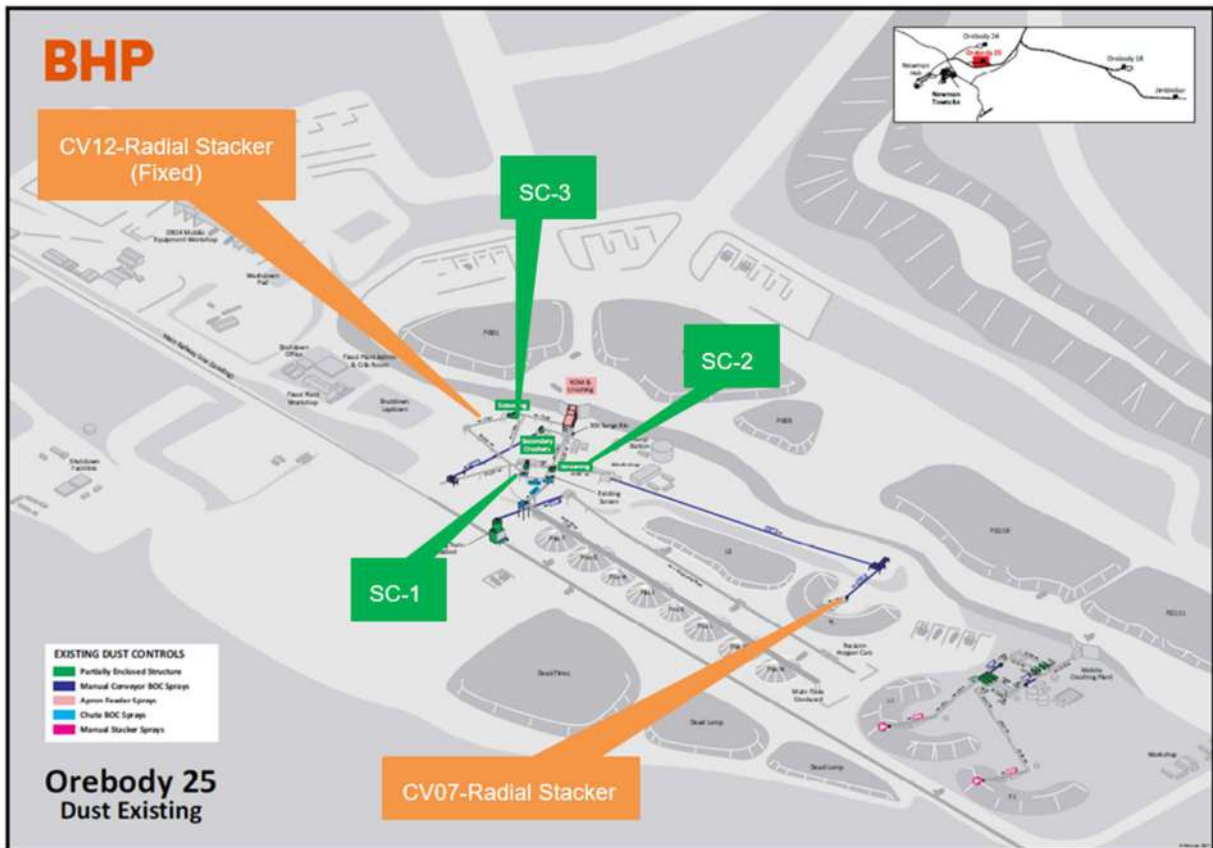


Figure 4: OB25 ore processing infrastructure and associated dust controls

### 3.3 Landfills

To support mining activities and personnel the Licence Holder operates four inert landfills at the site which accept inert waste material generated onsite including tyres, used conveyor belts and inert waste concrete. Waste is also buried within pit voids and overburden storage areas on the Premises (outside of the designated landfill sites). Putrescible wastes are disposed offsite.

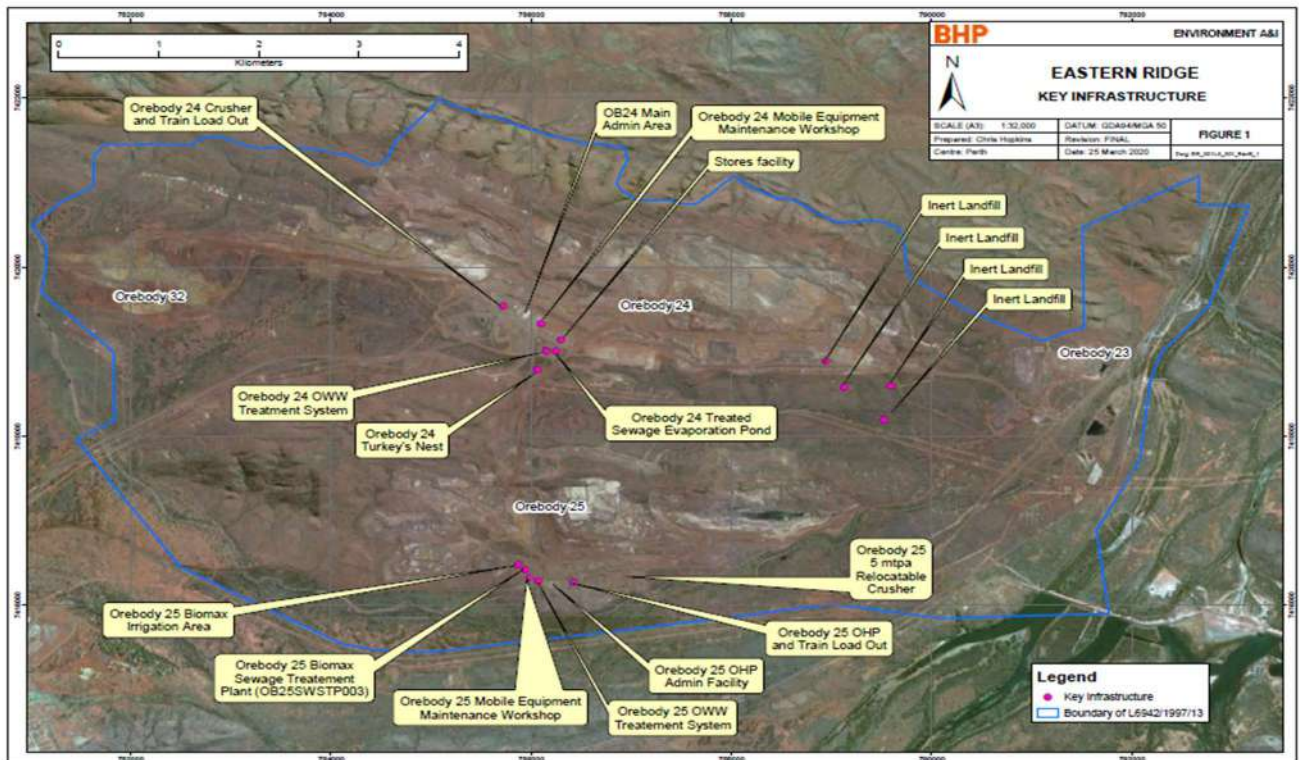


Figure 5: Premises key infrastructure map

### 3.4 Infrastructure

The Eastern Ridge Iron Ore Mine infrastructure, as it relates to Categories 5 and 63 activities, is detailed in Table 3 and with reference to the Site Plan (attached in the reviewed licence).

Table 3 lists infrastructure associated with each prescribed premises category.

Table 3: Premises infrastructure as it relates to Prescribed Activities

	Infrastructure	Site Plan Reference (on Amended Licence)
<b>Prescribed Activity Category 5</b>		
Crushing, screening, stockpiling and handling of ore at the OB24 OHP (Figure 3) and OB25 OHP (Figure 4) processing areas prior to train loading for transfer to Mt Whaleback operations for further processing, or to Port Hedland for export.		
1.	ROM stockpiles	N/A
2.	2 x Primary Crushers (or similar)	Figure 2: OB25 OHP: ROM and Crushing Figure 3: Primary Crusher
3.	2 x Secondary Crushers	Figure 3 (OB25 OHP):

	Infrastructure	Site Plan Reference (on Amended Licence)
		OB25 OHP: ROM and Crushing, Primary Crusher Figure 2 (OB24 OHP): Primary Crusher
4.	3 x Screens	Figure 2: Screening (2)
5.	Conveyor Belts	Figure 2 (OB24 OHP): CV1301 Figure 3 (OB25 OHP): CV01/A, CV02, CV03, CV04, CV05, CV07, CV08, CV09, CV11, CV12, CV101, CV102, CV103, CV104, CV105, CV106, CV107, CV108, CV110, CV111, CV112, CV113
6.	Fines Tipper Stacker (OB25 OHP)	Figure 2: RC01; Main Fines Stockyard
7.	Conveyor boom stacker	Figure 3 (OB24 OHP): CV1301
8.	Radial stacker	Figure 4 (OB25 OHP): CV12 and CV07
9.	Stockpiles	Figure 3 (OB24 OHP): Dead stockpiles, Dual Stockpiles Figure 4 (OB25 OHP): LS, TL Main Fines Stockyard: Pile F; Pile G; Pile H; Pile J; Pile K; Pile L; Pile M; and Pile N Dead Lump (2); Dead Fines
10.	2 x Train Loadout	Figure 2 (OB24 OHP): Train load out Figure 3 (OB25 OHP): Existing Train Loadout
11.	Train load out hopper bins	Figure 4: Reclaim Hopper Cars; Existing Train Loadout
<b>Prescribed Activity Category 63</b>		
Four inert landfills are operated onsite to manage onsite wastes		
1	Landfills	Figure 2: Inert Landfill (4) <sup>1</sup>

Note 1: Inert wastes are also disposed to pits during backfilling processes.

### 3.5 Legislative context

The mine is located on tenement ML244SA and was initially approved under the *Iron Ore (Mount Newman) Agreement Act 1964*, with operations commencing 2001. Table 4 summarises approvals relevant to the assessment.

**Table 4: Relevant approvals and tenure**

Legislation	Number	Subsidiary	Approval
<i>Iron Ore (Mount Newman) Agreement Act 1964</i>	Tenements E52/2009-1, ML244SA, G52/19-G52/27, G52/276, G52/277, G52/279; and Special Leases K858923 and N088235	Pilbara Iron Limited BHP Minerals Pty Ltd Mitsui-Itochu Iron Pty Ltd CI Minerals Australia Pty Ltd	To approve an agreement relating to iron ore deposits at or near Mount Newman and related harbour developments
<i>Rights in Water and Irrigation Act 1914</i>	GWL65219(12)	BHP Billiton Iron Ore Pty Ltd	5C License to Take Water within the Ophthalmia Borefield for annual water entitlement of 10,000,000kL (equivalent to 10 GLa). AML70/244 – Mt Whaleback Operation & Orebody 25, Crown Lease 3116/3684-Ophthalmia Dam & Pastoral Lease 3114/992 Ethel Creek Station. Licence valid until 25 June 2028.
	GWL182237(2)		5C License to Take Water within the Eastern Ridge Borefield (specifically PB25 Pit 1, OB 25 Pit 3 and OB24) for annual water entitlement of 10,920,000kL (equivalent to 10.92 GLa). AML70/244 – Section 13 – OB25 (Pit 1 and Pit 3) Operation AML70/244 – OB24 Licence valid until 2 May 2027.
	GWL74556(10)		5C License to Take Water within the Eastern Ridge and Mt Whaleback (mining) Operations (specifically OB23) areas for annual water entitlement of 14,600,000kL (equivalent to 14.6 GLa). AML70/244 – Mt Whaleback Operation and OB23/25 Operations. Licence valid until 1 December 2024.
<i>Dangerous Goods Safety Act 2004</i>	Dangerous Goods Licenses: DGS013893	BHP Billiton Iron Ore Pty Ltd	Dangerous Goods License
Part IV of the EP Act (WA)	Statement Number 478	BHP Billiton Iron Ore Pty Ltd	Ministerial Statement 478 was issued on 5 June 1998 to allow mining of Orebody 23 below water table. A Mine Closure Plan for Orebody 23 has been submitted to the EPA as this orebody has reached its end of life (BHP, 2016). Therefore conditions for dewatering are redundant.

Legislation	Number	Subsidiary	Approval
	Statement Number 712 (replaced by Statement 1037)		Issued on 24 January 2006 the statement relates to the expansion of existing mining operations at Orebody 25 including allowing mining below water table.
	Statement Number 834 (replaced by Statement 1037)		Statement 834 was issued on 8 July 2010 for the Orebody 24/25 Upgrade Project allowing the development of Orebody 24 and installation of new processing equipment (OHP24). The statement was amended on 16 November 2011 to increase the ore processing rate from 15mtpa to 18mtpa.
	Statement Number 1018 (replaced by Statement 1037)		Issued on 15 October 2015 for the above ground mining of a new orebody (Orebody 32).
	Statement Number 1037		Ministerial Statement 1037 was published on 21 September 2016 for the Eastern Ridge Revised Proposal and combines previously issued Statements 712, 834 and 1018. It also allows changes to existing mining operations including extension of Orebodies 24, 25 & 32, mining below water table at Orebody 24, development of a new orebody (Orebody 25 West) and discharge any excess dewatering into Ophthalmia Dam.
	Statement Number 1105		Provides conditions on future iron ore mining and associated activities and operations under the boundary of the Pilbara Expansion Strategic Proposal (see Figure 7).
Part V of the EP Act (WA)	L6942/1997/13	BHP Billiton Iron Ore Pty Ltd	This Licence.

### 3.5.1 Iron Ore (Mount Newman) Agreement Act 1964

The State Agreement details the rights, obligations, terms and conditions for the development of the project, and is administered by DJTISI on behalf of the Western Australian Government.

In the case of the Newman Operations, the State Agreement negates the requirement for regulation under the *Mining Act 1978*. However, DMIRS will continue to provide advice to DJTISI on the implementation of the State Agreement as required. As the Newman Operations licence review is not associated with an expansion of BHP's operations, DJTISI's role will be to ensure consistent communications between each agency and support a coordinated regulatory approach across Government.

No activity conducted under the State Agreement is exempt from compliance with the EP Act.

### 3.5.2 Environmental Protection Act 1986

There are numerous activities at the Premises that have the potential to contribute to dust impacts in Newman, some of which are not within scope of this assessment but may be regulated via alternate regulatory approvals. While it is acknowledged that the Licence Holder does apply a range of additional dust controls to these sources that are beyond scope of a Part V licence, a whole-of-Government approach to managing dust in Newman would be required to ensure more complete regulatory capture.

As the primary administrator of the EP Act, DWER is most suitably placed to regulate the dust from the Licence Holders prescribed activities to, in part address existing high dust levels in Newman through the Part V licence.

DWER regulates the environmental performance of mining operations at both Mt Whaleback and Eastern Ridge through Part IV and V of the EP Act. There remains scope within both Part IV and Part V approvals to enhance the regulation of dust from the Newman Operations and promote improved dust management practices across the whole facility.

Further detail on the role of DWER is provided in the sections below.

DWER will continue to engage with key decision-making authorities on the environmental performance of BHP's Newman Operations as it does with other projects of State significance. This includes the supply of air quality monitoring data that may be used to inform the decision making of other departments such as the DOH.

### 3.5.3 Licence amendments

The Licence was most recently amended on 22 March 2019 to allow the installation and operation of the mobile crushing plant situated adjacent to OB25 OHP. The mobile crushing plant has capacity to process up to 5 million tonnes of ore per annum primarily consisting of ore from OB25. A report confirming completion of construction of the mobile crushing plant in accordance with the Licence conditions was submitted to DWER on 3 September 2019.

In 2021, the Licence Holder ceased operation of the mobile crushing plant and is currently in the process of removing it from site.

The amendment also included an increase in the processing capacity at OB24 OHP from 8mtpa to 12mtpa delivered through driver upgrades at the OB24 OHP primary crusher. No new dust control equipment was proposed at OB24 OHP as part of the upgrade. The upgrades resulted in an increase of the overall processing capacity at Eastern Ridge of 9mtpa (32mtpa to 41mtpa).

The Licence was amended further in June 2020 to allow the construction and operation of three additional inert landfills.

### 3.5.4 Part V compliance

Current Part V licence conditions relevant to dust at the Premises are limited to the monitoring of ambient air quality in Newman, and the investigation and reporting of 24-hour dust events that exceed an ambient target of 70  $\mu\text{g}/\text{m}^3$  ( $\text{PM}_{10}$ ) averaged over every 24-hour period midnight to midnight. There are currently no dust management requirements on the Existing Licence although some controls are implemented by the Licence Holder.

As discussed in section 2.3.1, all matters not related to dust emissions are beyond scope of this assessment and are therefore not raised below. A search of the previous five annual audit compliance reports and the Department's Incident and Complaints Management System has identified no dust-related non compliances from the Premises.

A number of  $\text{PM}_{10}$  exceedance days at the Town Centre and Newman East air quality monitors have been identified each reporting period. Exceedances of  $\text{PM}_{10}$  reporting targets at ambient locations ( $70\mu\text{g}/\text{m}^3$  averaged over 24 hours) cannot represent non-compliance with the Licence conditions as they may be influenced or directly caused by non-mining sources not within the control of the Licence Holder. Therefore, further investigation of individual exceedances is required to determine source and possible pathway. Further discussion on  $\text{PM}_{10}$  exceedance reporting is provided in section 4.3.

#### Site visits

Since advising the Licence Holder of the Part V review of the Newman Operations, DWER officers visited the Premises in November 2020 and 2021 to inform this risk assessment. On 17 November 2020, representatives of the departments of Mining, Industry Regulation and Safety;



and Jobs, Tourism, Science and Innovation and DWER visited the Premises ahead of the review commencing. DWER licensing officers also visited the site in August 2019.

During each site visit dust was observed at ore handling and processing locations. The Licence Holder identified numerous opportunities for improvements to onsite dust management which appear to be well progressed, including:

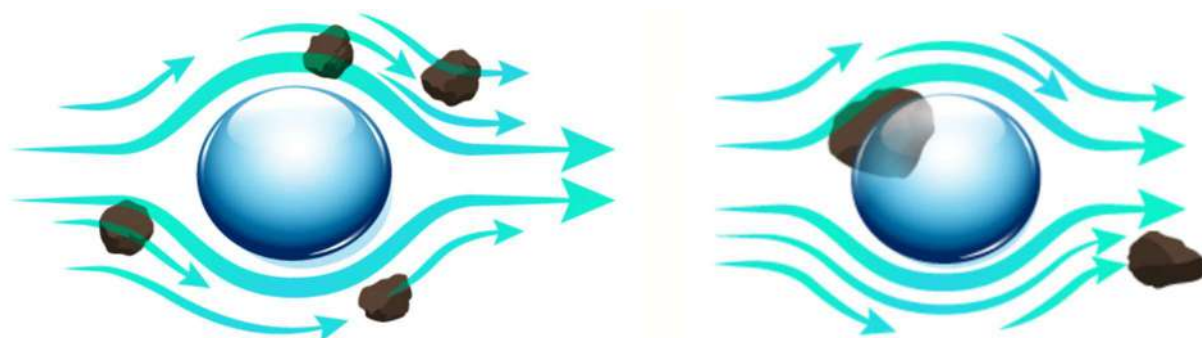
- Automation of haul trucks and water cart planning based on haulage traffic.
- Speed reduction during dusty conditions.
- Profiling and vegetating landforms in low dust risk seasons.
- Water control performance investigations and maintenance based on high priority assigned to dust control effectiveness.

DWER has sought to incorporate relevant dust control initiatives into the Amended Licence to ensure that they are progressed.

### **Existing dust controls**

During the site visit undertaken in November 2021, DWER officers noted that in some cases, spray equipment was either not present e.g. at some belt scraper locations on OHP OB25, or not effective. In other locations, dust sprays on ore feed hoppers to the OHP OB25 processing circuit was visibly identified as adequately suppressing dust.

DWER officers noted that in some cases, spray equipment was not sufficiently adaptable to control dust from the different ore types that are handled at the Premises e.g. at stackers. The Licence Holder advised that each ore behaved differently and that sprays for ore types that generate coarser particles may not suppress dust as effectively from ore types that generate finer particulates. This is consistent with DWER's understanding that for sprays to be most effective, the droplet size should be similar to the size of the dust particle. As depicted in Figure 6, droplets that are too big for the particles can result in air flows that divert particulates around the droplet.



**Figure 6: Dust particle behaviour and droplet size (Source: The Spray Nozzle People, 2021)**

Key dust sources observed during site visits were typically around crushing locations at OHP OB24 and where ore was dropped from height, for example at stackers and along conveyor routes. Dust from excavation and haulage of ore was also identified although these sources are beyond scope of this review (refer to section 2.3).

Visual observations during site visits are limited to what infrastructure was handling ore and what ore was being handled at the time of the visit. There may be other locations around the Eastern Ridge operations where dust controls are also required but were not witnessed as significant sources during site visits.

There are currently no dust management requirements on the Existing Licence.

### **Proposed dust controls**

The Licence Holder has identified opportunities for improvements to onsite dust management. These are discussed further in section 5.2.2.

### **Dust monitoring**

The Licence Holder has trialled the operation of microsensor dust monitors to better inform dust behaviour (refer to section 4.2.3). Although these dust monitors are not designed to Australian Standards for dust monitoring, they may remain useful for operational management of dust as they are easily relocatable to identify dust sources.

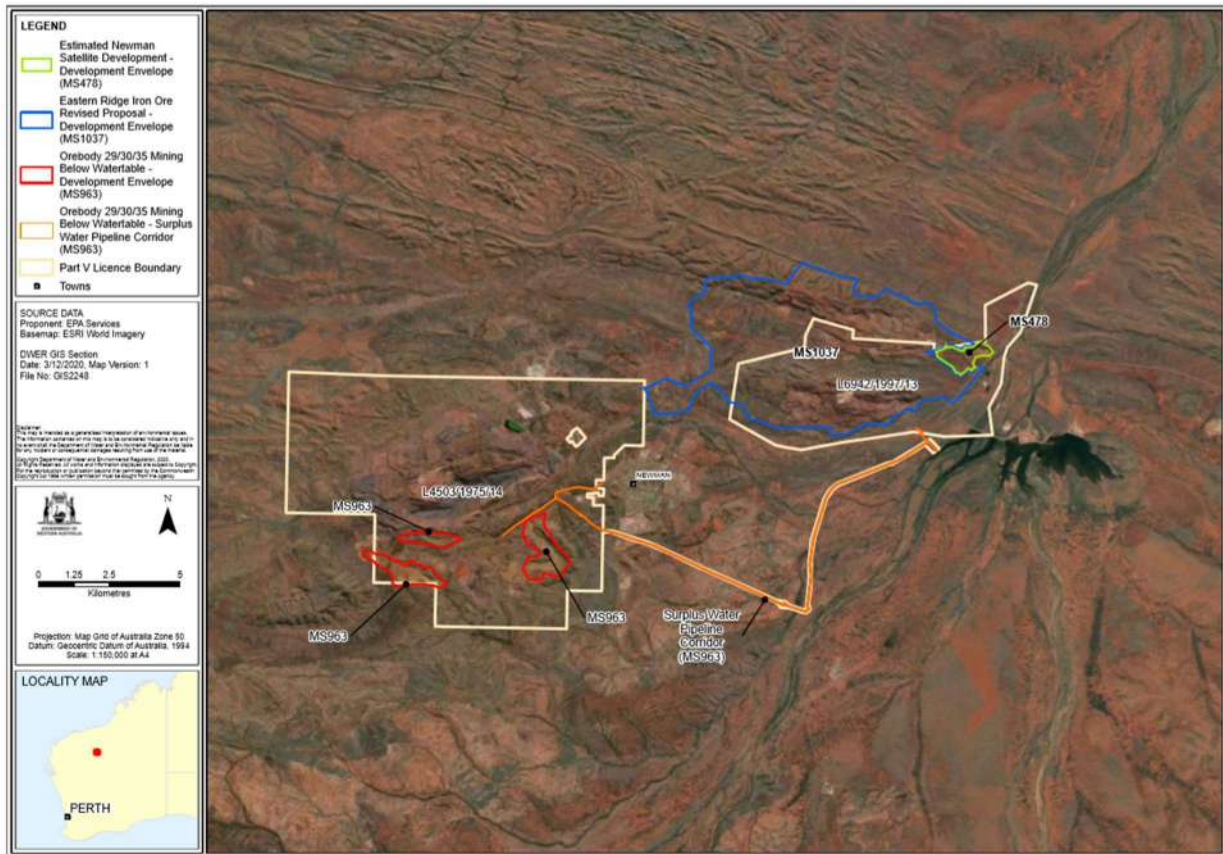
A review of dust monitoring at the Premises identified that the location of fixed dust monitors may not accurately represent the dust concentrations along the likely pathway from the prescribed activity operational areas to sensitive receptors. This is expected to impact the Licence Holder's ability to accurately report on attribution for reportable dust events in Newman. Refer to section 4.2 for further discussion.

### **3.5.5 Part IV of the EP Act**

The Environmental Protection Authority (EPA) is an independent statutory body that protects the environment by providing sound, robust and transparent advice to the Minister for Environment. DWER supports the EPA in conducting environmental impact assessments that inform conditions placed on Ministerial Statements issued by the Minister for Environment under Part IV of the EP Act.

Ministerial Statements (MS) for Mt Whaleback (MS963) and Eastern Ridge (MS478 and 1037) (Figure 7) condition the discharge of excess mine dewatering to Ophthalmia Dam and the monitoring of terrestrial and groundwater ecosystems. In parallel to this Amendment Report (Part V licence review), DWER will review the Part IV approvals to identify need and opportunity for the regulation of dust emissions and impacts from those sources not within the scope of this Amendment Report, including dust from:

- open areas beyond the footprint of ore processing and handling and tailings storage facilities;
- pits (blasting, excavation, haulage);
- haul roads; and
- waste rock dumps (overburden).



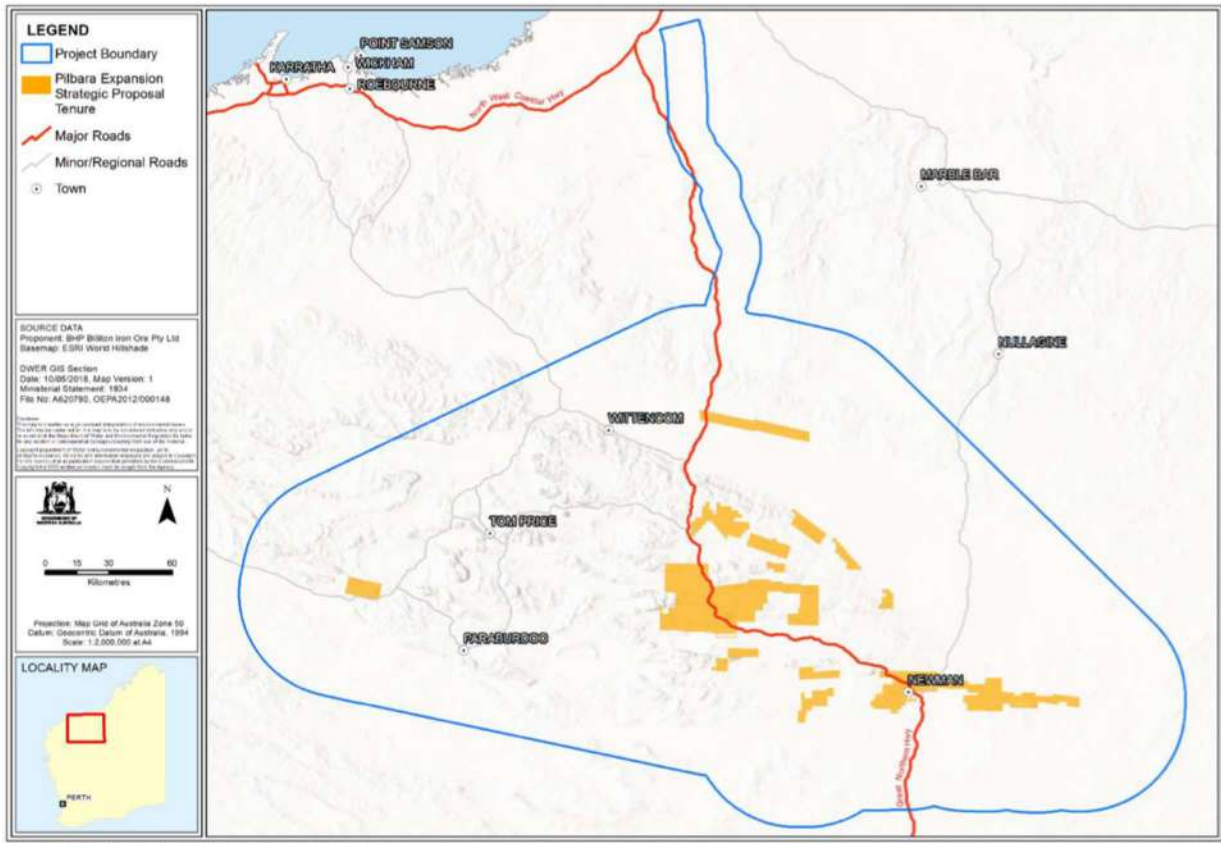
**Figure 7: Overview of Part IV and V EP Act approval boundaries for the Newman Operations**

MS 1105 was published on 11 July 2019, for the Pilbara Expansion Strategic Proposal, which is relevant to the construction and operation of all new BHP iron ore mine developments throughout the Pilbara Region. It is noted that all new applications for expansion of mining activities in the Newman Strategic Proposal project boundary depicted in Figure 7 will require BHP under MS1105 to maintain air quality and minimise emissions to meet recognised air quality standards and criteria. Criteria specified in condition 11-1 of MS1105 includes the *National Environment Protection (Ambient Air Quality) Measure* (NEPM) for particles as PM<sub>10</sub> and PM<sub>2.5</sub>.

*11-1 The proponent shall manage the implementation of the proposal to meet the following environmental objective:*

- (1) *maintain air quality and minimise emissions so that environmental values are protected, and in particular:*
  - (a) *meet recognised air quality standards and criteria, including:*
    - (i) *National Environment Protection (Ambient Air Quality) Measure for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, particles as PM<sub>10</sub> and PM<sub>2.5</sub>; or*
    - (ii) *other guidelines on a proposal specific basis as determined by the CEO.*

BHP is also required by Ministerial conditions 6-1 and 11-3 of MS1105 to develop an Air Quality Management Plan to address impacts on air quality, where relevant, including from, but not limited to: dust emissions due to clearing of vegetation; emissions from power plants; mining (including blasting), handling, stockpiling and transport of iron ore; and crushing and screening of materials.



**Figure 8: Strategic Proposal project boundary and BHP tenements**

**Key determinations:**

- 1) Conditions of MS1105 are relevant only to new mining operations near to Newman townsite and in the broader Pilbara Region and do not apply to existing operations or authorised infrastructure upgrades as detailed in section 3.3.3.
- 2) The Licence Holder has notified DWER of its intent to develop orebodies to the northwest of OB24 OHP following the completion of mining at OB25. As it is not currently practicable for the Licence Holder to achieve NEPM criteria for particulates (PM<sub>10</sub> and PM<sub>2.5</sub>) at Newman, further consideration to conditions of MS1105 would be required prior to development.
- 3) The DOH have provided advice on the relevant air guideline value to be applied in Newman (refer to section 5.1).

**3.5.6 Planning**

Local dust sources outside of the mine sites also contribute to dust in Newman. Dust emissions generated from activities such as land development sites, commercial activities and light industry, woodworking, grinding, roads, trotting tracks, extractive industries involving sand or gravel extraction are generally managed by local governments.

The Shire of East Pilbara plays an important role in managing dust generation and impacts in residential areas of Newman through the establishment of industry zones appropriate to the prevailing land use (Shire of East Pilbara Local Planning Strategy 2020). The Shire may also require the use of dust controls as conditions on approvals for certain activities conducted in close proximity to sensitive receptors.

## 4. Air quality monitoring

### 4.1 Ambient dust monitoring

The Existing Licence requires air quality monitoring to be undertaken at Newman Town Centre and Newman East, with the results of this monitoring publicly available in real time (Ecotech, 2021). The Licence Holder also reports on its air quality monitoring results its Annual Environmental Report (refer to section 4.3).

Each background monitor is a Beta Attenuation Monitor (BAM), maintained and operated in compliance with Australian Standard 3580.9.11 *Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM<sub>10</sub> beta attenuation monitors*. These monitors are fitted with nephelometers to measure PM<sub>10</sub> in near real time, 10-minute averages. Nephelometers, or any other 10-minute averaged particulate monitor, do not have Australian Standards associated with their operation or maintenance. However, data from these monitors remains useful for reactive management purposes to potentially reduce the degree and duration of impacts, where such impacts are associated with an activity under the control of the Licence Holder.

The Newman Town Centre ambient monitor is also capable of measuring particulate matter sized 2.5 microns in diameter and smaller (PM<sub>2.5</sub>).

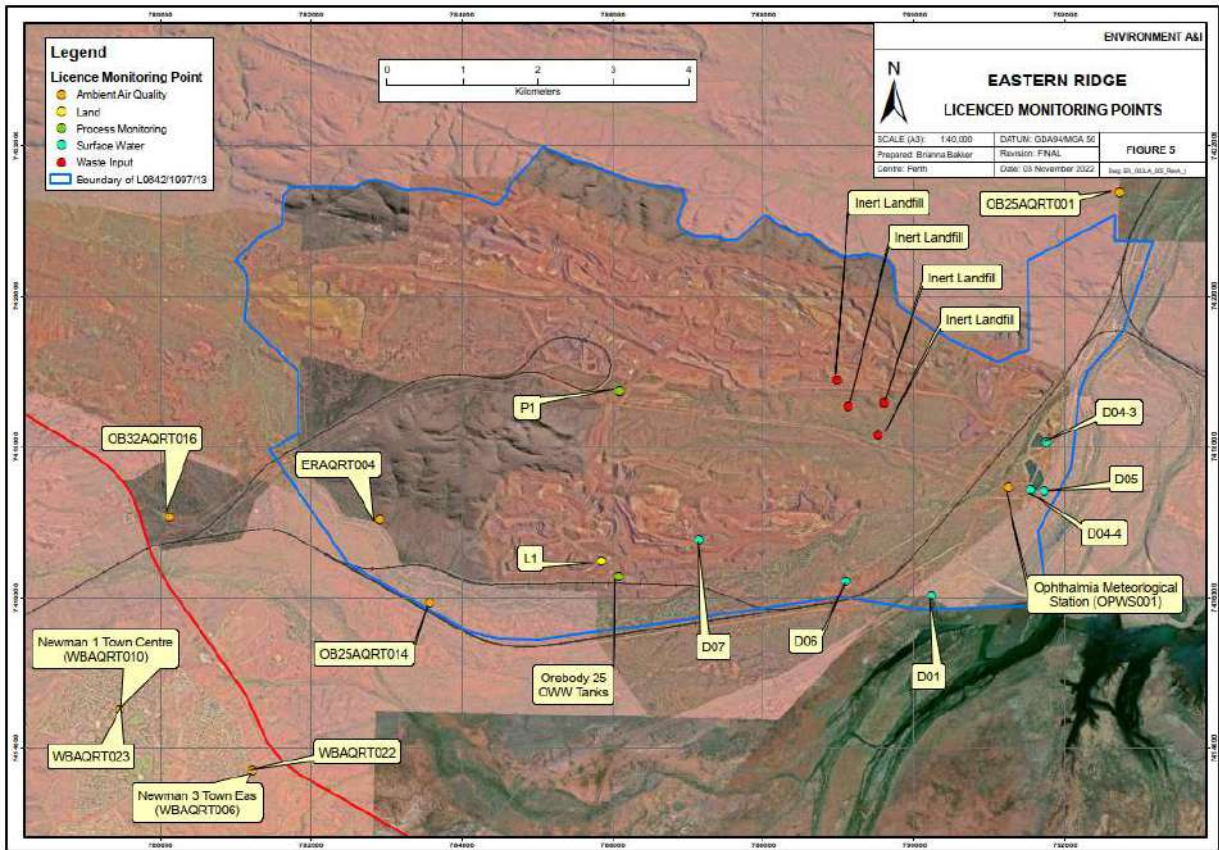
Dust concentrations and movement in Newman is significantly influenced by mining activities, topography, bushfires and seasonal weather patterns. The monitors are also influenced by local sources including the use of unsealed surfaces that surround both monitors which can be accessed by light vehicle. The Town Centre monitor is located within an unsealed carpark that is accessed by the local school staff, parents and visitors.

### 4.2 Review of the monitoring network

A major consideration of this dust review is the appropriateness and effectiveness of the existing monitoring network.

There are differences in the monitoring equipment used across the Newman Operations. BAM1020 / Real-Time Module (RTM) monitors are used for the Newman Town Centre, Newman East and all boundary and background monitoring locations, while one E-sampler monitor is used on-site. Concentrations measured by different monitors (for the same dust size fraction) are generally not directly comparable. In addition, BAM/real-time modules and E-sampler monitors record data using different averaging periods. Therefore a comparison of dust concentrations at monitors located near to dust sources (on-site, or source monitors) with data recorded at boundary and community monitors is not directly comparable and may provide limited reliability.

Figure 9 depicts the existing dust monitoring network at the Newman Operations.



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**Figure 9: Newman air quality monitoring locations (represented by orange points)**

#### 4.2.1 Background monitoring

Upwind monitoring is used to quantify dust levels entering industrial premises and must accurately represent background PM<sub>10</sub> concentrations. If sited appropriately background monitors can be used to indicate the general attribution of dust to industrial activities and in some cases can identify where regional dust events are the cause of high dust levels at receptors. Having appropriate, reliable and representative background monitors is essential for collecting data to inform both licensing and public health decisions.

The Licence Holder operates one background monitor for the Premises, Background 1 (ER) (OB25AQR001), as depicted in Figure 9.

#### 4.2.2 Downwind monitoring

Downwind monitoring ideally represents a mixed dust plume including potential background and plume sources from industrial premises. The downwind site should not be dominated by temporary localised dust sources not directly related to ongoing operations, for example use of unsealed road traffic, construction activity or other dust generating activities.

Monitoring data shows that major dust plumes originating from the Premises are transported through relatively narrow sectors toward the Newman townsite. Desktop review of the location of existing downwind monitor OB25AQR014, depicted in Figure 9, appears to be within these narrow sectors and capable of identifying short term peaks in PM<sub>10</sub> concentrations from the Premises. However, the configuration of other monitors (ERAQR004 and OB32AQR016) nearby to dust sources within the Premises do not appear capable of measuring particulates as they travel from the OHPs to sensitive receptors in Newman.

### 4.2.3 Source monitoring

On-site dust monitoring can help to identify potential individual sources at mining operations that span across a large area, such as those conducted at the Premises.

There exist no permanent PM<sub>10</sub> monitors near to likely dust sources. This may limit the Licence Holder's ability to identify the source of high dust events recorded at boundary monitors, or for boundary monitors to accurately measure dust plumes that travel toward sensitive receptors.

While the location of E-samplers are generally fixed, they can be moved around to identify dust sources and movement. To ensure data continuity that would allow comparison of particulate levels over time, it is necessary to maintain consistency in the location of monitors across the network generally.

The Licence Holder has trialled the use of 9 micro sensors around the Premises. The location of the sensors is reviewed and changed according to analytical needs as the Licence Holder's understanding of high-risk weather conditions evolves. The purpose of these monitors is to help understand the generation and behaviour of dust (BHP, 2021).

Micro sensors have been located adjacent to BAM monitors, including at the Newman Town Centre monitor to determine the accuracy and potential for ongoing use of micro sensors across the Newman Operations. The correlation between data from the micro sensors and BAMs was found to be poor during the trial period (R<sup>2</sup> value of 0.52). Despite this result, the use of microsensors as a low cost alternative to Australian Standard-monitors such as BAMs can remain worthwhile for indicative purposes.

Microsensors can still be used to measure relative dust levels near to a source/s in the absence of BAMs or other PM<sub>10</sub> monitoring devices. Studies by the Licence Holder and third parties have demonstrated that microsensors are effective at identifying spatial variability in dust concentrations (BHP, 2021c, Tagle et. al, 2020). The correlation between microsensors was very high (R<sup>2</sup> value of 0.97) meaning that microsensors placed across a small or large area can be used to determine relative dust concentrations near to a source or along a pathway (BHP, 2021c).

### 4.2.4 Meteorological monitoring

There are three monitoring stations in the Newman area that measure wind speed and wind direction; Newman Airport (operated by the Bureau of Meteorology), Whaleback (operated by BHP) & Ophthalmia Dam (operated by BHP).

There are large variations in wind data recorded at each monitoring site. Possible causes of this are the differences in mast height, potential topographic or other aerodynamic influences and compliance with Australian Standard requirements.

Therefore the Ophthalmia Met Station or OB24 Met Station depicted in Figure 9 may not be representative of the wind direction or speeds measured at boundary monitors or those PM<sub>10</sub> monitors that record dust travelling between the Premises and sensitive receptors.

**Key determination:** The Delegated Officer has determined that improvements to the monitoring network are required. The following conclusions have been made:

- For the existing regional monitors to provide reliable data as background monitors, their siting and/or surrounding environment needs to be improved to minimise impacts from nearby roads or other dust sources. Similarly, receptor monitors in the Newman townsite may be impacted by frequent vehicle movement on the surrounding unsealed carpark.
- Boundary monitor OB25AQR014, depicted in Figure 9, is the most appropriate current boundary monitor for use in high dust events to trigger management response at the OB25 OHP. However, the Licence Holder has advised DWER that

operation of the OB25 OHP will be reserved for contingency periods only.

- There is no appropriately located PM<sub>10</sub> monitor located downwind of the OB24 OHP.
- Limitations of the monitoring network make it difficult to identify exact dust sources within the scope of this assessment.
- Microsensors sensors are not appropriate for applying management triggers for PM<sub>10</sub> (refer to section 4.2.3), although they may be useful for identifying spatial variability of particulate matter across the Premises.

### 4.3 Monitoring data

DWER analysed data provided by the Licence Holder from all current fixed location PM<sub>10</sub> and meteorological monitors between 2016 and 2021 calendar years. The analysis included that of data from on-site/source monitors, boundary monitors and ambient monitors located in the Newman townsite.

Table 5 identifies the number of exceedances of the NEPM and Port Hedland-specific air guideline value (AGV) for 24-hour PM<sub>10</sub> concentrations (70µg/m<sup>3</sup>) at ambient monitors that are intended to represent background dust and those in the Newman townsite. A review of Table 5 shows that both criteria are likely to be exceeded each year.



**Table 5: Exceedances of NEPM and criterion under the Existing Licence at monitors in Newman (PM<sub>10</sub>) measured midnight-to-midnight<sup>1</sup>**

Calendar Year	Criteria µg/m <sup>3</sup>	Town Centre	Newman East	Background 2	Background 3
2011	> 50	29	19	4	N/A
	> 70	12	2	3	N/A
2012	> 50	61	59	17	N/A
	> 70	19	18	6	N/A
2013	> 50	54	53	17	N/A
	> 70	18	20	1	N/A
2014	> 50	72	81	15	6 <sup>^</sup>
	> 70	26	35	4	2 <sup>^</sup>
2015	> 50	56	33	5	7
	> 70	31	5	2	0
2016	> 50	35	7	5	6
	> 70	11	2	1	2
2017	> 50	42	11	5	35
	> 70	8	0	0	12
2018	> 50	63	38	16	21
	> 70	32	10	5	12
2019	> 50	117	75	32	42
	> 70	50	30	14	11
2020	> 50	45	44	14	6
	> 70	23	11	5	2
2021	> 50	23	14	4	4
	> 70	5	3	1	1

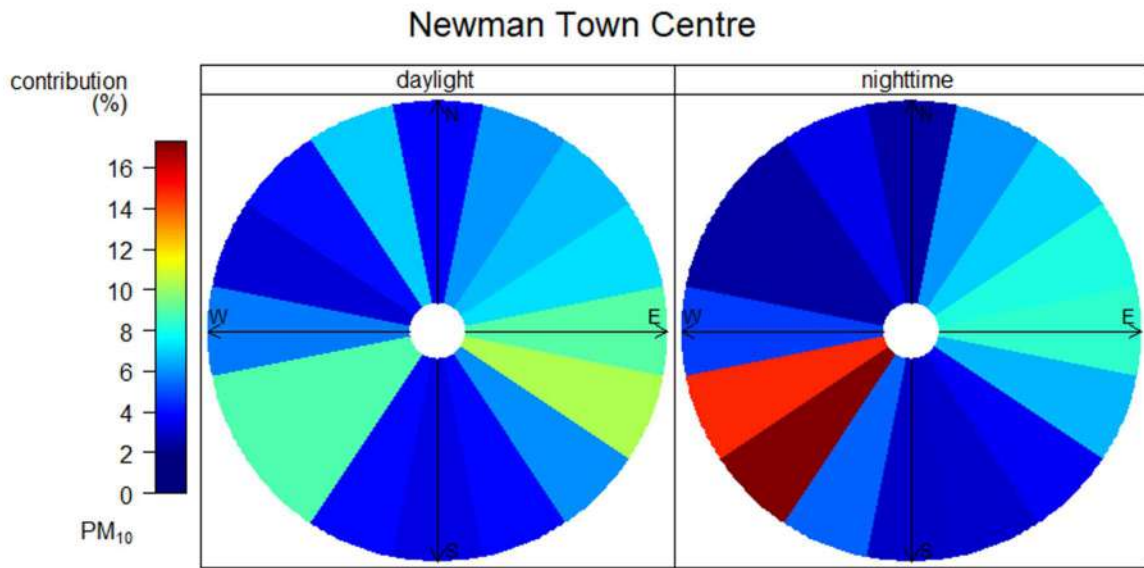
Note 1: The source/s of exceedances has not been analysed within this table.

Concentrations of PM<sub>10</sub> at the Town Centre monitoring site between 2016 to 2020 period shows the following features:

- Higher average dust concentrations and higher frequency of elevated dust concentrations during the night in comparison to daytime (7am to 7pm).
- Higher contribution of BHP's Mt Whaleback operations to overall concentrations during the night in comparison to daytime.
- Higher wind speeds do not necessarily cause the highest dust events at the Newman Town Centre.
- The contribution of higher wind speeds (greater than 3 m/s) to overall concentrations is greater in summer months, while the contribution of low wind speeds (less than 3 m/s) becomes important in winter (June to August).

The overall contribution of dust sources (as PM<sub>10</sub>) at the Town Centre monitor, particularly at nighttime (7pm to 7am), indicates a disproportionately higher contribution coming from the west-southwest to southwest vector (Figure 10). This direction places the Fixed Plant West and

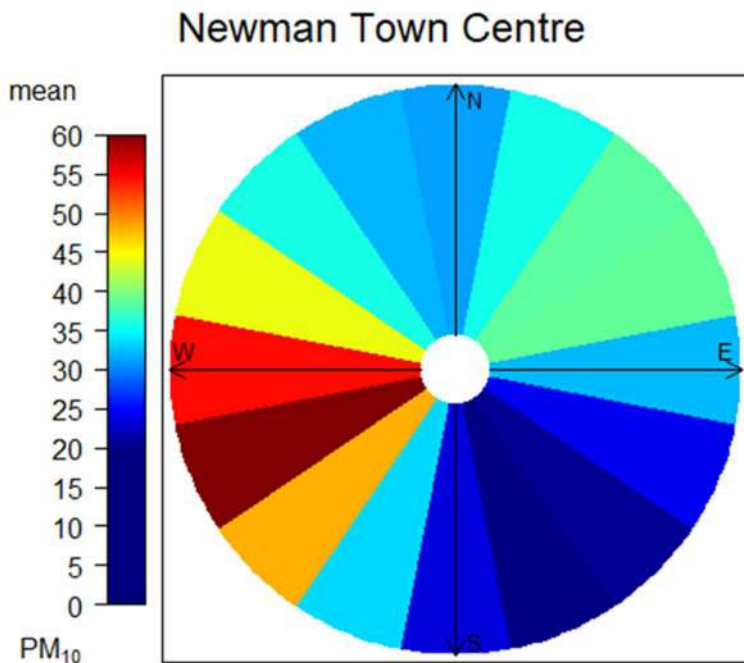
Orebody 29 within that arc of influence (Mt Whaleback Operations – L4503/1975/14).



**Figure 10: Overall contribution of PM<sub>10</sub> and direction of source between 2016 and 2020 as measured at the Newman Town Centre monitor**

When looking at the source direction of peak emissions, high dust events appear to frequently come from the same westerly direction, which is not within the wind arc of the Premises assessed within this Amendment Report.

Peak events also appear to come from the direction of the Premises to the north-east of the Newman Town Centre monitor, although much less frequently (Figure 9).



**Figure 11: Direction of highest average PM<sub>10</sub> concentrations at the Newman Town Centre monitor between 2016 and 2020**

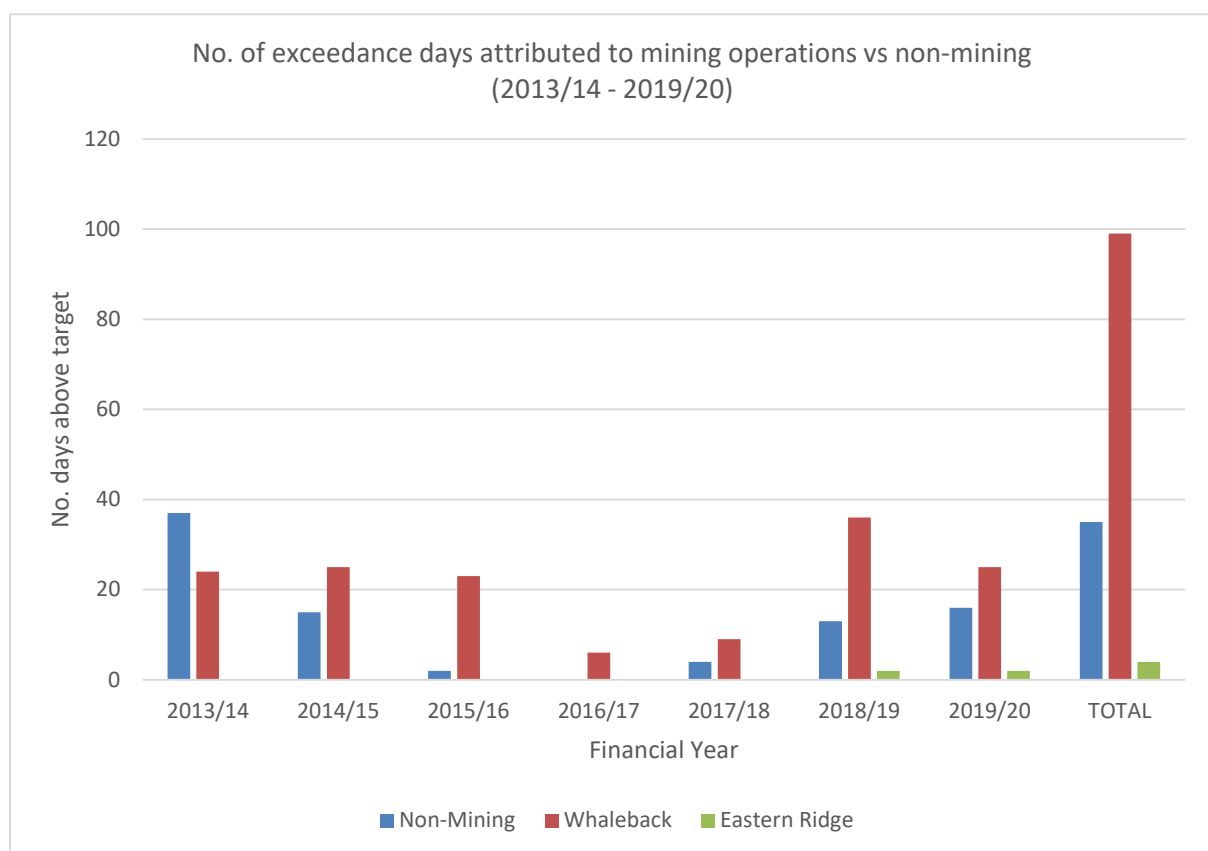
The Town Centre monitor is located in the middle of an unsealed school car park. This may influence dust concentrations at the monitor during times where there is vehicle movement adjacent to the monitor inlet. The Licence Holder has identified that peaks in PM<sub>10</sub> dust

concentrations at the Town Centre monitor have been consistently identified on weekday mornings and afternoons, matching up with school drop-off and pick-up times (BHP 2021).

#### 4.4 Exceedance reporting

The Existing Licence requires BHP to report any exceedances of the ambient target (24-hour average PM<sub>10</sub> concentration of 70µg/m<sup>3</sup>) at the air quality monitors in Newman.

The ambient air target was reported to have exceeded on 43 days during the 2019/20 reporting period with only two exceedances attributed to operations at the Eastern Ridge Iron Ore Mine. The remaining 16 events were attributed to other sources beyond Licence Holder operations (non-mining). Since the implementation of the conditions on the Existing Licence in May 2018, only four out of 106 exceedances have been reported to be attributable to Eastern Ridge mining operations. Exceedance data shows that the majority of exceedances of the target specified in the Existing Licence are associated with Mt Whaleback operations (62.5%) or other sources (33%).



**Figure 12: Number of exceedance days attributed to mining operations vs non-mining (FY2013/14 - FY2019/20)**

**Key findings:**

- The Pilbara region is a natural dusty environment with windblown dust from non-mining related sources a significant contributor to the dust loading at Newman.
- Mining operations at Mt Whaleback have been identified as the dominant source of high concentration dust impacts at Newman. Occasional moderate impacts from Eastern Ridge were also identified, but far less frequently due to prevailing wind directions, the scale of mining activities and greater distance to receptors.
- Dust emissions associated with Eastern Ridge operations have the greatest potential to influence the Town of Newman when the wind direction is from a north-

east to east direction (arc of influence). Meteorological data shows winds are generally favourable for transporting dust emissions from the Eastern Ridge operations away from the town of Newman.

- A wind arc between approximately 56 and 93° (from an E to ENE direction) places the Newman township downwind of OB25 OHP operations. The arc of influence for OB24 OHP is approximately between 45 and 80°.
- Following technical review of recorded PM<sub>10</sub> concentrations at the Newman Town Centre site between 2016 and 2020, DWER identified that higher wind speeds do not necessarily cause the highest dust events at the Newman Town Centre.
- The reduced operations of OB25 OHP, and progressive mining of ore resources further from town are expected to result in a reduced influence of Eastern Ridge operations on PM<sub>10</sub> concentrations in the Newman townsite.

## 4.5 Newman dust composition monitoring campaign

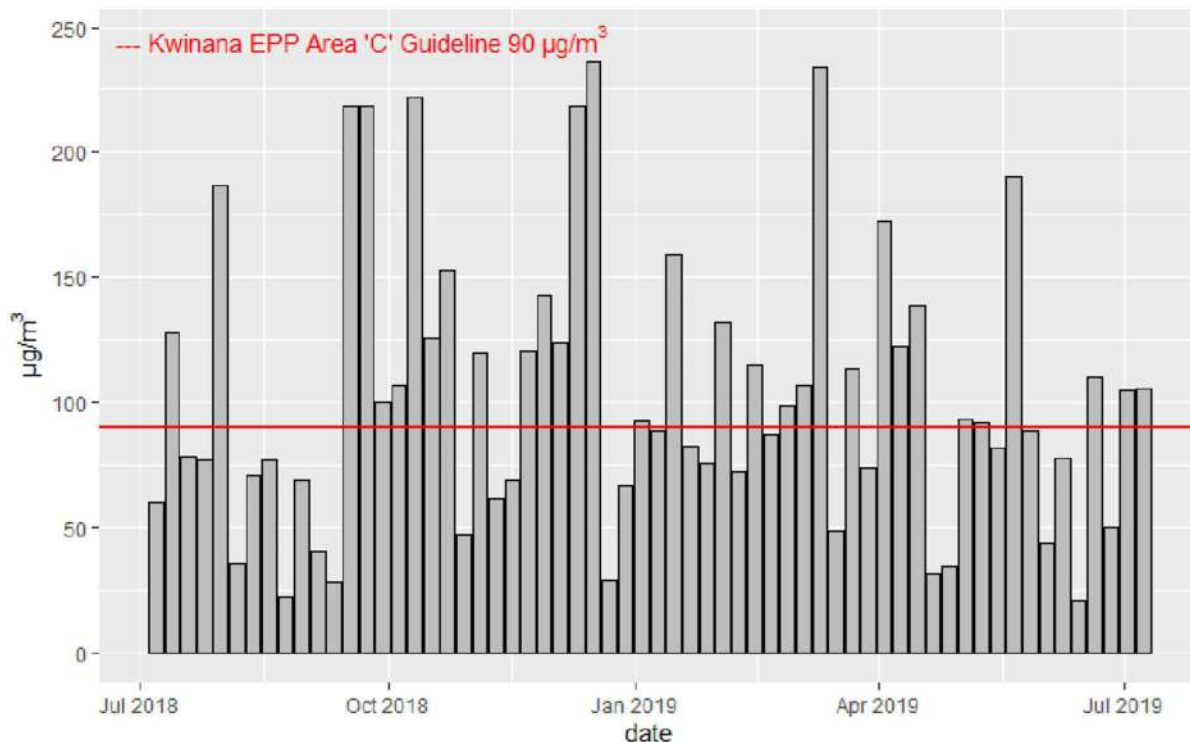
Between July 2018 and July 2019, DWER, in collaboration with the Shire of East Pilbara, undertook a 12-month dust composition monitoring campaign (DWER, 2020a) to assess the levels and composition of dust and to determine whether asbestos fibres were present in ambient air in Newman. The results indicate:

- asbestos levels were below the limit of detection for all samples;
- of the metals analysed, iron was detected at the highest concentrations, reflecting the mineralogy of the area. The iron levels detected are below the adopted guideline for iron oxide (as hematite);
- manganese was elevated in a small number of samples however the long-term health guideline value was not exceeded. These results are consistent with the mineralogy of the area;
- all other metals were detected at levels below the adopted guidelines; and
- daily average Total Suspended Particulates (TSP) levels exceeded a benchmark guideline adopted for the study in the majority of samples (Figure 13)<sup>1</sup>. The elevated concentrations of TSP measured during the campaign are consistent with other dust monitoring data collected by industry in the region.

The study assessed all airborne particles (as TSP) and was not intended to duplicate the ambient monitoring of PM<sub>10</sub> undertaken by the Licence Holder. Particulate concentrations (TSP) are represented in Figure 13 and compared against the Kwinana Environmental Protection Policy guideline for reference only<sup>1</sup>.

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<sup>1</sup> For the purposes of this study, TSP concentrations were compared against the Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992 (EPP) Area 'C' standard of 90 µg/m<sup>3</sup> averaged over 24 hours. This standard is for comparative reference only and is not applicable to the Newman airshed as a regulatory standard.



**Figure 13: Daily average TSP concentrations between 7 July 2018 and 8 July 2019**

The results were also compared against the 24-hour for PM<sub>10</sub> currently applied on the Existing Licence and adopted by Government for residential areas of Port Hedland (70 µg/m<sup>3</sup>). The criterion was exceeded on 48 days at the Newman Town Centre monitoring site, and on 21 days at the Newman East monitoring site. The two background monitoring sites recorded exceedances of the Port Hedland AGV on nine and eight days respectively during the same period (refer to section 5.1.1).

**Key findings and determinations:**

- 1) There exist multiple standards adopted for particulates across Western Australia. It is evident from various monitoring campaigns that ambient dust levels in Newman exceed each standard. Section 5.1 of this Amendment Report considers the appropriate for Newman against which risk will be assessed in this Amendment Report.
- 2) The Department of Health has reviewed the results of the monitoring campaign and advised that the measured concentrations of metals and asbestos do not represent a public health risk to the Newman community. Nonetheless, the elevated levels of dust in Newman have further justified this review.

## 5. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway and impact to receptors in accordance with the *Guidance Statement: Risk Assessments* (DER 2017).

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified pathway, and a potential adverse effect to the receptor from exposure to that emission.

## 5.1 Air quality criteria

DOH is the primary agency for public health matters in Western Australia. Therefore, DWER sought advice from the DOH during this risk assessment process as to the appropriate air quality criteria to apply to the Newman population.

The standard or target for particles for PM<sub>10</sub> as outlined in Schedule 1 of the NEPM is 50 µg/m<sup>3</sup> averaged over 24 hours (midnight to midnight), with no exceedances. The NEPM provides a national framework for all Australian jurisdictions to monitor and publicly report on common ambient air pollutants in urban settings. The NEPM guidance level is based on exposure to emissions typical of large urban centres where pollutants other than PM<sub>10</sub> may be present in larger concentrations and contribute to overall health impacts.

NEPM monitoring protocols provide guidance to jurisdictions on monitoring population exposure to air pollution. In practice, NEPM monitoring sites are located in areas that are representative of ambient air quality for large population centres where people live (25,000 people or more).

Whilst in principle, the NEPM standard applies to all Australians, in reality it is not met everywhere that people live for various reasons. The implementation of the NEPM does not preclude jurisdictions from adopting complementary standards or targets for their own policy or regulatory purposes. In doing so, jurisdictions may use a risk-based approach in determining environmental standards appropriate for site specific circumstances or conditions, along with improvement strategies for regulated and non-regulated sources and exposure reduction strategies.

It is important to note that the interim AGV, and NEPM, are assessment guidance levels and should not be considered as enforceable limits. This is because ambient air quality monitoring reflects the particulate concentrations in the air in the areas surrounding the monitoring locations only. It does not attribute concentrations to specific sources, such as emissions from one or multiple licensed operations, local or regional dust sources.

The DOH considered the application of both air guideline values (NEPM and interim AGV) in deliberation of the appropriate health standard for PM<sub>10</sub> in Newman. The DOH consulted DWER and BHP in relation to the appropriate AGV and advised that while the 24-hour NEPM for PM<sub>10</sub> is the default health standard for particulates in the absence of further health studies specific to the Newman population, the application of the 24-hour AGV applied in Port Hedland and already stated on the existing licences for BHP's Newman Operations (70 µg/m<sup>3</sup> for PM<sub>10</sub>) is supported in the interim. This is to enable the progression of improvements to address dust sources through this review while DOH further investigates the appropriateness of implementing an alternate AGV to the NEPM ongoing. A history of the origin of the interim AGV for Newman is provided in section 5.1.1.

As discussed in section 3.3.7, conditions of MS1105 requiring the application of NEPM will apply in the event that new mining operations are conducted within the airshed of the Newman townsite.

### 5.1.1 Port Hedland and Newman interim air quality criteria

In Port Hedland a 24-hour of 70 µg/m<sup>3</sup> for PM<sub>10</sub> has been applied based on the outcomes of the 2016 *Port Hedland Air Quality Health Risk Assessment for Particulate Matter* (HRA).

The HRA concluded that 70 µg/m<sup>3</sup> for PM<sub>10</sub> provided a similar level of protection to the population of Port Hedland (at the time of assessment) as the national standard for PM<sub>10</sub> of 50 µg/m<sup>3</sup>. The DOH considered that the number of dust-affected individuals in Port Hedland is low, but also that the probability of identifying risk is low to a large extent because the population is small (~5,000 people).

There exist similarities between the population size and composition in Port Hedland and

Newman (ABS 2016a; ABS, 2016b). Similarly, both locations experience high levels of particulates, which are dominated by the presence of iron and crustal dust. The HRA concluded that the composition of finer particulates in Port Hedland is different when compared to urban centres and this may result in different health outcomes (DOH, 2016). The same conclusions could be drawn for Newman, which has comparatively fewer combustion sources near to town (no combustion emissions from diesel-fuelled ships and fewer truck movements).

A similar assessment could be undertaken for Newman to identify an appropriate public health criterion through an investigation of current health data however, this data may be limited in its representation of the Newman population. DWER understands that much of the health data available is representative of the Shire of East Pilbara population. For accurate conclusions to be derived from an HRA, health data would need to consider populations within a specific environmental context i.e. the Newman townsite. The capture of health data for populations residing in other areas in the Pilbara may reduce the reliability of the HRA's conclusions.

### 5.1.2 Further health studies

Community stakeholders have raised concern over the impacts of dust to the health of Newman residents. Discussions with stakeholders has identified that this concern appears largely due to the community's uncertainties relating to the composition of dust and perceived high incidence of morbidities<sup>2</sup>.

As a consequence, community stakeholders have requested that further health studies be undertaken to clarify if there is a correlation between the air quality in Newman and the perceived high rates of morbidity amongst community members.

The option of a direct population study has been considered by the DOH to obtain health data that is more reflective of the Newman population than that currently available. This type of study would involve an ongoing and detailed review of the health of a population cohort as opposed to a review of existing health statistics to determine correlative risk. This type of study can take several years to complete if they are to demonstrate with statistical confidence that a specific population does not experience adverse health outcomes to higher particulate levels. However, they rely heavily on the cohort investigated remaining in Newman to maintain a 'critical mass' of participants to account for natural attrition.

Therefore, there remains the potential that such an investigation would result in similar conclusions presented in the Port Hedland HRA (2016): *"[The] number of affected individuals is very low but only because the population is small."*

There has been no statistical evidence or population health data either identified or provided to verify community concerns in relation to an increased incidence of morbidities at the time of assessment. There remains the real possibility that a direct population health study may fail to identify a statistically significant incidence of chronic health issues amongst Newman residents associated with exposure to dust. Health outcomes associated with PM<sub>10</sub> exposures are non-specific and have multiple causes. However, and in general, the respiration of fine particulate matter is widely known to contribute to a variety of health impacts (USEPA, 2022a).

#### **Key findings and determinations:**

- 1) DWER will look to the DOH, as the primary agency for advice on public health matters in Western Australia for conclusions on the appropriate ongoing standard.
- 2) On advice from DOH, the AGV for PM<sub>10</sub> of 70µg/m<sup>3</sup> has been applied to this Licence

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<sup>2</sup> Section 4.4 of this Amendment Report summarises DWER's investigation of Newman dust composition, concluding that particulate matter presents the greatest risk to human health.

Review as an interim standard (interim AGV) until advised otherwise by DOH. The interim AGV, and NEPM, are assessment guidance levels and should not be considered as enforceable limits.

- 3) Dust levels in Newman are high, exceeding both interim AGV and NEPM (refer to section 4.3). The regulatory approach focused on reducing overall dust in Newman remains unaffected by the determination of appropriate guidelines.
- 4) DOH has indicated its support for the current approach of progressing regulatory improvements to reduce overall fugitive dust impacts on Newman through this licence amendment concurrently with investigating the appropriate AGV.
- 5) DOH are responsible for considering the appropriateness of further health investigations to support the ongoing application of the interim AGV versus the NEPM standard.

## 5.2 Source-pathways and receptors

To understand the risk of dust to public health it is critical to understand the source and pathway of dust and the sensitivities of the receptor to that dust.

### 5.2.1 Ore characterisation

Certain ore types are known to have a greater dust potential than others based on their characteristics and typical moisture content as received at the Premises. For example, Marra mamba ores are friable and can break up during handling (Lascelles, 2000). Investigations into various ore types at the Licence Holder's mines identified that Marra Mamba ores had a greater percentage of fines and higher erosion rates when compared to the typical Brockman Iron Formation ore types (BHP, 2013). Although Marra Mamba typically has a high combined water, increasing the moisture content of these ores is not expected to significantly increase the cohesiveness and the ore may continue to break during handling (Okazaki et. al, 2006).

The greater dust potential of Marra Mamba ore types is also supported by observations of DWER officers at site visits to the Licence Holder's premises (refer to section 3.3.6).

Ore processed at Eastern Ridge is sourced from both Marra Mamba (OB32) and Brockman (OB24 and OB25) ore deposits (refer to Table 2). Deposits to the west of current deposits that feed into the Premises' processing facilities are Marra Mamba orebodies (OB28, OB33, OB26, OB36). Following the completion of mining at OB25, it is anticipated that these western deposits will be targeted and hauled to the Premises for processing meaning a higher proportion of Marra Mamba ores are likely to be handled at the Premise in the future.

#### *Ore moisture*

Online moisture sensors are installed to monitor the moisture of material on the conveyor system at conveyors CV108, RC01 and RC03, providing ore moisture data prior to stockpiling and train loading. In the event that ore moisture content is outside the DEM Level, additional water is applied where possible although there is a lag time between measurement and control being turned. Ore processing and handling emission and controls

The Licence Holder implements numerous controls for dust management throughout the Premises. Existing controls implemented by the Licence Holder specific to ore handling and processing facilities within the scope of this assessment are provided in Table 6.



**Table 6: Licence Holder existing controls**

Site infrastructure	Equipment	Dust controls
<b>OB25 OHP</b>		
Crusher	OB25 OHP Primary Crusher	Apron feeder spray (as above)
	OB25 OHP Secondary Crusher	Partially enclosed
Screens	OB 25 Screens (SC1, SC2 and SC3)	Partially enclosed
Conveyors (with bulk ore conditioning)	CV102, CV106, CV107, RC03	Manual BOC sprays
Train loader	OHP25 train loading via loaders or via loaders through Reclaim Hopper System	3 x automated dispense chute sprays that are manually switched on
<b>Mobile crushing plant</b>		
Mobile crushing and screening equipment at OB24 OHP	Equipment, including associated conveyors and stockpiles/stackers, has been removed from the Premises.	
<b>OB24 OHP</b>		
ROM	OB24-OHP ROM Surge Bin	ROM tipping sprays (used for selected feed types)
Conveyors	CV1301	BOC sprays: OC1301A, OC1301B, OC1301C, OC1301D
Stockpile	Stockpile	Boom sprinkler (manual)
Train loaders	Train loader	Partially enclosed in a tunnel with extraction
<b>Other</b>		
Roads and open areas	Water carts	Automated haul trucks Speed restrictions for haul trucks and light vehicles 4 water carts operational across site accessing 3 standpipes (targeting haul roads rather than light vehicle roads) Dust suppressant additive applied to light vehicle roads
Landfill operations	Water carts	Application of water on nearby roads using water carts and the operation of cannons on water carts to wet down the landfill face where high levels of dust

		are generated.
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Dust controls are not informed by moisture data and are either manually operated or triggered by ore handling equipment being activated. For example, bin tipped sprays at the OB24 OHP ROM surge bin are activated by a sensor that detects the presence of a haul truck. Dust controls (sprays) are typically overridden by operators where it has been raining or ore is known to be too wet. During a site visit in November 2021 by DWER officers, this dust control equipment was identified as effectively reducing dust as ore was tipped into the hopper when implemented (surge bin).

The structural design of OHPs has led to significant double handling of ore at the ROM and stockpiles/train load-out using front end loaders and stockpiling prior to load out. This type of manual ore handling results in increased dust sources where dust control needs to be considered.

The Licence Holder proposes a series of works over the coming 5 years to reduce the potential for ore handling and processing sources to contribute to ambient PM<sub>10</sub> concentrations in Newman. Improvements are to be implemented in two phases as described in Table 7 and shown in Figure 14.

**Table 7: Licence Holder proposed dust controls**

Site infrastructure	Equipment	Phase 1	Phase 2
<b>OB25 OHP<sup>1</sup></b>			
ROM	OHP25-OHP ROM Bin	Install tipping hopper sprays	Install ROM Pad water cannons
Conveyors	CV102, CV106, CV107, RC03	Automate the manual sprays	Install water treatment softening dosing system to mitigate calcium blockage issues
	CBOC CV05/RC01, CBOC CV108/CV104, CBOC CV104/CV04	Recommission automated in chute bulk ore conditioning sprays (CBOC) located in transfer chutes	
Stackers/Stockpiles	OB25 Fines tipper stacker	-	Install cannons on RC01 Tipper Stacking Structure to water stockpile Cones F - N
Reclaimers	OB25 Reclaimer conveyor RC02 and Hoppers RH01, RH02, RH03	Install cannons around RC02 Reclaiming Hopper System	-
<b>OB24 OHP</b>			
Stockpile	CV1301	Installation of two additional boom sprays at the end of the stockpile conveyor.	-

Other			
Roads	-	Seal light vehicle roads around OHP25 Installation of an additional standpipe	Relocation of OB25 Shutdown Facilities to reduce traffic on unsealed access roads
Open areas	-	Early implementation of areas for rehabilitation and consider temporary rehabilitation of high dust areas	

Note 1: Dust controls at OB25 OHP are planned in the event that production at the OHP restarts and processes an ore at a rate greater than 5Mtpa in any annual period.

Other initiatives that are beyond the scope of this Part V review have not been listed above. For example, initiatives to reduce emissions from blasting, hauling and waste rock dumps.

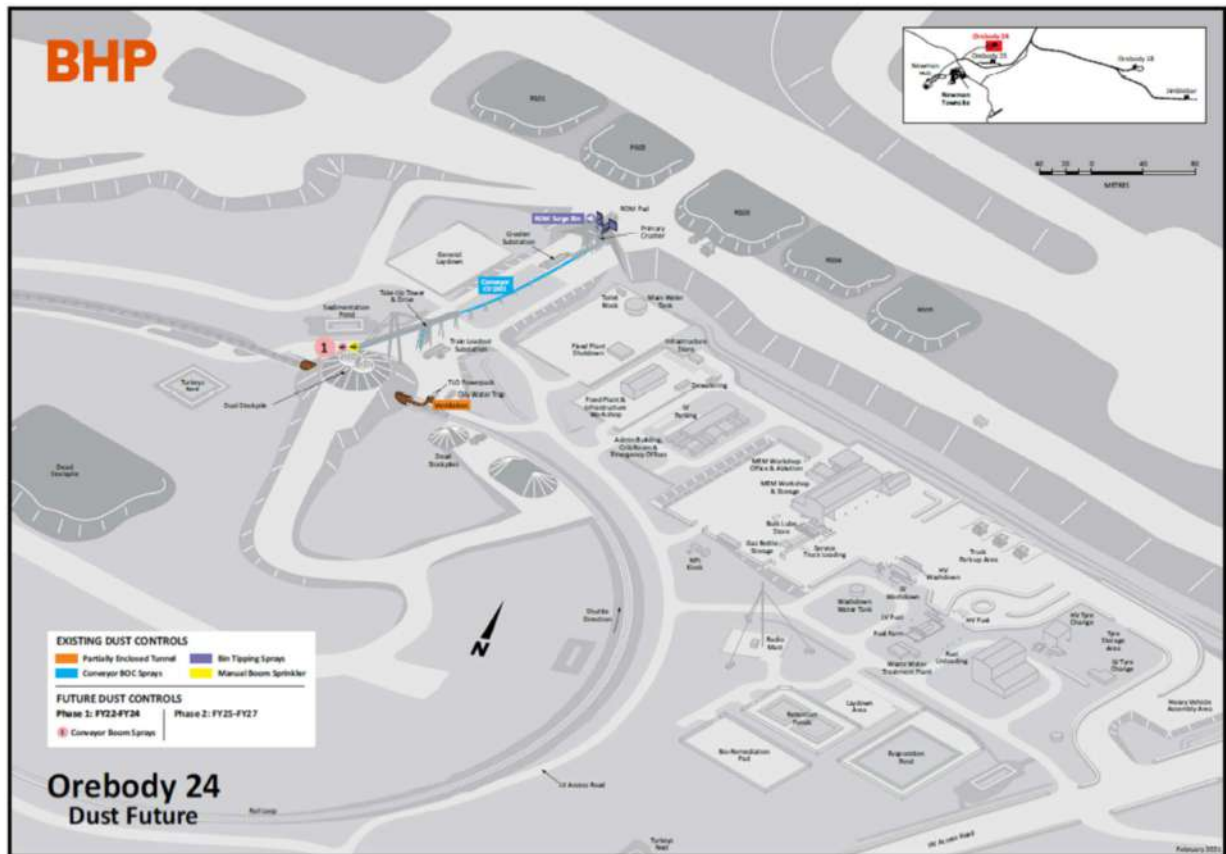


Figure 14: Proposed and existing dust controls at OB24 OHP (BHP 2021)

### 5.2.2 Landfill emission and controls

The Licence Holder operates four landfills within the Premises used for the disposal (burial) of Type 1 and Type 2 inert wastes. Landfilling activities have the potential to generate dust through the operation of machinery and handling of waste. The primary control for dust at landfill sites is application of water on nearby roads using water carts and the operation of cannons on water carts to wet down the landfill face where high levels of dust are generated.

### Key findings:

- There is limited opportunity to apply dust controls on mobile equipment such as front end loaders.
- Future expansion into other ore deposits has the potential to contribute to dust from ore processing and handling where ore is extracted from above water table. Expansion into orebodies OB28, OB32, OB33 and OB37 will increase the proportion of Marra Mamba ores handled at the Premises, requiring greater focus on dust controls that are effective when handling both Brockman and Marra Mamba ore types.
- The Licence Holder has identified that dust control efforts relating to prescribed activities at Newman operations (crushing and screening the Premises and Mt Whaleback Operations) have typically been weighted towards Mt Whaleback Operations, which is recognised through this review as the dominant source of dust in Newman townsite. Recently implemented controls at the Premises have largely been focused on reducing emissions from haulage.
- There remain numerous opportunities for further improvements to dust management and control infrastructure beyond that proposed by the Licence Holder through this review. Further investigation into dust sources and control opportunities is required.

### 5.2.3 NPI emissions

The Licence Holder reports emissions estimations for the Premises to the National Pollutant Inventory (NPI) on an annual basis. In May 2022, the Australian Conservation Foundation (ACF) updated its report on what the most polluted postcodes in Australia were, identifying the Newman postcode as being the second most polluted in Australia for air, unchanged from its 2018 evaluation (ACF, 2018; ACF, 2022). The Delegated Officer has determined that the findings of this report do not accurately reflect the situation in Newman townsite.

Pollution was measured based on the reporting of NPI data that is reported to Government by industry throughout the Newman postcode annually. The Newman postcode covers an area of 36,687 km<sup>2</sup>, which includes a large number of mining activities that span across the locality, not just the Premises or Mount Whaleback Iron Ore Mine. The report refers only to emissions as reported by individual industry through the national NPI program and may not necessarily represent the levels of air quality experienced at different locations in the same postcode. For example, the highest emitters in the Newman postcode in 2020/21 were Christmas Creek and Roy Hill Mine, which were responsible for 22.5% and 14.7% of total industry emissions (ACF, 2022).

NPI data is based on emissions estimates that are based on generic calculations that may not accurately reflect the true emission rate of each individual infrastructure or equipment. The likelihood that these emissions will impact nearby receptors is determined by the nature of the pollutant, the location from which it is emitted, meteorology and topography of the land. For comparison, the Premises contributed to around a third of NPI-reported PM<sub>10</sub> emissions from either Christmas Creek or Roy Hill Mines. However, these sites are each located approximately 120 km from the Newman townsite and unlikely to have a significant impact on ambient dust.

### 5.2.4 Pathway to receptors

In accordance with the *Guidance Statement: Risk Assessment* (DER 2017), the Delegated Officer has excluded employees, visitors and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies, and is provided for under other state legislation.

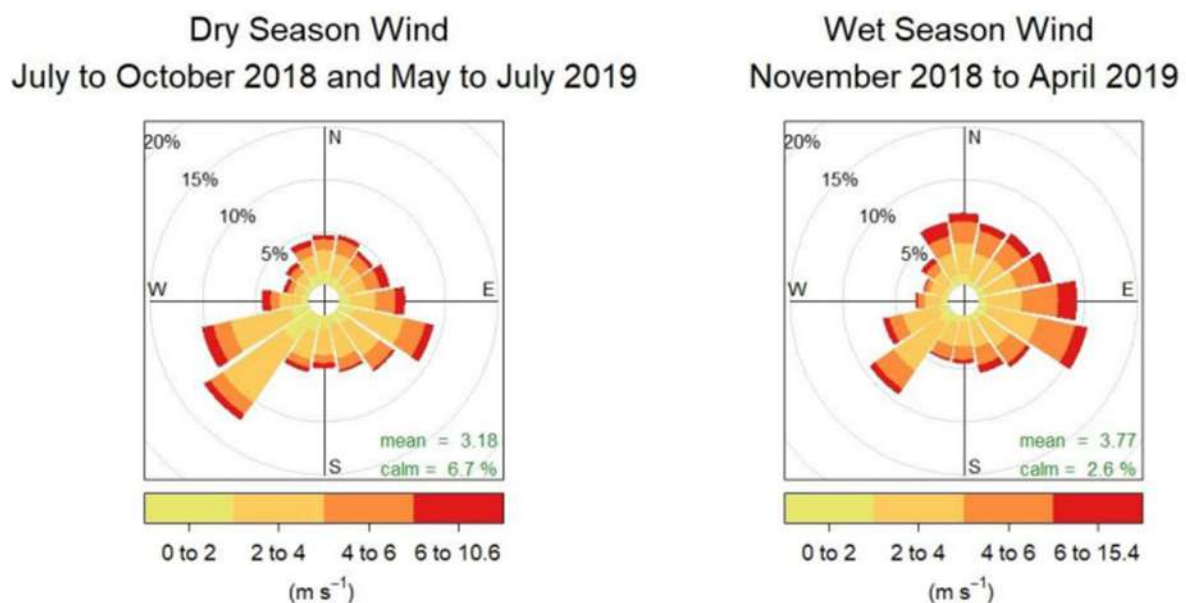
Table 8 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guidance Statement: Environmental Siting* (DER 2016)). In the 2016 Census the residential population of Newman was 4,567 (Australian Bureau of Statistics).

**Table 8: Sensitive receptors and distance from prescribed activity**

Sensitive receptor	Distance from prescribed activity
Residences of the town of Newman. Closest residential area off Daniels Drive (zoned Residential)	Approximately 5.75km west-south-west of the Orebody 25 OHP and train loadout (2.5km from the Premises boundary)  Approximately 6.6km south-west of Orebody 24 OHP and train loadout.  Approximately 9.5km south-west of the nearest landfill
Parnpajinya Community (zoned Rural)	Approximately 5.9km west of the Orebody 25 OHP and train loadout (2km from the Premises boundary)
Newman Hospital	Approximately 6.8km west-south-west of the Orebody 25 OHP and train loadout (3.5km from the Premises boundary)

### Meteorology and topography

The topography of the region, weather and mining activities all influence the pathway and dispersion of dust. For example, data collected at the Newman Airport suggests that the dominant winds are generally from the east to the south-east with some high frequency winds from the south-west. Wind data at Mt Whaleback Operations identifies a dominant westerly influence during dry season.



**Figure 15: Dry and wet season wind roses for Newman Airport for (DWER, 2020)**

As discussed in section 4.2.4, wind data at Newman Airport may not be representative of the wind direction or speeds measured at boundary monitors or those PM<sub>10</sub> monitors that record dust travelling between the Premises and sensitive receptors.

High background dust levels in the Pilbara with exceedances at background monitors are

greatest between November and January when stronger wind conditions are observed.

### 5.2.5 Amenity impacts

The Australian Concise Oxford Dictionary defines amenity to be the pleasant or useful features or overall pleasantness of a place. As such, the assessment of amenity is intrinsically subjective and it is best assessed against community expectations, reasonably held for that community and at that point in time. In the context of air quality, amenity impacts are caused by elevated levels of particulate matter or other air pollutants. Katestone (2011) report that commonly identified amenity impacts include:

- short-term reduction in visibility. For example a visible plume may adversely affect the aesthetics of the environment such as scenic view;
- buildup of particulate matter on surface within buildings resulting in increased cleaning;
- soiling of laundry being dried in the open air; and
- buildup of particulate matter on roofs which can flush into rainwater tanks potentially affecting quality (taste) of drinking water or tank capacity.

The most commonly used parameters to measure amenity impacts are Total Suspended Particulates (TSP) and dust deposition. TSP refers to all dust particulates that are suspended in the air, including coarser fractions, while dust deposition refers to the amount of dust deposited over a set period and area.

There are no site-specific criteria for TSP or dust deposition criteria that have been established or adopted for the Newman area and no monitoring of these parameters for amenity is currently conducted.

When viewing the amenity criteria of other environmental regulators around the world (Table 9) it is evident that there is significant variability in criteria. This is due to a number of factors including the baseline, or background dust levels in each regional area varying greatly as well as the sensitivities and expectations of local receptors in relation to dust.

**Table 9: Dust deposition criteria used in other jurisdictions**

Jurisdiction	Standard/objective	Comment
Quebec, Canada	7.5 tonnes/km <sup>2</sup> /month (7.5g/m <sup>2</sup> /month)	None
Alberta, Canada	53 mg/100cm <sup>2</sup> /month (5.3 g/m <sup>2</sup> /month)	In residential and recreation areas
	158 mg/100 cm <sup>2</sup> /month (15.8 g/m <sup>2</sup> /month)	In commercial and industrial areas
New South Wales, Australia	2g/m <sup>2</sup> month	Incremental. 2 g/m <sup>2</sup> /month corresponds to 67 mg/m <sup>2</sup> /day
	4 g/m <sup>2</sup> /month	Total. 4 g/m <sup>2</sup> /month corresponds to 133 mg/m <sup>2</sup> day
Germany	0.35 g/m <sup>2</sup> /day (10.5 g/m <sup>2</sup> /month)	Deposition value of PM <sub>10</sub> for the protection against nuisance or significant disadvantage due to dust fall (non-dangerous dust)

Source: (p. 150, Katestone, 2011)

To measure the baseline dust deposition level, it is necessary to measure dust levels without the influence of industry operations in the area. For this to be possible, dust deposition monitoring at background sites is generally required. With regard to TSP, an appropriate trigger value for TSP that identifies the point at which amenity is likely to be impacted has not been defined for Newman. Other measures commonly used to assess amenity impacts include community surveys and complaint information.

### **Community surveys and complaints**

Other measures commonly used to assess amenity impacts include community surveys and complaint information.

In 2021, the Western Mineworkers Alliance (WMWA, 2021) undertook a public survey of community sentiments about dust emissions in Newman. Respondents were identified as current or former Newman residents, or FIFO workers who spend a significant amount of time in the community.

Of the 84 respondents, 74% said they had experienced damage to property from dust. In addition, 40% said that they had experienced lifestyle impacts (not being able to do what they would otherwise like to do, due to dust).

A search of DWER's Incidents and Complaints Management System has identified one complaint lodged to DWER in relation to amenity impacts from dust in Newman.

As at 30 June 2022, no community complaints had been received by the Licence Holder in relation to dust impacts. One historical complaint has been lodged to DWER in relation to amenity impacts from dust in Newman in 2012, based on a search of the department's Incidents and Complaints Management System.

**Key finding:** The Delegated Officer has considered amenity and reviewed criteria used in other jurisdictions and has found that:

- 1) there are no site specific amenity criteria established or adopted for Newman or for the Pilbara region of Western Australia;
- 2) amenity is intrinsically subjective and linked to a particular community's expectations at a particular point in time. In addition, there is significant variation between criteria used across other jurisdictions;
- 3) based on community surveys, submissions to this review (refer to Appendix 2) and social media comments it appears that some members of the Newman community are concerned about impacts to amenity.

### 5.3 Risk ratings

Risk ratings have been assessed in accordance with the *Guidance Statement: Risk Assessments* (DER 2017) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in section 5.2.5. Where linkages are in-complete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in sections 5.2.2 and 5.2.3), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the Licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 10.

The Amended Licence L6942/1997/13 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises i.e. Primary Activities listed in Table 1.

The conditions in the Amended Licence have been determined in accordance with *Guidance Statement: Setting Conditions* (DER 2015).

**Table 10. Risk assessment of potential emissions and discharges from the Premises during operation**

Risk Events						Risk rating <sup>2</sup> C = consequence L = likelihood	Licence Holder's controls and existing conditions sufficient?	Conditions of licence	Justification for additional regulatory controls
Sources/Activities	Potential emission	Potential pathways and impact	Receptors	Potential adverse impacts	Licence Holder/ existing Licence controls <sup>1</sup>				
Crushing, screening, stockpiling and transport of ore.  Vehicle movements within the processing and handling footprints of OB24 and OB25 OHPs.  Open areas within the processing and handling footprint.	Dust	Air/windborne pathway causing impacts to health and amenity	Residents in the town of Newman located 5.75km WSW of OB25 transfer stations and 6.6km SW of OB24 train load out.	Health impacts associated with the inhalation of finer particulates (PM <sub>10</sub> ).  Amenity impacts from TSP and deposited dust.	Sprays on OB24 OHP feed hopper (surge bins).  Ore conditioning sprays on selected conveyors.  Dust suppression sprays at OB24 OHP stacker and boom sprinkler for stockpile dust management.  Vehicle speed limits and application of dust suppressant/water to unsealed roads.  Maintenance of dust control availability.	C = Major L = Possible <b>High Risk</b>	No	Existing Licence Holder controls with the following additional regulatory controls:  Addition of management trigger criteria for dust recorded at Premises PM <sub>10</sub> monitors, associated with each operational area.  Restrictions to the operation of front end loaders on dead ore stockpiles during high risk meteorological conditions for dust.  Minimum requirements on the operation of dust controls available at the OHP OB25.  General housekeeping conditions for the clean-up of material deposited around site.	See section 6.
Earthmoving activities within the landfill footprints.  Open areas within the landfill footprints.			Residents in the town of Newman located approximately 9.5km southwest of the landfills.	Health impacts associated with the inhalation of finer particulates (PM <sub>10</sub> ) and asbestiform fibres.  Amenity impacts from TSP and deposited dust.	Waste disposal limits.  Covering of waste following deposition.  Operation of water carts to wet down nearby roads and spray landfill area when high dust generated.  Rehabilitation of landfill cells within 6 months after completing disposal to that cell.				

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guidance Statement: Risk Assessments* (DER 2017).

Note 2: Proposed Licence Holder's controls are depicted by standard text. **Bold and underline text** depicts additional regulatory controls imposed by department.



## 6. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

This licence review is coupled with a review of the Licence Holder's Mt Whaleback Operations (L4503/1975/14) and an holistic approach has been applied to prioritise dust management measures that are likely to improve air quality in Newman. Dust monitoring data, the greater tonnages handled and the site's closer proximity to receptors (refer to sections 4, 5.2.5 and 5.3) indicate that greater regulatory focus should be applied to the Mt Whaleback Operations compared to the Premises. However there remains the potential for exceedances of the AGV at Newman townsite monitors to be attributed to the Premises and the dust risk level has been assessed in this Amendment Report as 'High' (refer to Table 10).

Conditions placed on the Amended Licence form part of DWER's iterative approach to improving dust controls at the premises, and broader Newman Operations to ensure that dust sources are identified and risks are managed to acceptable levels. Conditions are targeted toward reducing dust emissions are expected to manage all particulate emissions (e.g. TSP, PM<sub>10</sub> and PM<sub>2.5</sub>) from the Premises. The Licence Holder will be required to submit a program of works that identifies what improvements can be made for the purposes of reducing dust emissions at key sources within the Premises and address the 'High' risk determined through this assessment.

As a greater priority has been applied to dust improvements at the Mt Whaleback Operations premises, longer lead-in timeframes for the implementation of improved dust management have been applied to the Premises.

Also taken into consideration is the possibility that OB25 OHP will not be operated ongoing, or at least will be operated at a limited capacity when OB24 OHP is non-operational. Conditions have been applied to the Amended Licence to prioritise improvements to OB24 OHP. In the event of increased operation of OB25 OHP being required in the future, additional controls will be necessary.

Activities within the premises boundary that have the greatest potential to contribute to dust emissions include ore processing, blasting, truck movements on mine roads, clearing and rehabilitation works. Of these activities, the Part V licences only regulate ore processing activities, which includes the operation of crushing and screening infrastructure, all connecting infrastructure (e.g. train load-out), and the front end loader and adjacent vehicle movements associated with feeding the crushing and screening infrastructure or train loading. As a result, the scope of the Part V licence is limited in its ability to regulate all major dust sources from the Premises.

A whole-of-Government approach to the regulation of dust in Newman is required.

### 6.1 Summary of amendments

All proposed changes have been incorporated into the Amended Licence using the updated licence template as part of the amendment process.

#### 6.1.1 Throughput limits

Limits have been applied to the Amended Licence that restrict the amount of ore processed at the Premises.

**Note:** Limits do not increase from previously assessed tonnages at the Premises.

**Grounds:** It is possible that an increase in throughput could result in additional dust outputs from the Premises, depending on the ore type responsible for throughput increases and the

infrastructure used for handling the additional ore. This is particularly true for ores that require rehandling prior to crushing and screening.

### 6.1.2 Infrastructure and equipment

The Licence Holder must be able to accurately measure and achieve an Average Monthly Availability and Performance rate of 90% or more for all key dust controls.

**Note:** Average monthly availability and performance is determined based on a calculation of combined average percentage availability of equipment, calculated for each calendar month by dividing the time that the equipment is operating, by the time the equipment is required to be operating.

Determination of when equipment is required to be operating is dependent on a number of factors taken into consideration:

1. Moisture content of the ore being handled or periods of rain – there is a lower risk of dust generation when handling ore that is wet.
2. Slumping risk on the coarse ore stockpile – this presents a safety risk to operators and is likely to occur when the surface of the stockpile is wet/has a low dust potential already.
3. Machines operating on the coarse ore stockpile – this presents a safety risk to operators.
4. When chutes are being hosed – the hosing of chutes results in a significant amount of water being added to the product as it moves upstream, resulting in a lower dust potential.
5. When low volumes of ore are being handled – smaller tonnages handled, for example less than 300 tonnes per hour, are expected to result in reduced rates of dust generated.

Dust control availability requirements will apply to all existing dust control equipment within 12 months of the Amended Licence issue date.

Exclusions to the activation of dust controls when handling dry fines has been applied to Licence conditions, although with the exception of boom sprays at stockpiles.

Fines have been identified in section 5.2.1 as presenting a greater dust risk than lump ores. Therefore the application of water via stacker boom sprays has not been excluded from dust control activation requirements due to wind conditions. This approach acknowledges that adding water to high fines-high clay content ores can create additional, unintended dust sources through conveyor carry-back, while ensuring that dust sprays at the tip of conveyors stacking ores to stockpiles continue to operate. Boom sprays/sprinklers are not directed at the conveyors and have the potential to effectively suppress dust even during higher winds.

**Grounds:** A measured approach is required to ensure that dust is controlled in an effective and safe manner. The requirement to upgrade systems that allow the calculation of dust control availability is expected to both improve the identification of dust control faults, and ensure that there are steps in place to turn the controls on when they are needed to reduce the dust potential.

The Delegated Officer notes that it is not possible to statistically verify that all ore has a moisture content above the DEM Level through each stage of handling. Therefore ore that is mined below the water table or is resulting in, for example the bogging of transfers, is defined as “wet ore”.

### 6.1.3 Improvement requirements

A review of existing dust controls and the submission of an improvement plan for dust controls at the Premises’ OHPs form a requirement of the Amended Licence. The Licence Holder is required to review all infrastructure that handles ore at the Premises to determine the most suitable locations for additional dust control, including but not limited to focus on:

- stackers;
- reclaimer hopper cars and train load out infrastructure;
- crusher feed bins/hoppers where ore is delivered by haul truck or front end loader;
- interlocks on dust collection systems; and
- carry back of ore on the underside of conveyor belts and/or dust generated from belt scraping.

**Note:** The Licence Holder has committed to installing additional dust control equipment and/or redesigning existing controls to improve the containment of dust at the Premises. The review of dust control equipment and submission of an improvement plan are in addition to the Licence Holder's proposed improvement works. A proposal for additional works must be submitted to DWER within 18 months of the Amended Licence being issued based on a review of air quality and operational data. This timeframe is aligned with the same requirement for the amended Mt Whaleback Operations licence under this review as the two operations are to be considered together. While additional controls are required at the Premises, consideration should be given to the prioritisation of reducing dust emissions from the Licence Holder's Mt Whaleback Operations, as the higher "dust-risk" premises to sensitive receptors in Newman.

Consideration must also be given to the ore type/s handled at each location investigated. It is possible that a dual/side-by-side spray systems would be required, or the replacement of nozzles with misting spray capability, to ensure the appropriate management of dust from handling all different ore types at the Premises.

Noting the Licence Holder's intent to access new ore bodies to the northwest of OB24 OHP, consideration must be given to future ore characteristics when determining the requirements for additional dust controls.

**Grounds:** The risk of dust has been assessed as 'High' in Newman with the Premises being a contributor under specific wind conditions. DWER officers have visited the Premises and identified significant visible dust being generated at multiple sources where low or unknown levels of control were being applied to manage dust.

The Delegated Officer acknowledges that the Licence Holder, as the operator of the Premises, is best placed to identify what improvements can be made to optimise reductions in dust generated at ore processing infrastructure.

Although the Mt Whaleback Operations have been identified as having a higher dust-risk associated, improvements at the Premises are also required to minimise contribution to high dust levels in the Newman townsite. A longer timeframe to the implementation of management measures (e.g. dust control availability) has been provided to prioritise improvements at the Mt Whaleback Operations.

The Licence Holder has advised that new ore bodies, largely from high clay, Marra Mamba deposits, will be targeted to extend the life of the Premises. These ores will initially be mined from above the groundwater level, have a low moisture content and high fines content. Therefore future dust controls presented to the Department, for example sprays, will need to consider the material characteristics of current and future ores, and how that impacts dust behaviour at handling sources.

#### 6.1.4 Management triggers

Amendments have been made to incorporate trigger management actions for dust control in response to elevated short-term PM<sub>10</sub> concentrations at select boundary monitors where the Premises may be a contributing source.

### ***Management trigger criteria – Particulate concentrations and consideration of background data***

High dust levels recorded at town monitors can be influenced by a number of sources including regional dust events, local sources, mining activities and ore processing activities. The focus of management triggers is intended to address dust generated within the respective OHP areas depicted in Figures 3 and 4. Therefore exclusions to management trigger requirements have been included for boundary and town monitors to give consideration to dust that is likely to be sourced from beyond the prescribed activities.

For example, where high dust concentrations are recorded in town but are also recorded at ambient monitors (located outside of the specified wind arcs) over the previous hour, management actions are not required through the Licence. However, there is no restriction to the Licence Holder to implement additional dust control if it is identified that premises activities are contributing to the dust in Newman.

Limitations with the existing boundary monitor, OB32AQRT016, have been identified (refer to section 4.2.2), which make its use suboptimal for the purpose of response actions to high dust events that may impact receptors. Therefore trigger management criteria against this monitor have been set as an interim measure until a new monitor is installed in a more appropriate location.

Management trigger levels and reportable events differ from those applied to the Mt Whaleback Operations due to each operation's distance to receptors. Unlike the Mt Whaleback Operations, the distance between town monitors and OHPs at the Premises is too great for trigger criteria to be effective. By the time a dust plume from the Premises potentially reaches the Newman townsite, the source is expected to have been resolved.

Microsensors have not been considered for regulatory purposes as they are frequently remobilised and require very frequent calibration, meaning that consistent data trends cannot be established. These monitors may be useful for internal dust management practices by the Licence Holder or source identification investigations that assist with investment planning for additional dust controls. Identifying the source of dust using alternative monitoring equipment may also enable more timely and focused reactions to peak PM<sub>10</sub> concentrations at the boundary before impacts are experienced at a receptor locations.

### ***Management trigger criteria – Wind arcs***

Management actions will only be triggered where the averaged wind direction places an OHP within the Premises upwind of the Newman townsite, and that OHP is operational. Due to the significant variability in recorded wind directions and speed across monitors investigated wind arcs must be measured from each monitor specified in dust management trigger conditions. To allow for changing wind directions and taking into consideration the greater distance to the Newman townsite when compared with the Mt Whaleback Operations, wind arcs for management triggers have been assigned a slightly broader "arc of influence".

Reportable event wind arcs have a broader arc, to take into consideration the larger averaging period of a reportable event (24 hours versus 1 hour) and the likelihood of wind variability during that period.

### ***Management requirements***

The Licence Holder will be required to address each exceedance by actively seeking to identify the source of dust, where identified, until PM<sub>10</sub> concentrations reduce to below trigger levels. Where the cause remains unknown and background monitors are not recording elevated PM<sub>10</sub> concentrations, additional general site controls for the abatement of dust are required and are stipulated on the Amended Licence. This includes the operation of available BOC sprays on routes that are currently handling ore, operation of boom stacker sprays on stockpile and additional water cart operation.

## Timeline

To allow the Licence Holder to update their automated alert systems to achieve compliance with the clarified management trigger criteria, a 12-month lead-in period has been applied.

**Note:** Trigger events are to be measured against a 1-hour rolling average that relies on the use of 10-minute data collected by e-samplers and/or nephelometers located at each specified monitoring location. The use of 10-minute data to inform trigger alerts allows the Licence Holder to react to high ambient dust levels at the Premises boundary in near-real time.

Trigger requirements are only applicable for each OHP when they are operating. The Delegated Officer acknowledges that operations at OB25 OHP will be on an as-needed basis in the event that OB24 OHP is non-operational.

To avoid requiring the Licence Holder to conduct multiple trigger investigations for the same dust event and at the same monitor location and within a three-hour period, the Licence Holder may interpret the exceedance to be a single event. In such cases, it is allowable for the Licence Holder to conduct (a minimum of) one trigger investigation where a single dust event has occurred.

Where dust levels continue to be high over an extended period and the Premises is upwind of the recording monitor, the Licence Holder will be required to investigate the high dust levels and submit analysis and conclusions as a Reportable Event within quarterly reporting (refer to section 6.1.5).

DWER notes that the Licence Holder receives notification of high dust risk meteorological conditions such as inversions/low mixing heights, high winds and wind directions that may place the Newman townsite downwind of operations. Dust risk forecasting tools continue to be adapted and improved to inform go/no-go decisions for potential dust generating activities at the Premises ahead of being alerted to high dust trigger events.

Where the exact source of the trigger exceedance cannot be determined, for example during an inversion event, but dust is visibly generated from operations, the Licence Holder is required to address the source of dust through additional control. Exclusions to this requirement are in place if the application of additional control will result in risks to safety. In addition, where it can be visibly identified on the ground, and certified by operators through records, that dust is not being generated from the location where specified controls are conditioned to be turned on.

**Grounds:** While the operation and meteorological conditions that typically result in high dust events are not well known, the overall risk of AGV exceedances remains 'High', resulting in an elevated risk to community health. Therefore increased particulate monitoring and improved management responses are required with regulatory oversight. The high level of risk associated with dust emissions from the Premises justifies the application of interim management responses to high dust events and in the absence of detailed understanding of high dust risk conditions.

It is worth noting that management criteria set against averaged wind arcs are not a perfect solution to responding to Premises impacts on receptors. For example, this method may limit the recording of, and response to dust events occurring at receptors during wind directions beyond the 'arc of influence'. This may occur where dust from the Premises moves in an arcing fashion as wind direction swings. Therefore additional conditions for the ongoing management and avoidance of dust are required.

It is possible that over time management responses will be amended to ensure that they more appropriately address the risk of high dust events being experienced in the community. The intent of this condition is to ensure that high dust levels at the boundary or in the community are addressed to either reduce or prevent ongoing impacts where this is within the control of the Licence Holder.

Dust management by avoidance, using tools such as predictive dust risk forecasting, is

acknowledged as a more effective control than reactive management via dust triggers. However, in a high dust risk setting multiple approaches are required to prevent and minimise impacts to nearby sensitive receptors.

### 6.1.5 Ambient monitoring

Community monitors will continue to be required to measure particulates as PM<sub>10</sub> on 1-hour and 10-minute averages. In addition, amendments have been made to require the monitoring particulates as PM<sub>2.5</sub> at Newman Town Centre community monitor.

**Note:** The measurement of PM<sub>2.5</sub> is not currently required at monitors near to dust sources, background monitors or at boundary monitors although the Town Centre Monitor location has been set up with the ability to monitor particulates as PM<sub>2.5</sub>.

The Delegated Officer notes that particulate monitoring data from the Newman 1 Town Centre monitor can be impacted by adjacent vehicle movements over the surrounding unsealed road surface.

**Grounds:** PM<sub>2.5</sub> and PM<sub>10</sub> monitoring at receptor locations is expected to provide improved understanding of particulate composition and better inform risks to human health. Enhanced community air quality data will support any further analysis into public health data.

### 6.1.6 Reporting

To support DWER in its analysis of the Premises contribution to overall PM<sub>10</sub> concentrations in Newman, quarterly reporting conditions of the Licence have been amended to require the provision of all boundary monitoring data to DWER on a quarterly basis. This will also assist the department to analyse possible sources and contributing factors to high dust events periodically.

Dust scatter plots, otherwise known as dust roses, must be provided for Reportable Events to assist in the identification of the directional source of the high dust emissions. For each Reportable Event the Licence Holder is required to provide a comparison of boundary monitoring data with that recorded at ambient monitors in the Newman community to determine possible impacts.

Average Monthly Availability and Performance rates of dust control infrastructure must be reported within the annual report with 24-hour availability rates to be provided as supporting information to Reportable Events.

**Note:** All annual reporting for monitoring data on waste inputs, discharges, surface water and groundwater have been directly transferred into the revised licence template.

All monitoring data from the network (town and boundaries) must be provided to inform the ongoing reviews of dust impacts and the effectiveness of dust management to inform future regulatory controls.

**Grounds:** Under certain meteorological conditions there is clear correlative relationship between PM<sub>10</sub> concentrations at boundary monitors when dust is high in town.

### 6.1.7 Administrative amendments

In converting the licence into the revised format, a number of administrative amendments have been made.

Other required amendments were identified during the review process to align reporting periods with other Licence Holder operation licences and to update the licence such that it accurately reflects site operations.

For example, during the review process the Licence Holder identified the requirement to utilise an existing evaporation pond (OB24 Sedimentation Pond) as a contingency discharge location for oily water separators in the event that treated OWS ponds are likely to overflow due to wet

weather events. The Delegated Officer identified that the same level of containment is available at both ponds is the same and that authorisation to continue this activity does not constitute a revision of previously assessed risk.

Similarly tyres and rubber are disposed into backfilling areas of pit voids. The Amended Licence authorises this activity noting that dust from backfilling operations are not expected to significantly increase as a result.

These changes were made acknowledging that environmental risks are not increased from amended conditions.

## **7. Consultation**

The Licence Holder was provided with the draft Amendment Report and draft Licence on 12 August 2022 and 23 November 2022. The Licence Holder provided comments which are summarised, along with DWER's response, in Appendix 1.

Public comment on BHP's Newman Operations was invited on 14 June 2021 when DWER advertised its intent to review both Part V licences. On 21 and 22 June 2021, direct letters were sent to the Shire of East Pilbara, relevant State Government agencies and direct interest stakeholders offering an opportunity to comment on the Part V licence reviews and air quality in Newman. Following public request, the comment period was extended to 24 August 2021 and the identified direct interest stakeholders notified. Comments received have been summarised and responded to in Appendix 2.

## Definitions of terms and acronyms

In this Amendment Report, the terms in Table 11 have the meanings defined.

**Table 11: Definitions**

Term	Definition
AACR	Annual Audit Compliance Report
ACN	Australian Company Number
AER	Annual Environment Report
Annual Period	means a 12 month period commencing from 1 July until 30 June in the following year
AS 3580.1.1	means the Australian Standard AS 3580.1.1 <i>Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment</i>
AS 3580.9.11	means the Australian Standard AS 3580.9.11 <i>Methods for sampling and analysis of ambient air - Determination of suspended particulate matter - PM<sub>10</sub> beta attenuation monitors</i>
asbestos	means the asbestiform variety of mineral silicates belonging to the serpentine or amphibole groups of rock-forming minerals and includes actinolite, amosite, anthophyllite, chrysolite, crocidolite, tremolite and any mixture containing 2 or more of those.
averaging period	means the time over which a limit or target is measured or a monitoring result is obtained
Category/ Categories/ Cat.	Categories of Prescribed Premises as set out in Schedule 1 of the EP Regulations
Amended Licence	The Licence (L6942/1997/13) granted under the EP Act as a result of this assessment.
Amendment Report	refers to this document, which can be defined as a Licence review.
Delegated Officer	an officer under section 20 of the EP Act.
DEM	Dust Extinction Moisture
Department	means the department established under section 35 of the <i>Public Sector Management Act 1994</i> and designated as responsible for the administration of Part V, Division 3 of the EP Act.
DoH	Department of Health
DWER	Department of Water and Environmental Regulation
EP Act	<i>Environmental Protection Act 1986 (WA)</i>
EP Regulations	<i>Environmental Protection Regulations 1987 (WA)</i>
Existing Licence	The Licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during this Review
Licence	means this licence numbered L4503/1975/14 and issued under the EP Act
Licence Holder	BHP Iron Ore Pty Ltd
Minister	the Minister responsible for the EP Act and associated regulations
MS	Ministerial Statement
mtpa	million tonnes per annum
NEPM	National Environment Protection (Ambient Air Quality) Measure
OHP	Ore Handling Plant
PM	Particulate Matter
PM <sub>10</sub>	used to describe particulate matter with a diameter of 10 microns (µm) or less
Prescribed Premises	has the same meaning given to that term under the EP Act.
Premises	refers to the premises to which this Amendment Report applies, as



	specified at the front of this Amendment Report
Primary Activities	A defined in DWER's <i>Guidance Statement: Risk Assessments</i> to include the primary activities which fall within the description of the category of prescribed premises in Schedule 1 to the EP Regulations.
quarterly	means the 4 inclusive periods from, 1 July to 30 September, 1 October to 31 December and in the following year, 1 January to 31 March, 1 April to 30 June
ROM	Run of Mine
TLO	Train Load Out
µg/m <sup>3</sup>	micrograms per cubic metre

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## Appendix 1: Summary of Licence Holder’s comments on risk assessment and draft conditions – October/December 2022

Condition	Summary of Licence Holder’s comment	Department’s response
Infrastructure and equipment: Requirement for 90% rate of average monthly availability for specified dust controls.	Requesting clarification of interpretation of 90% monthly availability rates – that this refers to availability for each grouped item and overall 90% dust control availability.	Confirmed. The condition intent and wording requires the Licence Holder to achieve a 90% availability rate for each group of dust controls. That is, water sprays on stackers and reclaimers must be available for operation for a combined average of 90% of the time that the equipment is required to be operating, as averaged over each month.
	Proposed rewording to add in the parameter Average Monthly Performance for stockyard cannons. This is a more appropriate measure for this infrastructure. The provided definition for “Average Monthly Performance”:  <i>means the average percentage in automatic mode of equipment, calculated for each calendar month by dividing the time that the equipment is operating in automatic mode, by the time the equipment is required to be operating, taking into account Exclusion Periods if applicable.</i>	Accepted. DWER notes that the Licence Holder is requesting a differentiation between the meaning of “Average Monthly Availability” for general dust controls and stockyard water cannons.  It is understood that this is due to stockyard cannons operating on a standard scheduled time ongoing (regular intervals), as opposed to automatically based on operating conditions. As the change does not appear to alter the intent or final calculation of required availability, changes are accepted.
	Request that points c) transfer station sprays, and d) BOC sprays, are combined.	Accepted.
	Request the addition of “Exclusion Periods” for sprays using the definition provided.	Noted. Discussion provided in the “Definitions” section of this table.
Further works	With reference to the requirement to install and review BHP understands that the inclusion of ‘install’ means the review and any subsequent additions/changes to the network need to be installed within 18 months of date of issue. The Licence Holder recommends the structure of the condition to read similar to:  The licence holder to conduct a review of the Newman dust monitoring network and implement recommended improvements within 18 months of the date of the issue of this licence”  Twelve months is not practicable as the supplier has advised that it will	Noted. The condition has been amended to reflect the intent of conducting a review of the monitoring network data to determine where dust improvement controls can be implemented. The requirement to install an additional trigger management PM <sub>10</sub> monitor is separate to the plan for further works.  Revisions to the condition now require the completion of the investigation within 18 months of the issue of the licence.

Licence: L6942/1997/13

Condition	Summary of Licence Holder's comment	Department's response
	<p>take at least 4-5 month lead time to install a new monitoring station, with additional time required for calibration and review (not allowing for contingency). Additional time may also be required if any further approval is required for siting of monitor within the site (e.g. any internal BHP or external Shire approvals).</p>	<p>The installation of the monitoring equipment at the location determined through the review within the same period.</p> <p>Noting the priority to address dust issues (identified through the overall Newman Dust Review) with the Fixed West Plant operating under Licence L4503, the extension to PM10 monitor install has been accepted.</p>
	<p>There is no timing associated with the submission of the report on the review of installed and existing dust monitors. Request this is aligned with the 18 month timeframe set in Condition 7.</p>	<p>As above.</p>
	<p>Request for further works at OB25 OHP to be implemented within 12 months of triggering the specified throughput values, as opposed to within 6 months.</p>	<p>Noted. Accepted on the basis that controls at the current OB24 OHP should be prioritised over the lower throughput OHP at OB25.</p>
<p>Dust monitoring and management</p>	<p>Current monitors would not comply with wind speed and direction requirements of AS 3580.14 as this is for Meteorological masts (10m high), while the installed monitors are 2.5m which would not comply with the Standard.</p>	<p>Noted. The Delegated Officer acknowledges that full compliance with Australian Standards for siting is not always possible or necessary. Suggested changes have been accepted to acknowledge the height of meteorological monitoring on existing BAMs does not fully comply with Australian Standards.</p>
	<p>The Licence Holder has requested the inclusion of the term "untreated" to unsealed trafficable areas. Some unsealed roads have been treated with chemical suppression (e.g. dust mag) and spraying with water will impact the effectiveness of the chemical suppressant.</p>	<p>Noted. The term untreated has been added noting that chemical dust suppressants must be applied to, <i>and maintained</i> on unsealed light vehicle roads not regularly serviced by water carts and on unsealed and un-trafficked non-operational areas.</p>
<p>Required management actions once trigger criteria is exceeded.</p>	<p>Reword management trigger requirement to remove the word "cease" when referring to identifying the operational source of dust, for example front end loading operations. Proposed wording:</p> <p>"Modifying iron ore handling activities for the purpose of eliminating that dust source, such as changing feed source or adjusting rate and routes"; and</p> <p><del>"ceasing</del> <b>modify</b> iron ore handling activities for the purpose of eliminating that dust source, for example changing the feed source or adjusting handling rates and/or routes."</p> <p>This allows for suitable flexibility in management to target the objective of eliminating the source.</p>	<p>Noted. The term "cease" remains an option, along with modifying handling activities including reducing throughput rates and changing feed source. Therefore the addition of "or modifying" is accepted without removing the option to cease.</p>

Condition	Summary of Licence Holder's comment	Department's response
	<p>The Licence Holder raised that the application of additional dust controls is not required and can cause operational issues in the event that the infrastructure/location can be identified as not being the source.</p> <p>If an activity can be confirmed as not the cause of the exceedance, even if the cause of the exceedance is unknown then the management requirement should necessarily need to be applied.</p>	<p>Noted. An additional condition has been inserted to allow controls to not be implemented where the safety of operations would be adversely affected (existing amended condition) and where it can be identified on the ground (i.e. not via video footage) that no visible dust is being generated at that location.</p> <p>Note that the dust management condition seeks to address all minor or major contributors to elevated dust emissions. Therefore any visible dust from the specified locations must be addressed with additional dust control once installed and operational.</p>
	<p>Licence Holder requests the removal of the requirement to operate the available conveyor boom stacker with increased timer frequency</p>	<p>Noted. Condition wording has been amended to state: "operate available conveyor boom sprinklers/sprays by increasing watering cycle interval."</p> <p>The operation of these sprinklers is required during a high dust event to remove stockpiles as a potential source of the trigger event, unless it can be visually confirmed that there is no visible dust coming off the stockpile or other exclusions apply.</p>
<p>Waste management</p>	<p>Request this is removed as it is not a waste material, but a capping material. This change has been undertaken in the Mining Area C licence L7851 where clean fill is now only referenced in the waste cover requirements.</p>	<p>Noted. For consistency and to not include capping material within the calculated authorised throughput tonnages, reference to clean fill in this table has been removed.</p>
<p>Definitions</p>	<p>Insert a definition for Exclusion periods to the operation of dust controls: refers to periods during which the dust controls referred to in Condition 3 are not required to be operated, being the following:</p> <p>(a) when iron ore is presenting on the belt at below the minimum throughput threshold of 300 tonnes per hours; or</p> <p>(b) conditions in which operation of the dust control equipment would adversely impact safe operations.</p> <p>Without limiting the generality of (b), the following are deemed to be Exclusion Periods:</p> <ul style="list-style-type: none"> <li>• when the iron ore being handled is Wet Ore or fines;</li> <li>• during 1-hour periods where rain is recorded at <b>BHP Stockyard</b></li> </ul>	<p>Noted. The insertion of a definition to exclude periods where adding water may impact the safety or operation of equipment, or where the addition of water is unlikely to result in dust mitigation, has been accepted. Amendments to suggested text have been made to improve the clarity and certainty of the definition.</p> <p>Further justification for exclusion factors provided in section 6.1.2. The final point in the proposed definition is not accepted. Water at the base of stockpiles is not considered an "Exclusion period" for the purpose of control availability unless other exclusions are available. Instead, this may instigate a review of the boom spray function to ensure its coverage applies more effectively to the stockpiles only.</p>

Condition	Summary of Licence Holder's comment	Department's response
	<p><b>weather station AT796 on tail end of CV702 or meteorological station WBWS001;</b></p> <ul style="list-style-type: none"> <li>• <b>when there is a risk of slumping of, or a machine is operating on, the Coarse Ore Stockpile or Stockyard Stockpiles;</b></li> <li>• <b>stockyard water cannons when the effectiveness of the cannons is wind inhibited</b></li> <li>• during hosing of chutes.</li> <li>•</li> </ul>	<p>Definition of "Wind inhibited" has not been added to the Licence. As the definition only applied to the operation of boom sprinklers/sprays. These sprays are discharged from the tip of the conveyor and are directed to the ore as it is stacked, the stockpiled ore and dust arising from stockpiled ore as it is disturbed by wind. Therefore the increased operation of these sprays is necessary during high dust events.</p>
	<p>Remove OMM sprays as these are not present at the Premises.</p>	<p>Noted and accepted.</p>
<p>Schedule 4: Infrastructure and equipment</p>	<p>Remove reference to the mobile crushing plant at OB25 OHP as equipment has been demobilised and removed from site.</p>	<p>Noted.</p>
<p>Schedule 5: Quarterly reporting</p>	<p>The Licence Holder is seeking clarification on what reporting should be undertaken for dust events until Quarterly Reports are required (12 months after the issue of the licence). Is it via the current ET1 process of reporting?</p>	<p>Previous ET1 reporting requirements have been replaced by Schedule 5 Quarterly Reporting conditions.</p> <p>Additional condition not required. All monitoring data for the period will need to be submitted in accordance with Schedule 5 and can be investigated upon receipt of data. Further investigation may be provided by the Licence Holder to support DWER's review of the data, or DWER may request further information in accordance with reporting conditions associated with Department requests.</p>
	<p>BHP understands the requirement to report the source of ore would be as per the data provided in the current ET1 forms i.e. pit sources (eg. Eastern Syncline 2, WB ACS4, OB29 etc.) that source refers to this for in-loaded premises.</p> <p>In addition, that reporting of crushed and screened ore tonnages would be as per current ET1 form requirements.</p>	<p>The information provided through ET1 reporting on pit sources continue. Changes made to the reporting requirements attempts to provide greater clarity and specificity on what needs to be investigated and reported, compared to that presented in the ET1 section of the Existing Licence.</p>
	<p>BHP understands the requirement to report the on the location and tonnes of ore crushed and screened would be as per the data provided in the current ET1 forms i.e. which OHP was crushing and screening for that 24hr period (OB24 or OB25).</p>	<p>As above.</p>

Condition	Summary of Licence Holder's comment	Department's response
	Request the removal of the requirement to compare the moisture content against the DEM level for each ore outloaded. Primary crushed ore from OB24 cannot be compared to DEM, as it is only sampled as a Primary Crushed product and then it is then processed and blended on COS.	Noted and accepted.

## Appendix 2: Summary of public authority and stakeholder comment

Theme	Submitter	Summary of comment	Department response
Health	Department of Health	<p>DOH considers that the NEPM 24-hour, PM<sub>10</sub> standard of 50µg/m<sup>3</sup> is the appropriate default air guideline value to apply in sensitive use areas of the townsite.</p> <p>A public health assessment, specific to the Newman population would be required to justify any variation to the default guideline.</p> <p><i>Updated comment 17 May 2022:</i></p> <p>However, the DOH appreciates that historically the guidance value has been 70 µg/m<sup>3</sup>, consistent with an agreed guidance value in Port Hedland. The DOH will continue to support the guidance value of 70 µg/m<sup>3</sup> while the licence review is ongoing.</p> <p>The DOH has expressed reservations about conducting a health study in Newman due to the small population and the subsequent difficulties in meaningful interpretation of the findings. However, DOH is prepared to discuss further the risks and benefits of a study for providing the necessary evidence for the current, and future, licence reviews.</p>	<p>Noted. When assessing the risks associated with dust emissions DWER has applied the AGV of 70 µg/m<sup>3</sup> and consistent with this advice, as an interim standard.</p>
	Shire of East Pilbara	<p>The Shire advocates for a regulatory approach that intrinsically incorporates public health and nuisance considerations and mechanisms to adequately address air quality.</p>	<p>Noted. DWER has taken into consideration risks to human health from dust in its review of the licence. The Delegated Officer has concluded that there is a 'High' risk to public health from dust generated at the premises. This conclusion has been based on the regular exceedance of air quality criteria (refer to section 4.3).</p> <p>In addition, operations at the premises are a known and significant contributor to ambient dust</p>



Theme	Submitter	Summary of comment	Department response
		<p>Community concerns are primarily related to the composition of the dust and the potential health impact of breathing in the dust over longer exposure periods.</p> <p>Concern also relates to potential human exposure to finer dust particles such as those measured within PM<sub>10</sub> and PM<sub>2.5</sub> size ranges and the known acute and chronic health effects associated with inhaling finer particles found in dust.</p>	<p>concentrations in the Newman townsite. However, the contribution of individual sources from the premises is not well defined.</p> <p>DWER proposes an iterative and whole-of-Government approach to ensure that the impacts of dust are well understood and regulated to the appropriate levels. The Amended Licence is the first step in achieving this.</p> <p>Noted. DWER has reviewed monitoring data obtained at existing monitors for particulates as PM<sub>10</sub>. Summary data and conclusions are provided in section 4.5.</p>
	The Western Mineworkers Alliance (WMWA)	<p>It is clear that dust emissions are at levels which seriously impact the health, wellbeing and lifestyles of community members. The WMWA undertook a public survey of community sentiments about dust emissions in Newman. Of the 84 respondents, 82% said that they had experienced health impacts.</p> <p>Of these responses, the health impacts highlighted are the most concerning. Community members identified a range of illnesses linked to dust emissions:</p> <ul style="list-style-type: none"> <li>• Hayfever and allergies</li> <li>• Blood noses</li> <li>• Asthma</li> <li>• Sinus infections</li> <li>• Bronchitis and difficulty breathing</li> </ul>	<p>Noted. DWER considers the DOH to be the primary agency for public health matters in Western Australia. DWER will look to guidance from DOH on the appropriate AGV for Newman and detail on statistically relevant data on health impacts.</p> <p>This review has identified the need for further improvement works to be undertaken for the management of dust. The overall objective of the review is to reduce dust from each of BHP's premises for the purpose of improving Newman air quality.</p>

Theme	Submitter	Summary of comment	Department response
		<ul style="list-style-type: none"> <li>Coughing up phlegm</li> </ul> <p>Respondents noticed that these conditions almost immediately disappeared when they left town.</p>	
	The Western Mineworkers Alliance (WMWA)	The Indigenous residents of Newman, already facing a higher level of health risk, are among those most impacted.	Noted. As above.
	Community stakeholders	<p>Chronic obstructive pulmonary disease (COPD) is a chronic inflammatory lung disease that causes obstructed airflow from the lungs and a major illness in our area.</p> <p>An allied response is required between BHP, the WA health department and the East Pilbara Shire Town planning.</p>	As above.
		<p>The Newman postcode has been identified as among the most polluted postcodes in Australia.</p> <p>I am concerned that the smallest particulate matter PM<sub>2.5</sub> isn't easy to know the readings on. My understanding is that is the most dangerous of particulate matter as it is able to cross every barrier within the body, including the blood brain barrier.</p>	As above.
		<p>BHP are regularly exceeding appropriate quality air levels. What exactly does it mean for public health, that BHP daily average Total Suspended Particulates (TSP) levels exceeded a benchmark guideline adopted for the study in the majority of samples?</p>	As above.
		<p>The DWER 2020 report: <i>Newman dust composition monitoring campaign</i> failed to answer the question:</p> <p>What are we breathing and are the levels of particulates acceptable for Newman residents?</p>	<p>Noted. The monitoring campaign concluded that the measured concentrations of metals and asbestos do not represent a public health risk to the Newman community.</p> <p>Since this publication, DWER has obtained additional data on particulates both in town and</p>

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			within the premises boundary. Discussion is provided in section 4.5.
Health – monitoring	Shire of East Pilbara	The Shire requests consideration be given to more robust monitoring, analysis and transparent reporting of dust in Newman and potential health impacts. This includes monitoring for PM <sub>10</sub> and PM <sub>2.5</sub> .	Noted. The Amended Licence includes requirements to monitor for both PM <sub>2.5</sub> and PM <sub>10</sub> at ambient (community) monitors.  This level of monitoring is expected to provide a sufficient understanding of particulate composition to inform risks to human health.
	Community stakeholders	My expectation is that levels of PM <sub>2.5</sub> , or preferably PM <sub>1</sub> , would be measured as they are the particulate matter that is a threat to public health.  I feel this is something that should have already been done and should be immediately addressed, by a new completely independent and time bound dust report.	Noted. As above.
		For me as a resident, I would like to know that medical data is being kept and researched and studied. I would like reassurance that our rates of cancers, heart attacks and strokes, mental health are not higher here as a result of PM <sub>2.5</sub> .  To my knowledge medical data is not being actively recorded and analysed.	Noted. DWER considers the DOH to be the primary agency for public health matters in Western Australia. DWER will look to guidance from DOH on the appropriate AGV for Newman and detail on statistically relevant data on health impacts.
		We need to explain, why there is a reported 30% increase of respiratory illnesses, presented in the Pilbara and surrounds. Port Pirie, Mt Isa and Broken Hill, have been testing people as part of their monitoring since 2012, but only as a result of community pressure and political intervention.  Testing of human subjects is required, not just (ambient dust) laboratory testing. In addition, a health register should be initiated, with the aim of tracking the health concerns of Newman residents	As above.
		It doesn't seem we are doing monitoring of health specific to	As above.

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		the Pilbara that could be linked to harmful exposure.	
		Testing should also include indoor monitoring of residential dwellings, schools and other venues.	As above.
		What process must our dust monitoring systems and devices pass for suitability and approval, before it can be installed? What guidelines exist to monitor the suitability of the systems and devices once they are in use? Are our present systems reliable?	<p>Conditions of the Amended Licence require particulate monitoring to be conducted in accordance with Australian Standards.</p> <p>DWER will continue to maintain regulatory oversight of particulate data in Newman. The Amended Licence requires the submission of air quality monitoring data every quarter. As part of this submission the Licence Holder will also be required to provide supporting information to high dust event investigations, as specified in the Amended Licence.</p>
		What are the problems with our present systems? Is data missing, data capture rate down?	<p>The Licence Holder has submitted sufficient information for most monitoring sites to understand potential limitations of dust monitoring data. DWER's analysis of this information did not uncover major flaws.</p> <p>An outcome of this review is to improve the dust monitoring network in relation to OHPs and identifying the potential source of high dust events (refer to section 6.1.3 and 6.1.4).</p>
Amenity	Shire of East Pilbara	<p>The Shire is aware of community concern relating to dust deposition on front and back yards, outdoor furniture items, swimming pools, roof areas, vehicles and the outdoor washing line. Ambient dust is also known to affect the servicing and maintenance of air-conditioning units and is resulting in additional cleaning considerations.</p> <p>One community comment was that the composition of the dust may have a detrimental impact to the paint work of vehicles.</p>	<p>Noted. The focus of this assessment is on emissions and discharges that may present a risk to public health, amenity or the environment.</p> <p>DWER acknowledges that there exist impacts to amenity as a result of high dust levels in Newman. Controls applied to the Amended Licence for the protection of health are also expected to be protective of amenity.</p>

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	The Western Mineworkers Alliance (WMWA)	The WMWA undertook a public survey of community sentiments about dust emissions in Newman. Of the 84 respondents, 74% said they had experienced damage to property from dust. In addition, 40% said that they had experienced lifestyle impacts (not being able to do what they would otherwise like to do, due to dust).	As above.
		Day-to-day activities that would be taken for granted by most Australians – like washing clothes and cars, turning on the AC, or even taking a walk – are a struggle for those living in Newman, due to dust from BHP's operations.	As above.
Industry regulation	Shire of East Pilbara	The Shire asks DWER to continue to consult with the Department of Health to ensure that appropriate air quality targets, limits and monitoring requirements are applied to the BHP Part V licences and where levels are exceeded DWER take action to protect the public interest.	<p>Noted. As there are a number of dust sources not regulated under the Part V licences, a whole-of-Government approach to managing dust in Newman is required. DWER will engage DJTSl, DMIRS, EPA and DoH to continue an inter-Departmental approach to managing broader dust impacts on the town of Newman.</p> <p>Conditions applied to the Amended Licence are focused on improving the Department's understanding of significant dust sources to inform ongoing whole-of-Government regulation.</p>
	The Western Mineworkers Alliance (WMWA)	Environmental conditions applied by Department of Water and Environmental Regulation must be tightened and enforced.	Noted. DWER proposes an iterative and whole-of-Government approach to ensure that the impacts of dust are well understood and regulated to the appropriate levels.
		<p>Several survey respondents who were long-term residents noted that the dust had been noticeably worse since Mount Whaleback became the hub of BHP's iron ore operations in the Pilbara.</p> <p>BHP's dust emissions under its Newman operations are already significantly exceeding limits set out in its licences. In</p>	Noted. The AGV used in this assessment (24-hour PM <sub>10</sub> of 70µg/m <sup>3</sup> ), is an interim standard until final determination is provided from DOH on the appropriate standard to be used. The interim AGV is intended to be applied as an assessment guidance level and should not be considered as an enforceable limit.

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		2018-19, BHP exceeded its licence limits on dust emissions no less than 45 times.	This approach is consistent with the broader application of the NEPM standard throughout Australia.
	The Western Mineworkers Alliance (WMWA)	The Department of Water and Environmental Regulation should be properly resourced to investigate and enforce compliance breaches. Given that BHP is already exceeding its dust limits, any tighter limits will need to be vigorously enforced.	As above.
		Conditions should include local vegetation that mitigate airborne dust. In Port Hedland, Curtin University and Greening Australia, in partnership with BHP, have begun studying the most effective local plants for easing dust pollution, with rigid branches and needle-like leaves being the most important features in reducing effective dust impacts.	<p>Noted. The effectiveness of this control for the reduction of ambient dust concentrations has not been investigated by DWER, although the department is aware of these studies.</p> <p>In accordance with DWER's regulatory framework, this risk assessment has applied a source-pathway-receptor model to assess dust controls. In the hierarchy of controls, residential amelioration or abatement is classed as the lowest level of control.</p> <p>DWER will continue to investigate monitoring data from within the Licence Holder's premises to ensure that controls can be targeted toward the source of dust and focus on elimination, or engineering controls to reduce emissions.</p>
Consultation and information	Community stakeholders	The community consultation process was poorly managed. The notification of the submission period for public comment could not be found on the website, nor was it easily found in the public domain.	<p>Noted. Being a DWER-initiated licence review that did not require the submission of an application from the licence holder, there was no document made publicly available in the consultation process.</p> <p>DWER encourages all interested parties to track progress of how Newman air quality is being managed via the State Government website: <a href="http://www.dwer.wa.gov.au/newman">www.dwer.wa.gov.au/newman</a></p>

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			<p>Here, interested parties can access real-time air quality monitoring data, the DWER dust composition study and request to be notified of updates to the webpage via email.</p>
		<p>Why was the Newman dust composition report delayed and why was there repression of freedom of information, in trying to access the report and in the release of the 2 year delayed East Pilbara Shire initiated dust report? Further still, is BHP completely non-complicit in the reports delay, because they have an application pending.</p>	<p>The report required detailed analysis of data, thorough review and interagency communication and engagement with the Shire to ensure that conclusions were robust and unambiguous. DWER did not intentionally delay the release of the report.</p> <p>The report was informed by monitoring data from Shire/DWER-operated monitors, and the analysis of this data and report conclusions were made independent of the Licence Holder.</p>
		<p>Request for complete disclosure in releasing information of public interest. Information that should be transparent and time bound, that's easily accessible.</p> <p>For example, Requesting the 'Annual environmental report / BHP Billiton Iron Ore Pty Ltd.', from the state library is a cumbersome process.</p>	<p>Noted.</p> <p>Real-time air quality data, including that within Newman, is publicly accessible via the website: <a href="http://airodis.ecotech.com.au/newman/index.html">http://airodis.ecotech.com.au/newman/index.html</a> Graphical data on each monitor is also available for 7 days.</p> <p>Note that care must be taken when analysing air quality data. A deep understanding of the siting and limitations of monitoring equipment is required to arrive at accurate conclusions. The Amended Licence requires the submission of validated monitoring data to DWER to be used to inform future regulatory decision making.</p> <p>The Annual Environmental Report is publicly available information that can be requested from the Licence Holder directly, or via the State Library. The report does not provide significant detail on air quality data.</p>

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		I don't feel air quality readings are readily available.	As above.
	The Western Mineworkers Alliance (WMWA)	BHP's reports on their own environmental compliance are not made public, requiring whistle-blowers to publish this alarming figure.  The WMWA recommends that environmental assessments, studies and reports conducted under BHP's licences should be available for the public to review. If BHP is complying with its expectations under its licences, it has nothing to worry about; if it is not complying, the community deserves to know.	As above.
General comment	Department of Health	It is the opinion of the DOH that the main focus of the licence review should be to reduce ambient concentrations [sic] through the implementation of effective management measures at the Newman Operations sources and that these measures are subject to a scheduled audit process.	Noted and agreed in principle.  Activities with the potential to contribute to dust emissions at the mine sites include ore processing, blasting, truck movements on mine roads, and clearing and rehabilitation works. Of these activities, the Part V licences regulate ore processing and associated activities, which limits the scope of regulation to crushing and screening of ore, and connecting infrastructure.  Therefore a whole-of-Government approach is required for the regulation of dust at the Newman Operations, including for those activities that remain beyond the scope of the Part V licence. To ensure that the focus of improvements is on controlling the key sources of dust, further investigation and analysis of monitoring data and operational activities is required.
	Environmental Protection Authority Services	New applications for expansion of mining activities in the Newman area may be regulated under MS 1105 (Pilbara Expansion Strategic Proposal), which requires BHP to maintain air quality and minimise emissions.	Noted.
	Department of	DJTSI's role will be to provide advice on State Agreement	Noted.



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	Jobs, Tourism, Science and Innovation (DJTSI)	matters and support the Department of Water and Environment Regulation in ensuring that there is a coordinated approach across Government.	