Fortescue
The New Force in Iron Ore

Report

Licence Amendment – Supporting Document

Anderson Point Materials Handling Facility

March 2022

PC0053-40000-AP-EN-0002

	Licence Amendment – Supporting Document		
Document_Revision Number	PC0053-40000-AP-EN-0002		31/03/2022
Status	IFU - Issued for Use		
Summary of Changes			
Author	Leon Sheridan	Signature	01/04/2022
Checked	FMG Squad Check	Signature	
Approved	Brett McGuire	Signature	
Access to this document:	Public Use (Access to all)	Next Review Date: (if applicable)	NA

EXECUTIVE SUMMARY

The Pilbara Infrastructure (TPI) currently operates the Anderson Point Materials Handling Facility (MHF) at the Port of Port Hedland for the export of hematite iron ore. The current approved throughput under Licence **L8194/2007/3** is 188 Million tonnes per annum (Mtpa) hematite and 22 Mtpa magnetite (210 Mtpa total capacity). Fortescue is seeking a licence amendment to remove the restriction on the hematite portion within the 210 Mtpa material handling capacity (ie. handling 210 Mtpa hematite when no magnetite is being produced). The proposed change will allow flexibility in the mix of hematite and magnetite throughput within the existing 210 Mtpa approved capacity for the MHF. The Proposal incorporates:

- Construction and operation of an additional fourth shiploader (SL 704 / CV 940) and new conveyor CV 933 at the AP5 berth.
- Construction and operation of a new shuttle conveyor SH 953 at AP5.
- Construction and operation of a new transfer station TS 302 which will connect CV 302 with CV 902, CV 903, CV 908 and CV 909.
- Tie in of CV 908 with CV 901 and TS 901 (CV 908 has been constructed).
- Proposed extension to existing transfer station TS901 to join CV 908 and CV 909.
- Construction and operation of 4 new additional HPLV's (belt wash stations) on CV 918, CV 927, CV 951 and CV 933. Potential to install an additional 3 optional HPLV's on CV 901, CV 905 and CV 906.
- Construction and operation of three new bulk ore conditioning sprayers on conveyors within the inload and outload circuit.
- Construction and operation of Moisture Reduction System (MRS) trial beneath Canyon G stockpile to extract water from magnetite product in order to maintain transportable moisture limit (TML) below 10.5%.
- Proposed progressive replacement of noise rollers on outload circuit at the shiploading berths.
- Additional stormwater discharge location for Train Unloader 2 (TUL2) and update to water recovery system from TUL facilities.
- Construction and operation of a new desalination plant to replace the existing desalination plant at the port.

- Change in the requirement of Condition 25 in relation to Dust Extinction Moisture (DEM) compliance of iron ore outload and alignment with other operators at the port.

This document supports a licence amendment application to **L8194/2007/3** for the Proposal. The key environmental factors are considered to be emissions to air (dust and noise) and emissions to land and water.

The results of the noise modelling for the approved 210Mtpa amendment demonstrate that the in-isolation case complies with the assigned levels at all receivers with the exception of the Hospital. As such, it has been proposed that all new conveyors associated with this amendment will be fitted with Ultra Low Noise Idlers.

The cumulative model scenario results show that the noise impacts have increased at all receivers by between 0.8 and 1.1db compared to the base case. This is due to the addition of the new infrastructure and the increase in Sound Power Levels (SWL's) of existing equipment measured in 2021, when compared to the last SWL measurements taken in 2017. Based on the proposed increases at all receivers for the cumulative scenario, it is recommended that noise mitigation is proposed for the cumulative case and specifically that ultra-low noise idlers will be progressively fitted to existing conveyors CV 921, CV 922, CV 927, CV 948 and CV 911 and all new conveyors which make up the in-isolation case for new infrastructure.

Dust modelling was undertaken for three scenarios;

- Scenario 1 - 210 Mtpa hematite in isolation
- Scenario 2 – 200 Mtpa hematite and 10 Mtpa magnetite
- Scenario 3 – 195 Mtpa hematite and 15 Mtpa magnetite

The results of the dust modelling (for standalone and cumulative scenarios), at the Taplin Street receptor, indicate that the annual average concentrations for the three expansion scenarios are anticipated to be lower than that predicted for the 210Mtpa base case scenario. The results also indicate that there is no effective change in the Maximum PM_{10} concentrations across all three scenarios and that the number of excursions of the Taskforce criteria at Taplin Street is predicted to either remain the same or decrease across the scenarios.

These impacts will be managed in accordance with existing approvals for the MHF and the relevant Fortescue management plans.

ACRONYMS

Acronym	Meaning
AAQ	Ambient Air Quality
ANZECC	Australian and New Zealand Environment and Conservation Council
AQMS	Air Quality Management System
BMS	Fortescue's internal Business Management System
BN	Surge Bin – eg. BN921
CHF	Concentrate Handling Facility
CV	Conveyor – eg. CV909
DEM	Dust Extinction Moisture
DWER	Department of Water and Environmental Regulation
EPA	Environmental Protection Authority
EQG	Environmental Quality Objectives
IB	Iron Bridge
MHF	Materials Handling Facility
Mtpa	Million tonnes per annum
NEPM	National Environmental Protection Measures
NPI	National Pollutant Inventory
PER	Public Environmental Review

Acronym	Meaning
PHDMT	Port Hedland Dust Management Taskforce
PHIC	Port Hedland Industry Council
PM_{10}	Particulate Matter less than 10 microns
PNTS	Pilbara Native Title Services
PPA	Pilbara Ports Authority
PPB	Prescribed Premise Boundary
SH	Shuttle – eg. SH906
SK	Stacker – eg. SK701
SRE	Short Range Endemic Invertebrates
SS	Sample Station – eg. SS913
SWL	Sound Power Level
TS	Transfer Station – eg. TS909
TDS	Total Dissolved Solids
TUL	Train Unloader – eg TUL1

TABLE OF CONTENTS

List of Tables

List of Figures

List of Plates

LIST OF APPENDICES

1. INTRODUCTION

The Pilbara Infrastructure (TPI) currently operates the Anderson Point MHF at the Port of Port Hedland for the export of hematite iron ore. Fortescue currently exports approximately 185 Mtpa via the Port under licence L8194/2007/3 (the Licence) issued under Part V of the Environmental Protection Act 1986 (EP Act).

The current licence (Condition 18) enables Fortescue to export a total of 210 Mtpa (188 Mtpa Hematite and 22 Mtpa Magnetite) following the construction and commissioning of nominated infrastructure. Fortescue is seeking approval to increase the approved hematite export capacity of the Anderson Point MHF to incorporate export of up to 210 Mtpa of hematite and remove the current licence restriction on hematite product.

The removal of the hematite restriction of 188 Mtpa (within the approved 210 Mtpa) will allow increased flexibility in the product mix of hematite and magnetite ore throughput at the Port as first magnetite ore is expected at the Port from the Iron Bridge project in late 2022. Proposed upgrades to shiploading infrastructure and the additional Shiploader 4 at AP5 berth will allow for efficiencies at the MHF and enables the increase in the hematite proportion of the MHF throughput capacity. Further to this, additional belt wash stations and bulk ore condition sprays within the inload circuit will assist in reducing dust emissions at the MHF.

The proposed replacement of the existing desalination plant with an increased output of treated water (from 4 megalitres per day (ML/day) to 5.4 ML/day) will support effective operation of the additional dust control infrastructure.

This document has been prepared as a Licence Amendment Application to provide the necessary information required by the DWER to assess the proposal to increase hematite proportion of ore throughput at the MHF up to 210 Mtpa, allowing flexibility to alter the throughput ratio of hematite and magnetite products based on customer and marketing requirements.

1.1 PROJECT BACKGROUND

1.1.1 Existing Operations

Fortescue has been developing its operations since 2005. This involves a series of iron ore mines in the Pilbara region of Western Australia, and rail and port infrastructure for export of iron ore through the Port of Port Hedland.

A key component of Fortescue's operations is the port facilities at Port Hedland. The Anderson Point MHF includes the following key components:

- Rail loops

- Train Unloaders
- Conveyors
- Stockyard (including inload and outload conveyors, stockpiles, stackers and reclaimers)
- Wharves
- Shiploaders.

The existing MHF at the Port is approved under Part V of the EP Act to operate in accordance with Licence L8194/2007/3 – Category 58 Bulk Materials Loading or Unloading. The approved throughput for the MHF is 210 Mtpa (188 Mtpa hematite and 22 Mtpa magnetite).

1.2 PURPOSE AND SCOPE

This document has been prepared to seek an amendment to the Licence to increase the hematite proportion of throughput of the MHF from the existing restriction of 188 Mtpa hematite up to 210 Mtpa. The removal of the hematite restriction of 188 Mtpa (within the approved 210 Mtpa) will allow for a flexible product mix of hematite and magnetite. Hematite production is expected to increase above 188 Mtpa and first magnetite ore is scheduled to arrive at the MHF from the Iron Bridge project in late 2022. This document provides an overview of the proposal and outlines the key environmental management controls to manage potential impacts from proposed works.

2. ADMINISTRATION

2.1 APPLICANT/OCCUPIER DETAILS

The applicant and occupier of the premises for which this application is made, is:

Fortescue Metals Group Ltd
Level 2 Hyatt Centre
87 Adelaide Terrace
East Perth, WA 6004

Postal address:
GPO Box 6915
East Perth, WA 6004

Australian Company Number: 002 594 872

All correspondence in relation to this application should be addressed to the key contact for this application:

Mr Sean McGunnigle
Manager - Environmental Approvals
Tel: 0438 958 771
Email: smcgunnigle@fmgl.com.au

2.2 PROPOSED PRESCRIBED PREMISES

The Anderson Point MHF infrastructure is considered a Prescribed Premises and is for the purposes of bulk materials loading or unloading and screening of material (Table 1). The Licence is issued to licensee Fortescue Metals Group Limited (ACN 002 594 872). The only proposed change to the existing Prescribed Premises Boundary (PPB) as part of this licence amendment is to accommodate the new desalination plant location on the south eastern corner of Australia Island as identified in Figure 8.

The proposed change to the product mix within the capacity as part of this licence amendment is identified in Table 1 below and allows for the removal of the restriction of 188 Mtpa hematite throughput in a combination with magnetite production with the Iron Bridge project first ore expected in late 2022.

Table 1: Prescribed Premise Category

Category	Description	Production Capacity	Approved Capacity	Proposed Capacity
58	Bulk material loading or unloading: premises on which clinker, coal, ore, ore concentrate or any other bulk granular material is loaded onto or unloaded from vessels by an open materials loading system	100 tonnes or more per day	210 Mtpa 188 Mtpa hematite, 22 Mtpa magnetite (total throughput of 210 Mtpa)	**Up to 210 Mtpa hematite/magnetite combination (removal of restriction on hematite production**)
70	Screening etc. of material: Premises on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated.	More than 5,000 but less than 50,000 tonnes per year	45,000 tpa	-

2.3 STAKEHOLDER CONSULTATION

Stakeholder consultation specific to the Proposal was initiated by Fortescue to facilitate effective communication with the regulators and other key stakeholders, to allow issues to be identified and addressed.

Fortescue is an active member of the Port Hedland Industry Council (PHIC), participating in meetings and projects associated with environmental aspects including dust, noise, marine, and the community.

Consultation specific to this Proposal with relevant stakeholders is outlined in Table 2 below.

Table 2: Stakeholder consultation undertaken relevant to proposal

Date	Stakeholder	Outcomes/discussion points
20/08/20 (monthly) to present	Department of Jobs, Tourism, Science and Innovation (JTSI)	FMG meets with JTSI monthly since August 2020 to discuss AP5 Shiploader works with the most recent discussion on 28 March 2022.
26/08/20	Minister for State Development	Submission of Clause 13(2)(a) notice under the TPI State Agreement to the Minister for State Development seeking in principle approval for the AP5 Shiploader works.
22/10/20	Minister for State Development	FMG received in principle approval from the Minister for State Development for AP5 Shiploader works with approval until April 2022.
27/08/21	Pilbara Ports Authority (PPA)	Development Approval (DA) application for Shiploader 4 at AP5 submitted to PPA for assessment.
02/01/22	PPA	PPA issued Acknowledgement Notice to FMG for DA application.

Date	Stakeholder	Outcomes/discussion points
02/03/22	DWER	Pre-submission briefing (teams meeting) with Fiona Roser on proposed scope of licence amendment.
24/03/22	Minister for State Development	FMG submitted a request to the Minister for State Development for an extension of 12 months (from April 2022 to April 2023) to the Minister's in principle approval.
29/03/22	PPA	PPA provided comments on application to request amendment to delete reference to priority scheduling (not relevant to the application)

2.4 RELEVANT LEGISLATION

2.4.1 *Environmental Protection Act 1986 – Part IV*

In May 2007 Fortescue referred a proposal to construct an additional dredge pocket to enable construction and operation of a new third loading wharf. The EPA determined in April 2008 that this proposal could be assessed as an Assessment on Referral Information (ARI) level of assessment (EPA Assessment No. 1732). Fortescue received approval to develop the third berth under Ministerial Statement 771 (MS 771) in August 2008.

In August 2010, Fortescue referred to the EPA a proposed expansion to the Anderson Point MHF (Expansion of Herb Elliott Port Facility to 120 Mtpa Onshore Component) under s38 of the EP Act. The Chairman of the EPA determined that the proposal to expand the Port did not require assessment by the EPA and was granted the status of "Not Assessed" (EPA Record Number A327658). It was identified that the proposed clearing of vegetation was managed under management plans approved under MS 690 and the emissions, discharges and hazardous materials related to the proposed expansion could be managed under Part V of the EP Act.

In December 2013, Fortescue requested an amendment to MS 690 under Section 45C of the EP Act to increase throughput from 120 Mtpa to 175 Mtpa through the AP5 Expansion. This was granted in February 2014. With this amendment, reference to 'tonnage' was removed and it was made explicit that matters such as dust and noise were managed under Part V of the EP Act.

The Port Hedland Port is managed by the Pilbara Ports Authority (PPA). PPA received approval for the South West Creek Dredging and Reclamation Project under Ministerial Statement 859 in March 2011. This approval included the dredging of 14.2 Mm^3 of material and removal of up to 40 hectares (ha) of mangrove vegetation within South West Creek.

Following consultation with EPA Services and DWER, Fortescue considers that the proposed increase in the hematite proportion of throughput within the existing approved 210 Mtpa does not require any amendment to MS 690 or any additional approvals under Part IV of the EP Act.

However, Fortescue has applied to amend MS 771 to remove obligations relating to dust. As discussed above, these will now be managed via a Licence issued pursuant to Part V of the EP Act. Ministerial conditions (MS 1179) for the removal of the dust condition (Condition 11 of MS 771) were approved by the EPA on 18 January 2022.

2.4.2 *Environmental Protection Act – Part V*

Industrial premises with potential to cause emissions and discharges to air, land or water are known as 'prescribed premises' and trigger regulation under the EP Act. Prescribed premises categories are outlined in Schedule 1 of the *Environmental Protection Regulations 1987*.

Part V of the EP Act requires a works approval to be obtained before constructing a prescribed premises and makes it an offence to cause an emission or discharge unless a licence or registration is held for the premises.

The Licence has a series of performance, monitoring and reporting requirements relating to infrastructure, equipment and emissions. Schedule 2 of the Licence currently specifies the bulk material volume of 188 Mt of iron ore (hematite) exported per annum.

2.4.3 Other Legislation

In addition to the EP Act, legislation relevant to proposal includes:

- *Aboriginal and Torres Strait Islander Heritage Protection Act 1984*
- *Aboriginal Heritage Act 1972*
- *Aboriginal Heritage Regulations 1974*
- *Agriculture and Related Resources Protection Act 1976*
- *Australian Heritage Commission Act 1975*
- *Australia Heritage Council Act 2003*
- *Australian Quarantine Regulations 2000*
- *Biodiversity Conservation Act 2016*
- *Biosecurity and Agriculture Management Act 2007*
- *Conservation and Land Management Act 1984*
- *Contaminated Sites Act 2003*

- *Dangerous Goods Safety Act 2004*
- *Dangerous Goods Safety (Goods in Ports) Regulations 2007*
- *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*
- *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*
- *Environmental Protection (Controlled Waste) Regulations 2004*
- *Environmental Protection (Liquid Waste) Regulations 1996*
- *Environmental Protection (NEPM–NPI) Regulations 1998*
- *Environmental Protection (Noise) Regulations 1997*
- *Environmental Protection (Unauthorised Discharges) Regulations 2004*
- *Fuel Quality Standards Act 2000*
- *Hazardous Waste (Regulation of Exports and Imports) Act 1989*
- *Heritage of Western Australia Act 1990*
- *Heritage of Western Australia Regulations 1991*
- *Local Government Act 1995*
- *Maritime Transport and Offshore Facilities Security Act 2003*
- *Maritime Transport and Offshore Facilities Security Regulations 2003*
- *Mines Safety and Inspection Act 1994*
- *Mines Safety and Inspection Regulations 1995*
- *Native Title Act 1993*
- *Port Authorities Act 1999*
- *Rights in Water and Irrigation Act 1914*
- *Road Traffic Act 1974*
- *Soil and Land Conservation* Act 1941

3. SITE BACKGROUND

The Port of Port Hedland is the largest export port, by tonnage, in Australia. In the 2020-21 financial year approximately 725 Mt was exported. The main commodity passing through the port is iron ore, which accounted for 74% of exports by weight in 2019-20. Other commodities include manganese ore, chromite ore, copper concentrate, salt, scrap metal, and livestock. The port also imports a variety of commodities including oil and fuel, sulphuric acid, containers, break bulk and general cargos.

Fortescue has previously undertaken an extensive review and evaluation of the existing environment in the Port Hedland area as part of the Public Environmental Review (PER) for Stage A (Port and North-South Railway) (Environ, 2004) and the Environmental Referral Document for the third berth (Fortescue Metals Group Ltd, 2008). Other proponents have completed environmental surveys and investigations that provide a significant body of knowledge relating to the existing environment. These approvals include:

- South West Creek Dredging and Reclamation Project (Ministerial Statement 859)
- Roy Hill 1 Iron Ore Project, Port Infrastructure Port Hedland (Ministerial Statement 858)
- Outer Harbour Development - Port Hedland - BHP Billiton Iron Ore (BHPBIO) (Ministerial Statement 890)
- Lumsden Point General Cargo Facility – Port Hedland Port Authority (PPA) (Ministerial Statement 967).
- Multi-User Iron Ore Export (Landside) Facility Port Hedland - North West Iron Ore Alliance (Ministerial Statement 891).

3.1 LOCATION

The MHF is located within the Port of Port Hedland inner harbour, in the Pilbara Region of Western Australia (Figure 1).

The Pilbara region is sparsely populated, with a total resident population of approximately 62,841 people in 2020 (Department of Primary Industries and Regional Development, 2020). The majority of the Pilbara's resident population is centred in the towns of Port Hedland, Karratha, Newman, Tom Price, Paraburdoo, Roebourne, Wickham, Dampier, Onslow and Marble Bar.

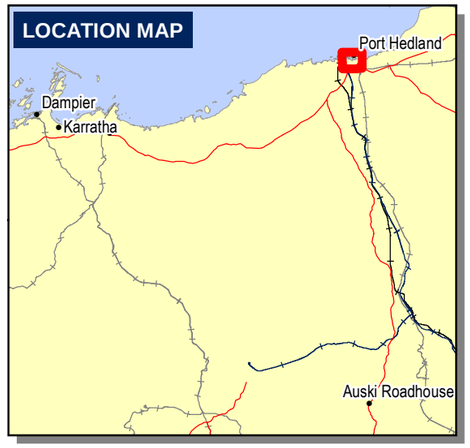
The town of Port Hedland supports a population of approximately 15,500 people with a combination of residential, commercial, administrative and industrial facilities including the port operations (Town of Port Hedland, 2020). The population fluctuates in relation to the construction and operation phases of major resource and related infrastructure projects (Pilbara Development

Commission, 2003). Port Hedland includes both the original Port Hedland town site and South Hedland (located 15 km inland).

Figure 1 Port Hedland Inner Harbour

660,000
665,000
670,000
7,755,000
7,750,000
7,745,000

LOCATION MAP



LEGEND

- Anderson Point Materials Handling Facility

Data Source(s):
All data FMG

N

0 0.5 1 1.5 2 2.5
Kilometres

Port Hedland Inner Harbour

Requested By: A. Winzer
Drawn By: PM
Revised By: sanli
Approved By:
Scale: 1:40,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: P_MP_EN_0163_r1

Date: 23/12/2019
Size: A3L
Revision: 1
Confidentiality: 1

Fortescue Metals Group Ltd
The New Force in Iron Ore

3.2 PHYSICAL ENVIRONMENT

The Project is located in the Pilbara region, within the Hamersley subregion as defined by the Interim Biogeographic Regionalisation of Australia. The Hamersley subregion is defined by Kendrick (2001) as mountainous areas of Proterozoic sedimentary ranges and plateaux dissected by gorges.

3.2.1 Climate

The region around Port Hedland is classified as arid-tropical, becoming more arid inland. Climatic data provided by the Bureau of Meteorology indicate that peak rainfall occurs in the summer months between January and March with a secondary peak in May and June. Climatic conditions in the Pilbara are influenced by tropical cyclone systems predominantly between January and March. Rainfall during May and June is generally a result of cold fronts moving across the south of the State, which occasionally extend into the Pilbara. Annual average rainfall for the Pilbara ranges from 180 mm to over 400 mm with the Bureau of Meteorology data indicating an annual average of 321 mm at Port Hedland.

Average maximum summer temperatures are generally between 35°C and 40°C and winter maximum temperatures generally between 22°C and 30°C. In this climate, annual evaporation rates greatly exceed the mean annual rainfall.

Wind roses of wind direction versus wind speed are shown in Plates 1 and 2 at 9 am and 3 pm respectively, based on data from 1942 to 2016 (BOM, 2021). These show that the easterly and south-easterly winds are more prevalent at 9 am and north and north-westerly winds are more common at 3 pm.

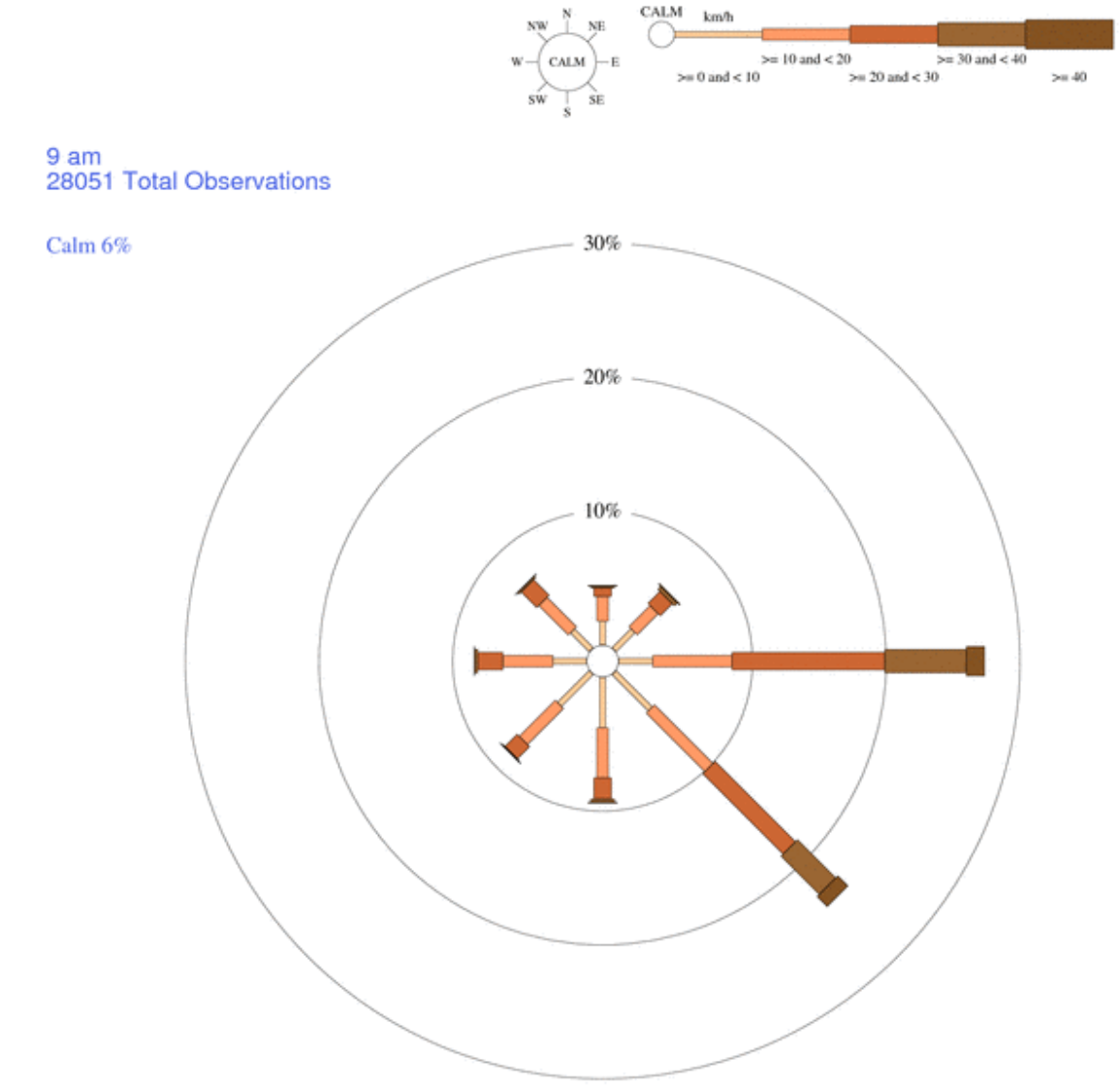


Plate 1: Port Hedland Wind Rose, 9am

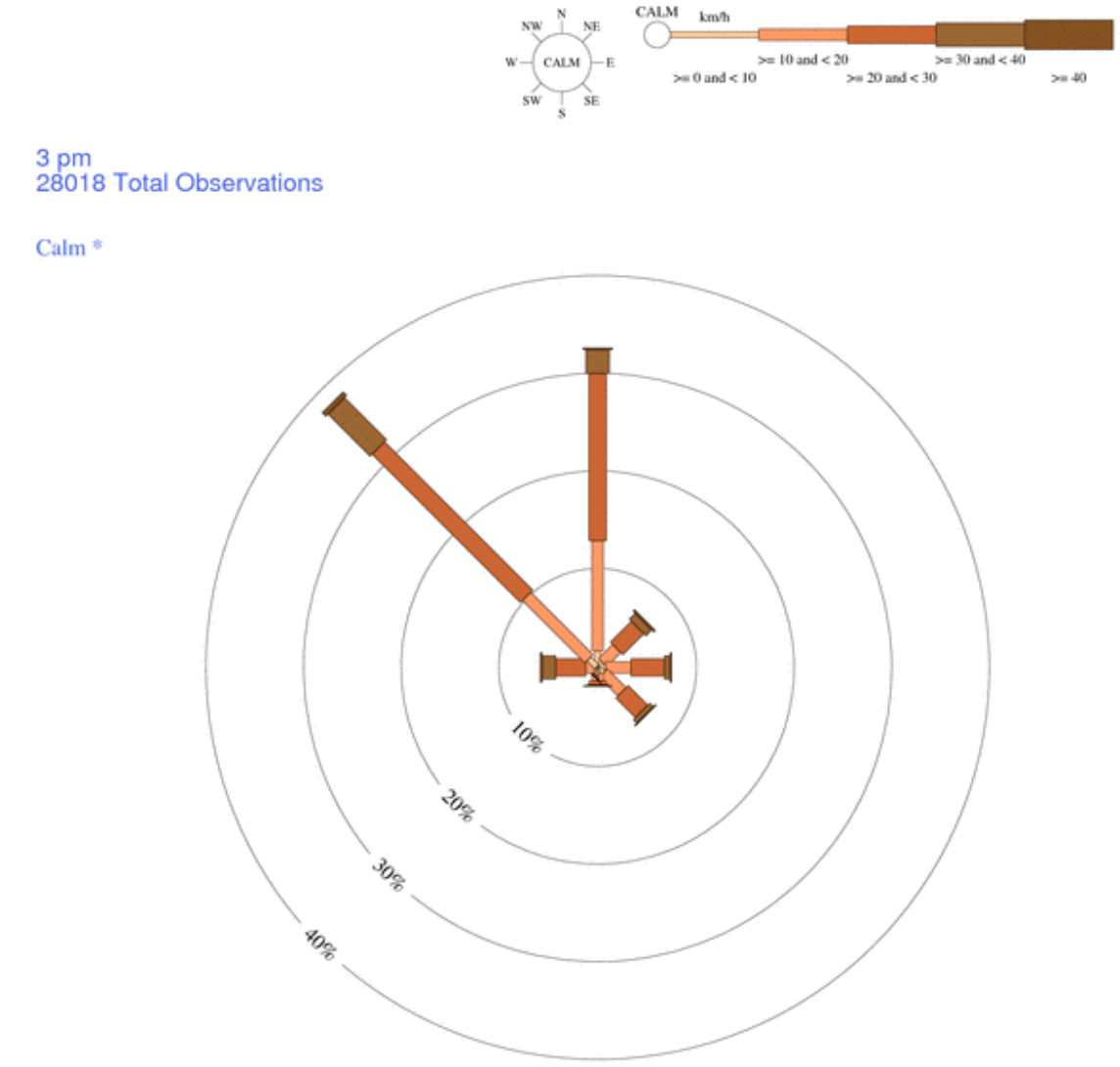


Plate 2: Port Hedland Wind Rose, 3pm

3.2.2 Landforms, Geology and Soils

The Pilbara landscape is typically flat and highly weathered with low rangelands occurring in the interior, representing a landscape that has remained largely unchanged for 100 million years. The topography of the Port Hedland area is predominantly influenced by the Abydos Plain, which rises from the coastal lowlands to around 300 to 400 m above the mean sea level adjacent to the Chichester Range, located approximately 200 km south-west of Port Hedland.

The topography of the Port Hedland coastal area varies from open harbour to tidal creeks, intertidal mudflats, bare coastal mudflats and sandy lowlands.

Two characteristic physiographic land systems are present within the Project area:

- Littoral (bare coastal mudflats with mangroves on seaward fringes, samphire flats, sandy islands, coastal dunes and beaches) which occurs along the coast in the northern section of the Project area.
- Uaroo (Broad sandy plains supporting shrubby hard and soft spinifex grasslands) which occurs broadly on the northern Abydos Plain, further inland than the Littoral land system and extending to the southern-most extent of the Project area at the Rowley Yard.

The Port Hedland area is situated within the Pilbara Craton described as a metamorphosed basement of granitoid rocks and gneiss. The Pilbara Craton is overlain by the Hamersley Basin; a Late Archean volcanic sedimentary sequence characterised as basal basic lavas overlain with clastic sedimentary sequences and banded iron formations. Quaternary sedimentary units overlay the Hamersley Basin and are generally identified as clastic rocks and sediments forming cemented clayey sandstones and conglomerates. Upper parts of the deposits exhibit red colouration as a result of limonite cementing.

3.2.3 Local Hydrology

The Port Hedland Area Catchment includes several creeks discharging to the coast, between the Turner River Catchment and the De Grey River Catchment.

The Project is located between the existing BHPBIO Port Hedland-Shay Gap Railway and Anderson Point. The major creeks that drain north are South West Creek and South Creek, which occur on either side of Anderson Point. Both creeks cross under the existing BHPBIO railway infrastructure before discharging into the harbour. South West Creek drains through the western side of the Project area, discharging west of Anderson Point. South Creek drains through the eastern side of the dredge settlement areas, and discharges east of Anderson Point. Natural drainage within the Project area flows via the bare mudflats to the intertidal creeks.

Under cyclonic conditions mudflats and intertidal creeks are also susceptible to storm surge (Worley Parsons, 2015).

The Proposal traverses the groundwater areas of coastal plain alluvial deposits and regional granite terrain. Silt, clay and sand with minor gravel, comprise the alluvial deposits on the coastal plain. Groundwater lenses occur where sand and gravel units appear and are enhanced by weathered basement and/or calcrete. The sections of greatest thickness occur generally along the drainage lines in which the majority of the sediment is transported.

The regional granite terrain comprises medium to coarse grained biotite granodiorite with common pegmatite veining, and groundwater flow is mostly associated with fracturing and intrusions of pegmatite and/or dolerite rocks.

Groundwater levels at the Proposal site are largely influenced by tidal variation. Prior to construction of the Port, the majority of the area was submerged except for the south-west corner of the Project area (Fortescue, 2015).

3.3 BIOLOGICAL ENVIRONMENT

The Anderson Point MHF is located within the Roebourne subregion of the Pilbara region, which is considered to be a region of significant biodiversity based on the geological, altitudinal and climatic diversity. The Roebourne subregion is characterised by alluvial plains, low stony hills and granite outcrops, comprising largely granitic soils with Quaternary alluvial and older colluvial coastal and sub coastal plains interspersed with resistant linear ranges of basalt.

3.3.1 Vegetation

Beard (1975) mapped the vegetation of the Pilbara at a scale of 1:1,000,000 and the study area lies entirely within the Fortescue Botanical District of the Eremaean Botanical Province as defined by Beard.

Flora surveys undertaken by GHD (2012) identified four broad floristic formations within the AP5 Expansion area:

- Mangrove Forest - high potential conservation value (EPA, 2001)
- *Tecticornia* Open Samphire - high potential conservation value, based on specific fauna habitat
- *Triodia* Hummock Grassland - moderate potential conservation value, widespread in the study area and common in the sub-region
- Open *Eucalyptus* Woodland - moderate to high potential conservation value, widespread in the study area and common in the sub-region.

No significant ecological communities, including Threatened and Priority Ecological Communities, Groundwater Dependent Ecosystems and Sheet Flow Dependent Ecosystems, were found within the study area or considered likely to occur (GHD, 2012).

3.3.2 Flora

GHD (2012) specifically targeted flora of Conservation Significance and all areas where such flora had been recorded in previous surveys were revisited. No rare or threatened tax listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) or the *Biodiversity Conservation Act* (BC Act) were found in the GHD survey (GHD, 2012).

Table 2 details the conservation significant flora recorded during the survey (GHD, 2012).

Table 3: Conservation Significant Flora (GHD 2012)

Species Name	Conservation Status
Tephrosia rosea var. Port Hedland	Priority 1
Gomphrena pusilla	Priority 2
Abutilon pritzelianum	Priority 3
Gymnanthera cunninghamii	Priority 3
Heliotropium muticum	Priority 3
Bulbostylis burbidgeae	Priority 4

No Declared Plants under the *Agricultural and Related Resources Protection Act 1976* were recorded in the study area, none of these are listed as declared pests on the WA Organism List under the BAM Act. Five introduced taxa were routinely observed, including:

- *Cenchrus ciliaris* (Buffel Grass)
- *Chloris virgata* (Feather Top Grass)
- *Aerva javanica* (Kapok)
- *Malvastrum americanum*
- *Passiflora foetida var. hispada* (Stinking Passion Flower).

The areas where these taxa were observed were generally areas with a high degree of human disturbance, urbanised and roadside areas (GHD, 2012).

3.3.3 Fauna

GHD (2012) identified 11 broad fauna habitat types within the study area, including Tidal Creek lines, Mangroves, Rocky Grassland, Dunal, Samphire and Inter-tidal Mudflats, Beach/Rocky Coastline, Sandplains, Woodlands, Shrublands, Grasslands and Riverine.

The conservation significant species that were recorded during the survey within the Project area or in the immediate surrounds are outlined in Table 3. A further nine species listed as Migratory under the EPBC Act were also recorded during the survey (GHD, 2012).

Table 4: Conservation Significant Fauna (GHD 2012)

Species Name	Common Name	Conservation Status (BC Act)	Conservation Status (EPBC Act)
Dasyurus hallucatus	Northern Quoll	Threatened	Endangered
Numenius madagascariensis	Eastern Curlew	Threatened	Critically Endangered
Ctenotus angusticeps	Airlie Island Ctenotus	Priority 3	-
Dasycercus blythi	Brush-tailed Mulgara	Priority 4	-
Falco peregrinus	Peregrine Falcon	Other specially protected fauna	-

A desktop assessment found no short-range endemic (SRE) invertebrate fauna species within a 10 km buffer of the study area when using the EPBC Act Protected Matters Search and a 50 km buffer of the study area when using the NatureMap database (GHD, 2012). The GHD field assessment found one spider of which little taxonomic work had been done into the species and it is unknown whether this was an SRE. No other SRE species were recorded in surveys of the Project area (GHD, 2012).

3.4 INDUSTRIAL ENVIRONMENT

3.4.1 Air Quality

Dust has the potential to impact on both human health and amenity. Particulate matter of 10 microns (µm) in aerodynamic diameter (PM10) or smaller can be inhaled and particles smaller than PM2.5 can penetrate the lungs and enter the bloodstream.

Exposure to these small particulates has the potential to exacerbate respiratory problems, particularly in young children and older adults (DSD, 2010).

3.4.2 Applicable Guidelines and Standards

The key guidance relating to dust management in Port Hedland have been developed by DWER, PHIC and the Department of Health. The guidance includes the following publications:

- *Air quality and dust management Port Hedland Factsheet (PHIC, 2022),*
- *Port Hedland Regulatory Strategy* (DWER, 2021),
- *Industry Regulation Fact Sheet – Managing Dust in Port Hedland* (DWER/DoH, 2018),
- *Industry Regulation Fact Sheet – Industry regulation of port facilities at Port Hedland (DWER, 2017)*
- PPA *Dust Management Guidelines: Leading Practice* DOC-EH009 (PPA, undated),
- *Port Hedland Dust Management Taskforce Management Plan* (DSD, 2010),
- *Port Hedland Dust Management Taskforce's Report to Government* (DSD, 2016).

DWER Industry Regulation Fact Sheet

This fact sheet outlines DWER's 'road map' for improved industry practices. As part of the Western Australian Government's 2018/19 Budget, DWER has received additional resources to realise the remaining recommendations of the Taskforce over the next five years. The following nominal timeframe for action has been set:

- 2018/19 - Develop best practice dust management guidelines for port operators. This will take an external consultant approximately one year, involving the benchmarking of current port practices and developing recommendations for significant improvements;
- 2018/19 and 2019/20 - Transfer the Port Hedland Industries Council air quality monitoring network to DWER. All costs for the refurbishment, operation and maintenance of the monitoring network will be absorbed by all port operators holding a licence granted for Category 58 under the EP Act, through an appropriate cost recovery arrangement. Once in control of the ambient monitoring network DWER will publish real time monitoring data on the Department's website with trends and further analysis reported annually;
- 2019/20 - Develop industry-self-assessment criteria, to be implemented though licence conditions, that require port operators to determine performance gaps, and propose strategies for improving current handling practices to comply with the new standards proposed by the best practice guidelines;

- 2020/21 and 2021/22 - Industry to comply with new best practice standards for bulk handling, in conjunction with more robust regulatory instruments and controls and with ongoing monitoring; and
- 2022/23 - Undertake a review of the results to determine if improvement has occurred.

At the completion of the five years, the Department will report on the outcomes of the planned strategy to Government as a resolution to the issue first highlighted by the EPA in 2009. This report will describe the final outcomes, along with any recommendations for required future investigations or assessments.

DWER has proposed a five-year plan for the proposed improvements to be finalised. Planning controls will also take a considerable period before changes begin to take effect. In the interim period, DWER will take a conservative approach to the assessment of any works approval, licence or amendment applications received for premises in the Port Hedland airshed, until the self-assessment stages of the process are completed and submitted.

Applicants will be encouraged to demonstrate no net increase to dust emissions in Port Hedland from port related activities. Where this isn't demonstrated, DWER will consider further controls that may in part serve to offset any increase in dust emissions. Importantly, any changes to operations in the interim period will still be subject to the best practice dust management guidelines when they are defined, and port operators may be asked retrospectively to address any performance gaps that are identified.

Port Hedland Dust Management Leading Practice Guidelines

In 2010, the PPA commissioned SKM to conduct modelling to determine the effectiveness of dust control techniques in minimising air quality impacts in the Port Hedland region due to potential new iron ore export facilities. Modelling identified key dust mitigation techniques that were effective measures to lower dust emissions from bulk handling operations, which are outlined in these guidelines. This document is a key outcome of the Port Hedland Dust Management Taskforce Air Quality and Noise Management Plan (DSD, 2010).

Fortescue recognises the development of new Dust Best Practice Guidelines in line with DWER's Regulatory Strategy for Port Hedland and will work with the Department to implement these guidelines.

The guidelines set out findings based on a review of national and international best practice and describe what is broadly considered to constitute leading practice for dust management in bulk materials handling processes. These dust best practice guidelines are an integral reference for all new developments at the Port and include leading practice examples for the main activities leading to the generation of dust: Unloading, Stacking, Stockpiles, Reclaiming, Conveyors and Transfers, and Ship Loading.

Current Port dust management measures are compared against PPA Leading Practice Guidelines in Table 4.

Table 5: Assessment of Port Dust Management Measures against PPA Leading Practice Guidelines

PPA Leading Practice	Current Fortescue Management Measure
All ore brought into, stockpiled and loaded through the Port of Port Hedland is at, or above, the Dust Extinction Moisture (DEM) for that particular Ore.	Prior to trains arriving at the MHF, a product specification report is sent to operations personnel which details iron ore parameters including ore moisture. This guides inload operations personnel as to how much water should be added to the ore prior to being stockpiled. Whilst this is occurring, the Integrated Planning team correlates all the train ore data (including moisture) and generates a stockpile moisture prediction report. During ship loading, this data is verified by the Infrared (IR) moisture report provided by a third party at the site sample facility. During ore handling at the MHF, Fortescue undertakes a number of dust control activities to reduce the likelihood of ore moisture levels becoming less than the DEM including dust suppression through conveyor and balance machine water sprays, and stockyard water cannons. The majority of ore handled at the MHF (approximately 85%) has been through a wet process at the mines rather than the traditional dry, crush and screening process. Wet processing of ore at the mines removes fine materials (i.e. less than 40 microns) from the final product therefore reducing the potential for dust generation at the port.
Major transfer stations or transfer stations located adjacent to shiploaders are fully enclosed with extraction (either wet or dry).	All transfer stations are enclosed. Water sprays and rubber skirts fitted to the exit of transfer points.
All transfer stations are to be fitted with a fogging system.	All transfer points have dust spray bars fitted to the boom end, which is the point of highest dust incidence. All transfer stations also have skirting systems (hard and soft) to minimise dust emissions.
All trafficable areas are to be sealed and regularly cleaned and maintained (including traffic management).	The main causeway and internal carpark are sealed. The use of a chemical dust suppressant is used in unsealed, trafficable areas. Water carts are used to minimise dust emissions from unsealed trafficable areas. Additionally, speed limits (40km/h and 20km/h along main trafficable areas and 20km/h on the wharf) have been set to reduce dust lift off.
A meteorological forecast system in place to predict adverse weather conditions and allow for early action for dust management.	Aside from awareness of imminent adverse weather conditions via the realtime Air Quality Management System (Section 3.4.1.3), Fortescue uses a monitoring-based response system based on real time dust measurements. An automated email is sent to key personnel when air quality targets are exceeded. An Australian Standards compliant meteorological station has been installed near the TUL to provide additional data for dust modelling purposes and assist with calibration of the Port dust monitoring network which support the AQMS.

PPA Leading Practice	Current Fortescue Management Measure
All shiploader booms are fitted with sprays at the loading chute.	All existing shiploaders have sprays at the loading chutes and boom tip.
Water cannons are used on all stockpile areas to maintain the DEM of the product and prevent dust emissions associated with wind erosion.	Water cannons are fitted along all canyons within the stockyard.
All stackers are luffing/slewing type to reduce drop height and are fitted with water sprays on the boom.	All stackers at the Port are slewing/luffing type and have sprays fitted on their booms.
Car dumpers are fully enclosed and fitted with dust extraction (wet or dry).	All existing train unloaders / car dumpers are enclosed and fitted with a dust extraction system.

Port Hedland Dust Management Taskforce Management Plan and Report

In 2009 the Port Hedland Dust Management Taskforce (PHDMT) was established. The taskforce, which reports to the Premier, includes representatives from the following:

- the Town of Port Hedland;
- Pilbara Ports Authority (PPA);
- iron ore exporters (including BHPBIO, Fortescue, Hancock Iron Ore); and
- relevant Government departments (including the Department of Health, Department of Jobs, Tourism, Science and Innovation and the Department of Water and Environmental Regulation).

In 2010, the PHDMT published the Port Hedland Air Quality and Noise Management Plan (DSD, 2010) to enable a framework for effective dust management strategies within Port Hedland. The taskforce made a number of recommendations which have been addressed. These include:

- Establishment of a comprehensive network of air quality measuring devices throughout the Port Hedland area, including South Hedland;
- Adoption of an interim air quality guideline measure for the national standard for PM_{10};

- Development of leading practice dust management guidelines; and
- Undertaking of a Health Risk Assessment (HRA) for PM_{10}, silica, mineral fibres, sulphur oxides (SO_x) and nitrogen oxides (NO_x).

The PHDMT commissioned a series of studies that considered the application of the national PM_{10} standard to Port Hedland. The taskforce recommended the adoption of an interim standard for air quality at Port Hedland for PM_{10} of 70 µg/m^3 (24-hour average) with 10 exceedances per year (as determined at the Taplin Street monitoring station). The PHDMT agreed that this measure sets an appropriate level of protection for the community whilst requiring industry to adopt current best practice techniques and operate on a continuous improvement basis. This standard has since been adopted as the appropriate criteria for air quality management in Port Hedland (DSD, 2010).

The PHDMT released a final report in August 2017 (DSD, 2016). The report endorsed formal application of the interim standard for PM_{10} of 70 µg/m^3, which has been supported by Government, in addition to public guidance on industry dust and noise management and regulation. Specifically, Government has provided the following direction:

The Government supports the full transfer of the operation and maintenance of the Port Hedland Industries Council (PHIC) air quality monitoring network to the Department of Water and Environmental Regulation (DWER), with appropriate cost recovery arrangements to be made through PHIC.

- *The Government supports the Taskforce recommendation for the implementation of a coordinated risk-based review and assessment approach to managing dust in Port Hedland. To give effect to this:*
    - *DWER will complete the reviews of all port premises licences under Part V of the Environmental Protection Act 1986, applying a consistent and risk-based approach to the regulation of dust for each premises.*
    - *Where premises are subject to Ministerial Statements, DWER will assist the Environmental Protection Authority to determine a consistent and singular regulatory approach for bulk handling port premises, to eliminate regulatory duplication.*
    - *DWER will commission an independent third-party review and develop a dust management guideline for bulk handling port premises, outlining its expectations in relation to the assessment of dust impacts, dust control and monitoring requirements from these premises.*

- *Through licence reviews, DWER will implement the dust management guidelines for bulk handling port premises under Part V, Division 3 of the Environmental Protection Act 1986.*

3.4.3 Air Quality Standards and Monitoring

The National Environment Protection (Ambient Air Quality) Measure (Air NEPM), sets uniform standards and goals for six 'criteria' pollutants (including PM_{10} particles) in ambient air. The standard for PM_{10} set in the Air NEPM is 50 µg/m^3 (24-hour average) with a target of five exceedances per year (http://www.environment.gov.au/topics/environment-protection/air-quality/air-quality-standards).

As summarised in Section 3.4.1.1, the PHDMT report endorsed the application of the national PM_{10} standard to Port Hedland. The taskforce recommended the adoption of a standard for air quality at Port Hedland for PM_{10} of 70 µg/m^3 (24-hour average) with 10 exceedances per year (as determined at the Taplin Street monitoring station). The PHDMT report found that following extensive peer review, there would be minimal additional health benefits from adopting the NEPM measure for PM_{10}. The interim standard should apply until the local sources of dust are identified and managed. Fortescue's dust management strategy therefore, is to comply with the measure of PM_{10} of 70 µg/m^3 (24-hour average) to ensure that there are no more than 10 exceedances per year as a result of Fortescue's activities.

Performance against air quality targets is coordinated by DWER using a network of eight ambient air quality monitoring stations installed across the area (Figure 2). The real-time data is also made accessible to the community via a monitoring website http://airodis.ecotech.com.au/porthedlandairqualitymonitoringnetwork/index.html

Figure 2: PHIC Ambient Monitor Network


Kingsmill St
Neptune Pl
Richardson St
Taplin St
Wedgefield
BOM
South Hedland
Yule River
40 km south-west of Port Hedland

3.4.4 Monitoring Results

DWER Ambient Monitor Network

The Port Hedland Ambient Air Quality Monitoring Network was established by the Port Hedland Industries Council (PHIC) in 2009. The control and responsibility of the Ambient Air Quality Monitoring Network was officially transferred from PHIC across to the Department of Water and Environmental Regulation (DWER) on 14 December 2021 through a Memorandum of Understanding.

The Ambient Air Quality (AAQ) Monitoring Report (PHIC, 2021) presents the analysis of the 2020-2021 air quality monitoring in Port Hedland and assesses the data against the criteria specified in the AAQ NEPM and by the PHDMT. A summary of measured 24-hour average concentration of PM_{10} between FY12 and FY21 (calculated as midnight to midnight) are detailed in Table 5.

In FY 2020/21, the number of days above the AAQ NEPM standard of 50 µg/m³ ranged from 8 days at BoM and Yule River to 101 days at Wedgefield. Twenty four average concentrations were above the AAQ NEPM standard on multiple occasions at all sites in FY2020/21. Note, as discussed above, a measure of 70 µg/m³ is used as an interim standard for air quality under the PHDMT management plan.

In FY21, the monitoring station at Taplin St recorded one day on 3 October 2020 above the 24-hour average guideline for PM_{10} of 70 µg/m³. The exceedance at the Taplin site on 3 October 2020 was attributed to a local industry source as well as a regional event.

Table 5 below shows the following:

- The long-term trend at the sites that have been in operation since FY 2012/13 shows peaks occurred in the annual average concentration in FY 2014/15 and in FY 2018/19, while troughs occurred in FY 2016/17 and in FY 2020/21.
- The trend in the annual average concentration at the sites that have been in operation since FY 2015/16 is generally consistent with the longer-term trend, with a lower concentration recorded during FY 2016/17 and FY 2017/18, a peak in FY 2018/19 and FY 2019/20, followed by another drop in FY 2020/21.
- The Richardson St monitoring site shows a gradual increase in the annual average concentration from FY 2015/16 through to the peak in concentration in FY 2019/20. The average concentration dropped again in FY 2020/21, with the gradual increase prior likely due, in part, to site changes that have occurred in the past few years, including the operation of a boat repair business since 2017.

- While the Taplin St monitoring site had a gap in monitoring data between May 2018 and December 2019, the available long-term data across all of the sites, including Taplin St, can provide an inference as to the long-term trend at this site. The available data shows that this site generally experienced a similar long term trend to that observed at the other monitoring locations up to the period of missing data at the Taplin St site, and then again after monitoring at the site recommenced in January 2020. While it cannot be determined whether the concentrations increased at Taplin St during the FY 2018/19 and FY 2019/20 along with all of the other monitoring stations, the data from the other sites suggests that this may have been the case.

Table 6: PHIC Ambient Network annual average 24-hour PM_{10}concentrations from FY12 – FY21

Monitoring Station	Annual 24 hour average PM_{10} concentration (ug/m^3)								
	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21
BoM	No data*	No data*	No data*	25.4	21.4	23.8	31.5	32.1	25.5
Kingsmill St	47.1	44.8	50.4	44.7	40.4	43.7	51.0	50.3	38.3
Neptune Pl	28.1	31.6	37.1	32.3	27.4	26.4	40.2	36.6	21.6
Richardson St	40.7	38.1	40.0	35.2	40.0	47.3	51.4	54.1	40.7
South Hedland	No data*	No data*	No data*	26.5	22.2	16.1	24.4	27.9	20.6
Taplin St	36.8	37.9	36.3	35.6	31.3	34.4	No data	31.1	29.8
Wedgefield	No data*	No data*	No data*	51.1	43.1	42.2	55.0	54.6	42.7
Yule River	23.1	18.1	21.5	18.5	15.4	17.9	22.2	21.0	16.4

*****Site not operating

Fortescue Air Quality Monitoring

Fortescue undertakes an extensive dust monitoring programme at the MHF, including an air quality management system (AQMS) and dust emissions source characterisation surveys:

- An internal early warning system is in use to manage triggers (associated with current licence conditions) in addition to surrounding boundary monitors shown in Figure 4 below. Alerts are sent out to Operations Supervisors and Environment personnel when dust levels and wind direction exceed defined criteria, as detailed in the *High Dust Alert Response Procedure* (P-PR-EN- 0007). This enables Fortescue to activate targeted dust controls and prevent potential dust exceedances.

- Records of date, time, duration and root cause of dust incidents and exceedances are kept within the BMS database with corrective and preventive actions put in place as applicable.
- An Air Quality Management System (AQMS) is utilised to assess potential dust impacts and evaluate dust risk in advance; provide recommendations to address potential dust issues; and evaluate dust events to determine whether Fortescue's port activities may have contributed to a dust event (Figure 3).
- Dust emissions source characterisation surveys 'point source monitoring' has occurred at the Anderson Point MHF since 2014, most recently in December 2021. During the monitoring period, samples were collected using a handheld DustTrak monitor from various locations around site. The results will be used to generate site specific emission rates for each product type and location and identified the highest dust contributing equipment and locations.

Figure 3 Fortescue's Air Quality Management System

662,000 664,000 666,000

7,752,000 7,750,000 7,748,000 7,746,000

Wharf

End of Road

NW Corner

NE Corner

Finucane

0

SW Corner

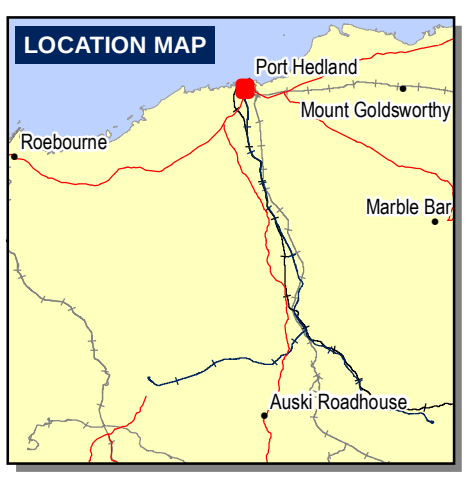
SE Corner

Wedgefield

TUL Met Station

TUL SW

TUL SE



LEGEND

- BAM Sites
- Meteorological Station

N

0 200 400 600 800

Meters

Air Quality Management System

Requested By: Tina Batistic
Drawn By: C Whyte
Revised By: sanli
Approved By:
Scale: 1:20,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: P_MP_EN_0130_r6

Date: 23/12/2019
Size: A3P
Revision: 6
Confidentiality: 1

Fortescue Metals Group Ltd
The New Force in Iron Ore

Dust Emissions Source Characterisation Surveys

Prior to 2014, dust emissions from the Anderson Point MHF have either been estimated using National Pollutant Inventory (NPI) calculations or using a combination of NPI calculations and site-specific estimates.

Since 2014 Fortescue has undertaken site specific, ‘point source’ measurement surveys of particulate emissions from sources within the Anderson Point MHF (PEL 2014, 2015/2016 and 2017, GHD 2018, ETA, 2019). The purpose of the surveys is to derive source-specific emission factors for each material handling process (train unloading, conveying, transfer stations, stacking, reclaiming, shiploading) based on the various incoming and outgoing ore types and their associated moisture level. A summary of all potential dust sources within the Anderson Point MHF Prescribed Premise Boundary is shown in Figure 4.

Deriving site specific emission factors allows Fortescue to transfer from generic emission factors, such as those outlined in the National Pollutant Inventory (NPI) Emission Estimation Technique Manual for Mining Version 3.1 (EETM for Mining Ver3.1) (Environment Australia, 2012), to ones that are more applicable to the operation.

Point source surveys are used to quantify the effectiveness of dust controls across site and are key inputs to dispersion modelling to predict potential impacts of future expansions on the Port Hedland airshed. The results of these surveys confirm continuous improvement in onsite dust management with a minimum annual emissions reduction of 10% since the surveys commenced.

The initial annual reduction in predicted emissions was contributed to by transitioning from entirely NPI estimates to a combination of both NPI and site-specific estimates. Ongoing annual reductions in predicted emissions have continued through the advent of site specific dust controls.

Figure 4 Location of Existing Sources at Anderson Point MHF

3.4.5 Regulation

The 175 Mtpa MHF Licence issued on 29 May 2014 included ambient air quality monitoring for dust deposition and PM_{10} emissions. Following this, DWER deregulated dust emissions through a Licence Amendment approved on 7 December 2016. Dust emissions have been managed under Part IV of the EP Act with impacts being managed under the Dust Management Plan required by Condition 17 of Ministerial Statement 690.

On 3 June 2020, a new condition (Condition 17-5) was inserted into the dust conditions in Ministerial Statement 690 which included the following wording:

> ***17 Dust***
>
> *17-5 Conditions 17-1, 17-2, 17-3 and 17-4 of Ministerial Statement 690 cease to have effect once dust is licensed through Part V (Environmental Regulation) of the Environmental Protection Act 1986.*

On 17 January 2022, conditions relating to dust (Condition 11) were removed from Ministerial Statement 771.

Dust emissions, monitoring and management at the Anderson Point MHF is now managed under Part V of the EP Act and specifically under the conditions within the new Port operating licence (L8194/2007/3) that was approved by the Department of Water and Environmental Regulation on 24 September 2021.

3.4.6 Existing Dust Management

Fortescue implements significant dust management techniques and infrastructure at the MHF to minimise dust emissions from the facility. Key aspects include:

Train Unloader

- key components at the ore car dumpers are enclosed
- dust enclosures around the ore car tippers are operated and maintained
- a dust extraction system (incorporating dry collection)

Conveyors and Transfer Points

- conveyor transfer points are enclosed
- an integrated control system is in place to prevent overloading of conveyors and minimise spillage
- water sprays are used at each transfer point for effective dust control and retention of ore moisture content

- all transfer stations have dust hoods with fitted water sprays and rubber skirts at the exit points
- belt scrapers are used to clean conveyor belts
- belt cleaner sprays are used to further clean the belt and reduce carry-back
- under belt cleaning is undertaken to remove spillage from underneath conveyors.

Stackers

- stacker booms are fitted with spray heads
- automated stacker luffing system to minimise the drop height depending on which bench of the stockpile is being stacked.

Reclaimer

- spray heads installed at the bucket wheel, sluice, skirt exit, and chute areas of the reclaimers
- water sprays are mounted close to the bucket wheels to wet the ore stockpile at the digging face, and to provide a curtain of water in which the bucket wheel operates.

Stockpiles

- stockpiles are fitted with fixed stockpile water cannons which can be operated in either local or auto modes
- each row of stockpiles is approximately 1,800 m long and face approximately 45 degrees perpendicular to prevailing winds (SE to NW).

Ship Loading

- shiploaders can be lowered into the hatch of the ship to minimise the drop height
- shiploaders are fitted with water sprays at the boom discharge and boom conveyor system
- shiploader conveyors are fitted with spray bars on return launder curtains which are automated when ore is present
- on average, approximately 95% of all ore shipped had moisture levels above the DEM.

Wharf

- wharf clean-up activities are undertaken at the Wharf.

Roads

- appropriate speed limits are in place and enforced at site
- the main causeway road is sealed
- chemical dust suppressant is regularly applied to unsealed roads.

Vegetation shelter belts

Vegetation shelter belts have been established on the eastern and northern sides of the stockyard, to act as a natural wind fence once vegetation has matured and will also reduce dust emissions generated from open areas. The shelterbelt is 2.2 km long and 6 m wide. An example of the shelter belt is shown in Plate 3.

Plate 3: Vegetation Shelter Belt at Northern End of Stockyard (Stage 4 and 5)

Port Operations Dust Working Group

In addition to the dust controls listed above, a summary of Fortescue's continuous improvement since 2016 conceived and implemented at the Anderson Point MHF by the Port Operations Dust Working Group is provided in Table 6.

Table 7: Summary of Implemented Dust Controls at the Anderson Point MHF

Installation Date	Dust Control
Q1 FY16	Upgrade inload circuit belt scrapers
Q1 FY16	PLC (Programmable Logic Control) change in stockyard for water cannons to precondition the stockpile surface prior to stacking products SOFF, SOPF and CCTF
Q2 FY16	Install triple impact roller frames across inload and outload circuits
Q2 FY16	Install belt scraper upgrades on outload circuit
Q2 FY16	Ensure 95% of outloaded product has moisture content above DEM

Installation Date	Dust Control
Q2 FY16	Install Belt wash stations on outload causeway conveyors CV921 and CV948
Q4 FY16	Redesign CV953 tail end and surge bin chute
Q4 FY16	Automated underbelt sprays on outload circuit
Q1 FY17	Automated underbelt sprays on inload circuit
Q1 FY17	Install poly ring rollers on return side of inload and outload circuit
Q3 FY17	Install inload circuit moisture analysers
Q3 FY17	Install outload circuit moisture analysers
Q3 FY17	Stage 1 Port shelter belt planted
Q4 FY17	Install auto tensioning belt cleaners on outload circuit
Q4 FY17	PLC (Programmable Logic Control) change to reduce belt drift on outload circuit
Q1 FY18	PLC change to reduce belt drift on inload circuit apron feeders
Q1 FY18	Install upgraded hydraulic training plates
Q2 FY18	Stage 2 Port shelter belt planted
Q4 FY18	Stage 3 Port shelter belt planted
Q4 FY19	Stages 4 and 5 Port shelter belt planted
Q2 FY20	4 belt wash stations installed (CV915, CV921, CV944, CV945)
Q3 FY20	4 belt wash stations installed (CV902, CV911, CV916, CV 948)
Q2 FY21	3 belt wash stations installed (CV912, CV922, CV950)
Q4 FY21	Supplementary planting of shelter belt
Q2 FY22	New Street Sweeper acquired
Q2 FY22	Dustac optimised application trials
Q2 FY22	Optimisation of Train Unloader catenary sprays

3.4.7 Noise

As an existing bulk material port, Port Hedland is subject to a range of noise from both construction and operational activities. The dominant source of noise in Port Hedland is from pre-existing, established industries, most notably BHPBIO's operations. These industrial sources

significantly exceeded the assigned noise levels in Port Hedland prior to Fortescue commencing operations (Lloyd George, 2013). The residential areas of Port Hedland have developed with industry and are co-located to a large extent on the east and south sides of the harbour. The development of bulk loading facilities such as Anderson Point on the south side of the harbour provides a buffer between these industrial areas and residential areas.

3.4.8 Applicable Guidelines and Standards

Noise Regulations

The Environmental Protection (Noise) Regulations 1997 (the Regulations) operate as a prescribed standard under the EP Act and set limits on noise emissions. The Regulations define maximum allowable noise levels which apply to noise received at noise sensitive premises, such as residential areas. These are determined by a combination of a base noise level plus an Influencing Factor. The result is termed the “assigned level”.

The assigned noise levels include L_{A1}, L_{A10} and L_{AMAX} noise parameters, defined as:

- L_{AMAX} – assigned level which is not to be exceeded at any time
- L_{A1} – assigned level which is not to be exceeded for more than 1% of time
- L_{A10} – assigned level which is not to be exceeded for more than 10% of time
- The L_{A10} noise limit is most representative of continuous noise emissions from the Anderson Point MHF.

For noise sensitive premises, the time of day also affects the assigned levels. As the MHF operates 24 hours a day, 7 days a week, the noise emissions have been assessed against the most stringent night-time assigned levels (10 pm - 7 am).

Based on the above, the night-time L_{A10} assigned level is relevant to the MHF.

Port Hedland Dust Management Taskforce Management Plan and Report

In 2010, the PHDMT published the Port Hedland Air Quality and Noise Management Plan (DSD, 2010) to enable a framework for effective noise management strategies within Port Hedland. The taskforce made a number of recommendations which have been addressed. These include:

- Establish an independent, best practice comprehensive air quality and noise management regime in Port Hedland.
- Establish a State Environmental Policy for Port Hedland to monitor and manage noise using Noise Regulation 17 exemptions where appropriate. Including:

- developing a cumulative noise model;
- defining noise sensitive zones;
- clarifying planning measures; and
- clarifying building standards.

The PHDMT released a final report in August 2017 (DSD, 2016). The report included two recommendations relevant to noise management:

4.1 The Department of Environment Regulation assesses unacceptable noise levels and assesses whether additional controls can be introduced as part of its review of all port premises licences under Part V, Division 3 of the Environmental Protection Act 1986.

4.2 The Town of Port Hedland uses the Port Hedland Cumulative Noise study to inform its land-use planning for the West End of Port Hedland.

The report has generally been supported by Government, which has provided the following direction:

- The Government supports DWER working with industry to explore the feasibility of approvals under Regulation 17 of the Environmental Protection (Noise) Regulations 1997, where the prescribed noise standard cannot be met by individual premises.
- The Government supports the Taskforce recommendation that the Port Hedland Cumulative Noise study is used to inform land-use planning for the West End of Port Hedland.

PHIC Cumulative Environmental Noise Study

The PHIC cumulative environmental noise study (SVT 2013) confirmed that cumulative noise emissions from industry in Port Hedland currently exceed the Regulatory noise levels. At this stage, a Regulation 17 exemption process has not been initiated for Port Hedland. Until such an exemption has been approved, it is proposed that the PHIC strategic noise goals be utilised to give guidance to operators with regard to noise management and assessment in Port Hedland.

The applicable noise limits for the Project, including influencing factors and adjustments, are presented in Table 7. These include both the in-isolation and cumulative levels. The receivers are the same as those used in the PHIC Cumulative Environmental Noise Study.

Table 8: Receiver Locations and Applicable Noise Levels

Receiver Name	GPS Coordinates		Assessment Criteria Night LA10 Assigned Level	
	Easting	Northing	In Isolation	Cumulative
Brearley Street	667699	7753338	32	40.7
Hospital	665799	7753424	32	48.5
Police Station	664652	7753117	47	54.8
Pretty Pool	671261	7752609	30	29.7
South Hedland	667852	7742771	30	27.0

3.4.9 Regulation

Impacts arising from noise emissions from the MHF are managed under the Operations Noise Management Plan required by Condition 18 of Ministerial Statement 690.

3.4.10 Existing Noise Management

Fortescue implements noise management at the MHF to minimise noise emissions from the facility. Key aspects include:

- All conveyors have been fitted with low noise idlers which provide less contact on the return side of the belt and have the added advantage of reducing dust generation at the same time being low noise.
- Personnel identify noisy/ faulty rollers for replacement during maintenance and inspection to reduce potential for equipment failures and delays.

3.4.11 Noise Monitoring and Emissions

Annual noise monitoring at the MHF was undertaken from 30 September - 2 October 2021, incorporating monitoring at 6 locations surrounding the facility to validate the noise model. The environmental noise assessment report is provided at Appendix 6.

Results indicate that the predicted worst-case noise levels exceed the assigned noise level at only one of the five sensitive receivers, at the Hospital in Port Hedland by 4.1 dB (Tallis, 2021). The report also indicates that under the cumulative scenario, there is an increase in dB from 0.8 dB to 1.1 dB across all five sensitive receivers in Port Hedland. However, the report does state that Fortescue's noise contribution is minimal, when compared to other operators in Port Hedland, with up to 9.8 dB less noise emissions at all 5 sensitive receivers in Port Hedland.

The key recommendation from the report for Fortescue to reduce the cumulative case noise impacts is for ultra-low noise idlers be fitted to existing conveyors CV921, CV922, CV927, CV948 and CV911. All new conveyors as identified in the scope of this licence amendment should be fitted with ultra-low noise idlers too.

No noise complaints have been received to date by Fortescue at the Anderson Point MHF operations in the 2021 reporting year.

3.5 SOCIAL ENVIRONMENT

3.5.1 Aboriginal Heritage

All Port activities are subject to the *Aboriginal Heritage Act 1972*. As no new disturbance of land is required for the Project, there are not expected to be any changes to impacts on Aboriginal heritage.

4. PROJECT DESCRIPTION

The Proposal incorporates a removal of the restriction on hematite ore throughput within the proposed 210 Mtpa production at the MHF. The proposed change will allow for a mix of hematite and magnetite throughput within the existing 210 Mtpa approved capacity for the MHF. There are a number of physical changes to the existing infrastructure proposed.

Physical changes to the existing infrastructure are outlined in the following sections.

4.1 RAIL UNLOADING

There are no proposed changes to the existing rail loop and train unloaders. Currently there are three existing train unloaders (TUL601, TUL602 and TUL603) which receive trains arriving at the MHF and unload ore using rotary car dumpers.

4.2 SHIPLOADING

There is a proposed new Shiploader (SHL704) to be constructed at AP5 berth per the design details and map provided at Appendix 1 and Figure 6.

The shiploader will be fitted with spray bars on the boom discharge and the conveyors during loading to minimise dust emissions from the outload infrastructure. There is also an additional new conveyor (CV933) proposed between AP 4 and AP5 to provide flexibility for ship loading along the outload wharf. The new conveyor will be fitted with a belt wash station.

There is also a new proposed shuttle (as outlined in the map provided in Figure 6) at AP5 (SH 953) within the existing transfer station (TS 954). This new shuttle will assist with the distribution of ore between the 2 outload wharf conveyors CV 932 and proposed CV 933.

An additional change at the shiploading berths is the proposed progressive replacement of noise rollers on the outload circuit. As identified in the noise report completed by Tallis at Appendix 6, ultra-low noise idlers will be fitted to existing and new conveyors with a specification to operationally achieve a sound power level (SWL) of 85 dB or less.

4.3 STOCKYARD

Ore from the train unloaders is transported to the stockyard using three inload circuits. On arrival in the stockyard area, ore is distributed to the main inload conveyors CV911, CV912, CV916 and CV918 via a system of short conveyors and transfer stations.

There is a new proposed transfer station TS 302 (as outlined in the map provided in Figure 5) which will connect CV 302 with CV 902, CV 903, CV 908 and CV 909. This will assist with full connectivity for the Iron Bridge project and specifically allow for magnetite concetrate to be

distributed to all six stockyard canyons. The other proposed infrastructure changes at the entry point to the stockyards is proposed additions to TS 901 (as outlined in the map provided in Figure 5) to allow for full connectivity of the magnetite product with all canyons. CV 908 has been constructed but is yet to be tied in to CV 901 and TS 901.

One stacker operates on each of the main inload conveyors, depositing ore into one of six discrete stockpiles on each of the six canyons (B, C, D, E, F and G). No additional stackers are required by this proposal.

From the stockpiles, ore is reclaimed by one of three bucket wheel reclaimers that operate on the three main outload conveyors (CV913, CV914 and CV917). At the northern end of the stockyard, ore is distributed via a system of transfer stations and shuttle conveyors and transported on the outload circuit to the shiploaders at the wharf.

Fortescue has approval to construct additional infrastructure under Stage 2B of the AP5 Materials Handling Facility Works Approval **W5643/2014/1**. Infrastructure yet to be constructed includes:

- Two inload conveyors CV909 and CV918
- One additional live row and one additional bulk-out row (stockyard canyons)
- A fourth inload stacker SK705
- Transfer station TS909.

In addition to the existing and approved stockyard infrastructure, Fortescue proposes to construct minor infrastructure to match the shiploading capacity of the Anderson Point MHF throughput:

- Construction and operation of an additional fourth shiploader (SL 704 / CV 940) and new conveyor CV 933 at AP5 berth.
- Construction and operation of a new shuttle conveyor SH 953 at AP5.
- Construction and operation of a new transfer station TS 302 which will connect CV 302 with CV 902, CV 903, CV 908 and CV 909.
- Tie in of CV 908 with CV 901 and TS 901 (CV 908 has been constructed).
- Proposed extension to existing transfer station TS 901 to join CV 908 and CV 909.
- Construction and operation of 4 new additional HPLV’s (belt wash stations) on CV 918, CV 927, CV 951 and CV 933. Potential to install an additional 3 optional HPLV’s on CV 901, CV 905 and CV 906.

- Construction and operation of three new bulk ore conditioning sprayers on conveyors within the inload and outload circuit.
- Construction and operation of Moisture Reduction System (MRS) trial beneath Canyon G stockpile to extract water from magnetite product in order to maintain transportable moisture limit (TML) below 10.5%.
- Proposed progressive replacement of noise rollers on outload circuit at the shiploading berths.
- Additional stormwater discharge location for TUL2 and update to water recovery system from TUL facilities.
- Construction and operation of a new desalination plant to replace the existing desalination plant at the MHF.
- Proposed change in the definition of Condition 25 in relation to DEM compliance of iron ore outload and alignment with other operators at the Port of Port Hedland.

These changes will support the removal of the restriction of hematite ore throughput and incremental increase in throughput capacity up to 210 Mtpa of hematite for the Anderson Point MHF.

Fortescue requests that the list of infrastructure and equipment in Schedule 2 of the Licence be updated as per Table 8 and shown in Figure 5 and Figure 6. The construction compliance requirements for the proposed infrastructure associated with this proposal are identified in Appendix 8.

Figure 5 Fortescue Expansion – Additional Infrastructure

662,500 663,000 663,500

7,748,000

7,747,500

7,747,000

7,746,500

G1 F1 F1 E1 D1 C1 B1 A1

RC703/CV938

CV918 CV917 CV916 CV914 CV912 CV913 CV911

SUB571 SUB467 DESAL

TS909 CV909 CV968 CV908 CV903

TS908 TS902

Refer Inset

SUB566 SUB090

Workshops & Permit Hut

SUB010

CV302

Admin Office & Medical

CV906 CV905 CV901

SUB462 SUB461 SUB463

TUL001

SUB661 SUB662

TUL002 SUB663

TUL003 SUB563

SUB562 SUB561

INSET

CV911 CV902 TS906 SUB465 TS901 CV908 CV903 CV909 TS302 (Proposed) TS901 Ext (Proposed) SUB667 SUB666 CV906 CV905 CV302 CV901

LEGEND

- Prescribed Premise Boundary
- Reclaimer
- Admin Office/Medical
- Desalination
- Sub Station
- Train Unloader
- Transfer Station
- Transfer (Proposed)
- Workshops/Permit Hut
- Approved Infrastructure
- Conveyors

Canyons (Status)

- Existing
- Not in use

N

0 100 200 300

Metres

Requested By: L. Sheridan
Drawn By: J. Burke
Revised By: shlaw
Approved By:
Scale: 1:5,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: P_MP_EN_0183.004_r3

Date: 31/03/2022
Size: A3P
Revision: 3
Confidentiality: 1

Anderson Point MHF
Infrastructure Site Plan
(Map 4 of 4)

FMG Fortescue

Figure 6 Fortescue Expansion – Additional Infrastructure Wharf Side

664,000 664,500 665,000 665,500

7,751,500

7,751,000

TS905

SUB473

SUB591

SUB691

SL701/CV925

CV922

SL703/CV935

CV932

SL704/CV940
(Proposed)

CV933
(Proposed)

SH953
(Proposed)

SUB695

CV953

BN950

TS954

SUB694

CV921

CV921A

CV948A

CV948

CV950

SL702/CV926

CV927

LEGEND

- Surge Bin
- Shuttle (Proposed)
- Sub Station
- Transfer Station
- Ship Loader (Existing)
- Ship Loader (Proposed)
- Conveyors (Proposed)
- Conveyors
- Prescribed Premise Boundary

N

0 100 200 300

Metres

Requested By: T. Ridgeway
Drawn By:J. Burke
Revised By: jburke
Approved By:
Scale: 1:5,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: P_MP_EN_0183.001_r2

Date: 9/12/2021
Size: A3L
Revision: 0
Confidentiality: 1

Anderson Point MHF

Infrastructure Site Plan

(Map 1 of 4)

Fortescue

Table 9: Infrastructure and Equipment – Proposed Amendments (new infrastructure in bold)

Infrastructure	Reference
3 Train unloaders	Site Plan: TUL001, TUL002, TUL003
4 Stackers	Site Plan: SK701/CV923, SK702/CV936, SK704/CV937, SK705/CV939
3 Reclaimers	Site Plan: RC701/CV920, RC702/CV928, RC703/CV938
Stockpiles 6 rows of live stockpiles 2 rows of bulk-out stockpiles	Site Plan: Live stockpiles B1-B6, C1-C6, D1-D6, E1-E6, F1-F6, G1-G6
Inload Conveyors	Site Plan: CV302, CV901, CV902, CV903, CV905, CV906, CV908, CV909**,** CV911, CV912, CV916, CV918, CV968
Outload Conveyors	CV913, CV914, CV917, CV944, CV915, CV921, **CV921A***, CV922, CV927, CV932, **CV933,** CV945, CV948, **CV948A***, CV950, CV953
Transfer Stations	Site Plan: **TS302**, TS901, TS902, TS903, TS904, TS905, TS906, TS908, TS909, TS914, TS917, TS944, TS945, TS954, TS968
Shuttle Conveyors	Site Plan: SH913, SH914, SH917, SH906A**, SH953**
Sample Stations	SS903, SS917, SS914, SS913, SS944, SS945
Belt Wash Stations	CV302, CV918, CV927, CV932, **CV933**
Surge Bins	Site Plan: **BN921, BN948,** BN950
Shiploaders	Site Plan: SL701/CV925, SL702/CV926, SL703/CV935, **SL704/CV940**

* only required if surge bins BN921 and BN948 are installed.

4.4 BERTH AND WHARF FACILITIES

Fortescue operates five berths from the existing Port. No changes to the existing berth and wharf facilities are proposed.

4.5 SHIPLOADING

Three shiploaders are used to load ore from the outload circuit to bulk ore carriers.

There is a proposed new Shiploader (SL 704/CV 940) to be constructed at the AP5 berth per the design details and map provided at Appendix 1 and Figure 6.

The shiploader will be fitted with spray bars that will be operated on boom discharge and conveyor when loading to minimise dust emissions from the outload infrastructure. There is also an additional conveyor (CV933) proposed between AP 4 and AP5 to provide flexibility for ship

loading along the outload wharf. The proposed location of the new outload conveyor CV 933 is identified in the map provided at Figure 6.

4.6 WATER SUPPLY – DESALINATION PLANT

4.6.1 Background

On 24 September 2021, the Department of Water and Environmental Regulation (DWER) granted Fortescue a Licence Amendment under L8194/2007/3. The amendment authorised a throughput increase from 175 million tonnes per annum (Mtpa) to 210 Mtpa at the Port Hedland Anderson Point Materials Handling Facility (MHF).

It has been determined that corresponding water demand for dust control infrastructure at the Anderson Point MHF will increase from 1.4 gigalitres per annum (GLpa) to 2.5 GLpa, with a further provision to increase up to 3.2 GLpa. Fortescue currently holds GWL163999(7) under the RIWI Act 1914, allowing the abstraction of up to 1 GLpa for dust suppression, product processing, and railway construction and maintenance.

The existing desalination plant is approaching the end of its usable lifespan. The location of the existing desalination plant, in relation to the intake and outlets, is not ideal from a construction perspective due to the costs associated with maintaining and servicing the extensive length of infrastructure to run the plant, making the existing desalination plant costly to maintain and operate. Thereby Fortescue has explored multiple sites for the new desalination plant considering the above factors.

Australia Island has been selected as the most appropriate site with fewer environmental and construction constraints to support the construction of a desalination plant. The rationale for choosing Australia Island is that the area has adequate land available for construction. The site is near the ocean, so the pipeline will not be as long, reducing costs and the risk of failure and discharge of water. There is good quality seawater in the vicinity and the site is close to a power source.

4.6.2 Proposed change

Fortescue intends to construct a new desalination plant at Australia Island to replace the existing plant, which will be decommissioned once the new desalination plant is entirely built. The increased water demand is planned to be met through the continued abstraction from the MHF Water Supply Borefield and the new desalination plant.

Based on water usage from the MHF, it has been determined that a 5.4 ML/d plant is required to sustain 100% of the current water demand with 5% extra contingency availability. This would still be within the current licence inlet capacity of 12 ML/day. The size of the plant has been based on

the recovery rate of 45% as determined and recommended by the supplier to increase the plant's longevity.

Table 10: Required size of the new desalination plant

Desalination water supply (ML/day)	Bore water supply (ML/day)	Total Water Supplied (bore water and desalination) (ML/day)	Total water used in plant
1.73	3.5	5.23	5.11

The new desalination plant will be located within the south eastern corner of Australia Island as indicated in the map provided below in and will operate within the approved specifications of the existing plant, except for the location of the inlet and outlet points, increased outputs from treated water and brine discharge TDS. The proposed design of the new desalination plant is outlined in Appendix 2.

There is also a proposed amendment to the prescribed premises boundary to include the new desalination plant location as indicated in Figure 7. Table 10 below compares the existing and proposed new desalination plant and highlights the proposed changes to the key characteristics table.

Table 11: Existing and proposed desalination plant characteristics

Aspect	Approved Existing Characteristics	Proposed Characteristics
Location	Herb Elliott Port Facility, Anderson Point, Port Hedland	Herb Elliott Port Facility, Anderson Point, Port Hedland
Input	Maximum inflow of approximately 12 ML/d of seawater	Maximum inflow of approximately 12 ML/d of seawater
Output	Maximum design capacity: approximately 4 ML/d (1.5 GL/a) of treated water Maximum waste discharge: approximately 8 ML/d of saline water	**Maximum design capacity: approximately 5.4 ML/d of treated water** **Maximum waste discharge: approximately 6.6 ML/d of saline water**
Discharge Water Quality	Approximately 60,000 mg/L total dissolved solids (TDS) discharged into Port Hedland Harbour	**Approximately 76,000 mg/L total dissolved solids (TDS) discharged into Port Hedland Harbour**
Environmental Impacts	Potential impacts to water quality and associated ecosystems within the harbour due to discharge of saline water Minimal noise and dust	Potential impacts to water quality and associated ecosystems within the harbour due to discharge of saline water Minimal noise and dust

Aspect	Approved Existing Characteristics	Proposed Characteristics
Location	Herb Elliott Port Facility, Anderson Point, Port Hedland	Herb Elliott Port Facility, Anderson Point, Port Hedland

The existing desalination plant utilised AP1 and AP5 as the inlet and outlet discharge points. In contrast, the new desalination plant will operate the inlet on the service area of the wharf as the seawater inlet and the proposed brine discharge outfall as the outlet (Figure 8).

Additionally, the new desalination plant will be more efficient than the existing plant by producing less brine and more treated water, increasing by 35 % (5.4 ML/d). Brine discharge can potentially change seawater's salinity, alkalinity, and temperature averages, having catastrophic impacts on the marine habitat (Danoun, 2007). The new desalination plant will discharge less brine into the environment (6.6 ML/d), thereby reducing the harmful effects on associated ecosystems within the Port Hedland harbour due to the discharge of saline water. The brine produced from the existing desalination plant is discharged through the outfall at approximately 60,000 mg/L TDS. In contrast, brine produced from the new desalination plant is anticipated to be discharged through the new outfall at approximately 76,000 mg/L TDS.

To support the proposed increase in brine discharge salinity, brine dispersion modelling of the existing case and proposed new desalination plant, seawater intake and new brine discharge point was carried out by GHD to predict the potential impacts to the marine environment related to the increased brine flow and TDS concentration. The GHD brine discharge modelling report (GHD, 2022) provided at Appendix 3 concluded that the proposed increase in brine flow rate and salinity is predicted to comply with the derived Environmental Quality Guidelines (EQG's) for the existing High Level of Ecological Protection (HEPA) and Moderate Level of Ecological Protection (MEPA) delineations of Port Hedland Harbour. As identified in Section 5 of the report the proposed salinity is well below the EQG's for the upper creeks, harbour entrance and harbour waters.

The proposed relocation of the brine discharge outlet from the western shore of Anderson Point (existing case) to the eastern shore of the northern tip of Anderson Point (proposed case) was predicted to shift the zone of increased salinity to the eastern creeks of the harbour (Stingray Creek and South East Creek) for the proposed case, while reducing the input of brine to South West Creek. Furthermore, the new outlet location is subject to faster currents relative to the existing site which will yield a higher degree of dilution with ambient waters in close proximity to the outlet, resulting in a smaller incremental salinity increase (GHD, 2022). The predicted excess salinity at the proposed outlet location (0.31 Practical Salinity Units (PSU)) is lower than that of the existing case (0.62 PSU) despite an increase in the discharge rate and salinity of the reject brine for the proposed case.

In summary, the analysis conducted by GHD indicated that the potential brine impacts from the proposed increase in brine discharge salinity from the new desalination plant is environmentally acceptable.

Figure 7: Proposed desalination plant, seawater intake and brine discharge location

LEGEND

- Current Brine Discharge
- Current Seawater Inlet
- Proposed Brine Discharge
- Proposed Seawater Intake
- Proposed Desalination Plant

Part V Boundaries

- Existing Prescribed Premises
- Proposed Premises Extension

Data Sources:
All data, FMG, 2021.

N

0 50 100 150 200 250
Meters

Desalination Plant
Anderson Point

Requested By: T. Chipangura
Drawn By: S. Costello
Revised By: bralebala
Approved By: S. Costello
Scale: 1:6,000
Coordinate System: GDA 1994 MGA Zone 50
Document Name: P_MP_EN_0205.001_r3

Date: 7/02/2022
Size: A4L
Revision: 3
Confidentiality: 0

FMG Fortescue

4.7 MOISTURE REDUCTION SYSTEM TRIAL

4.7.1 Background

With magnetite concentrate scheduled from the Iron Bridge project and delivered to the MHF in December 2022, there is a requirement to meet the transportable moisture limit (TML) of the magnetite. The TML of the magnetite is required to be below 10.5% in order for the magnetite product to be shipped out of Port Hedland. If the TML is above 10.5% there is a risk that the magnetite concentrate may liquify during transport and result in a bulk ore carrier (ship) becoming unstable and capsize at sea. The moisture content of the product needs to be managed below it's transportable moisture limit (TML) of 10.5% and above the magnetite's DEM of 3.5%.

The magnetite concentrate will be processed through the Concentrate Handling Facility (CHF) at the MHF to approximately 10% moisture but the TML will be difficult to maintain under 10.5% during this process. Hence, there is a requirement to trial a moisture reduction system (MRS) beneath a Canyon G stockpile to reduce the moisture content below 10.5% TML and maintain moisture above the 3.5% DEM. The indicative design details for the MRS are provided in Appendix 4. It is important to note that the MRS will not affect the moisture content on the outside of the stockpiles that are maintained through the use of water cannons to reduce dust lift off as the system extracts water from within at the base and centre of the stockpile (as indicated in the figures provided at Appendix 4). Normal dust suppression measures (such as water cannons etc) will continue to be used on the stockpile during the operation of the MRS.

The alternative solution to the MRS is to leave the product to drain naturally, however indications are that with the magnetite product that this could take two weeks resident time to achieve the same result as the MRS. This is not feasible for the magnetite product given shipping loads and not practical at the planned 22 Mt of magnetite per annum.

4.7.2 Proposed change

The proposal is to install the Moisture Reduction System (MRS) beneath a single stockpile footprint (300m x 50m) in Canyon G initially to trial the system and ensure it achieves what is required. There is potential to expand into additional stockpiles within Canyon G and subsequently into Canyon H if the trial is successful.

The water that is extracted through the MRS at approximately 100-200L/second will be discharged to the surface water drain adjacent to the stockpile which forms part of the surface water management on site and/or will be returned to the CHF for use. The surface water drain has adequate capacity (1500L/second) to contain the water discharged from the MRS and stormwater in a 1:100 year 3 hour duration rainfall event, there is still an additional capacity of 800 L/second within the drain. The water proposed to be extracted through the MRS under the stockpile is expected to be of good water quality suitable for reuse within the MHF.

4.8 PROPOSED STORMWATER DISCHARGE FROM TUL2

4.8.1 Background

There is a requirement for an additional stormwater discharge point from TUL2 in the event of heavy rain from a cyclone or tropical low. The proposed discharge point will take water from TUL2 into a diversion drainage channel that connects with the existing stormwater surface drainage network at the MHF.

4.8.2 Proposed change

The proposed change to the licence is to include a new stormwater discharge point north of TUL2 within the diversion drain located north of TUL2 as outlined in the map provided in Appendix 5. The point is proposed to be labelled as 'W6' and the change within the licence is identified in Table 11 below.

Table 12: Proposed change to Table 15 in Schedule 3 of L8194/2007/3

Stormwater and wastewater management				
Row	Site infrastructure	Description	Operation requirements	Reference to plan
13.	Stormwater discharge points	Sedimentation ponds, silt traps and discharge points	Stormwater runoff from areas other than those areas handling or storing hydrocarbons (specifically workshop, vehicle washdown bay, train unloader, conveyor transfer points, refuelling areas and fuel storage tanks) is directed to sedimentation ponds. Stormwater is retained within the sedimentation ponds/silt traps for a sufficient period for the majority of suspended particles to settle prior to discharge from the following locations: • W1 – Sedimentation basin discharging to South West Creek; • W2 – Australia Island silt trap discharge; • W3 – Sample laboratory silt trap discharged via overflow pipe into South West Creek; • W4 – Australia Island Settlement Pond;	Figure 9: W1, W2, W3, W4, TUL1 Stormwater discharge point, **TUL2 Stormwater discharge point,** and L2

Stormwater and wastewater management				
			• TUL1 Stormwater discharge point; • **TUL2 Stormwater discharge point; and** • L2 – Train Unloader 3 Silt Trap discharge to rail loop	

4.9 PROPOSED CHANGE TO DEM OUTLOAD (CONDITION 25)

The dust modelling undertaken for the proposal (across all 3 scenarios) provided at Appendix 6 shows no net increase in dust emissions and no change or decrease in the number of exceedences with the Taskforce criteria at the Taplin St receptor.

Condition 25 of the current licence states that the licence holder must ensure that by 1 July 2022, 99% of iron ore outloaded from the premises, has a moisture content at or above the DEM level derived from application of AS4156.6-2000 and updated on an annual basis through laboratory analysis. Fortescue's current production schedule and blending of products demonstrates that compliance with 99% of all iron ore product at or above DEM at outload is difficult to achieve. Fortescue is proposing to change the compliance level from 99% to 95% to be consistent with requirements for other operators at the Port of Port Hedland without having any net increase in dust emissions or increase in the number of exceedences at the Taplin St receptor. The proposed installation of 7 belt wash stations identified in Section 6.2 below will assist to reduce any dust emissions from the facility.

The proposed change to the condition wording within the licence is identified in the excerpts below in bold.

Condition 24

The Licence Holder must ensure that ~~***until 30 June 2022***~~ *at least 95% of Iron Ore out-loaded from the Premises, as averaged per cargo hold, has a Moisture Content at or above the DEM level derived from application of AS4156.6-2000 and updated on an annual basis through laboratory analysis.*

Condition 25

~~***The Licence Holder must ensure that by 1 July 2022, 99% of Iron Ore out-loaded from the Premises, as averaged per cargo hold, has a Moisture Content at or above the DEM level derived from application of AS4156.6-2000 and updated on an annual basis through laboratory analysis.***~~

4.10 PROPOSED IMPROVEMENT IN DUST CONTROL INFRASTRUCTURE

Fortescue proposes to change the wording within Condition 10 to allow port operations to improve dust control measures and infrastructure within the Anderson Point MHF. If an area within the Anderson Point MHF is identified as requiring additional dust suppression measures, Fortescue will look to implement/install additional dust controls such as box sprays, ore conditioning sprayers etc.

The proposed change to the condition to allow improvements in dust suppression across the MHF includes the changes in bold below.

> ***Condition 10***
>
> *The Licence Holder must take proactive dust management measures where possible to prevent dust generation.* ***This may include installation of additional dust suppression measures such as ore conditioning sprays, belt cleaning infrastructure,*** *and at a minimum the wetting down of exposed areas prior to construction and/or clearing activities that involve ground disturbance, and as needed in accordance with Condition 10.*

5. IMPACT ASSESSMENT

5.1 EMISSIONS TO AIR - DUST

5.1.1 Dust Modelling

During 2014 and 2015 the Port Hedland Industries Council (PHIC) undertook an extensive atmospheric dispersion model validation project where it was determined that both AERMOD and CALPUFF were suitable models to determine the potential impact from industrial sources. In brief:

- AERMOD is the acronym or common name for the AERMIC Dispersion Model. It was designed by the AERMIC Committee (the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee) to treat elevated and surface emission sources in terrain that is simple or complex. In 2013 AERMOD replaced AUSPLUME as the regulatory model for air quality assessments in Victoria by the Victorian Environmental Protection Authority (VicEPA).

- CALPUFF is the dispersion module of the CALMET/CALPUFF suite of models. It is a multi-layer, multi species, non-steady-state puff dispersion model that can simulate the effects of time-varying and space-varying meteorological conditions on pollutant transport, transformation and removal. The model contains algorithms for near-source effects such as building downwash, partial plume penetration, sub-grid scale interactions as well as longer range effects such as pollutant removal, chemical transformation, vertical wind shear and coastal interaction effects. The model employs dispersion equations based on a Gaussian distribution of pollutants across released puffs and considers the complex arrangement of emissions from point, area, volume and line sources.

For this assessment, the dispersion model AERMOD (version 9.4) was used. The primary reason for using this model is that other proponents in the region, particularly BHP and Roy Hill, have recently used AERMOD for their own approvals process. By using AERMOD this assessment ensures consistency with other assessments within the region.

The model was configured in accordance with the work undertaken as a part of the PHIC Cumulative Air Model (CAM) (PEL, 2015). As noted in the PHIC CAM report (PEL, 2015) there are some constraints that need to be considered when using the PHIC CAM (AERMOD) including:

- The model may over-predict concentrations at Richardson Street.

- At the Kingsmill Street and Taplin Street receptors the model results are considered to be reasonable reflections of actual monitored air quality.
- The number of exceedances of the interim target at Taplin Street are considered to be reasonable reflections.

5.1.2 Air Quality Assessment Criteria

To control air pollution and achieve what is regarded as acceptable air quality, environmental authorities set air quality standards or guidelines for several common air pollutants.

The Western Australia Government has adopted the standards outlined by the National Environmental Protection Council in the National Environmental Protection Measure (NEPM) for Ambient Air Quality. For particulates, as PM10, the ambient standard is 50 µg/m^3 based on a 24-hour average.

For Port Hedland, the Port Hedland Regulatory Strategy (DWER, 2021) adopted the Dust Management Taskforce (Taskforce) interim guideline value of 70 µg/m^3 for PM10 (24-hour average) as an Air Guideline Value (AGV) with 10 exceedances per year, continue to be applied. This guideline is determined at the Taplin Street monitoring station (DSD, 2010), and for the purposes of assessing potential impact is extended to South Hedland and Wedgefield. The criteria used in this assessment is presented in Table 12 below.

Table 13: Air Quality Criteria – Dust Model

Pollutant	Criteria	Averaging Period	Comment
Particulate (as PM_{10})	70 µg/m^3	24-hour	Taplin Street, 10 exceedances per year

5.1.3 Background Concentrations

For this assessment, the PHIC CAM background model was utilised and the methodology for the development of this model is outlined in PEL (2015). The PEL (2015) report also noted that due to the way the model was calculated there is a high probability that not all fugitive sources within the Port Hedland region were accounted for. This provides further indication that the model should be considered as indicative only. The 24-hour statistics for the PHIC CAM background model are presented in Table 13. From this table it is apparent that the maximum 24-hour concentration is higher than the criteria which will affect the analysis of the modelling results, particularly when the maximum predicted concentrations, with background, are presented.

Table 14: Statistics of 24-hour PM10 PHIC CAM background model

Statistic	Concentration (µg/m^3)
Maximum	183
99th Percentile	53
95th Percentile	36
90th Percentile	32
70th Percentile	25
Average	22
Count >50 µg/m^3	5
Count >70 µg/m^3	1

5.1.4 Scenarios

Dust modelling was undertaken by Tallis Consultants to support the removal of the 188 Mtpa restriction on hematite throughput (within the approved 210 Mtpa throughput) at the MHF and proposed infrastructure changes at the stockyards and shiploading to assist with the increase in hematite throuhput. The dust modelling report is provided in Appendix 6.

The modelling was undertaken for three scenarios:

- Scenario 1 - 210 Mtpa hematite in isolation
- Scenario 2 – 200 Mtpa hematite and 10 Mtpa magnetite
- Scenario 3 – 195 Mtpa hematite and 15 Mtpa magnetite

For each of these scenarios the results were presented as:

- Standalone without background concentrations.
- Each scenario with other existing, approved and planned operations in the region including;
    - BHP Billiton Iron ore at 330 Mtpa
    - Pilbara Port Authority (PPA) at 24.1 Mtpa
    - Roy Hill at 70 Mtpa

- North West Infrastructure (NWI) at 50 Mtpa

The base case for this assessment is the approved 210 Mtpa scenario. The emissions for this scenario were re-estimated to incorporate improvements to the site-specific emission estimates (Appendix D within Appendix 6) since the original assessment was undertaken (Environ, 2014). As part of this emission estimation additional existing sources were included namely the conveyors associated with CV Inload-SK and CV Outload-RC. To estimate emissions the process flow for the 210 Mtpa base case was obtained. This contains the hourly tonnage, by product type, through the Train Unloaders (TULs), stackers, reclaimers and shiploaders.

5.1.5 Model Predictions

Base Case - 210 Mtpa (Fortescue) in isolation and cumulative

For reference purposes the predicted ground level concentrations at the Taplin Street receptor, for the Fortescue operations at 210 Mtpa (100% Hematite with 50Mtpa of ore from Eliwana mine (dry processed)), are presented in Table 14. This table presents the results for Fortescue as a standalone operation (without background) and cumulatively with other approved operations in the airshed (Appendix E.1 within Appendix 6).

Table 15: Predicted 24-hour ground level concentrations at Taplin St – Base Case

Statistic	Fortescue – no background	Cumulative – with background
Maximum	31	201
99th Percentile	23	76
95th percentile	14	58
90th percentile	10	52
70th percentile	5	42
Annual Average	4.1	34.6
Days > 70ug/m3	**0**	**8**

210Mtpa Model Results

Scenario 1 – in isolation and cumulative

For reference purposes the predicted ground level concentrations at the Taplin Street receptor, for the Fortescue operations at the proposed base case for Scenario 1 (210 Mtpa Hematite throughput with and 30 Mtpa contribution of ore from Eliwana mine), are presented in Table 15. This table presents the results for Fortescue as a standalone operation (without background) and cumulatively with approved operations in the airshed (Appendix E.2 within Appendix 6).

Table 16: Predicted 24-hour ground level concentrations of PM10 at Taplin Street for Scenario 1

Statistic	Fortescue – no background	Cumulative – with background
Maximum	29	201
99th Percentile	21	76
95th percentile	13	57
90th percentile	9	50
70th percentile	5	41
Average	3.9	34.4
Days > 70ug/m3	**0**	**7**

The results of the Scenario 1 modelling indicate that when compared to the base case, on a standalone basis:

- There will be a decrease in the maximum predicted ground level concentration at Taplin St.
- The model predicts that there will be a slight reduction in the annual average concentration at Taplin St.

The modelling also indicates that there will be decreases in the predicted ground level concentrations at other receptors within Port Hedland including the Richardson St and Kingsmill St receptors.

For the cumulative scenario:

- There will be no change in the maximum predicted ground level concentration at the Taplin St receptor
- There will be a reduction in the predicted annual average at the Taplin St receptor
- There will be no change in the number of exceedances of the Taskforce criteria

The modelling also indicates that there will be decreases in the predicted annual average concentrations at other receptors within Port Hedland including the Richardson St and Kingsmill St receptors.

Scenario 2 – in isolation and cumulative

For reference purposes the predicted ground level concentrations at the Taplin Street receptor, for the Fortescue operations at the proposed base case for Scenario 2 (200 Mtpa Hematite, 10Mtpa Magnetite), are presented in Table 16. This table presents the results for Fortescue as a standalone operation (without background) and cumulatively with approved operations in the airshed (Appendix E.3 within Appendix 6).

Table 17: Predicted 24-hour ground level concentrations of PM_{10} at Taplin St for Scenario 2

Statistic	Fortescue – no background	Cumulative – with background
Maximum	29	201
99th Percentile	22	75
95th percentile	12	57
90th percentile	9	50
70th percentile	5	41
Annual Average	3.8	34.3
Days > 70ug/m3	**0**	**7**

The results of the Scenario 2 modelling indicate when compared to the base case that, on a standalone basis:

- There will be a decrease in the maximum predicted ground level concentration at Taplin St.
- The model predicts that there will be a slight reduction in the annual average concentration at Taplin St.
- The modelling also indicates that there will be decreases in the predicted ground level concentrations at other receptors within Port Hedland including the Richardson St and Kingsmill St receptors.

For the cumulative scenario:

- There will be a no change in the maximum predicted ground level concentration at the Taplin St receptor
- There will be a reduction in the predicted annual average concentration at the Taplin St receptor
- There will be a reduction in the number of exceedances of the Taskforce criteria
- The modelling also indicates that there will be decreases in the predicted annual average concentrations at other receptors within Port Hedland including the Richardson St and Kingsmill St receptors.

Scenario 3 – in isolation and cumulative

For reference purposes the predicted ground level concentrations at the Taplin Street receptor, for the Fortescue operations at the proposed base case for Scenario 3 (195 Mtpa Hematite, 15Mtpa Magnetite), are presented in Table 17. This table presents the results for Fortescue as a standalone operation (without background) and cumulatively with approved operations in the airshed (Appendix E.4 within Appendix 6).

Table 18: Predicted 24 hour ground level concentrations of PM10 at Taplin St for Scenario 3

Statistic	Fortescue – no background	Cumulative – with background
Maximum	28	199
99th Percentile	21	75
95th percentile	12	57
90th percentile	9	50
70th percentile	5	41
Annual Average	3.8	34.3
Days > 70ug/m3	**0**	**7**

The results of the Scenario 3 modelling indicate when compared to the base case that on a standalone basis:

- There will be a decrease in the maximum predicted ground level concentration at the Taplin St. receptor
- The model predicts that there will be a slight reduction in the annual average concentration at Taplin St.
- The modelling also indicates that there will be decreases in the predicted ground level concentrations at other receptors within Port Hedland including the Richardson St and Kingsmill St receptors.

For the cumulative scenario:

- There will be a reduction in the maximum predicted ground level concentration at the Taplin St receptor
- There will be a reduction in the predicted annual average concentration at the Taplin St receptor
- There will be a reduction in the number of exceedances of the Taskforce criteria

- The modelling also indicates that there will be decreases in the predicted annual average concentrations at other receptors within Port Hedland including the Richardson St and Kingsmill St receptors.

5.2 EMISSIONS TO AIR - NOISE

5.2.1 Noise Dispersion Modelling

Noise management in Western Australia is implemented through the Environmental Protection (Noise) Regulations 1997, which operate under the EP Act.

The Regulations define maximum allowable noise levels which apply to noise received at noise sensitive premises, such as residential areas. These are determined by a combination of a base noise level plus an Influencing Factor (IF). The result is termed the “assigned level”.

The assigned noise levels include three noise parameters, defined as:

- L_{ASMAX} – assigned level which is not to be exceeded at any time;
- L_{AS1} – assigned level which is not to be exceeded for more than 1% of time; and
- L_{AS10} – assigned level which is not to be exceeded for more than 10% of time.

The L_{A10} noise limit is most representative of continuous noise emissions from the Anderson Point MHF.

For noise sensitive premises, the time of day also affects the assigned levels. As the Anderson Point MHF operates 24 hours a day, 7 days a week, the noise emissions have been assessed against the most stringent night-time assigned levels (10pm-7am).

Based on the above, the night-time L_{A10} assigned level will be used to assess the Anderson Point MHF. A discussion of the Environmental Protection (Noise) Regulations is presented in Appendix 4.

The PHIC cumulative environmental noise study has identified that cumulative noise emissions from industry in Port Hedland currently exceed the Regulatory noise levels. At this stage, a Regulation 17 exemption process has not been initiated for Port Hedland. Until such an exemption has been approved, it is proposed that the PHIC strategic noise goals be utilised to give guidance to operators with regard to noise management and assessment in Port Hedland.

This study has adopted a methodology based on the PHIC cumulative environmental noise study recommendations so that the proposed expansion for the study. The recommended methodology from cumulative environmental noise study is as follows;

During ongoing operations:

- Ensure plant and infrastructure equipment items are maintained and that their noise emissions are addressed in maintenance plans and activities.

During growth:

- As Low As Reasonably Practicable (ALARP) noise levels must be achieved and demonstrated.
- When assessed in isolation, i.e. excluding existing plant and infrastructure, any new plant equipment and infrastructure must comply with the Environmental Protection (Noise) Regulations 1997.
- The overall noise emissions, i.e. those of new plant and existing plant, remain the same or improve.

The “during growth” methodology is applicable to the Project as it involves the installation of new infrastructure. This requires the assessment of two modelling scenarios as follows:

In-Isolation Scenario.

An “in-isolation” scenario is a modelling scenario that consists of only new plant equipment and infrastructure (i.e. with no existing facility). As per the PHIC methodology, this must comply with the *Environmental Protection (Noise) Regulations 1997*.

Cumulative Scenario.

The cumulative case scenario consists of the existing facility (i.e. the base case) plus all new equipment and infrastructure required for the Project. This scenario is used to assess the overall Fortescue noise emissions against the cumulative levels in Port Hedland and requires that the overall noise levels from the facility remain the same so that there is no net increase.

Receptors

The applicable noise limits for the Project, including influencing factors and adjustments, are presented in Table 7, Section 3.4.8. These include both the in-isolation and cumulative levels. The receivers are the same as those used in the PHIC CENS and represented in Figure 8.

Figure 8: Noise Sensitive Receptors

5.2.2 Model Predictions

The noise modelling for the in-isolation case and cumulative case was carried out by Talis Consultants in September 2021. The environmental noise assessment report is attached at Appendix 7.

The predicted received noise levels for both the in-isolation case and cumulative case, and a comparison against the applicable noise criteria are presented in Table 18. All model runs were under worst case night-time weather conditions.

Table 19: LA_{10} Noise Modelling Results and Compliance Assessment

Sensitive Receiver	In Isolation Scenario			Cumulative Scenario		
	Assigned Level	Model Result	Cumulative Level increase in dB	Base Case	Model Result	Cumulative Level increase in dB
Brearley Street	32	28.3	Nil	40.7	41.6	0.9
Hospital	32	36.1	4.1	48.2	49.1	0.9
Police Station	47	44.8	Nil	54.8	55.9	1.1
Pretty Pool	30	17.0	Nil	29.5	30.4	0.9
South Hedland	30	11.4	Nil	27.0	27.8	0.8

From the modelling and analysis for the proposed 210 Mtpa expansion, the following has been concluded;

- The in-isolation case complies with the assigned levels at all receivers except for the Hospital. The results of the noise modelling for the proposed 210Mtpa expansion demonstrate that the in-isolation case complies with the assigned levels at all receivers with the exception of the Hospital. As such, it has been assumed that all new conveyors will be fitted with Ultra Low Noise Idlers.

- The cumulative model scenario results show that the noise impacts have increased at all receivers by between 0.8 and 1.1db compared to the base case. This is due to the addition of the new infrastructure and the increase in SWL's of existing equipment measured in 2021, when compared to the last SWL measurements taken in 2017.

- Based on the proposed increases at all receivers for the cumulative scenario, it is recommended that noise mitigation is proposed for the cumulative case and specifically that ultra-low noise idlers be fitted to existing conveyors CV921, CV922, CV927, CV948 and CV 911 and all new conveyors which make up the in-isolation case for new infrastructure.

When the controls (ultra-low noise idlers) are applied to mitigate noise levels in the cumulative scenario, all the modelled results at the sensitive receivers are below the base case as identified in Table 19 below.

Table 20: Noise modelling results with noise controls

Sensitive Receiver	Cumulative Scenario [dB(A)]		
	Base Case	Model Result	Cumulative Level increase in dB
Brearley Street	40.7	40.3	Nil
Hospital	48.2	47.9	Nil
Police Station	54.8	54.7	Nil
Pretty Pool	29.5	29.1	Nil
South Hedland	27.0	26.8	Nil

5.3 EMISSIONS TO AIR - LIGHT

Lighting is currently used at the MHF to enable safe, continuous operations and maintenance during the hours of darkness. Lighting is directed and/or shielded to minimise light overspill. No significant changes to lighting are proposed.

5.4 EMISSIONS TO WATER

With the exception of the addition of a discharge point at TUL2 for the discharge of uncontaminated stormwater (Appendix 5), no changes to existing surface water drainage are required for the Proposal. The Proposal infrastructure is located entirely within the approved disturbance boundaries for Ministerial Statement 690 and can be managed under the existing Licence. The only exception to this is the proposed new desalination plant which will be situated within the proposed premises expansion area as identified in Section 4.6 and surface water drainage around this facility will tie-in with the existing surface water management at the MHF.

The risk of impact to surface water resulting from Port operations is limited and will be managed using the existing surface water controls including:

- Existing drains and sediment basins to manage sediment in runoff waters; and
- Implementation of existing controls on the storage and use of hydrocarbons and chemicals

There is a new proposed brine discharge point associated with the new desalination plant at the MHF which will produce brine discharge of approximately 76,000 mg/L TDS to the marine environment. However, the revised brine discharge modelling undertaken by GHD (Appendix 3) and as described in Section 4.6 demonstrates that the discharge meets the Environmental Quality Guidelines (EQG's) and is environmentally acceptable.

5.5 EMISSIONS TO LAND

Discharges to land will be managed under the existing Licence and are expected to be limited to:

- Accidental spillage of ore product from conveyors, conveyor transfer points and other handling equipment;
- Accidental spillage of hydrocarbons from construction or operational activities;
- Hose down water from site cleaning; and
- Dust deposition from ambient air.

These potential discharges are subject to industry standard controls, which are documented in relevant environmental management plans.

6. ENVIRONMENTAL MANAGEMENT

During operations, the key emissions and discharges relevant to the Project will be:

- emissions to air:
  - dust emissions
  - noise emissions
- potential emissions to land and water.

An assessment of the management of potential emissions and discharges relevant to the operation of the Port is provided below.

6.1 PROJECT ENVIRONMENTAL MANAGEMENT

The MHF is an established, operating bulk materials handling facility and is operated in accordance with the conditions outlined in the Licence. Fortescue has adopted a systematic approach to environmental management and developed and implemented a series of plans, procedures and systems to manage environmental impacts at the MHF. The documents that are relevant to management of the impacts identified in this Proposal are:

- Fortescue's Environmental Policy (100-PO-EN-0001);
- Port Facility – Acid Sulphate Soils Management Plan (P-PL-EN-0014);
- Port Facility – Dust Environmental Management Plan (P-PL-EN -0010);
- Waste Management Plan (45-PL-EN-0014);
- Chemical and Hydrocarbon Management Plan (100-PL-EN-0011);
- Environmental Spills Procedure (100-PR-EN-1069);
- Chemical and Hydrocarbon Storage Procedure (100-PR-EN-1064);
- Hazardous Materials Management (45-PR-SA-0051);
- Greenhouse Gas Emissions and Energy Reporting Management Plan (100-PR-GH-0001);
- Fortescue Port Emergency Response Plan (P-PL-EM-0002); and
- Anderson Point Port Emergency Response Risk Management Plan (P-PL-EM-0155).

6.2 DUST EMISSIONS

Dust management is undertaken in accordance with the Dust Management Plan (P-PL-EN -0010) with a key objective of no net increase in dust emission in the region. Specific infrastructure and management practices currently used by Fortescue to manage dust emissions from the Port are outlined in Section 3.4.6.

In relation to the Proposal, Fortescue will install additional dust management infrastructure, as required to ensure dust emissions from the 210Mtpa Anderson Point MHF do not exceed the approved 'base case' levels listed in Section 5.1.5.

The following belt wash stations have been installed to date to achieve the 188 Mtpa run rate within the existing approved licence:

- CV911
- CV912
- CV915
- CV916
- CV921
- CV922
- CV944
- CV945
- CV948
- CV950

The following belt wash stations are proposed to be installed to achieve the maximum 210 Mtpa hematite/magnetite combination run rate with no net increase in dust emissions:

- CV302
- CV918
- CV927

Following installation of these dust controls, validation of their effectiveness will be undertaken through dust monitoring activities aimed at determining any change in emissions attributable to these controls. Depending on the results of the validation, the following dust controls may be

implemented to achieve a run rate of 210 mtpa with no net increase in dust emissions. It is highlighted that Fortescue may implement some, or all, of the controls listed below depending on the results of the validation.

Other dust controls to be implemented across the Anderson Point MHF include:

- Automation of the stockpile water cannons.
- Significant improvements in roads within the facility including:
    - Narrowing of access roads throughout the plant to reduce unsealed surfaces.
    - Increased use of water trucks and incorporating chemicals to assist in stabilising the road surface.

6.3 NOISE EMISSIONS

Noise management is undertaken in accordance with the Port and Rail Operations Noise Environmental Management Plan (45-PL-EN-0021). Specific infrastructure and management practices currently used by Fortescue to manage noise emissions from the MHF are outlined in Section 3.4.10.

In relation to the Proposal, Fortescue will install additional noise management infrastructure in order to minimise noise emissions from the Port as follows:

- Ultra-low noise idlers will be installed on existing conveyors CV921, CV922, CV927, CV948 and CV 911
- All new conveyors which make up the in-isolation case for new infrastructure will also be fitted with Ultra-low Noise Idlers.
- Ultra-low noise idlers will have a specification that is demonstrated operationally to achieve an SWL of 85 dB(A) or less in the field. The 85 dB(A) specification is applicable to the entire conveyor arrangement (not individual idlers), comprising 3 carry and 2 return idlers per metre. This will be verified by field measurement once implemented.

Following installation of low noise idlers, Fortescue will verify by field measurement that the Anderson Point MHF is being operated to meet the requirements of the Noise Regulations. If it is determined that the Anderson Point MHF is not compliance, additional contingency measures will be undertaken to remain compliant with the Noise Regulations.

REFERENCES

Department of State Development (2010) Port Hedland Air Quality and Noise Management Plan. The Port Hedland Dust Management Taskforce Report.

Department of Water and Environmental Regulation (2021). Port Hedland Regulatory Strategy. May 2021, https://www.wa.gov.au/system/files/2021-05/Port_Hedland_regulatory_strategy_May_2021.pdf

Department of Water and Environmental Regulation. Industry Regulation Fact Sheet – Managing Dust in Port Hedland (DWER/DoH, 2018), https://www.der.wa.gov.au/images/documents/our-work/community-updates/port-hedland/DWER_DOH_Fact_Sheet_-_Port_Hedland_air_quality.pdf

Department of Water and Environmental Regulation (2017). Industry Regulation Fact Sheet – Industry regulation of port facilities at Port Hedland. *https://www.itsi.wa.gov.au/docs/default-source/default-document-library/department-of-water-and-environmental-regulation-fact-sheet---industry-regulation-of-port-facilities-at-port-hedland---august-2017.pdf?sfvrsn=2*

Environment Australia (2012) National Pollutant Inventory Emission Estimation Technique Manual for Mining Version 3.1. ISBN 0 642 54700 9. Department of Sustainability, Environment, Water, Population and Communities Canberra, Australia. http://www.npi.gov.au/handbooks/approved_handbooks/mining.html

Environmental Protection Authority (2009). Environmental Protection Bulletin No. 2. Port Hedland Noise and Dust.

ETA (2022). Herb Elliot Port Dust Assessment (210 Mtpa) – Assessment Study. Report prepared for Fortescue Metals Group Ltd by Environmental Technologies and Analytics, Project 1254, issued January 2022.

ETA (2019). Dust Emission Source Characterisation Survey. Report prepared for Fortescue Metals Group Ltd by Environmental Technologies and Analytics, Project 1077, issued July 2019.

ENVIRON (2013). Herb Elliott Port Particulate Assessment. Report prepared for Fortescue Metals Group Ltd. 17 December 2013. Project Number:AS110687

Fortescue (2010). Expansion of Herb Elliott Port Facility to 120 mtpa - Onshore Component. Environmental Referral Document. August 2010 P-RP-EN-1031

GHD (2012). Report for Pilbara Gateway Port - Flora and Vegetation, Vertebrate Fauna and

Short Range Endemic Fauna Assessment.

GHD (2018). Dust Emission Source Characterisation Survey. Report prepared for Fortescue Metals Group Ltd by GHD, issued July 2018.

Hanna, S.R., G.A. Briggs and R.P. Hosker (1982). Handbook on Atmospheric Dispersion Report DOE/TIC-11223 (DE820002045). U.S. Department of Energy.

PEL (2014). FMG Herb Elliott Port Site Specific Emission Estimation. Report prepared for Fortescue Metals Group Ltd by Pacific Environment Ltd, issued June 2014.

PEL (2016). Dust Emission Source Characterisation. Report prepared for Fortescue Metals Group Ltd by Pacific Environment Ltd, issued April 2016.

PEL (2016a). FMG HPLV Monitoring. Report prepared for Fortescue Metals Group Ltd by Pacific Environment Ltd, issued August 2016.

PEL (2017). Dust Emission Source Characterisation. Report prepared for Fortescue Metals Group Ltd by Pacific Environment Ltd, issued September 2017.

PHIC (2022). Air quality and dust management Port Hedland Factsheet, Port Hedland Industries Council, https://www.phic-hedland.com.au/wp-content/uploads/2019/12/PC05472_PHIC_Air-quality-factsheet-update-Jan-2022_v1.pdf

Port Hedland Port Authority (undated). Dust Management Guidelines: Leading Practice. DOC – EH009.

Talis Consultants (2021). 210 MTPA Port Expansion: Environmental Noise Assessment Prepared for Fortescue Metals Group. Perth, WA.