Review of Existing Premises

Part V, Division 3 *Environmental Protection Act 1986*

Applicant:	**Southern Ports Authority**
ABN:	**30 044 341 250**
Licence Number:	**L5099/1974/14**
File Number:	**DER2016/0005840**
Premises:	**Port of Esperance** **The Esplanade and Bower Avenue, ESPERANCE WA 6450** **Crown Reserve 28207** **Certificate of Title Volume 3127 Folio 354**
Date of report:	**Monday, 1 October 2018**
Status of Report	**Final**

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Definitions of terms

Term	Definition
AACR	Annual Audit Compliance Report
AER	Annual Environmental Report
Amended Licence	means Reviewed Licence L5099/1974/14 as amended 1 October 2018 under Part V, Division 3 of the EP Act following the finalisation of this Decision Report.
BAM	Beta Attenuation Monitor
Category	As used in Schedule 1 of the EP Regulations
dB	decibel, a unit of measurement of sound level
Decision Report	This document
Delegated Officer	An officer to whom all of the powers and duties under - (a) sections 54, 57, 59, 59B, 60, 62 and 64 of the EP Act; and (b) regulations 5B and 5O of the EP Regulations have been delegated by the CEO of the department administering the EP Act pursuant to section 20 of that Act.
DER	Department of Environment Regulation
DEM	Dust Extinction Moisture
DWER	Department of Water and Environmental Regulation
DoH	Department of Health
EPA	Environmental Protection Authority
EP Act	means the *Environmental Protection Act 1986*
EP Regulations	means the *Environmental Protection Regulations 1987*
Existing Licence	The licence issued under Part V, Division 3 of the EP Act and in force prior to the commencement of, and during completion of, this review.
ICMS	Incident and Complaints Management System
ISQG	Interim Sediment Quality Guidelines, sourced from the *Australia and New Zealand Guidelines for Fresh and Marine Water Quality*
Licence Holder	Southern Ports Authority
Mtpa	Million tonnes per annum
MWTP	Metals wastewater treatment plant
Noise Regulations	*Environmental Protection (Noise) Regulations 1997*

PM_{10}	Particulate matter that is 10µm in diameter and smaller.
Prescribed Premises	premises of the types listed in Schedule 1 of the EP Regulations.
Premises	Esperance Port (as defined on the cover page of the Issued Licence)
Reviewed Licence	means Licence L5099/1974/14 as amended on 23 February 2018 following a full risk-based review of the Premises.
SPA	Southern Ports Authority
SWTP	Sulfur water treatment plant
TEOM	Tapered Element Oscillating Microbalances
Tpd	Tonnes per day
TSP	Total suspended particulates

1. Purpose and Scope of Assessment

The Port of Esperance (the Premises) is operated and controlled by Southern Ports Authority (SPA) (the Licence Holder). The Licence Holder is a Port Authority established by section 4 of the *Port Authorities Act 1999* (PA Act).

The Licence Holder handles over 200 ship movements each year and is the largest nickel concentrate port in the southern hemisphere. Approximately 15 million tonnes of bulk material is exported per annum comprising iron ore, nickel concentrate and grain. Other exports include spodumene, formed sulfur, fertiliser and woodchips. Imports include petroleum, fertilisers, sulfur, gold pyrite, sundries and empty shipping containers for the later export of nickel.

In early 2018 the Department of Water and Environmental Regulation (DWER) commenced the process of reviewing the Premises with the risk-based approach described in DWER's *Guidance Statement: Regulatory Principles* (July 2015). Through that licence review process, DWER undertook a full risk assessment of the Premises. The Reviewed Licence (L5099/1974/14), issued on 23 February 2018, took into consideration the Licence amendment application described in section 1.1 below and has subsequently been amended to incorporate the Licence amendment applications detailed in section 1.2. Changes to Licence conditions as a result of these amendments are specified in Appendix 1 and the Amended Licence attached to this report.

1.1 Reviewed Licence issued 23 February 2018

In July 2016, the Licence Holder submitted an application seeking approval to:

- authorise the export of approximately 120,000 tonnes of spodumene through the Premises per year;
- increase the approved premises bulk handling production capacity from 82,000 tonnes per day (Tpd) to 100,000 Tpd;
- replace and upgrade ambient dust monitors from Tapered Element Oscillating Microbalances (TEOMs) to Beta Attenuation Monitors (BAMs) at Sites 1 to 4;
- remove duplication of reporting requirements within the licence for the metals wastewater treatment plant (MWTP); and
- remove duplication of annual reporting requirements between regulation 17[1] reporting requirements and Part V of the EP Act licence for noise.

The request to handle spodumene was considered separately through Amendment Notices 1, 2 and 3 described in section 5.2. The remaining amendments requested through the July 2016 application were considered through a technical risk assessment and are detailed in this Decision Report.

In August 2017, the Licence Holder submitted a further request to increase spodumene throughputs to up to 1,000,000 tonnes per year from the authorised 120,000 tonnes per year. This was followed by a request in October 2017 to remove the requirement from Amendment Notice 1 to transfer containerised spodumene from Shed 6 to the ship within enclosed containers. The requests to increase throughputs and transfer spodumene containers to the ship without a lid in place were also assessed in this Decision Report as part of the Reviewed Licence decision making process, which considered emissions and discharges from all prescribed activities at the Premises.

[1] Refers to r.17 of the *Environmental Protection (Noise) Regulations* (Noise Regulations).

1.2 Amendment October 2018

The Licence Holder submitted an application to amend existing conditions of the Reviewed Licence on 26 March 2018, followed by a second application submitted on 18 May 2018 to authorise the handling of bulk nickel and copper concentrates. Both applications have been considered through this Decision Report and are summarised below in sections 1.2.1 and 1.2.2.

As part of the amendment process DWER has also considered the addition of Trial conditions to the Licence, which allow the Licence Holder to handle new bulk granular materials not specified in Schedule 2 of the Licence, in a test scenario. Trial conditions are intended to provide operational flexibility for ports and minimise impacts to economic growth where it can be demonstrated that any risk to public health, amenity and the environment is minimised to an acceptable level.

At any point prior to or during the Trial period, DWER may suspend or terminate the Trial in the event that the risk is considered to be unacceptable to public health, amenity or the environment; or in the event that the Trial (including product specifications, materials handling or controls) changes from that originally described through Notification of the Trial. The Trial may also be suspended or terminated if DWER becomes aware of the potential for risk to human health, amenity of the environment that differs from the risks identified in the Notification of the Trial.

Consideration of Trial conditions on all licences held by Port Authorities is provided in section 9.6.7 of this Decision Report with further details provided in DWER's *Industry Regulation Fact Sheet: Port Authority Trial Shipments* (Category 58 and 58A), which is available at DWER's website (www.dwer.wa.gov.au).

As a result of this assessment, the licence for the Premises has been revised and the Amended Licence is included in Attachment 1.

1.2.1 Application 26 March 2018

On 26 March 2018, Southern Ports Authority submitted an application to make the following amendments to the Licence:

- Include the requirement for TSP monitoring to be conducted at sites 1 to 4 (inclusive), consistent with Site 5;
- Modify the Licence reference number to acknowledge broadscale changes made through the Reviewed Licence;
- Remove the requirement for measuring sulfur as PM_{10} from ambient air quality monitoring (former Condition 13) on account of Total Sulfur being an ineffective indicator of the elemental sulfur being handled where natural sources are present; and
- Include conditions for the cessation of sampling at Sump 3 following the construction of a proposed new stormwater recovery and filtration system designed to capture 195m^3 of any spillage or stormwater in a first flush tank.

Treated stormwater currently captured in Hume interceptors 3 and 4 (H3 and H4) will be diverted to a new recovery and filtration system known as the 'StormDMT filter system'. The Licence Holder anticipates that the StormDMT filter system will be installed on the eastern end of Berth 2 and commissioned before July 2019.

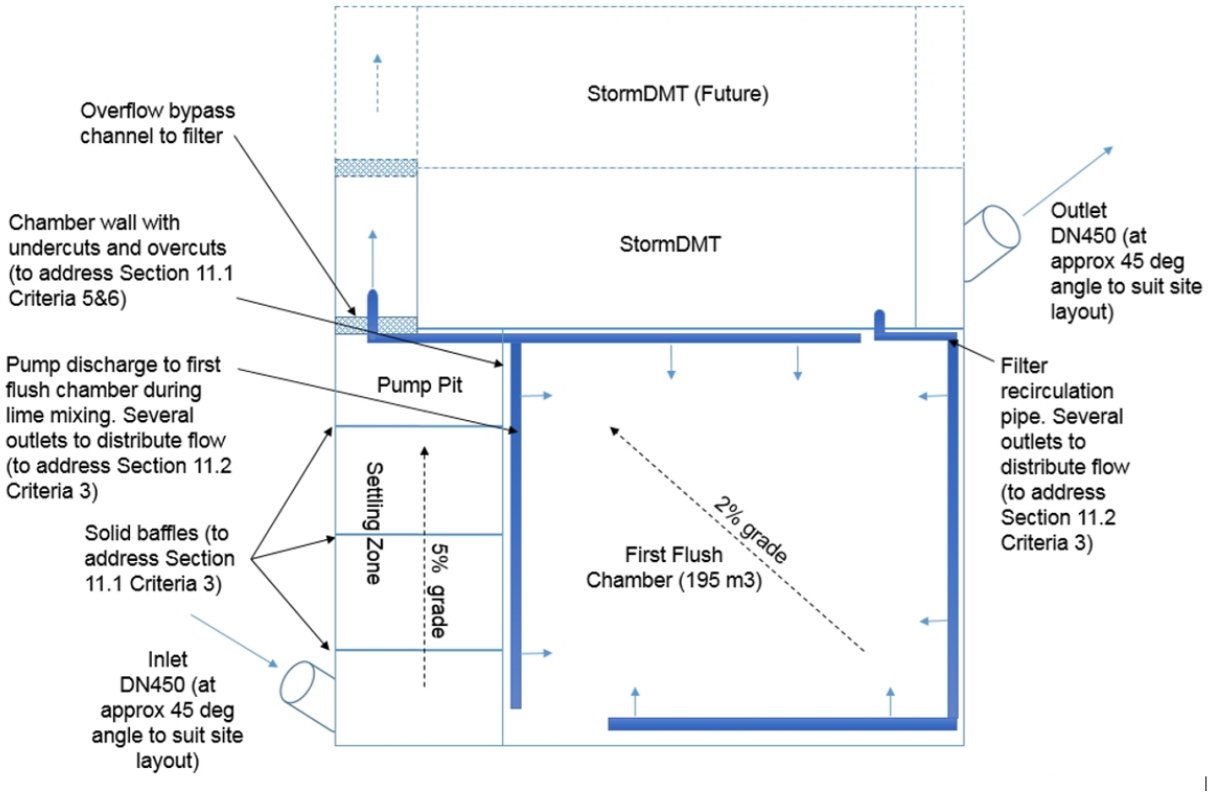


Figure 1: Proposed design of the StormDMT filter system

The purpose of replacing existing stormwater infrastructure at Berth 2 is to improve the capture and treatment of first flush runoff to the marine environment, which is likely to have elevated concentrations of contaminants.

Captured first flush stormwater will be isolated from subsequent rainfall runoff to be later pumped through the filter for treatment. Flow in excess of the first flush will pass through the StormDMT filter prior to being discharged to the marine environment. The filter will be replaced annually to ensure the infrastructure is operating optimally. Sludge will be pumped out to a holding tank for later disposal at a suitably licensed waste facility.

The application also requested the removal of (former) Condition 12 of the Reviewed Licence which states:

The Licence Holder must undertake Moisture Content monitoring of iron ore received at the Premises for the purpose of comparison against the DEM level of each iron ore product derived from the application of AS4156.6-2000.

For the purposes of this Condition, Moisture Content is to be determined in accordance with [the] Table below.

Table: Iron ore – representative sampling methodology

Column 1	***Column 2***	***Column 3***	***Column 4***
Location	***Parameter***	***Averaging Period***	***Method***
CV09 Moisture Analyser depicted in Schedule 1	*Moisture Content*	*Continuous during receipt of iron ore at the RCD.*	*The CV09 Moisture Analyser must be calibrated against annual Representative samples analysed using AS1289.2.1.1-2005 and undertaken by onsite laboratory.*

Key determination: In accordance with s.53(1)(b) a works approval or licence is required to construct, install or alter "…any equipment on the prescribed premises for — (i) the storage, handling, transport or treatment of waste prior to, and for the purpose of, the discharge of waste… into the environment."

The construction of the StormDMT filter system involves works which are minor in nature. Therefore the construction of proposed stormwater infrastructure can be authorised through the Amended Licence as opposed to a works approval.

Stormwater treatment infrastructure is risk assessed through a source-pathway-receptor analysis in section 8.6 of this Decision Report.

1.2.2 Application 18 May 2018

On 18 May 2018, the Licence Holder submitted an application to amend the licence to authorise the ongoing shipment of up to 800,000 tonnes per year (tpa) of nickel sulfide concentrate and 300,000 tpa of copper sulfide concentrate using a rotating tipping frame (Rotabox) open materials loading system at Berth 2. This application follows the Licence Holder's submission of a compliance document for works approval W5840/2015/1, issued on 31 December 2015, and Amendment Notice 1, issued 5 January 2018 (refer to 5.1.1).

Works Approval W5840/2015/1 and the subsequent Amendment Notice authorised the trial shipments of nickel and copper concentrates using a Rotabox loading system, which transports concentrates to the vessel within sealed containers, lifting them into each vessel's hold before opening the lid and tipping the contents into the hold.

A total of seven trial shipments of nickel sulfide and/or copper sulfide concentrates have occurred at the Premises between the periods of June 2017 and March 2018. During these trial shipments air quality was monitored at five ambient air quality monitoring stations located in the town of Esperance. Deposited dust was also measured at a series of deposition gauges and analysed for nickel and copper concentrations.

Of the seven trial shipments, three were found to satisfy the wind direction requirements of the trial conditions where monitoring stations were located downwind of trial shiploading activities. Monitoring data from these three trial shipments is summarised in section 5.6.5.

The application to load nickel and copper concentrates is not anticipated to increase maximum daily throughput amounts.

Key determination:

1) The Rotabox ship loading method falls within Category 58 under the EP Regulations for bulk material handling using an open loading system and a licence amendment is required to allow for the ongoing export of nickel and copper concentrates to continue using this method. While the Rotabox is closed for the majority of time that it is being used to transfer metal concentrates into the hold of a vessel, there is a short period where the metal concentrate is exposed to the environment.
2) The nickel concentrate handling method used at the Premises up until 2009 varies from the methods proposed through this amendment application. Previous handling methods involved the stockpiling of concentrate within a shed before transferring the nickel concentrate to the ship's hold via conveyor and chute. Therefore there are fewer pathways for nickel (and copper) concentrates to access sensitive receptors using proposed handling methods when compared to those used previously.
3) Existing containerised nickel concentrates from mines at Ravensthorpe and Forrestania will continue to be transported within closed containers at the Premises

until these products can satisfy conditions of the Amended Licence. Sealed container handling methods do not fall within the definition of Category 58 for bulk material handling.

A detailed risk assessment of bulk nickel and copper concentrate handling at the Premises using the Rotabox handling method is provided in this Decision Report.

2. Background

The Premises was first opened in 1965. The Premises was formerly operated by Esperance Port Authority (trading as Esperance Port Sea and Land) until amalgamating with Bunbury and Albany Ports in September 2014, forming SPA. The Licence Holder continues to operate ports in Bunbury and Albany as well as Esperance. The Licence Holder is a Port Authority established by section 4 of the *Port Authorities Act 1999*.

The Existing Licence, L5099/1974/14, covers Prescribed Premises Categories 58 and 82 as defined in Schedule 1 to the *Environment Protection Regulations 1987* (the EP Regulations). Table 1 below shows the prescribed premises categories, and the current approved production or design capacity of the facility.

Table 1: Prescribed Premises Categories in Existing Licence

Classification of Premises	Description	Approved Premises production or design capacity
Category 58	Bulk material loading or unloading: premises on which clinker, coal, ore, ore concentrate or any other bulk granular material (other than salt) is loaded onto or unloaded from vessels by an open materials loading system.	100,000 tonnes per day
Category 82	Boat building and maintenance: premises on which – (a) vessels are commercially built or maintained; and (b) organotin compounds are not used or removed from vessels.	Not applicable

3. Overview of the Port of Esperance

3.1 Infrastructure and equipment

Premises infrastructure, as it relates to primary activities of the Prescribed Premises categories in Table 1, is detailed in Table 2 and with reference to the Site Plan (Attachment 3).

Table 2: Port of Esperance infrastructure and equipment

	Infrastructure and equipment	Plan reference
Category 58: Bulk material loading or unloading		
1.	Berth 2 – Nickel concentrate, copper concentrate, fertiliser, sulfur, spodumene	Premises map: Berth 2
2.	Berth 3 – Iron Ore	Premises map: Berth 3
3.	Black Swan Shed Pad	Premises map: Black Swan Shed Pad
4.	Shed 1 – Iron Ore	Premises map: Shed 1
5.	Shed 2 – Iron Ore	Premises map: Shed 2
6.	Shed 3 – Iron Ore	Premises map: Shed 3

	Infrastructure and equipment	Plan reference
7.	Shed 4 – Iron Ore	Premises map: Shed 4
8.	Shed 5 – Sulfur and spodumene	Premises map: Shed 5 (Sulfur)
9.	Shed 6 – Spodumene	Premises map: Shed 6
10.	Rotary car dumper	Premises map: Car Dumper
11.	Grab bucket	N/A (removable equipment)
12.	Rotating tipping frame	N/A (mobile equipment)
13.	Conveyor system (Iron Ore Circuit)	Premises map: Depicted by red line
14.	Conveyor system (Sulfur Circuit)	Premises map: Depicted by yellow line
15.	Iron Ore Foaming System	Premises map: Foaming System
16.	Moisture content analysers and sample stations	Premises map: CV09 Moisture Analyser; CV32 Moisture Analyser; Sample Station
Related to Primary Activities (Category 58)		
17.	Vacuum truck	N/A – mobile
18.	Water truck	N/A – mobile
19.	Waste Water Treatment Plant (WWTP)	Figure 2: Wastewater treatment - Sulphur and MWTP plants
20.	Hume interceptors	Figure 2: H1 to H4
21.	StormDMT filter system	Figure 2: StormDMT
22.	Drains	Figure 2: SW1 to SW3
23.	Roads (including the truck turnaround point at Berth 3)	Premises map: Berth 3 road staged sealing; and Truck turnaround (hairpin bend)
24.	Spill containment unit	Premises map: Mobile Spill Containment Unit storage area
Category 82: Boat building and maintenance		
25.	Boat maintenance area, no current permanent infrastructure or equipment	Premises map: Boat Maintenance Area
Other activities		
26.	Berth 1 – Grain, woodchips (refer to section 3.2)	Attachment 3: Berth 1

3.2 Exclusions to the Premises

The following matters are out of scope of this assessment and have not been considered within the technical risk assessment detailed in this Decision Report:

- non-granular material and materials that are not transported in bulk including: nickel

transported in sealed containers, fuel, empty shipping containers, gold pyrite, magnesium oxide, scrap metals and other sundries;

- noise (see section 4.1.2);
- construction and operation of the proposed iron ore bottom car dumper application received 23 February 2016 (see section 5.2);
- storage of bulk granular material beyond the Premises boundary; and
- grain and woodchips.

CBH lease an area to the south of the Licence Holder's Premises boundary that is used to receive and unload grain. Grain is received by truck into ground level hoppers located between the CBH Grain Storage Facilities and the Licence Holder's iron ore rotary car dumper and conveyor circuit. From the storage area grain is then conveyed into the enclosed overhead conveyors to Berth 1 where it is loaded onto ships for export. There are no specific conditions relating to dust generated by grain in the Reviewed Licence as grain handling is not currently considered to fall within the scope of Category 58. Key emission sources from grain handling such as the shiploader and ground hoppers do not form part of the Premises. Subsequently, it is important to note the defences to offense provisions in the EP Act (see s.74, 74A and 74B of the EP Act) relating to emissions from the handling and loading of grain will not be available for the Licence Holder or CBH. Further general provisions of the EP Act relating to emissions from this activity will be applicable.

DWER is currently reviewing its position in relation to grain and Category 58. In the future, it is possible that grain (and woodchip) handling at ports around the State will be considered a prescribed activity.

SPA leases access to the Premises area to Esperance Power Station Pty Ltd for a power station licensed under L7902/2003/4, and a fertiliser blending premises, operated by Summit Rural (WA) Pty Ltd under Registration R1105/1996/1. Summit Fertilisers and the Esperance Power Station are excluded from the Prescribed Premises.

The Prescribed Premises boundary incorporates all storage areas, the rotary car dumper, WWTP, a Reclaim Area, administration buildings and Berths 1, 2 and 3.

3.3 Operational Aspects

In the 2016/17 financial year, material handled at the Premises included exports of iron ore, grain – including wheat, barley and canola, gold pyrite and nickel and copper products which accounted for approximately 99% of tonnage. Imported products (0.79 Mtpa) included fertiliser, magnesia oxide, nickel, petroleum, sulfur and sundries (SPA, 2016).

Table 3 details the different types of Category 58 bulk granular material currently loaded and unloaded at the Premises and the methods for handling while Table 4 provides a summary of the amounts handled at each berth.

Table 3: Port of Esperance Bulk Handling Activity - 1 July 2016 to 30 June 2017

Product	Total Tonnes FY 2016/17	Storage and transport	Loading/Unloading method
Iron ore from the Yilgarn	11,247,090	Received to site via side tipping trains within a partially enclosed shed. Stored within negative pressure sheds (Sheds 1 to 4). Transport via partially enclosed conveyors fitted with dust extractors. Conveyed to the Berth 3 ship loader.	Loaded via a telescopic chute equipped with a ring spray at Berth 3.
Nickel and copper concentrates (authorised under W5840/2015/1)	6,700 (nickel) 5,617 (copper)	Received onto site and stored in closed containers. Transported to vessel loading infrastructure in closed containers.	Loaded into bulk cargo vessels in closed containers using a rotating tipping frame at Berth 2.
Spodumene	54,672	Received to site via truck and stockpiled within Shed 6. Spodumene product is then transferred into containers using a front end loader. Transported to vessel loading infrastructure in containers.	Loaded into bulk cargo vessels in closed containers using a rotating tipping frame at Berth 2.
Formed sulfur imported by First Quantum Minerals	411,080	Stored within Shed 5 Transported via partially enclosed conveyors and transfer points.	Bulka bags or grab bucket loaded into a hopper or from Berth 2.
Fertiliser including urea, DAP, MAP, MAPZSC, DAPZSC, Allrich, Gusto, Phosphate)	138,906	Transported offsite by truck. No fertiliser storage onsite.	Bulka bags or grab bucket loaded into trucks using a mobile hopper from Berth 2.
Agricultural grain (wheat, barley, lupin and canola)[1]	2,961,912	Stored in sheds and silos operated by CBH and located beyond the Premises boundary. Transported via enclosed conveyors.	Loaded via chute/jet slinger at Berth 1
Woodchips[1]	204,576	Back-tipping truck into a hopper. Transported to ship by partially enclosed conveyors fitted with spill plates.	Mobile ship loader with telescopic chute at Berth 1 or Berth 2.

Note 1: Not currently regulated through Part V licences.

Table 4: Summary of activity at each berth

Location	Total tonnes/Berth – FY2017		
	Import	Export	Total
Berth 1	-	3,166,488	**3,166,488**
Berth 2	878,819	220,451	**1,099,270**
Berth 3	-	11,247,090	**11,247,090**
Total	**878,819**	**14,634,030**	**15,512,849**

3.3.2 Request to increase daily throughput rate

During the Licence review process, the Licence Holder requested to increase authorised daily

throughput rates from 82,000 Tpd to 100,000 Tpd. The request originated from an occurrence in the 2014/15 DWER reporting period, where loading was occurring at all three berths causing a minor exceedance of the nominated daily throughput (82,000 Tpd).

There is not expected to be a significant increase of the overall throughput at the Premises or change to existing operational activities associated with the request to increase the bulk handling production capacity to 100,000 Tpd. No additional berths are being constructed and there are no significantly faster ship loading methods being implemented or constructed. Based on current and proposed infrastructure, the Premises could possibly handle 114,000 tonnes of bulk material per day should three ships be simultaneously loaded/unloaded without interruption over a 24-hour period and at maximum efficiency. However, daily throughputs of this magnitude are unrealistic due to space limitations restricting ship sizes at each berth, in turn restricting throughput. In addition, throughputs are limited due to restrictions to traffic movement along Berths 1 and 2 required for the handling of containerised products and products such as woodchips and fertilisers.

The annualised amounts of bulk granular material handled at the Premises are a factor in the determination of risk. As such the amounts of the bulk granular materials listed in Table 5 have been considered for the purpose of the risk assessment in section 8.

Table 5: Bulk granular materials handled and amounts assessed

Commodity	Imported /Exported	Annual tonnage assessed
Formed sulfur	Imported	Up to 650,000 tonnes
Fertiliser including urea, DAP, MAP, MAPZSC, DAPZSC, Allrich, Gusto, Phosphate	Imported	Up to 200,000 tonnes
Spodumene (of the quality currently exported by Galaxy Resources Pty Ltd's Mt Cattlin Mine)	Exported	Up to 1,000,000 tonnes
Iron ore from iron ore mines in the Yilgarn	Exported	Up to 11,500,000 tonnes[1]

Note 1: The Licence Holder is not permitted to increase iron ore exports beyond current rates without an amendment to Ministerial Statement 681, which authorises 11.5 Mtpa of iron ore export (refer to section 4.1.3).

The Licence Holder also requested that consideration be given in this assessment to an increase in throughput amounts for sulfur, fertiliser and spodumene. This was in part due to a projected increase in demand for each product and to allow a buffering capacity for instances where the Licence Holder is required to increase import or export amounts unexpectedly. Fertiliser imports, for example, fluctuate greatly from year to year depending on demand from the regional agricultural industry while other commodities may be affected by fluctuations in price.

The most significant growth by any one commodity is anticipated to come from spodumene exports due to additional suppliers looking to export from Esperance. The projected (assessed) increase for spodumene exports from the Premises represents an 830% growth from previous approvals that authorised 120,000 tonnes per annual period. DWER has assessed the risk of handling spodumene in amounts specified in Table 5 under the assumption that all future spodumene product throughputs will meet the same minimum specifications as the product currently handled at the Premises.

In August 2017, First Quantum Minerals announced that the Ravensthorpe Nickel Project will enter care and maintenance by October 2017. The Licence Holder has requested that authorisation for the import of formed sulfur remains on the Licence for the potential future operation of the Ravensthorpe Nickel Project. Therefore this Decision Report assesses the risk of handling formed sulfur at the amounts specified in Table 5.

4. Legislative Context

4.1 Part IV of the EP Act

4.1.1 Background

Premises activities have been assessed by the Environmental Protection Authority (EPA) numerous times. This review of the Esperance Port Facility has had regard to the *Environmental Protection (Port of Esperance Operations Noise Emissions) Approval 2009* and Environmental Protection Authority (EPA) Report 1319 on the environmental factor of noise.

This review has also had regard to Ministerial Statements 681, 325 and 570. The most relevant factors relating to the proposed licence amendment are outlined below.

4.1.2 *Environmental Protection (Port of Esperance Operations Noise Emissions) Approval 2009* and EPA Report 1319

In the past, noise emissions from the Premises have exceeded the assigned noise level under the Noise Regulations, which required SPA to apply for an exemption under regulation 17 of the Noise Regulations, set out in the *Environmental Protection (Port of Esperance Operations Noise Emissions) Approval 2009* (the Approval). The Approval was a continuation and amendment of an earlier exemption granted in 2001.

The Approval was granted to SPA by the Minister for Environment on 25 September 2009 under regulation 17(7) of the Noise Regulations to allow the level of noise emitted from the Premises to exceed the standard prescribed in the Noise Regulations. The reasons for the grant of the Approval are outlined in EPA Report 1319. Table 6 specifies the levels the Licence Holder must currently meet under condition 3 of the Approval.

Table 6: Approved noise levels under regulation 17(7)[1] Approval

Type of premises receiving noise	Time of day	$L_{A\ 10}$ approved level (dB)	$L_{A\ 1}$ approved level (dB)	$L_{A\ max}$ approved level (dB)
Noise sensitive premises[2] at locations within 15 metres of a building directly associated with a noise sensitive use	0700 to 1900 hours Monday to Saturday	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sundays and public holidays	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	40 + influencing factors	50 + influencing factor	55 + influencing factor
Noise sensitive premises[2] at locations further than 15 metres from a building directly associated with a noise sensitive use	All hours	60	75	80

Commercial premises	All hours	60	75	80
Industrial and utility premises	All hours	65	80	90

Note 1: The Noise Regulations have since been amended and regulation 17(7) is replaced by regulation 18B(1) under the current version of the Noise Regulations as amended 24 January 2017.
Note 2: Noise sensitive premises refers to a premises defined in Schedule 1, Part C of the Noise Regulations and includes but is not limited to residential dwellings, short stay accommodation, schools and some hospitals.

The Approval requires the Licence Holder to take all reasonable measures to reduce noise emissions from Premises activities and to acquire noise sensitive premises that receive noise emitted from the Premises that exceed the standard prescribed by the Approval. The Approval also requires the Licence Holder to prepare an annual noise report to be submitted to DWER.

The Approval excludes the areas occupied by the CBH grain handling operations and the Esperance Power Station.

The Approval has effect for 10 years unless the Licence Holder applies for a further approval within the first 9 years. The Licence Holder has applied for a further approval in August 2018. The Licence Holder will be required to meet the current approved noise levels until further approval under regulation 18B(1), formerly regulation 17(7), is granted. Therefore any change in activity or increase in throughput must not result in an increase in noise above approved levels. Under condition 6(1) of the Approval, SPA must take all reasonable measures to reduce noise emissions from the Prescribed Premises.

Noise modelling was conducted as part of the works approval application (W5840/2015/1) to load nickel using rotating tipping frame equipment. Noise modelling considered worst case scenarios where bulk iron ore is being loaded, an iron ore train is being unloaded and the rotating tipping frame loading is occurring. According to the noise model, no significant increases in operating noise levels are anticipated and at worst, noise will be 9dB less than the Approved night-time assigned noise level.

The request to increase the allowable throughput at the Premises to 100,000 Tpd are within the range of current possible throughput (114,000 Tpd) based on existing infrastructure and operating methods. Based on the noise modelling undertaken for the works approval application an increase to the maximum daily throughput is unlikely to result in exceedances of noise as no further infrastructure is proposed and the worst case scenario has been modelled.

Key determination: Duplication of annual reporting requirements between (Noise Regulations) Regulation 17 reporting under Part IV and licence reporting requirements for noise under Part V have been removed.

The Licence Holder holds *Environmental Protection (Port of Esperance Operations Noise Emissions) Approval 2009.* Given the Licence Holder is required to comply with provisions of this approval including monitoring and reporting no conditions relating to noise are required in the Licence.

4.1.3 Ministerial Statement 681

Ministerial Statement (MS) 681 was first published by the EPA on 28 July 2005 for the following proposal:

> *The upgrading of marine facilities consists of deepening berths 1 and 2, dredging of the harbour basin and shipping channel, construction of a new deepwater berth, reclamation of approximately 15 hectares of land, construction of a new iron ore shed and associated shiploading and conveyor systems, and an increased throughput of iron ore to 8 million tonnes per annum, as detailed in schedule 1 of this statement.*

Key determination: Sediment monitoring remains a requirement of implementation conditions in MS 681, which were largely targeted towards impacts from dredging activities. No sediment monitoring conditions have been placed on the Reviewed Licence on the grounds that impacts to benthic communities from primary activities are not anticipated during normal operations and primary activities of the Premises.

The conditions in the Reviewed Licence have been determined in accordance with DWER's *Guidance Statement: Setting Conditions*. However, there remains a risk to the marine environment from marine discharges during normal operations. Therefore stormwater discharges are considered further in section 8.5 of this Decision Report.

MS 681 was later amended on 18 November 2009 and again on 6 September 2010 to allow iron ore exports to increase to the current approved level of 11.5 Mtpa. The following conditions in MS 681 are intended to control dust emissions from iron ore handling activities.

Condition 11 Performance Review (Dust and Noise)

Condition 11-1 Each three years following the commissioning of the new port facilities, the proponent shall submit a Performance Review report to the Department of Environment:

- *to document the outcomes, beneficial or otherwise;*
- *to review the success of goals, objectives and targets; and*
- *to evaluate the environmental performance with respect to dust and noise over the three years;*

relevant to the following:

1. *environmental objectives reported on in Environmental Protection Authority Bulletin 989;*
2. *proponent's consolidated environmental management commitments documented in schedule 2 of this statement and those arising from the fulfilment of conditions and procedures in this statement;*
3. *environmental management system environmental performance targets;*
4. *environmental management programs and plans; and/or*
5. *environmental performance indicators;*

to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

The relevant environmental management commitments documented in Schedule 2 of MS 681 are detailed in the table below.

Ministerial Statement 681 - Schedule 2 – Proponent's Environmental Management Commitments

No.	***Topic***		***Action***	***Objective***	***Timing***	***Advice***
14.	*Air quality*	*14.1*	*Review and update dust monitoring and management plan for port operations to accommodate upgrade (as required by Works Approval, Licence or registration).*	*Protection surrounding land uses and environmental values.*	*Prior to increasing iron ore throughput*	*Shire of Esperance*
		14.2	*Implement revised dust monitoring and management plan*		*During port operations*	

		14.3	*Enclose all iron-ore conveyors and transfer towers.*	*Protect surrounding land -uses and environmental values*	*During construction*	

To achieve compliance with the Ministerial Statement requirements the Licence Holder provides the EPA with a triennial report against conditions of MS 681 (and 325), which is supported by an Environmental Management Plan D16/1054 (SPA, 2017).

Key controls within this document relating to the control of iron ore dust include the following:

- Sheds 1 to 4 inclusive used to stockpile iron ore and are equipped with dust extraction.
- Enclosure of the iron ore conveyor circuit.
- Ore moisture monitoring on receipt of iron ore at the Premises (CV09) to identify ore that has a moisture content below the measured Dust Extinction Moisture (DEM).
- A foaming system is operated within the iron ore circuit wherever iron ore is detected with moisture levels significantly below DEM.
- Implementation of a dust monitoring program for the operation of the iron ore export facility.

Other commitments made by the Licence Holder in procedures referred to within the Environmental Management Plan include:

- vacuuming the product belt or wetting down iron ore product to prevent dust emissions on outloading system start up;
- applying water sprays either directly at the loading chute (ring spray) and/or at specific conveyors;
- shutting down loading conveyors where dust is visibly transported beyond the Premises boundary during the day; or at night, where dust can be seen to transport beyond the Premises boundary from Port Beach; and
- ensuring that the moisture content of bulk mineral product stored at the premises or arriving by ship is maintained above DEM or dust reduction actions will be required to keep dust to acceptable levels before unloading or ship loading can occur.

Key finding: MS 681 regulates the handling of bulk iron ore through the Premises. As such, dust risks from iron ore handling are largely not assessed through this Decision Report.

Reviewed Licence – Ministerial Statement 681

At the time of the Licence Review, on 12 August 2015, a section 45C (of the EP Act) application was submitted to the EPA with a proposal to temporarily increase iron ore throughput by 3.5 Mtpa. The increase in iron ore throughput would require the construction of an in-loading system (bottom car dumper) and a temporary increase in train movements at the Premises.

As SPA's plans for temporary expansion of iron ore handling did not eventuate, DWER did not determine an amendment to Licence L5099/1974/14 relating to the expansion of iron ore throughput. A final decision on the location of the bottom car dumper had not been made at the time of finalising this assessment and is therefore not considered further. The application for amendment to the Licence for additional bottom car dumping relating to this proposal from 2015 was returned to the Licence Holder.

4.1.4 Ministerial Statements 325 and 570

Ministerial Statement 325 (MS 325) was issued on 25 October 1993 and additional Ministerial Statement 570 (MS 570) was issued on 14 August 2001 in respect of the export of Iron Ore through the Port of Esperance. MS 325 includes conditions pertaining to:

- iron ore dust, particularly:
  - (i) ensuring that there is no visible, airborne iron ore dust nor discolouration outside the operations area;
  - (ii) no iron ore particulate discoloration of the ocean and beaches resulting from stormwater drainage discharges; and
  - (iii) iron ore particles in beach sand monitoring requirement with exceedances to be reported to EPA.
- Shutdown provision – if necessary, the Licence Holder shall cease iron ore handling operations for as long as necessary if dust or noise limits required in the Ministerial Statement have been exceeded or are likely to be exceeded; and
- Ship ballast water discharges.

MS 570 removes the conditions relating to noise limits in MS 325 and instead specifies that conditions to manage noise related to the proposal are regulated by the *Environmental Protection (Port of Esperance Noise Emissions) Approval 2001*.

Key Finding: The EPA has considered potential impacts from iron ore dust through environmental impact assessments undertaken under Part IV of the EP Act. Conditions for dust are set out through MS 681 and 325.

Consistent with section 59B of the EP Act:

(7) If the proposal amendment, revocation or suspension is related to a proposal which has been referred to the Authority under section 38, the CEO is not to so amend, revoke or suspend –

(b) contrary to, or otherwise than in accordance with, an implementation agreement or decision…

As such, conditions for emissions from the handling of iron ore at the premises are imposed in accordance with Ministerial Statement requirements. These requirements are detailed above through section 4.1.3 and 4.1.4 of this report.

4.2 Parliamentary Inquiry

A Parliamentary Inquiry was held into the cause and extent of lead pollution in the Esperance Area on 6 September 2007. There were a number of wide ranging recommendations made as a result of the inquiry. Lead is no longer handled at the Premises and is not authorised for handling under the Existing Licence. In conducting the risk assessment detailed in this Decision Report and applying regulatory controls DWER has had particular regard to the risk of dust emissions associated with the handling of bulk materials at the Premises.

Key Finding: Lead is no longer handled at the Premises and it is not authorised for handling under the Existing Licence. The Recommendations of the Parliamentary Inquiry have been implemented to clean-up lead contamination in and around the Premises and the Esperance community; and improved environmental management at Ports.

4.3 Contaminated Sites Act 2003

Crown Reserve 28207, known as the Port of Esperance, is classified as possibly contaminated – investigation required, under the *Contaminated Sites Act 2003*.

4.4 Planning

The Licence Holder has approval under the *Land Administration Act 1997* to operate on Crown Reserve 28207 for "Harbour purposes and other purposes within the functions and powers of a port authority under the *Port Authorities Act 1999*…"

The Licence Holder is the Decision Making Authority for building and infrastructure in its jurisdiction and is required under the *Port Authorities Act 1999* and *Port Authorities Regulations 2001* to build to Building Standards Australia and consult with the local municipality to ensure alignment with planning schemes and usage. No planning approvals from the Shire of Esperance are required for the proposed changes under this Licence Amendment.

4.5 Port Authorities Act 1999

SPA is the occupier of the Premises according to the *Port Authorities Act 1999*. SPA's functions, obligations and legislative powers are set out in the *Port Authorities Act 1999.* In accordance with section 30(1), Southern Ports has legislative power "(c) to control business and other activities in the port or in connection with the operation of the port; and (f) to protect the environment of the port and minimise the impact of port operations on that environment." In addition, the *Port Authorities Act 1999* provides that Southern Ports has exclusive control of the Port of Esperance, including leasehold areas beyond the Premises, subject to any direction given by the Minister for Transport.

4.6 Department of Mines, Industry Regulation and Safety (DMIRS)

SPA stores and handles products of mining and is therefore deemed to be a 'mine site' under the *Mines Safety and Inspection Act 1994*. DMIRS (formerly the Department of Mines and Petroleum) regulates the site under the *Mines Safety and Inspection Act 1994* and *Mines Safety and Inspection Regulations 1995* (Project Code J01675).

4.7 EPBC Act

The Licence Holder has not referred the proposed amendments to the Commonwealth Department of the Environment and Energy as a matter of National Environmental Significance under the *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*.

4.8 Applicable Regulations, Standards and Guidelines

This Licence review has been conducted in accordance with the following Guidance Statements:

- *Guidance Statement: Regulatory Principles* (July 2015)
- *Guidance Statement: Licence Duration* (November 2014)
- *Guidance Statement: Land Use Planning* (October 2015)
- *Guidance Statement: Setting Conditions* (September 2015)
- *Guidance Statement: Environmental Standards* (September 2016)
- *Guidance Statement: Risk Assessments* (February 2017)
- *Guidance Statement: Decision Making* (February 2017)

The following regulations applicable to the regulation of the Premises under Part V, Division 3 of the EP Act were also considered:

- *Environmental Protection Regulations 1987*
- *Environmental Protection (Noise) Regulations 1997*
- *Environmental Protection (Controlled Waste) Regulations 2004*

- *Environmental Protection (Unauthorised Discharges) Regulations 2004*

5. Part V of the EP Act

5.1 Works Approvals

Two works approvals have been issued for the Premises over the past six years.

5.1.1 W5840/2015/1

A Category 58 Works Approval was issued on 31 December 2015 for open bulk loading of nickel and copper concentrates from the Sirius Gold Pty Ltd (now known as Independence Group NL) Nova Nickel Mine utilising a rotating tipping container system. Proposed ship loading rates are 220,000 tonnes of nickel concentrate and 50,000 tonnes of copper concentrate per year.

The first three trial shipments occurred between 24 June and 6 October 2017. The objective of the first three trial shipments was to collect monitoring data on ambient air quality for the following parameters to better inform a risk assessment for ongoing shipments under this Licence:

- Total suspended particulates (TSP);
- Total particulate matter 10 microns or smaller in diameter (PM_{10}), that is considered respirable;
- TSP and PM_{10} for nickel, copper and total dust; and
- dust deposition of nickel, copper, iron and sulphur.

The Works Approval authorised five trial shipments with monitoring information to be submitted following the first three shipments to allow for the Licence Holder to refine loading methods while DWER and the Department of Health (DoH) reviewed and assessed air quality monitoring results.

Following the completion of the first three shipments in October 2017, the Licence Holder submitted a compliance report to DWER. DWER then referred the compliance report to DoH which advised that a minimum of three shipments upwind of monitors is recommended to provide greater confidence in the monitoring data.

Amendment Notice 1

On 28 November 2017, SPA submitted a compliance report for Works Approval W5840/2015/1. Following a review of the monitoring data, DWER identified that wind conditions during first trial shipment did not place ambient air quality monitors downwind of ship loading activities. Therefore data may not accurately represent the potential impacts to sensitive receptors in the community from bulk handling nickel and copper concentrates at the Port of Esperance.

Figures 1, 2 and 3 show the meteorological conditions during trial shiploading, shiploading times and the wind arcs that place sensitive receptors downwind of shiploading activities (45 to 135 degrees – as depicted by the red shaded area).

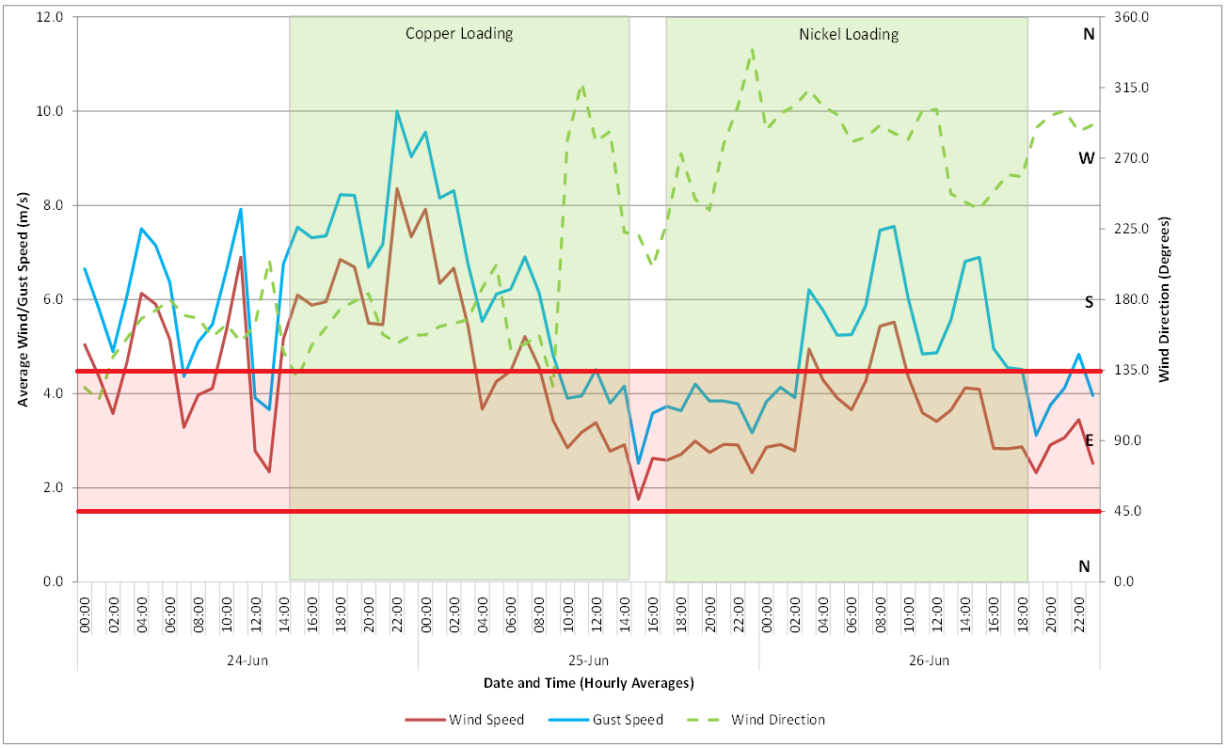


Figure 2: Wind conditions during first trial shipment 24 – 26 June 2017 (Source: MBS, 2017)

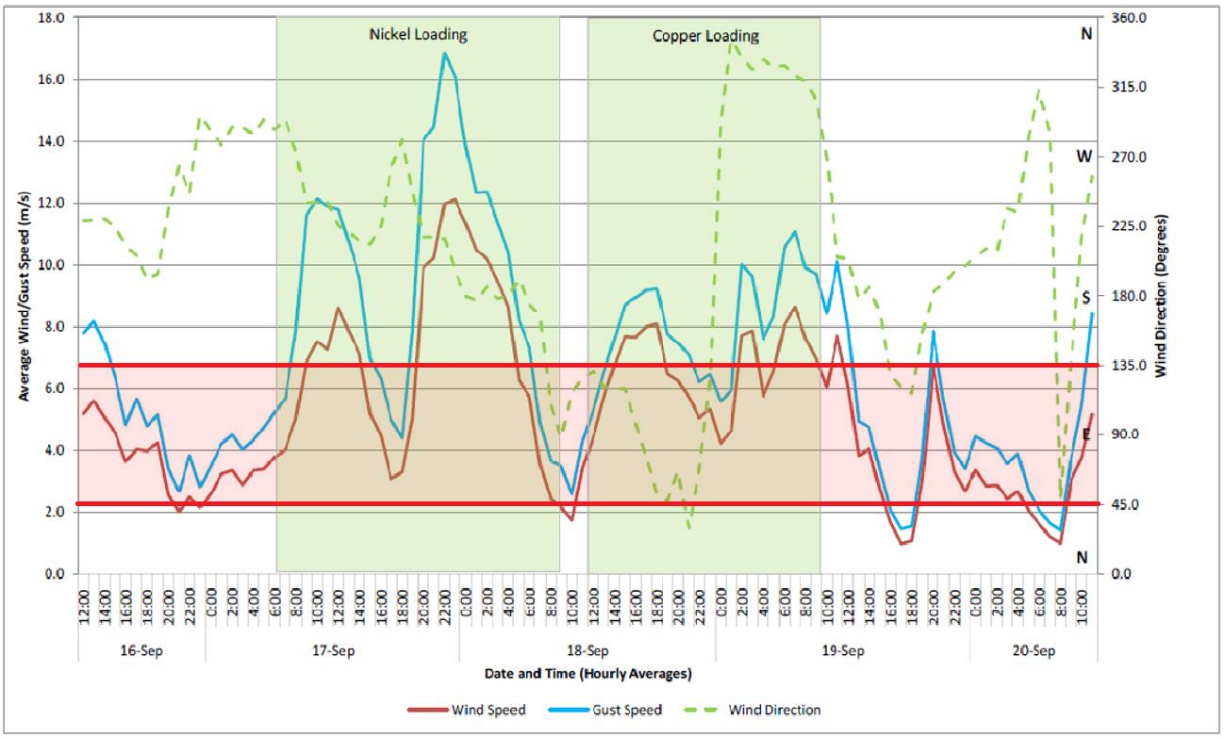


Figure 3: Wind conditions during second trial shipment 17 – 19 September 2017 (Source: MBS, 2017)

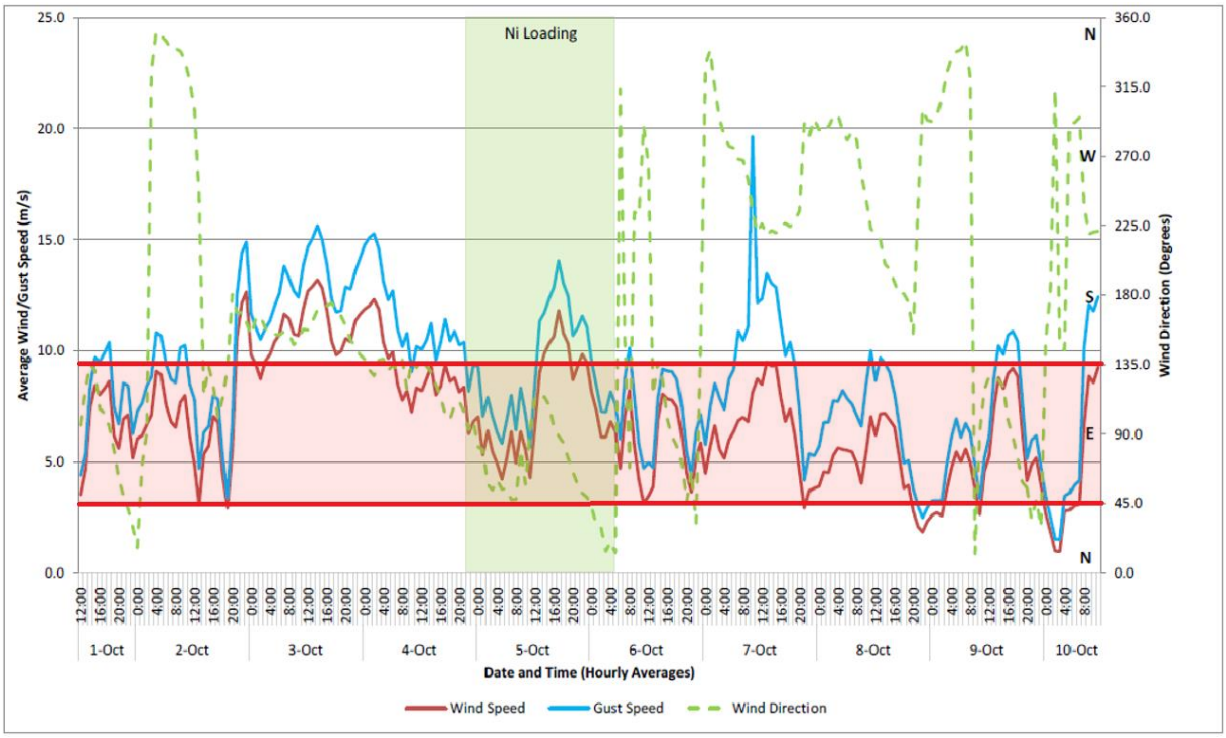


Figure 4: Wind conditions during third trial shipment 4 – 6 October 2017 (Source: MBS, 2017)

DWER subsequently amended Works Approval W5840/2015/1 through Amendment Notice 1, issued 5 January 2018, authorising an extension of the trial to 3 January 2019. The purpose of the extension was to require monitoring data from a minimum of three trial shipments where wind direction placed ambient monitors upwind of shiploading activities for a minimum:

(a) cumulative total of at least 12 hours during bulk nickel and/or copper concentrate loading; or

(b) of 75% of the 5 minute averaging periods recorded at EP7 MET, as depicted in Schedule 1, during the loading of nickel and/or copper concentrate/s.

Wind directions between 45 and 135 degrees were determined to be the most suited to placing existing monitors upwind of ship loading activities at Berth 2.

5.1.2 W4805/2010/1

A Category 58 Works Approval was issued on 9 December 2010, for the unloading, storage, handling and ship loading of spodumene from Galaxy Resources Pty Ltd's (Galaxy) Mt Cattlin mine. The Works Approval related to the construction of loading/unloading infrastructure.

A compliance statement for the works was received on 20 January 2011 stating compliance with works. However, the Licence Holder advised DWER that due to the significant variation in the actual material to be received compared to the proposed material from the mine, spodumene was not intended to be received at the Premises. The material described contained a high content of mica (>30%) presenting a significant dust risk. The works approval has expired and the works constructed under the works approval are now incorporated as part of the Existing Licence.

Since this time the processing of spodumene at Galaxy's Mt Cattlin mine has been improved to significantly reduce the mica content of the product. The Licence Holder is now satisfied that the material will not create visible dust during routine operations and an application to amend the Licence to authorise the export of spodumene from Galaxy has been approved (discussed further below).

5.2 Licence Amendments

Since 2014, the Licence has been amended five times, plus the amendment for which this Decision Report is relevant.

5.2.1 Amendment dated 28 February 2014

Licence L5099/1974/14 was issued incorporating amendments requested on 23 December 2013 by the Licence Holder. Amendments pertained to:

- Removing the emission target for silica given that, at that time, the Licence Holder had no plans to export spodumene;
- Changing reporting dates for noise monitoring to tie in with Noise Regulations regulation 17 approval dates (date changed from 1 December to 19 December);
- Changing of annual marine sediment monitoring dates from November to June or July;
- Removing zinc from dust gauge and sediment monitoring given that the Licence Holder had no plans to export spodumene. The Licence was amended to remove zinc from dust gauge monitoring, but not from sediment monitoring as zinc is a part of the sediment monitoring plan and was not directly related to the spodumene proposal.
- Removing the requirement to sample stormwater monthly to allow for months where no rainfall occurs. This was authorised and changed to two samples every two months at least 15 days apart.

The Licence was issued for a period of five years.

5.2.2 Amendment dated 19 February 2015

The Licence was amended on application by the Licence Holder to change ownership of the Licence from Esperance Port Authority to the then newly formed SPA. Further changes were made to the Licence upon request by SPA to modify noise monitoring locations and methodologies. This pertained to one week worth of continuous monitoring noise from one location near to the Premises as opposed to monitoring from 14 locations for one night per quarter. This was assessed by DWER as a more appropriate and representative measure of noise from Port activities. The Licence was updated into the format current at this time.

5.2.3 Amendment Notice 1 dated 3 October 2016

An Amendment Notice was issued on application by the Licence Holder to authorise the export of spodumene from Galaxy's Mt Cattlin Mine using the rotating tipping frame system. Additional requests were submitted with the application that were not addressed at the time of issue (see section 1). These are assessed in this Decision Report.

5.2.4 Amendment Notice 2 dated 25 November 2016

An Amendment Notice was issued on application by the Licence Holder to authorise a temporary increase in the authorised maximum mica content of spodumene handled at the Premises from 5% to 7.25% by weight. Following 31 December 2016, the Licence Holder was only authorised to ship spodumene with a mica content equal to or less than 5% by weight.

5.2.5 Amendment Notice 3 dated 4 July 2017

Amendment Notice 3 was issued on application by the Licence Holder to allow for doors to remain open at Shed 6 during the loading of spodumene into containers prior to shiploading. Monitoring data was received with the application demonstrating ambient air quality within the shed during container loading (Table 9). Based on this data the risk of dust emissions from Shed 6 is considered acceptable provided that product specifications required by the Licence

are achieved.

Key finding: Activities conducted under the authorisation of Amendment Notices 1 to 3 are risk assessed through this Decision Report. Conditions relevant to the handling of spodumene were transferred to the Reviewed Licence, which superseded Amendment Notices 1 to 3, which became redundant.

5.2.6 Amendment 29 April 2016

A universal amendment notice was issued to almost all licenced prescribed premises on 29 April 2016 to extend the licence expiry dates. In accordance with *Guidance Statement: Licence Duration*, licence expiry dates were extended by up to 20 years. Licence L5099/1974/14 was not listed in the notice as having an extended expiry in error.

Key determination: The extension to the Licence duration does not increase the risk to public health or environment as these risks can be managed adaptively through licence amendments. Therefore the expiry date has been extended from 6 March 2019 to 6 March 2032 in accordance with *Guidance Statement: Licence Duration* and consistent with the intended amendment issued for almost all licences on 29 April 2016.

5.2.7 Amendment application 19 February 2016

In addition to the above amendments, the Licence Holder submitted a licence amendment application on 23 February 2016, for the construction and operation of a new iron ore bottom car dumper and rail infrastructure at the existing Port of Esperance facility. This was to allow the Licence Holder to receive an additional 3.5 Mtpa from the Mineral Resources Limited owned Carina and J4 Iron Ore Projects. Additional storage would have increased the Licence Holder's total output from 11.5 Mtpa to 15 Mtpa, equating to an average of approximately 41,095 Tpd.

The application to increase throughput to 100,000 Tpd authorised through the Licence Review described in the key finding above, is not related to the then proposed iron ore export increases. Rather, the application to increase throughput related to the operational potential for current material handling procedures to exceed nominated throughputs with existing infrastructure when loading occurs at all three Berths.

Key finding: A final decision on the location of the bottom car dumper and rail infrastructure that was the subject of the application submitted on 23 February 2016, has not been reached at the time of finalising the Reviewed Licence, nearly two years from submission of the application. Therefore in accordance with section 57(2)(a)(i) of the EP Act, the Delegated Officer has decided to decline to deal with the application and the proposal has not been incorporated into this latest Amended Licence.

In accordance with s53(1)(a) of the EP Act the Licence Holder will be required to submit a works approval application for any future proposal to alter the iron ore in-loading processes.

5.3 Compliance inspections and site visits

DWER has undertaken two compliance inspections and one site visit in the last four years. A summary of these is provided below.

20 January 2015

An inspection was undertaken on 20 January 2015. At the time of inspection, there appeared to be no action plan regarding the prevention of dust exceedances which had been a regular occurrence during the year. The Licence Holder met with CBH on 17 February 2015 to discuss the exceedances and provided details of this meeting to DWER. Actions from the

meeting for the Licence Holder and CBH included amending internal exceedance reporting procedures to notify CBH as appropriate, and making improvements to dust management in the CBH lease area. DWER was satisfied with the information provided and the inspection was closed off on 10 April 2015.

21 January 2014

An inspection was undertaken on 21 January 2014. At the time of inspection, non-compliances were identified from the 2013 AACR (further detailed in Section 5.4 below) and additionally, a stormwater pipe at Berth 2 was observed to be broken, potentially compromising the containment capacity of the berth. A number of general observations were made including a storage shed containing stockpile of iron ore fines where a door was left open which had the potential to emit dust, all three double-skinned diesel refuelling tanks located at the site did not have an appropriate hardstand for spill containment and temporary sludge storage on a cracked concrete floor had the potential for leachate generation.

Evidence of compliance was received by DER on 19 March 2014. DER was satisfied with the information provided and the inspection was closed off on 3 April 2014.

Site visit – 14 July 2018

The purpose of the site visit conducted in July 2018 was for familiarisation as opposed to regulatory reasons. During this visit DWER officers did note that grain loading was underway at Berth 1 and grain dust was visible within the Port of Esperance leasehold area. The source of this dust was visibly identified at the base of grain silos below the point where the conveyor emerges from the silos. As discussed in section 3.2, DWER is currently reviewing its position on grain handling and Category 58 with a view to incorporate the regulation of bulk grain loading using an open materials loading system under Part V of the EP Act.

5.4 Annual Audit Compliance Reports and Annual Environmental Reports

The reporting period for the Licence Holder under L5099/1974/14 is 1 October until 30 September the following year and received by DWER in December of each year. A review of the past three AERs and AACRs has been undertaken and issues of note are set out below. A summary of monitoring data provided with AER submissions is provided in section 5.6.

5.4.1 2016 to 2017 Report

During the reporting period there was one exceedance of PM_{10} target values at Site 4 on 19 July 2017. On this date, diesel was being unloaded at Berth 2 and iron ore loaded at Berth 3 for a cumulative period of 2 hours, 15 minutes. Therefore bulk material handling activities at Berth 3 are unlikely to be the source of dust. Further, recent rains had wet unsealed roads suggesting that dust was likely to have been generated from grain unloading activities as north to north-easterly winds place Site 4 downwind of Premises/CBH activities.

Three TSP exceedances were recorded during the reporting period with two of these exceedances occurring on one day at two monitoring sites. The Licence Holder notes that each of these exceedances could be attributed to grain loading for the following reasons:

- Exceedances 17 and 18 December 2016 – Material handling being conducted at Berth 1 (grain) and 2 (sulfur). Metals species analysis of sulfur indicate no increase in concentrations at Sites 3 and 4, where exceedances were recorded, when compared to days where sulfur is not being loaded.
- Exceedance 4 April 2017 – Material handling being conducted at Berth 1 (grain) and 2 (fertiliser). Grain is assumed to be the source of TSP as fertilisers are unlikely to produce significant levels of dust.

Unsealed roads were also assumed a potential source of elevated TSP during the each

exceedance. The progressive sealing of unsealed areas is currently underway to eliminate this dust source.

Other self-reported non-compliances include missing data from dust deposition gauges, presumed stolen, and failure to conduct monthly stormwater monitoring due to lack of rainfall. As these instances were beyond the control of the Licence Holder, DWER did not find SPA to be non-compliant with the Licence in-force at the time of reporting.

5.4.2 2015 to 2016 Report

A non-compliance was identified by the Licence Holder in the 2015/16 AACR with condition 3.8.1 as the TEOM at Site 4 was only able to capture 87% of data over the annual period. All other monitors achieved a greater than 98% data capture rate. High Volume Air Samplers (HVAS) at Sites 3 and 5 also had faults during the annual period while dust deposition gauge DG13 went missing in October 2015, presumed stolen. DER did not assess these occurrences as being non-compliant with the Licence in-force at the time of reporting.

On 5 November 2015, SPA was non-compliant with former condition 1.3.5 when fertiliser was released to harbour waters. DER issued a letter of warning on 5 February 2016. On 25 May 2016, iron ore wash waters were allowed to enter the harbour waters. The Licence Holder in both incidents revised its loading procedures and no further action was required from DER.

Other key findings that have been referred to DWER's Compliance and Enforcement team included:

- Elevated nutrients in captured stormwater were identified following three fertiliser shipments.
- One incident of visible dust possibly impacting amenity was noted as arising from CBH activities.
- Two incidents where minor volumes of oil (< 10L) and plastics were released into the Esperance Harbour.
- Five complaints in total were recorded with each related to Port and truck noise.

5.4.3 2014 to 2015 Report

A non-compliance was identified with former condition 1.2.1 in respect of a spill of approximately 1 tonne of ammonium sulfate (fertiliser) on 31 October 2014 from a vessel after the ship had been released back to the shipmaster (ICMS 36946). This incident was closed out and no further action was required.

Other key findings included:

- Some monitoring data was missing for various reasons provided in the AACR. This was reported separately to DER by the Licence Holder.
- Fifteen complaints in total were recorded with three related to dust from iron ore loading and unsealed roads at the Premises and a fourth related to grain handling activities at CBH. Seven complaints were made about Port, truck and train noise.

General comments in respect of the AER and AACR reports include:

- Exceedances for TSP and PM_{10} targets (90 and 50 µg/m^3 respectively) are reported as likely to be the result of grain handling and dust lift-off from unsealed roads. Loading infrastructure at the Berth 1 grain handling facility is out-dated and a significant contributor to dust. Grain handling is not specifically conditioned in the Existing Licence; and
- Although nickel is has since been shipped in entirely closed containers, minor concentrations of nickel dust are still being recorded in monitoring data. This could be explained by remobilisation of dust from unsealed roads, or traces of material being left

on the outside of containers from the mine site. Nickel dust as PM_{10} was found in concentrations well below the 0.14 µg/m^3 target on the Licence, which was applied as a criterion for public health.

5.5 Compliance history check

DWER's Incidents and Complaints Management System (ICMS) is the system used to record complaints received and non-compliance requiring investigation. A review of ICMS was undertaken and a summary of incidents and complaints over the past five years is provided below.

A total of 31 incidents and complaints were recorded during this period, 25 of which related to TSP or PM_{10} target exceedances. The target exceedances were mainly related to grain handling operations which are conducted by CBH.

Two Letters of Warning were issued to the Licence Holder over this period. The first was issued on 16 April 2013 in respect of a late notification of a TSP target breach. The second was issued on 9 December 2015 in respect of a fertiliser spill into the Esperance Inner Harbour. These incidents were closed out following the issue of the Letters of Warning and no further action was required.

5.6 Modelling and monitoring data

5.6.1 Wastewater and Stormwater Monitoring

The Licence Holder is required by the Existing Licence to provide monthly reports to DWER for the monitoring of wastewater and stormwater. Stormwater samples are collected on a monthly basis from all Hume Interceptor Pits (Sumps 1-4) and drains with the following parameters investigated:

- Total suspended solids (TSS)
- Sulfur
- Copper
- Nickel
- Lead
- Iron
- Manganese
- Ammonia
- Nitrous Oxides (NOx)
- Total Nitrogen
- Total Phosphorous
- Total Petroleum Hydrocarbons (C6-C36)

Results are reported against the Australian and New Zealand Guidelines for Fresh and Marine Water Quality, 2000 (ANZECC Guidelines).

No long term trends have been identified in stormwater monitoring reports although some spikes have been identified. In some instances these spikes can be explained by the type of material handled in the previous month. For example in December 2015, June 2016 and June/July 2017 during fertiliser unloading activities at Berth 2, handling and clean-up procedures were not correctly followed (see Stormwater quality monitoring – 2015/16). In both examples the Licence Holder responded to the spikes by improving operating procedures and/or increasing environmental checks. Other spikes in elevated nutrients can be explained by external factors such as grain handling at Berth 1.

Stormwater captured in Hume Interceptors is recovered on a monthly basis and taken to onsite treatment facilities. Wash waters from fertilisers are also taken to the Myrup liquid waste facility or back to the receiver for reuse for sale as liquid fertiliser.

Treated water from the WWTP is discharged to the Reclaim Area, reused onsite for dust

suppression or disposed at an appropriately licensed waste facility for that waste e.g. the Myrup liquid waste facility. Reuse of wash waters for dust suppression is not considered a discharge and therefore has not been assessed in this Decision Report. The Licence Holder has adopted its own criteria based on ANZECC irrigation water trigger values.

Wash waters from nickel and copper handling operations, conducted in accordance with Works Approval W5840/2015/1, are taken directly to the liquid waste facility at Myrup. As a result there are only residual sources of metals in washwater that is treated at the WWTP with the majority of contaminants being nutrients from grain and fertiliser handling. All sulfur handling operations were suspended in September 2017 due to the shutdown of the FQM Ravensthorpe Nickel Operations.

Stormwater quality monitoring – 2016/17

Nutrient concentrations were notably elevated during the annual period with a maximum concentration of 263 mg/L recorded for Total Nitrogen at Sump 3 on 22 June 2017, and 21.20 mg/L for Total Phosphorous recorded at Sump 4 on 24 January 2017. It is understood that in these instances a discharge to the marine environment was unlikely due to insufficient rainfall and therefore there was no impact to the environment. Nutrient concentrations declined toward the end of the annual period possibly due to improved berth cleaning operations and the cessation of fertiliser shipments from July 2017.

As a result of ongoing issues associated with fertiliser handling, the Licence Holder has advised DWER that it is considering the feasibility of utilising the sulfur circuit to unload fertilisers in future as a means of reducing berth spillage. This will reduce the risk associated with fertiliser handling.

Copper was identified in Sump 2 at concentrations above ANZECC Guidelines for marine waters. The first shipment of copper concentrates handled in bulk commenced on 24 June 2017 with a second shipment conducted on 18 September 2017 in accordance with Works Approval W5840/2015/1. Copper concentrations in Sump 2 appear uncorrelated to bulk handling of copper concentrates indicating that there is another source. These exceedances were first identified in 2015 and have instigated a Licence Holder investigation into the source of copper and the cleanout of Sump 2 to prevent discharges to the marine environment. Investigations into the source of copper in stormwater are ongoing.

Stormwater quality monitoring – 2015/16

There were elevated concentrations of total nitrogen above ANZECC Guidelines for marine waters following a 10-fold dilution factor (2.30 mg/L) during the 2015/16 reporting period. This resulted in action by the Licence Holder (through re-training of fertiliser stevedores). The monthly water report for August 2016 noted a decline in total nitrogen concentrations from previous months.

In stormwater monitored at Sump 2 total and dissolved copper was identified in concentrations above ANZECC Guidelines for 80th percentile water quality trigger values (0.08 µg/m^3). The spike in copper concentrations was identified in August 2015 and exceeded water quality trigger values by a factor of nearly ten-fold (9.76). Since the spike in August, copper concentrations declined to below ANZECC criteria in November 2015.

At the time of reporting in 2016 there was no material handled in bulk at the Premises expected to contain sufficient concentrations to result in exceedances of ANZECC trigger values. In addition, nickel and gold pyrite handled at the Premises in containers were identified as having copper concentrations below laboratory level of reporting (<0.01 µg/m^3).

Stormwater quality monitoring – 2014/15

Monthly water reports show that stormwater with elevated levels of nitrates and nitrites were discharged from Drains 1 to 3 to the Esperance Inner Harbour in months of high rainfall. These concentrations were found to be in excess of ANZECC Guidelines at 80th percentile

trigger values. Total Phosphorous concentrations also exceeded these trigger values although only in the May sampling event and at Drains 2 and 3.

Due to level of dilution which was expected to occur shortly after the discharge and irregular frequency of discharge (based on high rainfall), it was not expected to impact the local marine environment significantly.

A spike in nickel concentrations in Sump 2 was identified in October 2014 stormwater monitoring data. Investigations by the Licence Holder determined that the likely cause was a large rainfall event that "*mobilised residual nickel from the external surfaces of nickel containers into the Berth 2 drains, which drain into sump 2*" (SPA, 2014). Following this event, the Licence Holder reported this to the mining company responsible for cleaning containers, who was reported to have implemented additional monitoring and corrective measures (SPA, 2014).

Key finding: The source of copper within stormwater (Sump 2) is not clearly related to any bulk material handled at the premises. Sediment sampling, discussed further in section 5.6.2, found that copper concentrations in the upper 10cm layer of sediment did not increase significantly from 2016 to 2017 sampling periods. Therefore it is likely that concentrations of copper in sediment are likely to be linked to previous handling activities as well as dredging.

There is a correlation between spills on Berth 2 during the activity of fertiliser handling and spikes in nutrient concentrations in stormwater. The use of grab buckets mounted to vessels presents a greater risk of bulk material spillage when compared to the use of the grab bucket connected to the sulfur circuit due to the reduced distance travelled by the grab and larger hopper size at the sulfur circuit.

5.6.2 Annual Marine Sediment Quality Report

In accordance with the Licence active prior to Review core sediment samples were taken on an annual basis from the top 10cm of the sediment layer at 19 monitoring locations within the Esperance Inner and Outer Harbour. Parameters monitored include total organic carbon, metals, metalloids and tin-based organic compounds tributyltin, dibutyltin and monobutyltin (TBT, DBT and MBT). Particle size distribution for sediment particles smaller than 62µm within the top 10cm of the sediment layer is also monitored on a triennial basis.

Samples collected in July 2016 indicated that concentrations of all metals decreased from 2014 results when spikes in nickel concentrations were observed. During the 2016 sampling event one sample (A10b) exceeded Australian and New Zealand Interim Sediment Quality Guidelines (ISQG) 'high' values (52mg/kg) showing nickel concentrations at 68mg/kg at A10b, adjacent to Berth 1. In 2017, the number of sites exceeding ISQG-High values for nickel reduced to zero although six sites remained above ISQG-Low values with 51 mg/kg nickel recorded at A10b.

This compared to four samples adjacent to Berths 2 and 3 taken in 2014 that exceeded the ISQG-High values for nickel. Dredging works conducted in July/August 2014 are believed to have caused increases in levels of nickel contamination in the top 10cm of sediment in the October 2014 survey.

Sediment sampling investigations also determine the bioavailable content of metals (As, Cd, Cr, Cu, Li, Mn, Ni, Pb, S, Zn) within sediment using dilute acid extraction processes to determine the potential impact to marine organisms. In the 2016 and 2017 sampling events, all bioavailable metals were each recorded as being below ISQG 'low' values.

ISQG-High values (80µg/kg) in 2014 sample period were also exceeded at two sites for TBT at Berth 3 sample site A8 (103.3µg/kg) and Berth 1 site A10b (1,687.5µg/kg). However, in 2016 sample results TBT concentrations had reduced with three sites above ISQG-Low

values (9µg/kg): A8, A9 and A10b, which had concentrations of 2.8, 11.7 and 26.1µg/kg respectively. The declining trend in TBT concentrations continued in the 2017 sampling event with sampling location A8 the only site to have a TBT concentration of 18.8µg/kg, which is above the ISQG-Low value of 9µg/kg. TBT is no longer applied to ships due to its high bioaccumulative toxicity to marine life and it is assumed that its presence is due to existing TBT flakes in sediment not being removed during dredging or TBT present on the undercoat of older ships.

SPA is planning to conduct toe line dredging in the near future as part of the required deepening of all three berths to depths of undisturbed sediment. This is expected to remove the majority of TBT paint flakes and lower elevated nickel/lead levels with contaminated dredge spoil likely to be disposed off-site or used for reclaim material.

Key finding: The fluctuations in metal and TBT concentrations in sediment is directly linked to dredging, which is not considered part of the primary activities of the licence categories. Previously dredging activities have been managed under Part IV of the EP Act through MS 681, which contains ongoing sediment monitoring requirements.

In addition, all bioavailable metal concentrations were below ISQG-Low values at each sampling location. Previous sediment quality monitoring conditions have not been transferred to the Reviewed and now Amended Licence and no further risk assessment is required.

5.6.3 Ambient Noise Monitoring

Annual noise reporting to DWER for the period of 20 November to 19 November the following year is required under the Regulation 17 Approval. Noise monitoring reports have also been submitted on a quarterly basis under earlier versions of the Part V Licence.

Key finding: To avoid unnecessary duplication with the Approval, noise reporting was removed from the Reviewed Licence. Noise monitoring and annual reporting will remain a requirement of SPA in accordance with the Regulation 17 Approval.

5.6.4 Annual Air Quality Reporting

The Licence Holder is required by the Existing Licence to undertake:

- speciation monitoring of deposited dust in 12 gauges located around town for nickel, iron, lead and sulfur;
- ambient particulate monitoring (PM_{10} and TSP) at Sites 1 to 4 with TSP also monitored at Site 5; and
- monitoring of TSP of nickel, iron, lead and sulfur at Sites 1 to 5.

Ambient air quality monitoring – 2016/17

HVAS data between 2014 and 2017 has found that total iron contributes up to an average of 3 per cent of deposited dust near to the Premises with grain reported by the Licence Holder as being the most significant contributor (from the Prescribed Premises) at dust deposition gauges. Maximum iron contribution ranged between 4 per cent at background monitor Site 5 to around 12 per cent at Sites 2 and 4 indicating that concentrations increase with closer proximity to the Premises. However, chemical fingerprinting of dust conducted in 2009 and analysis of gravel roads indicates that the source of iron within TSP was most likely to be from roads, which contain between 7.2 and 9.6 per cent iron.

Metals speciation monitoring at HVAS monitors identified no exceedances of previous nickel targets specified on the Licence (0.14 µg/m^3) although winds were predominantly offshore

during the trial of bulk nickel concentrate loading conducted in June and September 2017. On 5 January 2018, DWER amended Works Approval W5840/2015/1 that allowed the trial shipments. The amendment required further ambient air quality monitoring to allow for a risk-based review using more robust data measured where wind directions placed sensitive receptors downwind of bulk loading activities (refer to section 5.6.5).

The highest concentrations of sulfur levels over any 24-hour period was measured at 10 µg/m^3 although with the closure of the nickel mine in Ravensthorpe, sulfur handling operations ceased in September 2017. Lead levels did not exceed the 0.013 µg/m^3 recorded in the 24-hour period of 5 to 6 November 2016 and are not expected to present a risk as lead is no longer handled in bulk at the Premises.

Ambient air quality monitoring – 2015/16

The Licence Holder reported a 2% increase in imports and exports during the reporting period with grain, gold pyrite (not bulk handled), woodchips, sulfur and fertilisers responsible for the majority of this increase. Over the period the Licence Holder reported 10 exceedances to ambient dust targets (both PM_{10} and TSP), eight of which were directly related to bush fires while the remaining two were attributed to grain handling and site traffic on unsealed roads.

In its target exceedance notification submitted on 22 April 2016 the Licence Holder identified that “other sources [of dust] may have included dust from unsealed roads within the Port”. On 23 February 2016, the Licence Holder noted that “unsealed roads within the Port and grain handling operations in the CBH leasehold area may have contributed to TSP concentrations.” During the compliance inspection conducted on 20 January 2015, the Licence Holder identified the truck turnaround point and Shed 2 and Shed 6 entrance points as the most significant source of dust from haul roads as the dust binding agent is removed by turning vehicles more quickly than on straighter roads. DWER notes that the Licence Holder completed the sealing of entrance points to Shed 2 and Shed 6 with bitumen in November 2017.

During the reporting period, the following measurements were identified:

- The highest nickel (TSP) recording for any 24-hour period was 0.019 µg/m^3 at Site 2 on 16 February 2016, followed by a recording below detection levels in the following monitoring event. Sites 1, 3, 4 and 5 measured ambient nickel concentrations on 22 February 2016 were 0.007, 0.009, 0.007 and 0.003 µg/m^3 respectively.
- Iron in TSP constituted approximately 1.75% of total dust measured in TSP on average at Sites 1 to 5.
- Ambient lead in air fell below the limit of detection approximately 98% of the time with the maximum lead concentration value over one 24-hour period reaching 0.064 µg/m^3.
- The highest 24-hour average concentration of sulfur (10 µg/m^3) coincided with outloading activities onto trucks within Shed 5.

Ambient air quality monitoring – 2013/14 and 2014/15

For both the 2013/14 and 2014/15 annual periods iron ore dust presented the most significant portion of deposited dust out of the parameters monitored under the Licence. As organic material is not specified as a parameter monitored under the Licence, the scale of grain dust is not represented.

Other major contributors to dust found within deposition gauges included beach sand and dust from unsealed roads in the Prescribed Premises. The greatest amounts for both grain and iron ore dust typically occur in summer months across the monitoring locations. Seven of the eight TSP and PM_{10} exceedances reported to DER in 2015 cited grain handling and unsealed roads as the likely key contributors to each exceedance.

Key Finding:

1) Ambient lead concentrations in air have trended downwards following the cessation of bulk loading and clean-up operations conducted at the Premises. Those recordings above detection limits remained well below *National Environment Protection (Ambient Air Quality) Measure* (NEPM) criterion of 0.5 µg/m^3 over an annual period.
2) The Licence Holder has attributed air quality impacts, in part, to traffic on unsealed roads. Analysis of onsite gravel dust identified that iron contributes up to 9.6% of total road dust.
3) Sulfur concentrations may also be attributed to natural causes such as sea spray, which explains the upward trend in sulfur concentrations in the summer months when strong onshore winds prevail.
4) The request to replace TEOMS with BAMS for the monitoring of ambient PM_{10} concentrations was assessed through the Reviewed Licence as not having an impact on previous reporting or monitoring requirements.

5.6.5 Monitoring conducted during nickel and copper concentrate trial

A total of seven trial shipments of nickel and copper concentrates using the Rotabox system were conducted during the period June 2017 to March 2018 under Works Approval W5840/2015/1. Of these shipments, three were conducted where the wind directions placed ambient air quality monitors downwind of shiploading activities. Wind speeds averaged 7.0, 4.6 and 5.3 metres per second for trial shipments 3, 4 and 6 respectively and no rainfall was recorded during any trial shipments.

The propensity for dust generation from bulk material handling is largely dependent on handling methods, a product's particle size distribution and product moisture content. Particle size distribution analysis conducted on nickel concentrates handled during the trial period identified that the percentage of product that was able to be passed through a screen diameter of 11 microns was 19.3% - 26.6%. For copper this range was 16.6% - 19.2%.

Throughout the trial period all concentrates had a moisture content that remained above the DEM level for each product. Table 7 shows the average moisture content of all nickel and copper concentrate shipments compared to the DEM level for each product.

Table 7: Average moisture content of nickel and copper concentrates during the trial

Trial shipment	Nickel concentrate average moisture (%)	Copper concentrate average moisture (%)
1 – June 2017	9.19	6.45
2 – September 2017	7.02	8.08
3 – October 2017	9.47	Not loaded
4 – December 2017	Not loaded	7.69
5 – December 2017	9.33	Not loaded
6 – February 2018	8.40	7.64
7 – March 2018	9.40	Not loaded
DEM level	*2.4*	*1.9*

In addition to storing and transporting nickel and copper concentrates within closed containers prior to shiploading, the Licence Holder also operated misting sprays at the top of the ship's hold to act as a barrier to dust entering the environment.

Odour was also monitored during the trial period to assist in the assessment of risks to public amenity. On occasion, minimal odours were detected at the ship's hold during shiploading.

Odour was not detected beyond the premises during odour surveys conducted over the seven trial shipments.

Trial shipment air quality monitoring

Monitoring data from each of these trial shipments reveal that:

(a) trial loading activities did not result in exceedances of works approval limits for 24-hour averaged PM_{10} and TSP nickel and copper concentrations of 0.14 µg/m^3 and 1.0 µg/m^3 respectively during shiploading;

(b) dust deposition gauge assessments did not indicate a clear influence from nickel or copper concentrate loading; and

(c) there are increases in measured PM_{10} and TSP in the immediate vicinity of Berth 2 during shiploading as measured at portable dust monitors located within the Premises boundary. Spikes are less evident at ambient air quality monitors located near to residential receptors.

A review of data collected three days prior to, and three days after copper concentrate ship loading identified that copper concentrations as PM_{10} at ambient monitors remained below detectable levels for the vast majority of days with minor increases during ship loading events. All recorded concentrations remained below DoH recommended guidelines for 24 hour averaged concentrations in ambient air (1.0 µg/m^3) by an order of approximately 300 times.

Some nickel was identified during days where shiploading was not occurring, which may be the result of dust on external containers being transported to and from the Premises. Concentrations of nickel were recorded above 0.003 µg/m^3 on 9 of the 28 days of monitoring for the three trial shiploading events. It should be noted that the World Health Organization (WHO) guideline value (0.003 µg/m^3 – refer to section 8.4.2) is for an annual average. Using monitoring data collected during trial shipments, averaged PM_{10} concentrations fall well below 0.003 µg/m^3. Table 8 below depicts the concentrations of nickel and copper in ambient air on the days of ship loading.

Table 8: Ambient nickel and copper as PM_{10} during trial shiploading

Shipment	Parameter	Date	Site 1	Site 2	Site 3	Site 4	Site 5
Trial shipment 3 (nickel only)	PM_{10} Ni (µg/m^3)	4/10/2017	0.0075	0.00140	0.00141	0.00141	<0.00066
		5/10/2017	0.0074	0.00139	0.00140	0.00140	<0.00066
Trial shipment 4 (copper only)	PM_{10} Cu (µg/m^3)	21/12/2017	<0.00066	0.00262	0.00328	0.00131	<0.00066
Trial shipment 6 (nickel and copper)	PM_{10} Ni (µg/m^3)	3/2/2018	0.00214	0.00550	0.01152	0.02046	0.00079
		4/2/2018	0.00869	0.00530	0.00078	<0.00066	0.00214
	PM_{10} Cu (µg/m^3)	8/2/2018	0.00129	0.00261	0.00195	0.00196	<0.0006

Trial shipment 3

Wind directions during trial shipment 3, conducted between 4 and 6 October 2017, placed Berth 2 nickel concentrate loading activities upwind of ambient air quality monitors between approximately 2150 hours on 4 October and 2300 hours on 5 October. During this time winds

were light to fresh, between 4.2 and 11.8 m/s.

PM_{10} and TSP concentrations averaged over 24-hour periods were low with declining trends for TSP at all HVAS monitoring sites during the trial. TSP concentrations as measured at mobile monitors were also generally low.

Maximum 24-hour concentrations of nickel and copper as PM_{10} during trial shiploading totalled 0.0014 µg/m^3 and 0.0012 µg/m^3 respectively and falling well below the 0.14 µg/m^3 limit applied through the Works Approval.

Trial shipment 4

Between 21 and 22 December 2017 copper was loaded into a vessel for a period of 10 hours. Although the loading time did not allow for more monitoring during onshore wind conditions for longer than 12 hours, winds were onshore for more than 75% of the loading period (7.8 hours) and therefore monitoring data is expected to represent the highest seasonal potential for impacts to nearby residential receptors.

24-hour averaged PM_{10} and TSP concentrations measured at Sites 1 to 5 remained low throughout the trial shipment. TSP concentrations at mobile E-samplers EP5 and EP6 (Figure 5) during the fourth trial shipment showed short-term peaks around the beginning and end of shiploading activities. E-sampler EP7, which was directly downwind of Berth 2 shiploading activities, did not record elevated dust levels. Results at EP6 are expected to have been influenced by truck movements during this period.

No discernible increase in total suspended copper or copper as PM_{10} could be seen at ambient monitors as a result of copper concentrate loading on Berth 2.

Trial shipment 6

Nickel was loaded on 3 to 4 February 2018 over a period of 28.8 hours and with copper loaded onto the same vessel between 8 to 9 February 2018 over a period of 11.1 hours. During this loading event, winds were onshore and within the specified wind arc (45 to 135 degrees) for a cumulative period of 24-hours.

TSP concentrations at mobile E-samplers EP5 and EP6 (Figure 5) peaked during copper concentrate loading although these hourly averaged TSP never exceeded 100 µg/m^3 and decreased to below 30 µg/m^3 prior to the completion of shiploading. All other monitoring stations recorded low PM_{10} concentrations throughout the loading of both nickel and copper concentrates.

During shiploading PM_{10} nickel concentrations at ambient air quality monitoring sites ranged from below detectable levels (0.00066 µg/m^3) and 0.02 µg/m^3. The maximum TSP nickel concentration recorded during shiploading was 0.033 µg/m^3 at Site 4 on 3 February 2018. Copper concentrations on 8 February 2018 did not exceed 0.007 µg/m^3.

Baseline monitoring

A total of 59 sampling rounds were monitored for copper and nickel during baseline air quality testing from HVAS monitors located at ambient monitoring locations Site 1 to 5 inclusive (Figure 5). Results of the baseline sampling conducted between May 2016 and May 2017 are presented in Table 9.

A comparison of particulate matter as PM_{10} versus TSP identified that the mean percentage composition of PM_{10} to TSP across the baseline monitoring period was within 43 to 49% for all monitoring sites, with the lowest mean recorded for Site 4 (43%) and the highest for Site 5 (49%) (MBS, 2017).

Table 9: Baseline (pre-trial) summary statistics for nickel and copper concentrations as PM_{10} ($\mu g/m^3$) at Sites 1 to 5

	Monitoring Site				
	Site 1	**Site 2**	**Site 3**	**Site 4**	**Site 5**
Mean PM_{10} nickel concentration	0.0014	0.0015	0.0014	0.0014	0.0006
Median PM_{10} nickel concentration ($\mu g/m^3$)	0.00070	0.00071	0.00071	0.00071	0.00007
95% Upper Confidence Limit[1] for PM_{10} nickel concentration ($\mu g/m^3$)	0.0019	0.0020	0.0020	0.0018	0.0007
Mean PM_{10} copper concentration ($\mu g/m^3$)	0.00059	0.00068	0.00038	0.00048	0.00063
Median PM_{10} copper concentration ($\mu g/m^3$)	0.00036	0.00037	0.00036	0.00036	0.00037
95% Upper Confidence Limit[1] for PM_{10} copper concentration ($\mu g/m^3$)	0.00075	0.00081	0.00048	0.00060	0.00076

Note 1: The 95% Upper Confidence Limit refers to the level at which 95% of samples taken would measure below the value provided.

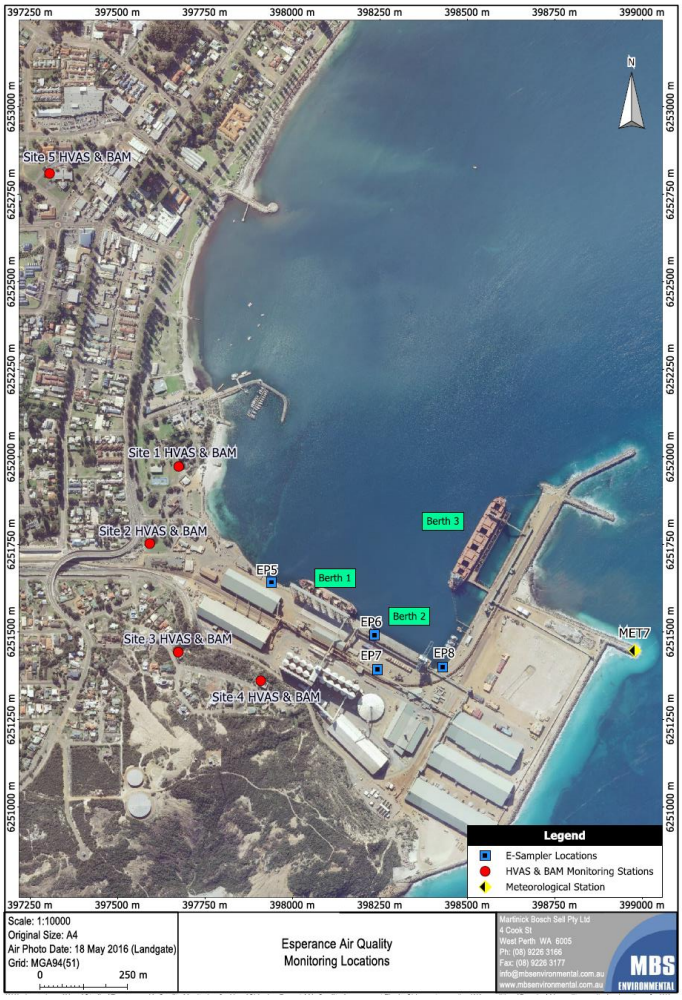


Figure 5: Ambient air quality monitoring sites

Key finding: The *Esperance Baseline Air Quality Assessment* (MBS, 2017), along with previous investigations conducted by the DoH into nickel concentrations in ambient air demonstrate the following:

1) The *Esperance Baseline Air Quality Assessment* (MBS, 2017) cannot be directly compared with the *2009 Report on Nickel Dust Monitoring in Esperance* (DoH, 2010) or the *Monitoring Results for Air-Borne Nickel in Esperance* (2012-2014) (DoH, 2015) for the following reasons:
    a) Baseline investigations into the ambient air metal concentrations at Sites 1 to 5 reviewed data from 59 sampling rounds. This is a significantly lower number of samples reviewed compared to annual DoH reviews of ambient nickel concentrations in Esperance (DoH 2010; DoH 2015);
    b) Weather conditions are likely to have varied between each investigation period;
    c) Blank glass fibre filters used at HVAS monitors contained low, but detectable levels of copper (2 µg/filter) and nickel (1 µg/filter). Unlike earlier DoH investigations into baseline nickel concentrations in ambient air, data provided in more recent baseline testing (summarised in Table 9) have been blank corrected; and
    d) Earlier investigations conducted by DoH relied on measurements of nickel concentrations as TSP as opposed to PM_{10}.
2) In its *2009 Report on Nickel Dust Monitoring in Esperance*, the DoH recommended that nickel concentrations be measured in PM_{10} instead of TSP as the concentration of respirable particulate matter is a more accurate reflection of health risks to sensitive receptors. Therefore this Decision Report assesses the risks to public health against monitoring data that presents respirable particulate matter.
3) PM_{10} monitored during trial shipments remained low and consistent with data gathered during baseline investigations for ambient air quality.
4) There were no discernible increases in nickel found within deposited dust collected in off-site (ambient) dust deposition monitors during the monitoring period.

5.6.6 Occupational air quality sampling in Shed 6 (spodumene)

Occupational air quality sampling undertaken in Shed 6 during spodumene loading in February 2017 revealed that silica, respirable particulates and inhalable particulates within Shed 6 did not exceed adjusted occupational exposure limits of 0.07 mg/m^3, 2.1 mg/m^3 and 7 mg/m^3 respectively. However, diesel particulates did exceed adjusted occupational exposure limits (0.07 mg/m^3) by as much as 270%. Monitoring data was collected during the loading of containers using a front end loader when shed doors were closed. Table 10 below compares air quality sample results within Shed 6 to exposure limits. The data provided in Table 10 was used to support the licence amendment application for Amendment Notice 3, issued 4 July 2017, to be able to open shed doors to reduce occupational health and safety hazards.

Table 10: Shed 6 ambient air quality during container loading

Sample Location	Date	Contaminant	Result	Adjusted Occupational Exposure Limit[3]
Static	26/02/2017	Respirable	0.3 mg/m^3	2.1 mg/m^3
Static	27/02/2017	Respirable	0.8 mg/m^3	2.1 mg/m^3
Static	28/02/2017	Respirable	0.2 mg/m^3	2.1 mg/m^3
Static	26/02/2017	Inhalable	0.6 mg/m^3	7 mg/m^3
Static	27/02/2017	Inhalable	2.4 mg/m^3	7 mg/m^3
Static	28/02/2017	Inhalable	1.0 mg/m^3	7 mg/m^3
Static	26/02/2017	Silica	0.04 mg/m^3	0.07 mg/m^3
Static	27/02/2017	Silica	0.06 mg/m^3	0.07 mg/m^3
Static	28/02/2017	Silica	0.03 mg/m^3	0.07 mg/m^3
Static	26/02/2017	Diesel Particulate	**0.12 mg/m^3**	0.07 mg/m^3
Static	27/02/2017	Diesel Particulate	**0.15 mg/m^3**	0.07 mg/m^3
Static	27/02/2017	Diesel Particulate	**0.19 mg/m^3**	0.07 mg/m^3
Loader Operator	26/02/2017	Diesel Particulate	0.026 mg/m^3	0.07 mg/m^3
Loader Operator	27/02/2017	Diesel Particulate	0.046 mg/m^3	0.07 mg/m^3
Loader Operator	28/02/2017	Diesel Particulate	0.030 mg/m^3	0.07 mg/m^3
Product Sampler	27/02/2017	Diesel Particulate	**0.099 mg/m^3**	0.07 mg/m^3
Product Sampler	28/02/2017	Diesel Particulate	**0.097 mg/m^3**	0.07 mg/m^3

Note 3: Occupational exposure limits have been adjusted by 0.7 to reflect an estimated 60 hour work week during outloading. Limits for silica, inhalable and respirable particulate matter are derived from Safe Work Australia's (2012) *Workplace Exposure Standards for Airborne Contaminants*. Diesel particulate limits are derived from the Department of Mines and Petroleum's 2013 Guideline *Managing Diesel Emissions in Underground Mines*.

6. Consultation on the application to amend the Licence

Due to the previously high level of community interest in the operation of the Premises, especially the handling of nickel concentrates, DWER provided a 21 day consultation period to the public that commenced 9 July 2018 and closed 1 August 2018. The application for amendment was published on DWER's website and advertised in *The West Australian* on 9 July 2018 and the *Esperance Express* on 13 July 2018 providing an opportunity for interested parties to submit comment. During the consultation period one submission was received. This submission and DWER's direct response is provided in Appendix 3. DWER also attended a community information session, held on 14 July 2018 by SPA and Independence Group. No input to the assessment was received at this meeting.

Drafts of the Decision Report and Amended Licence were transmitted to the Licence Holder for comment on 6 September 2018. Comments were received from the Licence Holder on 13 September 2018. These comments and DWER's response to them are summarised in Appendix 2.

Licence Holder previous comments on the Reviewed Licence are provided in Appendices 4 - 6.

7. Location and siting

7.1 Siting context

The Premises is located on the Esplanade, Esperance on Reserve 28207 near Dempster Head at latitude 33 ° 51' South, Longitude 121 ° 53' East.

The Premises is situated in the Great Southern region of Western Australia, approximately 1.5km South East of the town of Esperance. The area is zoned for Harbour purposes.

7.2 Residential and sensitive premises

The distance to sensitive land uses is defined in Table 11 and depicted in Figure 6 below:

Table 11: Receptors and distance from primary activity

Sensitive Land Uses	Distance from primary activity
Residential Premises 23 Bostock St	100m south of the Premises boundary 210m to nearest shed entrance (Shed 2 – iron ore) 360m to the nearest ship loader (Berth 1 – grain) *550m to Berth 2 ship loader (multi user berth including spodumene)*
Residential Premises 33, 37, 44, 45 and 46 Bostock St	All these properties are owned by the Licence Holder and occupied by the Licence Holder's employees and their families. 115m south of the Premises boundary 340m to the nearest ship loader (Berth 1 – grain) *240m to the nearest shed entrance (Shed 6 – spodumene)* *390m to Berth 2 ship loader (multi user berth including spodumene)*
Tea Rooms	435m to the nearest storage shed (Shed 2 – iron ore) 540m to the nearest ship loader (Berth 1 – grain)
Port Beach	370m to the nearest ship loader (Berth 1 – grain) 250m to the nearest shed entrance (Shed 2 – iron ore)
Esperance Yacht Club (boat pen)	500m to the nearest ship loader (Berth 1 – grain) 450m to the nearest shed entrance (Shed 2 – iron ore)
Industrial Premises[1] Esperance Power Station	0m between Premises boundaries 90m from nearest shed entrance (Shed 3 – iron ore) to power station generators

Note 1: CBH and Summit Fertilisers are industrial premises that are directly adjacent to the Premises and use port facilities to operate. Therefore these premises have not been considered receptors.

Figure 6: Nearby receptors to the Premises

7.3 Specified ecosystems

Specified ecosystems have been identified in the near vicinity of the Premises boundary.

Table 12: Specified ecosystems

Specified ecosystems	Distance from Prescribed Premises
Lake Warden (RAMSAR wetland)	Approximately 4,400 m northwest
Esperance Harbour – marine ecosystem The Esperance Harbour is defined as a moderate ecological protection zone in accordance with EPA's Environmental Assessment Guideline 15.	Within and directly adjacent to the premises boundary.
Threatened Ecological Community (TEC)	All of Esperance including unreclaimed sections of the Premises and surrounding industrial areas are registered as TECs. The Premises is a pre-existing facility that is located on cleared land and is unlikely to support native vegetation or animals.

7.4 Groundwater and water sources

Table 13: Groundwater and water sources

Groundwater and water sources	Distance from Premises	Environmental Value
P3 Public Drinking Water Source Area	660 m west	Water is used for potable residential use. The Premises is likely to be situated above and within the saline lens that interfaces fresh groundwater supplies and the marine environment. Port groundwater is downstream from PDWS areas.
P2 Public Drinking Water Source Area	1,570 m west	
P1 Public Drinking Water Source Area	2,350 m west	

7.5 Soil Type

The Premises is located on sandy gravel/sand soils. The area to the east of Berth 3 is made of reclaimed sand extracted from Esperance Harbour dredging projects.

7.6 Meteorology

7.6.1 Regional climatic aspects

Esperance has a Mediterranean climate with warm, dry summers and cool, wet winters. Temperatures can vary greatly depending on the direction of the wind. Southerly winds coming off the Southern Ocean that are typical in winter can result in cold, wet weather. Winds from the north that travel over central Western Australia often bring hot, dry days in summer. Hot days are typically followed by significant drops in daily temperature when the wind swings to a southerly arc and comes from the Southern Ocean (Esperance Visitor Centre, 2016).

7.6.2 Wind direction and strength

Esperance has typically strong winds, particularly in the winter months. South-easterly winds place the greater Esperance community downwind of the Premises while north-easterly winds are more likely to impact the nearest receptors on Bostock Street and those living in the West Beach area. Figure 7 shows that over the last 5 years, on average a south-easterly wind has blown toward suburban Esperance approximately 6.48% of the time, and at high speeds for approximately 1.03% of the time. Historically wind has blown in the direction of Esperance residents (between a south-easterly and north-easterly direction) approximately 23% of occasions (WillyWeather, 2016). Overall, the wind directions tend to be relatively predictable and roughly seasonally based, with winds for October to March being predominantly southerlies and south-easterlies, with westerlies and north-westerlies being dominant for the other parts of the year. It is important to note that this wind rose shows historical wind speed and wind direction data at Esperance and should not be used to predict future data.

7.6.3 Rainfall and temperature

The average temperature ranges from 14 to 26°C in summer and 9 to 20°C in winter. The annual average rainfall is 567 mm with the majority of rainfall falling between May and October. The Bureau of Meteorology (BoM) provides the mean rainfall and maximum monthly temperatures for Esperance (mean maximum temperature 1991-2016 and mean rainfall 1950 to 2016).

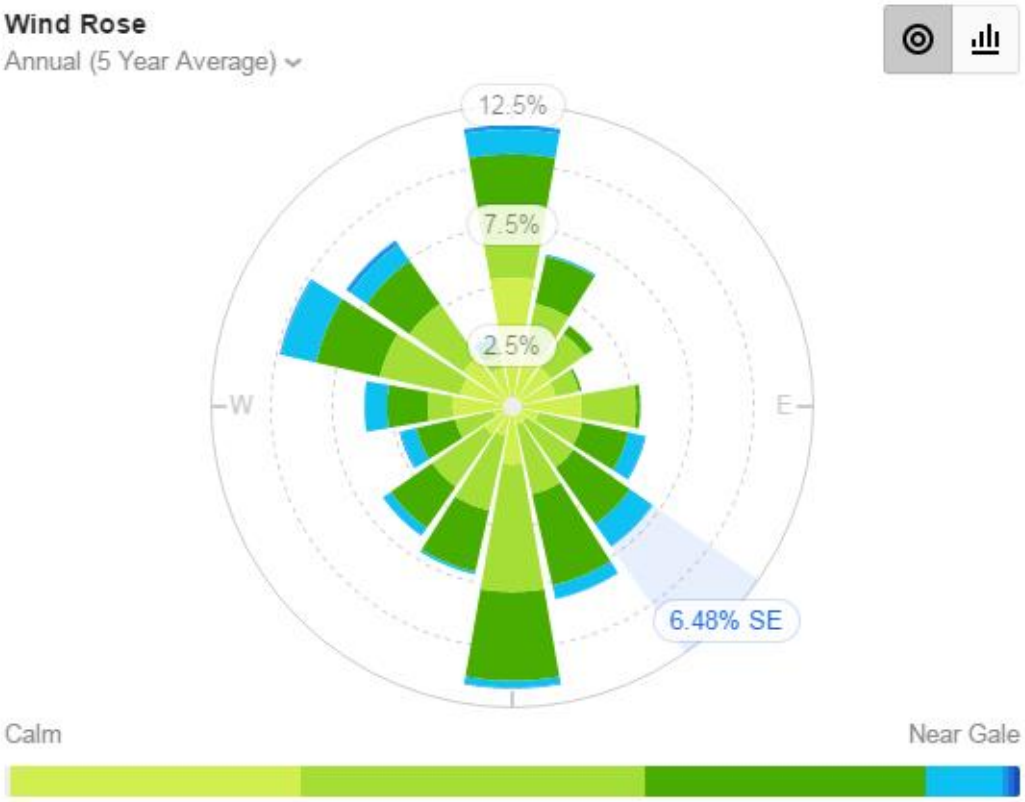


Figure 7: Five year average wind directions for Esperance (WillyWeather, 30 Nov 2016)

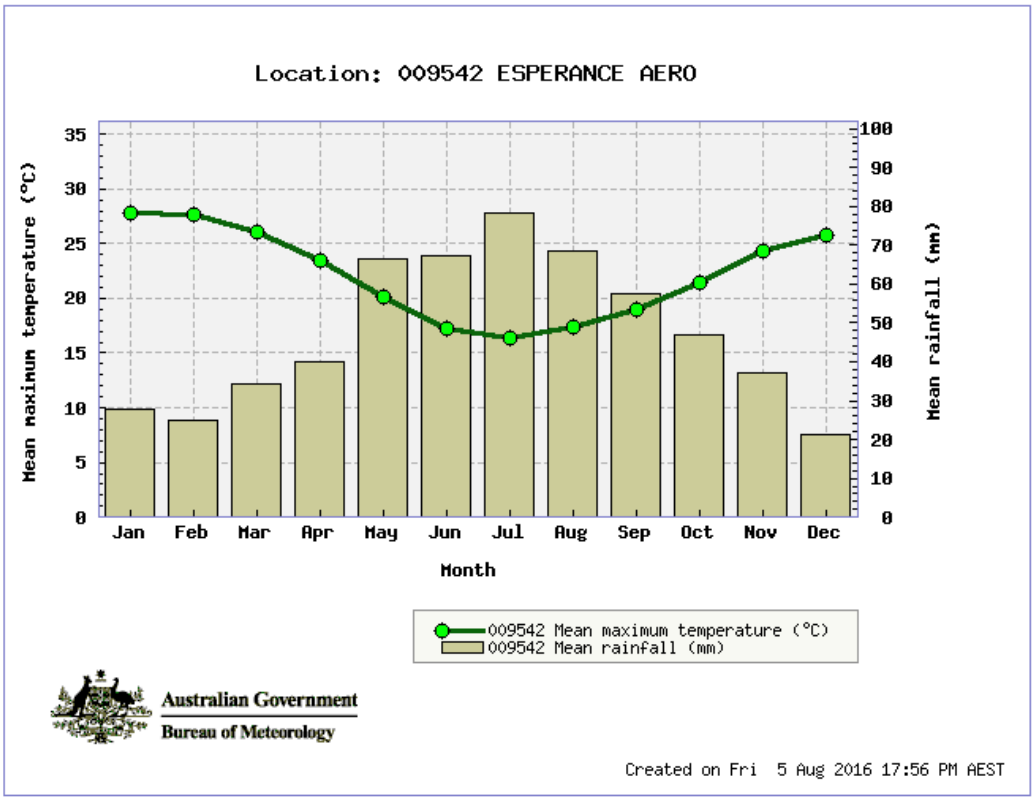


Figure 8: Mean maximum temperature and rainfall, Esperance (BoM, 2016)

8. Risk Assessment

8.1 Determination of emission, pathway and receptor

In undertaking its risk assessment, DWER will identify all potential emissions pathways and potential receptors to establish whether there is a Risk Event which requires detailed risk assessment.

To establish a Risk Event there must be an emission, a receptor which may be exposed to that emission through an identified actual or likely pathway, and a potential adverse effect to the receptor from exposure to that emission. Where there is no actual or likely pathway and/or no receptor, the emission will be screened out and will not be considered as a Risk Event. In addition, where an emission has an actual or likely pathway and a receptor which may be adversely impacted, but that emission is regulated through other mechanisms such as Part IV of the EP Act, that emission will not be risk assessed further and will be screened out through Table 14.

The identification of the sources, pathways and receptors to determine Risk Events are set out in Table 14 below.

Table 14: Identification of key emissions, pathway and receptor

			Potential Emissions	Potential Receptors	Potential Pathway	Potential Impacts	Continued to detailed risk assessment?	Reasoning
Source (see Attachments 2 and 3 for infrastructure references)	**Category 58** Bulk material loading or unloading	In-loading and out-loading of iron ore through car dumpers, shed stockpiling, and shiploaders	**Dust:** Fugitive dust emissions and spills from handling and movement of iron ore include points where ore is dropped from height such as at the ship loader, transfer points, storage sheds and the rotary car dumper.	Esperance Yacht Club – nearest boat pen located 730m from the ship loader at Berth 3. Closest residential premises – located 210m from Shed 2 entrance and 680m from the ship loader at Berth 3.	Air (windborne): wind speed and direction can change the level of dust generation.	Public health effects may include potential acute effects such as inflammation and asthma and chronic effects such as reduced respiratory function. Amenity impacts may include visible dust plumes and the deposition of material on vehicles, recreational vessels, dwellings and clothing.	No	Dust emission impacts have been assessed by the EPA and are conditioned through MS 325 and 681 (refer to section 4.1.3 and 4.1.4). Given that an assessment has been undertaken by the EPA and a determination and conditional approval has been provided through the Ministerial Statements, it will not be considered through this risk assessment. Part V licence conditions for the monitoring of iron ore have been applied for investigation purposes during reportable events and are consistent MS 325 and 681. Further discussion is provided in section 9.6.6.
			Noise: Noise from the operation of machinery and movement of bulk material. Train movements within the premises boundary during the unloading of iron ore.	Esperance Yacht Club – nearest boat pen located 730m from the ship loader at Berth 3. Closest residential premises – located 210m from Shed 2 entrance; 680m from the ship loader at Berth 3; and as close as approximately 100m south of the train line (within the premises boundary).	Air (windborne): wind temperature inversions, speed and direction can change the level of impacts from noise to receptors.	Potential impact on amenity. Impacts to public health may also arise as a result of ongoing noise that is above regulation 17 assigned levels.	No	Conditions to manage noise related to the Premises are specified in the Approval (see section 4.1.2). In addition, train noise outside of the Premises boundary is exempt from the *Environmental Protection (Noise) Regulations 1997* under r.3(1)(c). The remaining amendments proposed will not result in a change to noise emissions from the Premises. No further assessment is required.
		In-loading and out-loading of spodumene, sulfur, fertilisers and metal concentrates using hoppers, trucks, grab buckets and crane shiploaders (rotating tipping frame).	**Dust:** Fugitive dust emissions from handling and movement of spodumene include points where material is emptied into the ship, tracked on the outside of containers and emitted from storage sheds. Fugitive dust emissions from handling and movement of nickel concentrates and copper concentrates include points where material is emptied into the ship, tracked on the outside of containers. Fugitive dust emissions from handling and movement of sulfur and fertilisers include points where material is extracted from the ship and dropped into hoppers or trucks, and material that is emitted from storage sheds.	Closest residential premises – 390m to Berth 2 ship loader and 240m to the nearest shed entrance (Shed 6 – spodumene).	Air (windborne): wind speed and direction can change the level of dust generation.	Amenity impacts may include visible dust plumes including the deposition of material on vehicles, recreational vessels, dwellings and clothing. Public health effects may include potential acute effects that may include hay fever and asthma, and chronic effects such as reduced respiratory function. Silica found within spodumene presents a respiratory risk as it is potentially carcinogenic depending on its particle size and availability in air. Irritation to skin and eyes may occur from contact with sulfur and nickel dust.	Yes	N/A

			Noise: Noise from the operation of machinery and movement of bulk material.	Closest residential premises – 390m to Berth 2 ship loader and 240m to the nearest shed entrance (Shed 6 – spodumene).	Air (windborne): wind temperature inversions, speed and direction can change the level of impacts from noise to receptors.	Potential impact on amenity. Impacts to public health may also arise as a result of ongoing noise that is above regulation 17 assigned levels.	No	Conditions to manage noise related to the Premises are specified in the Approval (see section 4.1.2). The remaining amendments proposed will not result in a change to noise emissions from the Premises. No further assessment is required.
			Odour: Odours generated from chemicals used in the processing of metal concentrates (xanthate). Nickel and copper concentrates can give off a slight sulfurous to amine odour.	Closest residential premises – 390m to Berth 2 ship loader and 240m to the nearest shed entrance (Shed 6 – spodumene).	Air (windborne): wind speed and direction can change the level of odour generation.	Potential impact on amenity.	Yes	N/A
		General site activities (other dust sources)	**Dust:** Fugitive dust emissions may arise from exposed/unsealed areas such as laydown, reclaim and trafficable areas.	Esperance Yacht Club – nearest boat pen located 840m from the unsealed truck turnaround point. Closest residential premises – located 750m to the Reclaim Area and unsealed container storage (laydown) area.	Air (windborne): wind speed and direction can change the level of dust generation.	Amenity impacts may include visible dust plumes including the deposition of material on vehicles, recreational vessels, dwellings and clothing. Public health effects may include potential acute effects such as hay fever and asthma and chronic effects such as reduced respiratory function.	Yes	N/A
	Category 82 Boat building and maintenance	Maintenance of smaller vessels, for example pilot boats, in the boat maintenance area adjacent to the pilot boat pen. Boat building is not currently undertaken at the Premises and no fixed infrastructure is in place for this activity.	**Wash water:** Runoff water from cleaning, painting and mechanical repairing smaller vessels.	Esperance Inner Harbour marine environment approximately 70m from the temporary boat maintenance area.	Direct overland flow or seepage through the Reclaim Area to the Esperance Inner Harbour marine environment.	Hydrocarbons, cleaning and painting chemicals in discharged wash water may impact marine biota.	Yes	N/A
			Dust: Dust from abrasive blasting.	Closest residential premises – 650m from the temporary boat maintenance area.	Air (windborne): wind speed and direction can change the level of dust generation.	Amenity impacts may include visible dust plumes including the deposition of material on vehicles, recreational vessels, dwellings and clothing. Public health effects may include potential acute effects such as hay fever and asthma, and chronic effects such as reduced respiratory function.	No	Any abrasive blasting activities that may occur onsite must be carried out in accordance with the *Environmental Protection (Abrasive Blasting) Regulations 1998.*
	Directly related for Category 58 and 82 - Stormwater/ wash water management	Discharges to surface water from the berth or from spillages to harbour waters during ship loading/ unloading.	Fertilisers, sulfur, nickel concentrate and/or copper concentrate spillage or traces in stormwater discharges.	Esperance Inner Harbour marine environment.	Direct discharges to harbour waters from Hume interceptors H1 to H4 or via spillage.	Alteration of the chemistry of marine water may have acute or chronic toxic effects on marine organisms.	Yes	N/A
			Spodumene and/or iron ore spillage or traces in stormwater discharges	Aquatic plants within the Esperance Harbour.	Spills and fugitive dust entering the marine environment.	Reduction in accessibility to sunlight for marine ecosystem which may limit photosynthetic function.	Yes	N/A
			Fertilisers, sulfur, iron ore, spodumene, nickel concentrate and/or copper concentrate spillage or traces in stormwater discharges.	Benthic ecosystems within the Esperance Harbour.	Direct discharges to harbour waters from Hume interceptors H1 to H4 or via spillage.	Alteration of the chemistry of the benthic layer (sediment surface), which may have acute or chronic toxic effects on marine organisms.	No	Refer to section 5.6.2.
		Treated wastewater used for dust suppression and road washing.	Discharge of wastewater potentially contaminated with metals and nutrients.	Esperance Inner Harbour and outer rockwall. Groundwater beneath the Premises is saline and not used by industry or community and therefore is not considered a resource.	Seepage to groundwater that is later expressed to the marine environment.	Alteration of the chemistry of marine water may have acute or chronic toxic effects on marine organisms.	No	There is potentially a pathway to the marine environment, although the risk is considered low given that much of the Premises is sealed and does not require dust suppression. In addition, most of the water discharged for dust suppression is expected to evaporate rather than seep to groundwater when discharged for the purposes of dust suppression. Washdown water will be collected in sumps.

		Disposal of surplus treated water onto the Reclamation Area (see Site Plan – Attachment 3).	Discharge of wastewater potentially contaminated with metals and nutrients.	Esperance Inner Harbour and outer rockwall. Groundwater beneath the Premises is saline and not used by industry or community and therefore is not considered a resource.	Seepage to groundwater that is later expressed to the marine environment.	Alteration of the chemistry of marine water may have acute or chronic toxic effects on marine organisms.	Yes	N/A

8.2 Risk Criteria

During the assessment the risk criteria in Table 15 below will be applied to determine a risk rating set out in sections 8.4, 8.5 and 8.7.

Table 15: Risk Criteria

Likelihood	Consequence				
	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High

Likelihood		Consequence		
The following criteria has been used to determine the likelihood of the Risk Event occurring.		The following criteria has been used to determine the consequences of a Risk Event occurring:		
			Environment	Public health* and amenity (such as air and water quality, noise, and odour)
Almost Certain	The risk event is expected to occur in most circumstances	Severe	• **onsite impacts**: catastrophic • **offsite impacts local scale**: high level or above • **offsite impacts wider scale:** mid-level or above • Mid to long-term or permanent impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are significantly exceeded	• Loss of life • **Adverse health effects:** high level or ongoing medical treatment • Specific Consequence Criteria (for public health) are significantly exceeded • **Local scale impacts:** permanent loss of amenity
Likely	The risk event will probably occur in most circumstances	Major	• **onsite impacts**: high level • **offsite impacts local scale**: mid-level • **offsite impacts wider scale**: low level • Short-term impact to an area of high conservation value or special significance^ • Specific Consequence Criteria (for environment) are exceeded	• **Adverse health effects:** mid-level or frequent medical treatment • Specific Consequence Criteria (for public health) are exceeded • **Local scale impacts**: high level impact to amenity
Possible	The risk event could occur at some time	Moderate	• **onsite impacts**: mid-level • **offsite impacts local scale**: low level • **offsite impacts wider scale**: minimal • Specific Consequence Criteria (for environment) are at risk of not being met	• **Adverse health effects:** low level or occasional medical treatment • Specific Consequence Criteria (for public health) are at risk of not being met • **Local scale impacts:** mid-level impact to amenity
Unlikely	The risk event will probably not occur in most circumstances	Minor	• **onsite impacts**: low level • **offsite impacts local scale**: minimal • **offsite impacts wider scale**: not detectable • Specific Consequence Criteria (for environment) likely to be met	• Specific Consequence Criteria (for public health) are likely to be met • **Local scale impacts:** low level impact to amenity
Rare	The risk event may only occur in exceptional circumstances	Slight	• **onsite impact**: minimal • Specific Consequence Criteria (for environment) met	• **Local scale**: minimal to amenity • Specific Consequence Criteria (for public health) met

^ Determination of areas of high conservation value or special significance should be informed by the *Guidance Statement: Environmental Siting.*

* In applying public health criteria, DWER may have regard to the Department of Health's, *Health Risk Assessment (Scoping) Guidelines* **"on-site"** means within the prescribed premises boundary.

8.3 Risk Treatment

DWER will treat risks in accordance with the Risk Treatment Matrix below:

Table 16: Risk Treatment

Rating of Risk Event	Acceptability	Treatment
Extreme	Unacceptable.	Risk event will not be tolerated. DWER may refuse application.
High	Acceptable subject to multiple regulatory controls.	Risk event will be tolerated and may be subject to multiple regulatory controls. This may include both outcome-based and management conditions.
Medium	Acceptable, generally subject to regulatory controls.	Risk event is tolerable and is likely to be subject to some regulatory controls. A preference for outcome-based conditions where practical and appropriate will be applied.
Low	Acceptable, generally not controlled	Risk event is acceptable and will generally not be subject to regulatory controls.

8.4 Risk of Event – Dust

8.4.1 General Hazard Characterisation

The risk of dust generation and impacts can depend on the material characterisation including moisture and toxicity, the amount of material handled and the method of handling.

National and international occupational and environmental health databases (United States Environmental Protection Agency, Agency for Toxic Substances and Disease Registry, International Programme on Chemical Safety (US), National Institute for Occupational Health and Safety) were used to review toxicological profiles of all materials imported and exported at the Premises.

No material handled in bulk at the Premises has been assessed as toxic to human health with the exception of nickel and copper. Some forms of nickel are known to induce lung tumours when inhaled at occupational levels. However, the toxicity and carcinogenicity of nickel substances is directly related to the nickel compound and its solubility. Hazards associated with the nickel handled at the Premises are discussed in more detail below.

Silica can be present in low concentrations in spodumene and is known to present potential health risks (generally through occupational exposure – long term exposure to high concentrations). Naturally occurring radioactive materials can be present in some mineral sands in very low concentrations. However, spodumene from the Mt Cattlin mine is not classified as radioactive material as there are no known materials present (Galaxy Lithium Australia Limited, 2012).

Cumulative Dust

Fugitive dust emissions may arise from the primary activity of shiploading at the Premises and from exposed areas such as laydown, reclaim and trafficable areas. The proposal to export spodumene out of Berth 2 will result in an average of five extra trucks per day accessing the Premises. These trucks will turn around to exit the Premises using the unsealed stretch of road and turnaround point adjacent to Berth 3, which the Licence Holder has identified as a source of dust emissions from the Premises.

The key hazard associated with dust generated at the Premises is particulate matter finer than 10 microns (PM_{10}). These small particles have the potential to be drawn deep within the lungs causing possible respiratory and cardiovascular problems at high exposure. Long term repeated exposure is more detrimental than short term sporadic exposure with the most severe effects being reduced life expectancy due to long-term exposures. In addition, dust can cause eye irritation and reduced amenity. Residential receptors to the Premises are as close as 210m from the nearest product storage shed (Shed 2) and 390m from the nearest Licence

Holder-operated shiploader (Berth 2).

In the 2015 reporting period, the Licence Holder reported that grain handling operations were likely to be the most significant contributor to the majority of exceedances of the TSP criteria (90 µg/m^3) and 9 of 10 exceedances of PM_{10} criteria (50µg/m^3). Prior to the Reviewed Licence, and in accordance with Works Approval W5840/2015/1 (refer to section 5.1.1), the Licence Holder conducted speciation monitoring of deposited dust collected from dust deposition gauges depicted in Figure 9.

Each of the materials is discussed in more detail below.

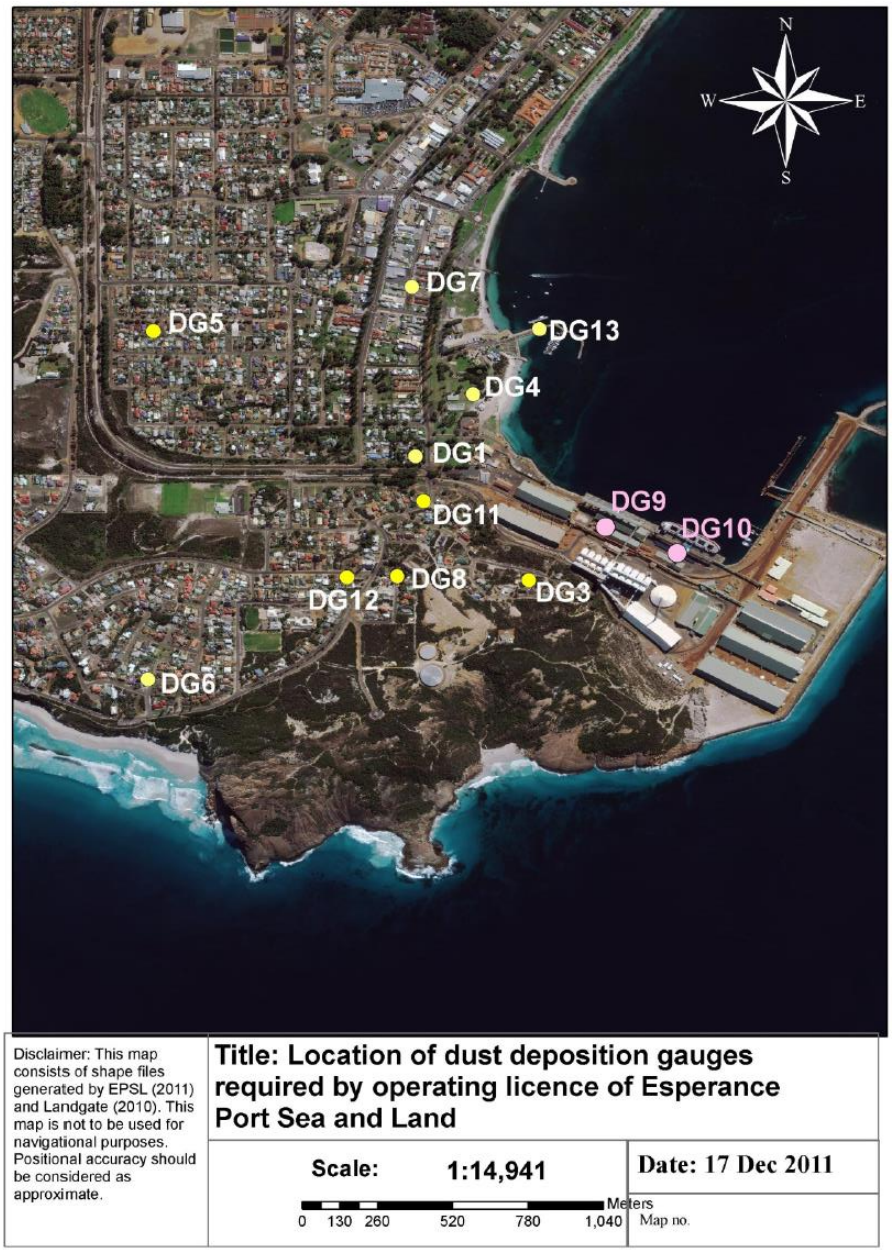


Figure 9: Dust deposition monitoring locations

Spodumene

Spodumene is delivered to the Premises in containers on the back of triple road trains. The material is unloaded within Shed 6 and stockpiled. The Licence Holder also proposes to store spodumene within the existing Sulfur Shed (Shed 5) or offsite (refer to section 0). When ship loading is undertaken the spodumene is loaded into containers within a shed before being transferred by truck to a rotating tipping frame at Berth 2, which places the container below the

ship's hold before tipping the spodumene into the vessel.

The key hazards associated with spodumene dust include crystalline silica and muscovite (mica). Crystalline silica is considered a Group 1 Carcinogen by the International Agency for Research on Cancer (IARC) and respirable forms may result in lung cancer or silicosis, a lung disease that severely reduces respiratory function. Epidemiologic data is emerging suggesting that crystalline silica may also impact the kidneys and trigger renal disease (Safe Work Australia, 2013). Muscovite may lead to pneumoconiosis, an occupational lung disease, when an individual is exposed to ongoing and high concentrations of finer muscovite particulates.

Sulfur and fertilisers

Sulfur and fertilisers are handled in an open circuit where they are unloaded from the ship using either bulka bags or grab buckets. Sulfur is unloaded into a hopper where it is transported by a partially closed conveyor system to Shed 5 for storage. Fertilisers are offloaded directly into mobile truck hoppers for transport offsite. Due to the level of material exposure at the point of unloading, between the grab bucket and the hopper, dust generation can vary depending on the material quality from the ship. Particularly dry and fine products, such as poorly formed sulfur pellets, are likely to present a greater dust event than moist, pelletized or larger particle sized product.

The key hazard associated with sulfur and fertiliser dust is particulate matter. Exposure including inhalation of sulfur and some fertiliser products, for example ammonium nitrate, can cause eye and skin irritation with high exposure levels causing inflammation of the lungs and nose as well as possible nausea and headaches.

Nickel and copper concentrates

Nickel and copper concentrates that are loaded in bulk using an open-materials handling method are delivered to the Premises in closed containers. It is not until the containers are placed below the vessel's hold that the lid of the containers are removed and the contents emptied using a Rotabox.

The health impacts reported to be associated with nickel as a result of exposure through inhalation include chronic bronchitis, reduced lung function and cancer of the lung and nasal sinus depending on the nickel compound. While non-cancerous effects have been observed with a number of different nickel compounds, cancer, however, has been largely associated with exposures to high concentrations of nickel subsulfide compounds typically seen in nickel refinery/processing workers.

It is important to note that the nickel concentrate proposed for ongoing export is present primarily as the naturally occurring mineral pentlandite ($(Ni, Fe)_9S_8$) with potential traces of millerite (NiS). These minerals have significantly different properties to the nickel subsulfide compounds found in nickel refinery dust and studies on people and animals with high exposure levels to the proposed concentrate have not identified a link to lung cancer (WHO, 2000; USEPA, 2000). DoH describes the nickel concentrate exported through Esperance as a type that will be rapidly cleared from the body even if inhaled (DoH, 2010).

Copper can rapidly enter the bloodstream although humans excrete high concentrations within days of exposure. Long term exposure to copper dust can cause irritation of the nose, mouth, and eyes, and cause headaches, dizziness, nausea, and diarrhoea. Copper is not classified as a carcinogen.

8.4.2 Air Quality criteria for dust

Particulate matter

The Licence Holder has previously been assessed on its dust emission performance against the following criteria within the respective documents:

- NEPM 2016, which recommends that ambient **PM_{10} does not exceed 50 µg/m^3** over a

24-hour averaging period (midnight to midnight); and

- *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992*, which requires ambient air within Areas B and C adjacent to the Kwinana Industrial Area to present **TSP concentrations below 90 µg/m^3** over a 24-hour averaging period.

TSP is currently measured at monitoring Sites 1 to 5 with PM_{10} monitored at Sites 1 to 4. Monitoring sites Site 1 to 4 are best described as "impact" monitoring locations as opposed to "ambient" locations due to their close proximity to the Premises boundary. For the majority of the Esperance community, dust in ambient air for the purposes of assessment against the above criteria is best represented by Site 5, which is approximately 1.6 km from the Premises. In 2015, Site 5 consistently recorded readings below TSP criteria. However, as a number of residential premises exist within close proximity to the Premises and Sites 1 to 4, ambient air quality criteria are to be applied to all monitoring locations.

Nickel

DoH has established the target health guideline for nickel (as PM_{10}) to be an annual averaged daily exposure level of 0.003 µg/m^3 based on a lifetime of continuous exposure (DoH, 2015). This guideline is based on the WHO annual average guideline of 0.003 µg/m^3.

A 24-hour guideline of 0.14 µg/m^3 has been adopted by DWER on advice from DoH to protect the community against short-term respiratory effects of nickel dust, such as bronchitis, sinusitis and exacerbation of asthma (DoH, 2008; Goetzmann, 2009). This guideline is different to the annualised guideline in that it protects against short-term health effects while the annualised guideline is for the protection of potential long-term effects from specific types of nickel. Regular instances where short-term guidelines are narrowly met, or even exceeded, increase the likelihood of exceedances of annualised guideline levels.

Copper

In the absence of internationally or nationally accepted guidelines, DWER has adopted the interim standard of 1.0 µg/m^3 over a 24-hour averaging period, which is used by the Netherlands National Institute for Public Health and the Environment (RIVM). This exposure level has been determined to be a tolerable concentration in air, which "humans can inhale during their entire lifetime without resultant adverse health effects" (RIVM, 2001).

Key Finding:

1) The use of *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992* as a comparative measure for dust events in the Esperance community is no longer considered applicable. These regulations apply only to an area comprising the local government districts of Cockburn, Kwinana and Rockingham surrounding the Kwinana Industrial Area. Therefore TSP target requirements have been removed from the Licence. The removal of TSP regulatory controls was also supported by DoH.
2) PM_{10} is a more accurate measure of potential impacts to public health as particulates smaller than 10 µm in diameter have a greater propensity to be drawn deep into the lungs. The use of both measures is not necessary to determine public health risks. Therefore requirements to monitor PM_{10} remain on the Licence.
3) WHO Guidelines for annual average exposure levels to nickel apply high levels of conservatism as they do not take into consideration the type of nickel in ambient air. WHO guidelines are measured against more carcinogenic forms of nickel such as nickel subsulfide (Ni_2S_3), which was not identified in the nickel concentrate shipped during trials – nor intended for ongoing shipment.
4) Following from advice from DoH, exposure to concentrations above the annual guideline (0.003 µg/m^3) will not necessarily lead to health effects or cancer because

the guideline has large in-built safety factors and the type of nickel transported is cleared rapidly from the body.

8.4.3 Assessment of Licence Holder controls

This assessment has reviewed the Licence Holder's dust management plans which contain the controls set out in Table 17 below.

Table 17: Licence Holder infrastructure controls for fugitive dust emissions

Site Infrastructure	Description	Operation details	Reference to Licence Plan (Attachment 3)
Controls for dust			
Spodumene handling and material specifications	Limits for the product quality: • moisture content to remain above the DEM level of 1.3% for fine material and 0.6% for coarse product; • muscovite content to be less than 5% on average; and • respirable silica quartz content to not exceed 1%.	Material will be handled in partially enclosed environments with little exposure to wind. Two months maximum anticipated storage time. Material is monitored at the Premises for moisture, muscovite and respirable silica quartz content.	N/A
Nickel and copper concentrate handling and material specifications using the Rotabox system (excluding fully containerised shipping)	Product moisture content is maintained above the DEM level. Nickel concentrates are devoid of subsulfides.	Nickel concentrate is stored and transported to the vessel within closed containers. The lid is opened only once the container has been lowered to below the hold of the vessel. Misting/fogging sprays are operated at the top of the vessel's hold at all times when loading.	Container Storage Areas
Storage (Sheds 1 to 6, excluding Shed 5)	Sheds are used for the storage of iron ore and spodumene stockpiles.	Storage sheds are fitted with dust collectors. Iron ore sheds are negatively pressured (bag houses) to prevent the escape of dust.	Sheds 1 to 6
Storage Shed 5	Shed used for the storage of sulfur and spodumene. The shed has two doorless entry points to prevent a build-up of hazardous gases.	Storage shed is fitted with a sprinkler system on the roof for dust suppression.	Shed 5 (Sulfur)
Sulfur circuit	Partially closed conveyor circuit	Water sprays are initiated where material has the potential to cause dust/has moisture below DEM. Surfactant is added to the stockpile.	Conveyors depicted in yellow on the Site Plan (refer to Attachment 3).
Foaming system	Liquid surfactant applied at the iron ore conveyor as a foam, allowing for better penetration into the iron ore surface than water.	Applied for problematic iron ore that has the potential to generate dust.	N/A –regulated through MS681.

Site Infrastructure	Description	Operation details	Reference to Licence Plan (Attachment 3)
Hoppers at Berth 1 and 2	Used to transport woodchips from trucks to the ship loader; sulfur to the Sulfur Circuit; and fertilisers to trucks for transportation offsite.	Equipped with water sprays for dust suppression. Manual sweeping conducted to contain spills.	N/A - mobile
Sealed roads and berths	Material collected on sealed areas can dry and become a dust source.	Mechanical sweeping and vacuuming is used to remove material collected on roads and berths. Spillages on the berth are removed immediately.	Berth 1 to 3
Unsealed roads and Container Storage Areas	Areas that can be a potential dust source when disturbed by vehicle movement.	Surfactant applied to unsealed roads. Water trucks are used to wet down dry areas as required[1].	Container Storage Areas Unsealed roads – N/A
Reclaim Area	Dredge spoil ground to the north of Shed 5.	Surplus treated water from the WWTP discharged to the Reclaim Area limits the dust potential.	Reclaim Area

Note 1: The Licence Holder has notified DWER of its intention to seal gravel within 12 months under the 1 – 5 Year Development Plan. This is to assist in controlling fugitive dust emissions from trafficable areas at the Premises.

Where the moisture content (dusting potential) of materials is not acceptable, the Licence Holder also commits to adding extra water and/or surfactant or suspend loading operations as required to keep emissions within the Premises boundary. Material moisture is provided with shipping information prior to arrival to the Premises for bulk imports whereas iron ore moisture is determined at the mine prior to arrival and undergoes further monitoring (and conditioning if necessary) onsite. Further monitoring infrastructure is discussed in Table 18 below.

Table 18: Licence Holder monitoring infrastructure

Monitoring	
Dust deposition	10 offsite and two onsite dust deposition gauges are used to analyse metal speciation (iron, lead, nickel, sulfur and zinc).
HVAS	Sites 1 to 5 have HVAS fitted with filter papers that analyse for TSP, iron, lead, nickel and sulfur.
Tapered Element Oscillating Microbalances (TEOMs)	TEOMs are currently used to record PM_{10} at Sites 1 to 4. *The Licence Holder has applied to replace TEOM monitors at Sites 1 to 4 with Beta Attenuation Monitors. See section 9.5.1.*
E Samplers	Estimate TSP in real time using light scatter. Depicted in Schedule 4 of the Licence (Attachment 3) as EP5 to EP8.
Meteorological station	Measures wind speed and direction and is also used to assist in wind loading procedures when required. Depicted in Schedule 4 of the Licence (Attachment 3) as EP7.

8.4.4 Key Findings

Information regarding the risks of dust from the premises demonstrates:

1. No material handled in bulk at the Premises has been assessed as toxic to human health. Silica, which is known to present potential health risks at occupational levels only, may be found in spodumene. However, respirable silica is only found in concentrations less than 1% (of total material), which does not require a Specific Target Organ Systemic Toxicity rating according to the Global Harmonisation System (IMA Europe, 2014). In addition, occupational air quality sampling undertaken in Shed 6 during spodumene loading in February 2017 revealed that silica, respirable particulates and inhalable particulates within Shed 6 did not exceed occupational exposure limits, with the exception of diesel particulates when shed doors were closed (Safe Work Australia, 2013; SPA, 2017; refer to section 5.6.5).
2. Due to its shape and weight mica has a high dust potential and is easily visible due to its reflective characteristics. As a result of improved spodumene processing at the mine site, the mica component of the fines material is reduced to below 5% compared to spodumene proposed for export through Esperance in 2010, which had a mica content of approximately 30%.
3. Woodchips and grain handling, although not currently regulated under Part V of the EP Act, contribute to ambient dust in the Esperance community.
4. Traffic along the unsealed trafficable areas adjacent to Berth 3 is likely to contribute to cumulative dust emissions from the Premises. The Licence Holder has proposed to seal gravel roadways alongside Berth 3 within 12 months.
5. Although close to the Premises boundary, air quality monitoring Sites 1 to 4 (inclusive) accurately represent the ambient air quality at the nearest residential receptors.
6. PM_{10} is a more accurate measure of ambient particulate matter that has the potential to impact on community health, when compared against TSP, as it represents the particulates that can be easily drawn deep into the lungs.
7. Throughput rates, both daily and annual, can impact the likelihood of fugitive dust emissions when handling is viewed in isolation of proposed controls. Throughputs listed in Table 5 were considered when determining risk of dust impacts.
8. Based on monitoring data presented in the application for ongoing nickel and copper concentrate handling, Licence Holder controls implemented during the trial sufficiently mitigate the risk of dust.

8.4.5 Consequence

Cumulative dust

The the handling of all prescribed bulk granular materials at the Premises contributes to the cumulative concentration of PM_{10}. Finer particulates can be drawn deep into the lungs and increase respiratory irritation, decrease lung function and/or lead to effects on the cardiovascular system. As well as dust emissions from all prescribed products, directly related activities such as vehicle movement (delivery of prescribed bulk granular materials) on unsealed roads contribute to PM_{10} emissions. Monitoring evidence over a number of years also shows that non-prescribed activities such as grain and woodchip handling through the Premises also contribute significantly to cumulative dust emissions from the Premises. The

PM_{10} from dust generated through all primary activities may result in low level offsite impacts at a local scale resulting in the consequence rating **moderate**.

Spodumene

Crystalline silica found within spodumene is present in concentrations between 1 and 10% and presents the main risk to public health as it causes silicosis and lung cancer. However, a key factor which has been considered is the particle size. The minimum particle size of spodumene is reported to exceed 20 µm suggesting that respirable silica content in spodumene is less than 1% (when grinding of ore during transport is conservatively factored) and meeting the Global Harmonisation System's classification for a non-toxic substance. In addition, Safe Work Australia (2013) report that chronic health impacts from crystalline silica would require prolonged exposure to substantial airborne quantities such as occupational exposure levels for two to five years. Ambient concentrations at nearby residential dwellings are expected to be significantly lower than occupational levels, which are represented by high concentrations of respirable silica and for long exposure times.

In view of these factors, the consequence of dust from spodumene is **minor** as there is the potential for impacts to amenity for short periods to a small population near to the Premises.

Sulfur and fertilisers

Both sulfur and fertilisers have a low toxicity and recommended health criteria (NEPM) is likely to be met during normal operating conditions. Therefore dust from the unloading of these products that reaches nearby receptors is expected to result in nuisance impacts only and so the consequence is **minor**.

Copper concentrate

The copper concentrate being shipped (chalcopyrite) has a low solubility and is very insoluble compared to other forms such as copper sulfate suggesting that there is limited ability for absorption into the bloodstream. Low level impacts to amenity have been determined as more likely than toxicological impacts in instances where occupational exposure levels are experienced in ambient air as a result of copper loading operations. However, under normal operations consequence criteria is likely to be met.

The consequence of bulk copper concentrate loading is **minor**.

Nickel concentrate

Based on monitoring data gathered during trial shipments, specific short-term consequence criteria are expected to be met in all circumstances.

Although averaged ambient PM_{10} data for nickel during the trial shipments did not exceed 0.003 µg/m^3, annualised guidelines for nickel as PM_{10} are at risk of not being met in some years where, for example, loading occurs during more onshore wind periods or throughputs increase. However, due to the high level of conservatism applied to these guidelines, as described in section 8.4.2, mid to high level adverse health effects are not expected. Therefore the consequence of bulk nickel concentrate loading is **moderate**.

8.4.6 Likelihood of Risk Event

Cumulative Dust

The Licence Holder has reported over the 2014/2015 period 10 exceedances to ambient dust targets (both PM_{10} and TSP). In addition, it is noted that the Licence Holder has reported that eight were directly related to bush fires and the subsequent dust storms and only two were attributed to grain handling and site traffic on unsealed roads. Noting that vehicle movement on unsealed roads has been identified as a contributing factor to some target exceedances during the reporting periods the likelihood of NEPM exceedances (public health) or impacts to amenity from the primary and directly related activities is **possible**.

Projected increases in overall throughputs (refer to section 3.3.2) are expected to marginally increase the likelihood of cumulative dust events. However, based on current Licence Holder controls and the handling methods used the risk event is not anticipated to occur in most circumstances and therefore does not increase to 'likely'.

Spodumene

Spodumene undergoes wet processing at the mine site and is therefore easily maintained at moisture concentrations above DEM (1.3%) even during loading. In addition, the mica component of the fines material will be below 5% on average and the respirable crystalline silica component below 1%, reducing the potential for a significant dust risk when compared with other spodumene products. Over 50% of the material, including silica and mica, has a particle size distribution between 20 µm and 447 µm with the remainder of material being larger than 447 µm. This means that the potential for dust emissions to be drawn deep within the lungs is limited.

Based on Licence Holder controls and product specifications, the likelihood of the impacts to amenity from handling spodumene at the Premises are rare when spodumene is stored in Shed 6, which has only one entry point and is shielded by buildings. However, the likelihood of dust being generated from the storage of spodumene increases with the use of Shed 5 when compared with Shed 6. This is due to the free flow of air moving through Shed 5 that may increase the rate of drying during storage. Therefore the likelihood of dust impacting amenity following the storage of spodumene at Shed 5 has been assessed as **unlikely**.

Any escaped material from Sheds 5 and 6 is expected to disperse as a result of wind turbulence between other storage sheds, which will reduce ambient concentrations at the receptor well below occupational exposure levels recorded in Table 10 of section 5.6.5. Further, high concentrations of respirable dust is not expected beyond the shed in most circumstances based on the particle size distribution of the product. Therefore the likelihood of impacts to human health have been assessed as **rare**.

The likelihood of health impacts to nearby sensitive receptors is not expected to increase as a result of increased throughput based on the assumption that product quality will meet the above minimum requirements.

Sulfur

The moisture content and particle size of sulfur being unloaded at the Premises can be highly variable, increasing the potential for dust emissions. The overall likelihood of the risk event is assessed as **possible** when the Licence Holder handles formed sulfur in the amounts specified in Table 5.

Fertilisers

Due to the cohesive nature and consistent density of fertiliser granules, the likelihood of dust emissions reaching nearby receptors is **rare**. Increases to authorised throughput are not expected to increase this likelihood.

Copper concentrate

Due to the intermittent nature of copper concentrate shipping long term exposure is not anticipated for the nearest receptors as copper is expected to rapidly pass through the body. In addition, reactions to copper are only expected at occupational exposure levels.

Based on monitoring data obtained during the trial loading of copper concentrate in 2017 and 2018, the likelihood of ambient PM_{10} copper concentrations reaching levels where toxic effects are experienced may only occur in exceptional circumstances and where Licence Holder controls are not implemented. Therefore the overall likelihood of the risk event is assessed as **rare** based on Licence Holder controls.

Nickel concentrate

During shiploading nickel (as PM_{10}) concentrations at ambient air quality monitoring sites ranged between below detectable levels (0.00066 µg/m^3) and 0.02 µg/m^3. Based on the continued operation of Licence Holder controls, impacts to amenity and short-term health are not expected to occur in most circumstances. Therefore the overall likelihood of the risk event is assessed as **unlikely**.

A study of baseline monitoring data gathered during shiploading and non-shiploading events in 2016/17 identified that annually averaged nickel concentrations ranged between 0.006 µg/m^3 at Site 5 and 0.0015 µg/m^3 at Site 2 (refer to Table 9). Although an increase in the frequency of shiploading may increase these averages to above annual guideline values at some time, the likelihood of long-term health effects is considered **rare** as guidelines are conservatively based on a 70 year period (lifetime exposure) and for higher risk compounds of nickel.

8.4.7 Overall rating

Cumulative Dust

The consequence and likelihood ratings described above through the Risk Matrix (Table 15) determined that the overall rating for the risk of dust impacts on sensitive receptors during operations is **Medium**.

Spodumene

Based on a minor consequence and a likelihood assessment of unlikely (for impacts to amenity), spodumene handling at the Premises presents a **Medium** dust risk. However, without Licence Holder controls and sufficiently damp material entering the Premises, the likelihood of the Risk Event would increase significantly.

Sulfur

Based on a minor consequence and a possible likelihood, sulfur handling at the Premises presents a **Medium** dust risk.

Fertilisers

Based on a minor consequence and a rare likelihood, fertiliser handling at the Premises presents a **Low** dust risk.

Copper concentrate

Based on a minor consequence and a rare likelihood, copper handling at the Premises presents a **Low** dust risk.

Nickel concentrate

Based on a moderate consequence and an unlikely likelihood, nickel handling at the Premises presents a **Medium** dust risk.

8.5 Risk Event – odour

8.5.1 General hazard characterisation and impact

Nickel and copper concentrates can give off a slight sulfurous to amine odour. Residual xanthate used as a reagent in ore processing may break down in shipping containers resulting in a rotten cabbage-like odour. Odours are likely to be more significant when the product reaches higher temperatures.

8.5.2 Assessment criteria

There are no relevant criterion for odours from nickel or copper concentrates. Odours are perceived differently from person to person and what may be a nuisance to some, may not be

a nuisance or detectable to others.

The decomposition of xanthate produces the following odorous compounds which have low human odour thresholds:

- Carbon disulfide (sweet odour) – odour threshold of 0.66 mg/m^3
- Methanethiol (rotten cabbage odour) – odour threshold of 0.003 mg/m^3
- Acetic acid (vinegar) – odour threshold of 0.034 mg/m^3

8.5.3 Assessment of Licence Holder controls

As odour from nickel loading is largely dependent on product quality, the Licence Holder has a limited ability to control odour emissions at the Premises. Xanthate dosing of nickel from the Nova Project is minimised to that required for effective floatation. Washing the nickel concentrate with milk of lime on site will serve to remove most of the residual xanthate. However, DWER acknowledges that other suppliers of metal concentrates may not provide the same level of treatment.

The use of the Rotabox handling method also reduces the potential for dust generation as product is contained within a sealed container until it is lowered to beneath the hold of the ship.

8.5.4 Consequence

Odours from metal concentrate products may result in impacts to the amenity of nearby receptors. As metal concentrates will only be exposed to air at the time of shiploading (beneath the hold of the vessel), the pathway for odours to reach receptors only exists during shiploading. No odours are anticipated from the storage or movement of metal concentrates at the Premises.

Low level impacts to amenity may occur where excess xanthate is not removed from the concentration process and wind directs odours toward sensitive receptors. The consequence is therefore assessed as **minor**.

8.5.5 Likelihood of Risk Event

Odour was not detected beyond the premises during any of the seven trial shipments. However, this trial was only carried out with metal concentrates treated offsite for the removal of xanthate. Should the Licence Holder accept concentrates from suppliers that do not apply similar controls for odour to their product, the risk of odours could occur at some time (**possible**).

8.5.6 Overall rating

Based on a minor consequence and a possible likelihood, nickel handling at the Premises presents a **Medium** odour risk.

8.6 Risk Event – discharges to water

8.6.1 General hazard characterisation and impact

Shiploading

Products loaded and unloaded at Berth 2 – nickel and copper concentrates, sulfur, spodumene and fertilisers, have the potential to contaminate stormwater and enter the Esperance Inner Harbour.

Currently stormwater is collected and directed through existing Hume Interceptors H2 and H4 inclusive (refer to Attachment 2). Hume Interceptors are designed to allow suspended solids in water to settle and remove hydrocarbons through filtration. Each Hume Interceptor has a

storage capacity of 5 to 10 m^3 and once full will discharge to the Esperance Inner Harbour screening solids before discharge.

The Licence Holder proposes to divert inflow from H3 and H4 to a new first flush capture and filter system (StormDMT filter system), which will capture potentially contaminated stormwater from shiploading and container storage activities at Berth 2. Filtered stormwater from this system will also be discharged to the Esperance Inner Harbour.

Contaminants such as nickel, iron and total nitrogen have historically been identified in stormwater drains SW1 to SW3 to the northwest of Berth 2, although no exposed materials are transported across these areas. Dust generated from bulk materials may be deposited in the catchment area and could get flushed by rainfall into the Esperance Inner Harbour.

Spills of material during ship loading and unloading may increase the turbidity of waters and decrease the ambient water quality to levels that may become toxic to aquatic organisms. Some metals in contaminated stormwater and spills discharged to the Esperance Harbour can bioaccumulate in sediment and marine biota where metals become bioavailable.

Boat maintenance

Hydrocarbons and chemicals found within lubricants, paints, varnishes and cleaning products used for boat maintenance may also increase the toxicity of marine waters adjacent to the temporary boat maintenance area if not appropriately contained. Spent garnet from abrasive blasting may also access marine waters increasing turbidity.

8.6.2 Water Quality Criteria

Historical dredging (to allow vessel access) and bulk material handling activities are likely to have resulted in significant disturbance to the Esperance Harbour and reduce the value of the area to marine organisms. In accordance with the EPA's 2016 *Technical Guidance - Protecting the Quality of Western Australia's Marine Environment; and Environmental Factor Guideline - Marine Environmental Quality*, the Esperance Harbour is deemed a *moderate ecological protection zone*. The localised area surrounding the stormwater discharge areas and tug boat pen have been assigned a *low level of ecological protection* as described in the EPA's EAG15 (approximately 70m radius from outfall).

Guideline trigger values for environments of low level of ecological protection recommend the 80th percentile trigger values for contaminants that have the potential to bioaccumulate or bioconcentrate as outlined in ANZECC Guidelines (ANZECC and ARMCANZ, 2000). For physico-chemical stressors, no criteria are provided for low ecological protection areas. For these parameters the ANZECC Guidelines for marine environments in Australia's south west have been used to represent potential marine environment adjacent to Berth 2. This is a very conservative measure given the disturbed nature of the Esperance Harbour (and moderate ecological protection).

ANZECC Guidelines trigger values for pH in the marine environment range between 8.0 and 8.4 (ANZECC, 2000).

Table 19: ANZECC National Water Quality Guidelines for marine environment

	Sulfur	Iron	Copper*	Nickel*	Ammonia*	Oxides of Nitrogen (NOx)$^+$	Total Nitrogen (TN)$^+$	Total Phosphorous (TP)$^+$
Guideline value (µg/L)	N/A	N/A	80	560	1,700	5	230	20

***** Trigger values for protecting 80th percentile of marine species

$^+$ Regional trigger values for southwest Australia

Within the discharge area of the Esperance Inner Harbour contaminants are likely to be rapidly diluted within the initial mixing zone following discharge. Therefore it is not appropriate to apply ANZECC Guidelines to the quality of water at the discharge point as dilution factors would need to be considered.

8.6.3 Assessment of Licence Holder controls

The Licence Holder has proposed to improve its management of stormwater capture and treatment at Berth 2 by redirecting stormwater from Hume interceptors H3 and H4 to a new StormDMT filter system. Table 20 below provides a comparison of stormwater inflows to existing infrastructure (H3 and H4) and the required inflow quality for the StormDMT filter system to achieve ANZECC Guidelines (Table 19) at discharge.

Table 20: StormDMT filter system treatment specifications

Parameter	Typical first flush stormwater quality from H3 and H4 (µg/L)[1]	Maximum inflow concentrations for StormDMT filter system to achieve ANZECC Guidelines for the marine environment at discharge (with no further treatment) (µg/L)
Dissolved nickel	1,200 (average) 11,300 (maximum)	10,000
Dissolved copper	7.0 (average) 40.0 (maximum)	200
Ammonia	10,000 (average) 61,000 (maximum)	50,000

Note 1: Based on stormwater sampling analysis from June 2010 to September 2016

Following an event, such as a spillage, making it likely that dissolved nickel or copper will exceed the maximum inflow concentrations in the first flush detention (Table 20), the Licence Holder proposes to either remove the first flush for disposal offsite or treat the water at the WWTP. Water treatment will include adding hydrated lime to precipitate dissolved metals, or to recirculate stormwater through the filter until these targets can be met. Careful addition of acid or lime will also be used to moderate the pH of stormwater to within ANZECC Guidelines and prior to discharge to the marine environment. Before hydrated lime or acid is added to stormwater, the discharge valve will be closed.

Verification of concentrations against targets requires laboratory analysis of at least one spot sample of water.

Where concentrations of ammonia exceed maximum inflow levels, the Licence Holder will either recycle the contaminated stormwater through the filter system or remove the first flush for disposal offsite. Similarly, where Total Petroleum Hydrocarbon concentrations exceed 10 mg/L the Licence Holder will have the contaminated stormwater removed from the Premises.

Table 21: Licence Holder controls for stormwater and wash water management

Control	Description
Hume interceptors	To maintain capacity and efficiency Hume Interceptors are cleaned out/emptied monthly although overflow from these sumps does occur in months of heavy rainfall. Hume interceptors are emptied of sludge and water prior to each shipment of copper concentrate and following the washdown of Berth 2 after the handling of copper concentrate. The minimum capacity of Hume interceptors is 5,000 m^3.
Closed stormwater circuit areas at Berth 2	Stormwater on the marine side of Berth 2 is directed to a sump to the east, which is then pumped to a stormwater tank for treatment and reuse or disposal offsite. It is not expected that dust settled or material spilt in this location will be discharged to the Esperance Inner Harbour as this area presents a closed stormwater circuit.
Waste water treatment plant (WWTP) – Metals treatment	Stormwater collected at Hume interceptors and in closed circuit tanks is sent to the WWTP for treatment prior to disposal offsite, reuse for dust suppression/wash down or discharge to the Reclaim Area for infiltration. Treatment is carried out to lower contaminants within the waste water to below values stated in the ANZECC guidelines for short-term irrigation. Sludges collected from Hume interceptors and the StormDMT filter system will be collected in geotextile bags for dewatering, with runoff to be treated at the WWTP. Performance testing has indicated that the WWTP is capable of lowering copper concentrations 16-fold with influent received at the WWTP having average copper concentrations of around 0.102 mg/L being reduced to 0.006 mg/L after treatment.
WWTP – Sulfur treatment	Wash waters produced from the sulfur circuit are dosed with caustic soda at the SWTP shown in Attachment 2 to increase the pH to within a neutral range between 6 and 9 and precipitate metals. When operational, waters from the SWTP are reused on site for dust suppression and road wet-sweeping. However, sulfur handling operations have been suspended since September 2017 due to the shutdown of the FQM Ravensthorpe Nickel Operations. As a result treatment processes will be limited to metals until a time where sulfur is rehandled at the Premises.
Boat maintenance wash water containment	Tarpaulins are used to line the temporary boat maintenance area underneath the vessel area extending to a three metre perimeter around the vessel during any vessel painting or mechanical servicing activities. All wash water is captured and directed to a tank for incorporation into the WWTP. The temporary boat maintenance area is swept and vacuumed on completion of any boat maintenance activities. All solid waste is disposed of at an appropriate licensed landfill. No more than 10 litres of anti-fouling paint is kept on the berth/temporary boat maintenance area at any one time.
StormDMT filter	The first flush capacity of the StormDMT filter system will be 195,000 m^3,

system (proposed)	which equates to 15 mm of rainfall over Berth 2. The system is designed to treat existing stormwater quality from Berth 2 to meet ANZECC Guideline values for direct marine discharge listed in Table 19. Where contaminant concentrations exceed those specified in Table 20, the Licence Holder will implement the additional management measures specified above in this section.

Table 22: Licence Holder controls for spills

Control	Description
Spillage clean up at the berths	Any spills contained and cleaned up: • During ship unloading a wet sweeper and vacuum and controlled waste trucks are present to clean up spilt material. • Material is returned to either the ship's hold, stockpiles or the mine site. • Industrial wash waters not suitable for onsite treatment or discharge are disposed at the Myrup Liquid Waste Management Facility. • Spill kits are available on all berths and fuelling stations. • Tanks and sumps have the capacity to store spilt liquids.
Spill plates	Spill plates are positioned between the berth and the ship to prevent any spillages from entering the Esperance Inner Harbour during fertiliser and sulfur unloading operations.
Sulfur unloading	The risk of larger sulfur spills during unloading are minimised through the implementation of the following controls: • The grab bucket is operated from a stable, fixed crane on Berth 2 as opposed to a mobile crane from the ship. • The hopper is located approximately 15m from the berth's edge meaning that there is a reduced likelihood of an early release of product from the grab bucket. • A spare grab bucket will replace the operating bucket in the event of minor leaks when the bucket is closed.
Spillage clean up within the Esperance Inner Harbour	Berms are available onsite to contain the spread of more buoyant spilt materials. Previous spills into the Esperance Inner Harbour have also seen the Licence Holder operate a suction pump to recover spilt material from the harbour sediments.
Nickel container auditing and prevention	Licence Holder conducts regular monitoring of containers for damage that would allow for the access of nickel to the stormwater system and potentially the marine environment. Defective containers are returned to the mine site for repair or disposal. A spill container is available for containing leaking containers.

Table 23: Licence Holder monitoring for surface water

Monitoring	Description
Monitoring	A monthly marine discharge monitoring program is underway with reference to the ANZECC marine water quality framework. Where the StormDMT filter system or Hume interceptors are not discharging to the marine environment at the time of sampling, samples are taken from the sump.

8.6.4 Key Findings

The information regarding the risks associated with discharges from the premises to water demonstrates:

1. Key contaminants found within stormwater along Berths 1 and 2 are iron, nutrients, sulfur and nickel which is consistent with the types of products handled at the Premises.
2. Copper, although present in Hume interceptors, has not been handled in bulk at the Premises prior to 24 June 2017 suggesting a non-bulk handling source. The introduction of copper concentrate handling at the Premises creates a new pathway for copper to enter the marine environment without adequate control.
3. Sulfur concentrations in stormwater are expected to reduce as there is no longer handled at the Premises following the shutdown of FQM's Ravensthorpe Nickel Operations. The risk assessment of sulfur is continued in this Decision Report to allow for potential recommencement of sulfur handling at the Premises.
4. Iron has a low toxicity and is largely inert. Impacts to the marine environment are only anticipated in circumstances where significant amounts are directly discharged into the Esperance Inner Harbour, resulting in suspended solids in the water column and or smothering.
5. Manganese, although present in stormwater and in similar concentrations as nickel, is not handled in bulk and has a low toxicity. It is possible that manganese is contained in small concentrations within other bulk ore products such as iron ore. The rate of accumulation as well as the rate of elimination are both high (Pinsino et. al 2012) suggesting that at concentrations historically found in stormwater, manganese does not present a risk to the marine environment.
6. Each Hume Interceptor has a storage capacity of 5 to 10 m^3 and although the Licence Holder empties the contents monthly, once full Hume Interceptors will discharge to the Esperance Inner Harbour, screening solids and hydrocarbons before discharge.
7. Stormwater on the marine side of Berth 2 is directed to a closed system that does not discharge directly to the marine environment.
8. Wash waters at the temporary boat maintenance area will be captured and directed to the WWTP.
9. The localised area surrounding the stormwater discharge and temporary boat maintenance areas have been assigned a low level of ecological protection as described in the EPA's 2016 *Technical Guidance - Protecting the Quality of Western Australia's Marine Environment; and Environmental Factor Guideline - Marine Environmental Quality*.

8.6.5 Consequence

Fertilisers

Nutrients and ammonia within discharged stormwater have the potential to reduce the volume of dissolved oxygen available to benthic communities. The concentrations of TP, TN and NOx regularly exceed ANZECC Guidelines for marine discharges at times of discharges to the Esperance Inner Harbour. Due to the likely rapid dilution rates, the consequence of discharges during normal operation are likely to be temporary and localised to the area immediately adjacent to Berth 2 where ships regularly occupy.

Larger spills of fertilisers may result in the rapid growth of algae. Once nutrients are consumed the algae is likely to decay and consume dissolved oxygen in the benthic environment, limiting the ability for parts of the Esperance Inner Harbour near to Berth 2 to sustain marine life. However, it is noted that following the December 2015 spill of approximately 1 tonne of fertiliser into the inner harbour, there were no reported algae outbreaks or other observed impacts on the marine environment. Any future large spill is likely to be limited to the volume of one grab bucket's contents.

As a result of spillage, the impacts to Esperance Harbour are considered minimal and the consequence of fertiliser spills on the marine environment **is minor**.

Sulfur

In the event that sea water turns acidic (pH below five) from sulfur discharges, impacts to fish species reproduction processes may occur. It can also cause mortality to some fish species (North Carolina State University, date unknown).

Any discharge of sulfur-contaminated stormwater is expected to neutralise rapidly upon entry to the Esperance Harbour. Larger spills of sulfur have the potential to create more significant impacts to the amenity of Port Beach users, swimmers and people fishing. Sulfur received at the Premises varies in consistency and while the majority of product is pelletised sulfur that sinks, the surface tension of water prevents finer sulfur particles from sinking. As a result sulfur has the potential to disperse into publicly accessible areas as a result of large spills from the grab bucket.

Although pelletised sulfur at the Premises is described as insoluble, sulfur wash waters can display high acidity with a pH around 4 indicating that some dissolution occurs. Impacts would likely be localised to a spill area as rapid mixing would result in the restoration of pH to background levels. The majority of marine organisms are expected to avoid short-term affected areas.

A large sulfur spill, for example more than a quarter of the contents of one grab bucket, is of **minor** consequence as there may be minimal off-site impacts at a local scale. Minor spills or leakages from a grab bucket are not expected to have off-site impacts and result in minimal impacts near to the spillage area.

Spodumene, iron ore and copper concentrate

Iron ore is insoluble, inert and likely to settle and/or disperse rapidly in the Esperance Harbour. The same is expected to be true for lithium within spodumene. Although lithium is soluble and can present ecotoxicological risks, when bound to sands in the form of spodumene is insoluble and therefore not bioavailable. Leaching tests on spodumene indicate that metals are largely insoluble and will not exceed ANZECC Guidelines for the marine environment. Therefore a spillage of spodumene or iron ore is only likely to result in impacts as a result of increases in turbidity.

Historical dredging and ship loading has created a disturbed, low sensitivity ecosystem within the Esperance Harbour that is expected to be resilient to temporary increases to turbidity. Therefore, the consequence is **minor**.

Copper concentrate

Copper in its dissolved form binds easily to sediments, is bioaccumulative in the marine environment and is significantly more toxic to fish, crustaceans and algae than to mammals and human receptors. As discussed previously, copper is passed through the human body readily, however this is not the case for marine flora and fauna, which eliminates copper more slowly.

The potential for lethal effects to 50% of marine species (LC_{50}) at an exposure period of 96 hours can vary greatly from as low as 0.01 mg/L for many invertebrates, up to 6.0mg/L for some fish species (Stauber et. al, 1996). Other more recent studies have found invertebrate tolerances to range between 0.046 and 4.6 mg/L (Prato et. al, 2005; Perez and Beiras, 2009).

However, the copper concentrate being shipped (Chalcopyrite) has a low solubility suggesting that there is greater potential for copper to be trapped within the StormDMT filter system and Hume Interceptors than to be discharged via ocean outfall. Direct discharges are not anticipated due to the handling method requiring delivery to the ship's hold within a sealed container (Rotabox).

Due to the high toxicity of dissolved copper to marine organisms, the release of copper to the Esperance Inner Harbour may impact marine organisms within close proximity to Premises activities. Although bioavailable copper is acutely toxic and may bioaccumulate, it does not biomagnify up the food chain causing persistent effects through the food chain. Therefore the low-level offsite impacts at a local scale are anticipated for those organisms unable to mobilise to a less contaminated environment. The slow oxidation of any spilt copper (Chalcopyrite) to soluble forms in this area will ensure dispersion of any soluble copper to below concentrations causing biological effects beyond the Esperance Inner Harbour.

The Delegated Officer has applied the precautionary principle in accordance with s.4A of the EP Act and has assessed the consequence as **major**.

Nickel concentrate

Nickel is a poor bioaccumulant although it remains a toxicant to marine life in its dissolved form. Toxic effects vary greatly between species with algae and molluscs affected at lower concentrations than fish species. As the nickel being handled at the Premises is not bioaccumulative and is insoluble, offsite impacts at a local scale are expected to be minimal with impacts greatest amongst immobile organisms close to the discharge points.

The consequence is **minor**.

Boat maintenance

As the constituents within paints, varnishes and chemical cleaning agents are relatively unknown the specific consequence criteria are conservatively assumed to be at risk of not being met. Therefore, the consequence is **moderate**.

8.6.6 Likelihood of Risk Event

Stormwater only flows in months of heavy rainfall. Where Hume interceptors are not discharging, samples are taken from the sump itself. Overall in 2015, there were six months where stormwater run-offs were adequate to allow for monthly stormwater sampling from stormwater drains. At other times stormwater discharges either did not occur due to low rainfall, or it did not occur in business hours where sampling could be undertaken. Therefore events of stormwater discharges to the Esperance Inner Harbour could occur at some time.

Fertilisers

The use of a grab bucket for fertiliser increases the likelihood of a spill entering the marine environment.

In 2015, approximately one tonne of fertiliser was spilt into the Esperance Inner Harbour. The

rapid solubility of fertilisers limited the ability for recovery in both incidents meaning that the likelihood of impacts is increased. Licence Holder-proposed increases in fertiliser handling throughputs are not expected to result in spillages occurring in most circumstances. Therefore the likelihood of a spill from any fertiliser causing minor off-site impact at a local scale will be **possible**.

Spills that land on the berth enter existing stormwater infrastructure (Hume interceptors), which currently have limited capacity to hold the first flush prior to discharge. Following the construction of the StormDMT filter system, and in the event of a spill on the berth, the Licence Holder will be able to treat or dispose of contaminated first flush stormwater before it is released into the Esperance Inner Harbour. This reduces the likelihood of the risk event to **rare**.

In addition, concentrations of ammonia in day-to-day stormwater discharges are expected to significantly decrease with the introduction of the StormDMT filter system.

Sulfur

Like fertilisers, sulfur is also unloaded using a grab bucket. However, there have been no reported incidents of sulfur discharges from a grab hopper in the last five years. Although the method of unloading is via grab bucket to hopper, the likelihood of a significant sulfur spill is less when compared to fertiliser unloading as a result of the additional controls described in Table 21The Licence Holder has proposed to improve its management of stormwater capture and treatment at Berth 2 by redirecting stormwater from Hume interceptors H3 and H4 to a new StormDMT filter system. Table 20 below provides a comparison of stormwater inflows to existing infrastructure (H3 and H4) and the required inflow quality for the StormDMT filter system to achieve ANZECC Guidelines (Table 19) at discharge.

Table 20: StormDMT filter system treatment specifications

Parameter	Typical first flush stormwater quality from H3 and H4 (µg/L)[1]	Maximum inflow concentrations for StormDMT filter system to achieve ANZECC Guidelines for the marine environment at discharge (with no further treatment) (µg/L)
Dissolved nickel	1,200 (average) 11,300 (maximum)	10,000
Dissolved copper	7.0 (average) 40.0 (maximum)	200
Ammonia	10,000 (average) 61,000 (maximum)	50,000

Note 1: Based on stormwater sampling analysis from June 2010 to September 2016

Following an event, such as a spillage, making it likely that dissolved nickel or copper will exceed the maximum inflow concentrations in the first flush detention (Table 20), the Licence Holder proposes to either remove the first flush for disposal offsite or treat the water at the WWTP. Water treatment will include adding hydrated lime to precipitate dissolved metals, or to recirculate stormwater through the filter until these targets can be met. Careful addition of acid or lime will also be used to moderate the pH of stormwater to within ANZECC Guidelines and prior to discharge to the marine environment. Before hydrated lime or acid is added to stormwater, the discharge valve will be closed.

Verification of concentrations against targets requires laboratory analysis of at least one spot sample of water.

Where concentrations of ammonia exceed maximum inflow levels, the Licence Holder will either recycle the contaminated stormwater through the filter system or remove the first flush for disposal offsite. Similarly, where Total Petroleum Hydrocarbon concentrations exceed 10 mg/L the Licence Holder will have the contaminated stormwater removed from the Premises.

Table 21: Licence Holder controls for stormwater and wash water management

Control	Description
Hume interceptors	To maintain capacity and efficiency Hume Interceptors are cleaned out/emptied monthly although overflow from these sumps does occur in months of heavy rainfall. Hume interceptors are emptied of sludge and water prior to each shipment of copper concentrate and following the washdown of Berth 2 after the handling of copper concentrate. The minimum capacity of Hume interceptors is 5,000 m^3.
Closed stormwater circuit areas at Berth 2	Stormwater on the marine side of Berth 2 is directed to a sump to the east, which is then pumped to a stormwater tank for treatment and reuse or disposal offsite. It is not expected that dust settled or material spilt in this location will be discharged to the Esperance Inner Harbour as this area presents a closed stormwater circuit.
Waste water treatment plant (WWTP) – Metals treatment	Stormwater collected at Hume interceptors and in closed circuit tanks is sent to the WWTP for treatment prior to disposal offsite, reuse for dust suppression/wash down or discharge to the Reclaim Area for infiltration. Treatment is carried out to lower contaminants within the waste water to below values stated in the ANZECC guidelines for short-term irrigation. Sludges collected from Hume interceptors and the StormDMT filter system will be collected in geotextile bags for dewatering, with runoff to be treated at the WWTP. Performance testing has indicated that the WWTP is capable of lowering copper concentrations 16-fold with influent received at the WWTP having average copper concentrations of around 0.102 mg/L being reduced to 0.006 mg/L after treatment.
WWTP – Sulfur treatment	Wash waters produced from the sulfur circuit are dosed with caustic soda at the SWTP shown in Attachment 2 to increase the pH to within a neutral range between 6 and 9 and precipitate metals. When operational, waters from the SWTP are reused on site for dust suppression and road wet-sweeping. However, sulfur handling operations have been suspended since September 2017 due to the shutdown of the FQM Ravensthorpe Nickel Operations. As a result treatment processes will be limited to metals until a time where sulfur is rehandled at the Premises.
Boat maintenance wash water containment	Tarpaulins are used to line the temporary boat maintenance area underneath the vessel area extending to a three metre perimeter around the vessel during any vessel painting or mechanical servicing activities. All wash water is captured and directed to a tank for incorporation into the WWTP. The temporary boat maintenance area is swept and vacuumed on completion of any boat maintenance activities. All solid waste is disposed of at an appropriate licensed landfill. No more than 10 litres of anti-fouling paint is kept on the berth/temporary boat maintenance area at any one time.
StormDMT filter	The first flush capacity of the StormDMT filter system will be 195,000 m^3,

system (proposed)	which equates to 15 mm of rainfall over Berth 2. The system is designed to treat existing stormwater quality from Berth 2 to meet ANZECC Guideline values for direct marine discharge listed in Table 19. Where contaminant concentrations exceed those specified in Table 20, the Licence Holder will implement the additional management measures specified above in this section.

. Based on current handling rates the likelihood of a large sulfur spill is considered rare although the likelihood increases to **unlikely** when increased throughputs specified in Table 5 are considered.

Spodumene and iron ore

The likelihood of spodumene causing offsite impacts during the loading is **rare** as spodumene material is loaded from beneath the tip of the ship's hold using a Rotabox. Similarly the likelihood of iron ore impacting receptors offsite is rare due to the enclosed handling of iron ore throughout the Premises until the point of loading, which is by a chute that is also lowered to below the ship's hold. Proposed increases to throughputs for spodumene are not expected to increase the likelihood of a spill due to material handling methods.

Copper concentrate

High levels of toxic impacts to marine organisms in the local area are not anticipated amongst marine organisms as discharge frequencies and durations are expected to limit localised exposure periods of marine organisms to contaminants within stormwater.

Once operational, the StormDMT filter system is expected to reduce the concentration of dissolved copper in stormwater discharges. Therefore the risk profile changes due to a reduced assessment of likelihood from **unlikely to rare** as the risk event is only expected to occur in exceptional circumstances following the implementation of improved stormwater filtration infrastructure.

Nickel concentrate

It should be noted that the likelihood of marine life exposure for the duration and concentrations required to affect marine organisms is unlikely due to significant dilution factors and the ability for the majority of species to move away from the contaminated area. Licence Holder controls for the treatment of stormwater using Hume interceptors reduce the potential for undissolved nickel to enter the marine environment.

Based on existing stormwater infrastructure the likelihood of ANZECC criteria for the marine environment being exceeded for nickel is **unlikely**. This is supported by monitoring data, which identifies that criteria is not exceeded in most circumstances. The StormDMT filter system further reduces the likelihood to **rare** as the system has a greater ability to remove dissolved metals from stormwater prior to discharge.

Boat maintenance

The Officer considers the likelihood of impacts from boat maintenance to the Esperance Inner Harbour is **rare**.

8.6.7 Overall rating

The consequence and likelihood ratings described above through the Risk Matrix (Table 15) determined that the overall rating for the risk of discharges to the Esperance Inner Harbour on sensitive receptors during operation as **Medium**.

Fertilisers

Based on a moderate consequence and a possible likelihood the fertiliser handling at the Premises presents a **Medium** risk to the Esperance Inner Harbour.

Although the StormDMT filter system will reduce the likelihood of fertiliser spills entering the marine environment, the overall rating remains as Medium.

Sulfur

Based on a minor consequence and possible likelihood the sulfur handling at the Premises presents a **Medium** risk to the Esperance Inner Harbour.

Spodumene and iron ore

Based on a slight consequence and a rare likelihood the spodumene and iron ore handling at the Premises present a **Low** risk to the Esperance Inner Harbour.

Copper

Based on a major consequence and a possible likelihood from existing infrastructure the copper concentrate handling at the Premises presents a **Medium** risk to the Esperance Inner Harbour.

Following the implementation of the StormDMT filter system the likelihood of dissolved copper exceeding ANZECC Guidelines at discharge is reduced to rare, although the overall risk rating remains as **Medium**.

Nickel

Based on a moderate consequence and a possible likelihood the nickel concentrate handling at the Premises presents a **Medium** risk to the Esperance Inner Harbour when considering existing Licence Holder controls.

Following the implementation of the StormDMT filter system the likelihood of dissolved nickel exceeding ANZECC Guidelines at discharge is reduced to rare, reducing the overall risk rating to **Low**.

Boat maintenance

Based on a moderate consequence and a rare likelihood the boat maintenance activities at the Premises present a **medium** risk to the Esperance Inner Harbour.

8.7 Risk Event – Discharges to Land

8.7.1 General hazard characterisation and impact

In wetter periods (mainly June to August) where the requirement for dust suppression water is reduced the Licence Holder discharges treated stormwater to the Reclaim Area where it infiltrates to the ocean. Infiltrated water may contain contaminants from current and historical exporting activities such as metals (copper, nickel, lead and iron) and nutrients that could create toxic environments for marine organisms near to the Reclaim Area.

8.7.2 Water quality criteria

The Licence Holder has implemented an internal management trigger criteria for general reuse that falls in line with ANZECC Guidelines (2000) for Short-term Irrigation Water. As the Reclaim Area is man-made and not considered to be the ‘environment’, these criteria are used as a comparative reference in the assessment of discharges only.

Unlike the immediate area surrounding the discharge points discussed in section 8.5, the marine environment to the east and immediately adjacent to the Reclaim Area is of moderate ecological protection value. Therefore the 90th percentile species protection trigger values of the ANZECC National Water Quality Guidelines have also been considered in the assessment of environmental risks associated with discharging treated wastewater to the Reclaim Area.

8.7.3 Assessment of Licence Holder controls

SWTP

When the SWTP is operational, the Licence Holder adds caustic soda to increase the pH to a range between 6 and 9 which allows reuse onsite. Testing of untreated water in 2016 indicated that dissolved metals did not exceed short-term irrigation trigger values for reuse with the exception of iron. However, following the addition of caustic soda, the increase in pH precipitated all metals, including iron, to well below ANZECC short-term irrigation values (Table 19).

As discharges of treated wastewater to the Reclaim Area is a disposal method as opposed to reuse, comparisons of wastewater quality to the ANZECC short-term trigger values should not be observed in isolation. Therefore a comparison is also made in Table 20 to the 90th percentile trigger values in ANZECC Guidelines. These 90th percentile trigger values assume a direct discharge to marine waters of moderate ecological protection value, whereas the pathway for discharged water to the marine environment is via infiltration through the Reclaim Area. This means that any comparison should be observed as a conservative approach to risk assessment.

The Licence Holder is not currently operating the SWTP as sulfur imports have been suspended and the sulfur circuit is not in use.

WWTP

Treatment of the wash waters consists of primary settlement in a sump before being drawn through a series of zeolite mineral filters and then being held in rainwater tanks for reuse.

The final treatment quality of discharged water is provided in Table 24 and compared against short-term irrigation trigger values and 90th percentile trigger values. Final effluent quality from the WWTP has historically met both sets of criteria, referred to in the ANZECC Guidelines as trigger values.

Table 24: Monitoring result for final effluent quality from wash water treatment infrastructure

	pH	TSS (mg/L)	Sulfur (mg/L)	Copper (mg/L)	Nickel (mg/L)	Lead (mg/L)	Iron (mg/L)
ANZECC Guidelines – Short term trigger values in irrigation	N/A	N/A	-	5.00	2.00	5.00	10.00
ANZECC Guidelines – 90th percentile trigger values for marine waters	6-9	-	-	0.003	0.200	0.0066	1.000[3]
WWTP – metals (23/6/2015 – 27/5/2016)[1]	7.73	<5	116	0.003	0.197	0.001	<0.05
WWTP – Sulfur (1/3/2016 – 13/6/2016)[1,2]	8.18	222	699	**0.006**	0.009	<0.001	<0.05

Note 1: SPA, 2016
Note 2: Dissolved metals (copper, nickel, lead and iron) were only tested once on 13/6/2016.
Note 3: 90th percentile trigger values are not available for iron. Instead effluent quality is compared against ANZECC Guidelines for marine waters with no protection levels for waters with a pH greater than 6.

8.7.4 Key Findings

The information regarding the risks of discharging treated stormwater to land

and demonstrates:

1. The marine environment to the east and immediately adjacent to the Reclaim Area is of moderate ecological protection value and therefore requires a higher level of protection than the Esperance Inner Harbour.
2. The final effluent quality from the WWTP satisfies ANZECC Guidelines for marine waters prior to discharge at the Reclaim Area.
3. Based on samples taken from sulfur circuit outputs in 2016, copper was the only dissolved metal that exceeded ANZECC Guidelines for marine waters of moderate ecological protection value (assuming direct discharge).
4. The addition of caustic soda to the sulfur circuit precipitated metals to make them less bioavailable.
5. Sludges removed from Hume interceptors and the proposed StormDMT filter system will continue to be dewatered into the WWTP for later reuse or disposal.

8.7.5 Consequence

Copper

Copper from the sulfur circuit currently exceeds ANZECC Guidelines for marine waters and may have toxic effects on marine organisms if permitted to seep beyond the Reclaim Area.

Copper concentrations at the point of discharge (from the WWTP) are greater than 90th percentile trigger values under the ANZECC Guidelines for marine waters. However, dissolved copper concentrations are expected to be lower at the point of seepage to the marine environment due to dilution with rainwater/groundwater and the ability for some of the copper to bind to soil within the Reclaim Area. Further there is likely to be rapid dilution upon entry to the marine environment, reducing the potential for marine organisms to be exposed to elevated concentrations of copper at the point of seepage expression.

The specific consequence criteria is likely to be met at the point of seepage to the marine environment and as such the consequence is considered to be **minor**.

Nickel, Lead and Iron

Average water quality of treated water from the WWTP satisfies ANZECC Guideline trigger values for 90% species protection for metals at the point of discharge at the Reclaim Area. Beyond the point of discharge rainfall and groundwater is expected to dilute contaminated water resulting in water falling well below ANZECC Guideline trigger values before being discharged beyond the rock wall where it will mix rapidly with ocean water. As the specific consequence criteria is expected to be met the consequence is considered to be **slight**.

8.7.6 Likelihood of Risk Event

Copper, nickel and lead bind to sediments meaning that it is likely that the silty sands of the Reclaim Area are able to attenuate some of the bioavailable (dissolved) metals and prevent them from entering the marine environment (National Environment Protection Council, 2011). In addition, surplus water will most likely be discharged to the Reclaim Area during periods of rainfall when water for dust suppression is not required. Rainfall is expected to aid in the dilution of metals prior to the contaminated water being expressed on the eastern side of the Premises rock wall.

In the event that copper is expressed beyond the Premises's rock wall at similar concentrations to that within discharged wastewater, the significant mixing from wave action is likely to reduce the concentration of copper.

Based on the ability of the Licence Holder to treat wastewater effectively, the overall likelihood of the Risk Event is considered to be **unlikely**.

8.7.7 Overall rating

The Delegated Officer has compared the consequence and likelihood ratings described above through the Risk Matrix (Table 15) and determined that the overall rating for the risk to the marine environment from discharged treated wastewater to the Reclaim Area during operations is **low**.

8.8 Summary of Risk Assessment and Acceptability

The risk items identified in section 8 including the application of risk criteria and the acceptability with treatment are summarised in Table 25 below.

Table 25: Risk rating of emissions

	Emission		Pathway and Receptor	Licence Holder controls	Impact	Risk Rating	Acceptability with treatment (conditions)
	Type	**Source**					
1.	Dust from all sources (Cumulative dust from Premises)	All regulated bulk material and unsealed trafficable areas.	Air, moving with the direction of wind.	Infrastructure and management controls	Public health and amenity.	Moderate consequence Possible likelihood **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
2.	Dust from materials handling (spodumene)	Spodumene handling and storage.	Air, moving with the direction of wind.	Product specifications, infrastructure and management controls	Amenity.	Minor consequence Unlikely **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
3.	Dust from materials handling (sulfur).	Sulfur handling and storage.	Air, moving with the direction of wind.	Infrastructure and management controls	Public health and amenity.	Minor consequence Possible **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
4.	Dust from materials handling (fertilisers).	Fertiliser handling and storage.	Air, moving with the direction of wind.	Infrastructure and management controls	Public health and amenity.	Minor consequence Rare likelihood **Low risk**	Acceptable.
5.	Dust from materials handling (nickel concentrate).	Nickel concentrate handling and storage.	Air, moving with the direction of wind.	Product specifications, infrastructure and management controls	Public health and amenity.	Moderate consequence Unlikely likelihood **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
6.	Dust from materials handling (copper concentrate).	Copper concentrate handling and storage.	Air, moving with the direction of wind.	Product specifications, infrastructure and management controls	Public health and amenity.	Minor consequence Rare likelihood **Low risk**	Acceptable subject to Licence Holder controls conditioned.

7.	Odour from metal concentrate loading	Metal concentrates within the vessel's hold	Air, moving with the direction of wind.	Product quality as received from the mine site (offsite controls)	Public amenity	Minor consequence Possible likelihood **Medium risk**	Acceptable subject to outcome based controls placed on the Licence.
8.	Discharge of contaminated stormwater and material spills to marine environment (fertilisers).	Stormwater (contaminate stormwater).	Direct from infrastructure.	Infrastructure and management controls.	Impacts on water quality and visibility.	Minor consequence Possible/Rare likelihood **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
9.	Discharge of contaminated stormwater and material spills to marine environment (sulfur).	Stormwater (contaminate stormwater).	Direct from infrastructure.	Infrastructure and management controls.	Impacts on water quality and visibility.	Minor consequence Unlikely **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
10.	Discharge of contaminated stormwater and material spills to marine environment (spodumene, iron ore)	Stormwater (contaminate stormwater).	Direct from infrastructure.	Infrastructure and management controls.	Impacts on water quality and visibility.	Minor consequence Rare likelihood **Low risk**	Acceptable subject to Licence Holder controls conditioned.
11.	Discharge of contaminated stormwater and material spills to marine environment (nickel concentrate).	Stormwater (contaminate stormwater).	Direct from infrastructure.	Infrastructure and management controls.	Impacts on water quality and visibility.	Minor consequence Unlikely/Low likelihood **Medium/Low risk[1]**	Acceptable subject to Licence Holder controls conditioned.
12.	Discharge of contaminated stormwater and material spills to marine environment (copper concentrate).	Stormwater (contaminate stormwater).	Direct from infrastructure.	Infrastructure and management controls.	Impacts on water quality and visibility.	Major consequence Unlikely/Rare likelihood **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
13.	Discharge of contaminated stormwater to marine environment (boat building).	Stormwater (contaminate stormwater).	Direct from infrastructure.	Infrastructure and management controls.	Impacts on water quality and visibility.	Moderate consequence Rare likelihood **Medium risk**	Acceptable subject to Licence Holder controls conditioned.
14.	Discharge to land from contaminated stormwater and material spills infiltrating to marine	Treated stormwater from the WWTP.	Seepage through the Reclaim Area to the marine environment.	Infrastructure controls.	Toxilogical impacts to ecosystem.	Slight consequence Unlikely **Low risk**	Acceptable subject to Licence Holder controls conditioned.

	environment.						

Note 1: The overall risk to the marine environment from nickel contaminated stormwater is reduced to 'Low' following the implementation of the proposed StormDMT filter system. Therefore risks are acceptable subject to Licence Holder controls conditioned. The overall risk rating does not change for risks to the marine environment from other materials handled at the Premises following the installation of the StormDMT filter system.

The risks to environment and public health have been assessed at the time of Licence Review (February 2018) and the following determinations are made:

1. Authorise an increase in throughput to 100,000 Tpd on the grounds that the requested increase will not result in significant impacts from changes to emissions and discharges (refer to section 3.3.2).
2. Authorise the replacement of TEOMs with BAMs for the monitoring of PM_{10} (see section 9.5.1).
3. Remove duplication of reporting requirements within the licence for the WWTP (see section 9.5.3).

Further determinations were made as part of the Amended Licence (October 2018) to:

1. Authorise ongoing nickel concentrate and copper concentrate handling using an open materials (Rotabox) system.
2. Remove the requirement for measuring sulfur as PM_{10} from ambient air quality monitoring conditions.
3. Include conditions for the cessation of sampling at Sump 3 following the construction of a proposed new stormwater recovery and filtration system designed to capture 195 m^3 of any spillage or stormwater in a first flush tank.
4. Amend iron ore moisture monitoring conditions to allow for the offsite calibration of the online moisture analyser.
5. Authorise the trial of new products through the Premises under strict conditions that require the provision of detailed product quality data prior to the commencement of the trial as well as management and monitoring plans that confirm that environmental risks during trial shipments are appropriately managed. Category 58A was also added to the Licence to extend the authorisation of trial shipments to bulk loading/unloading of salt products.

Further discussion of these determinations and the regulatory controls for the management of the risks identified in section 8 are described in section 9 below.

9. Determined Regulatory Controls

9.1 Summary of Controls

		Controls			
		9.2 Infrastructure and Equipment	9.3 Product Restrictions (and monitoring)	9.4 Specified Action	9.5 Monitoring
Risk Items (see section 8.8)	1. to 6. Dust from materials handling and unsealed areas.	●	●	●	●
	7. Odour from nickel concentrate handling			●	
	8. to 13. Discharge to water from contaminated stormwater and material spills.	●			●
	14. Discharge to land from contaminated stormwater and material spills infiltrating to marine environment.	●			●

9.2 Specified Infrastructure and Equipment Controls

9.2.1 Dust Management

The following environmental controls, infrastructure and equipment must be maintained and operated onsite for dust management:

- Bulk spodumene and sulfur to be stored in Shed 5 (sulfur and spodumene) and Shed 6 (spodumene only).
- Dust suppression sprays at hoppers for sulfur, fertiliser and woodchips.
- Sheds 1 to 4 inclusive are equipped with dust extraction.
- Enclosure of the iron ore conveyor circuit.

In addition, sealing the gravel road and turnaround point along Berth 3 will be required by July 2022 using a staged approach. The truck turnaround point, which is to be sealed by December 2018.

Specified infrastructure requirements are derived from those currently undertaken by the Licence Holder and through requirements of Ministerial Statements 681 and 325. The controls also align with Licence Holder commitments in the case of sealing roads and storage areas; and spodumene storage and loading commitments.

The Licence Holder will be required to manage the operation of the sprinkler system at Shed 5 to apply moisture to spodumene stockpiles and ensure compliance with the Licence, which requires the moisture content of spodumene to remain above the DEM level while on the Premises. Requirements specified in Amendment Notice 1 to place a lid on the spodumene containers as they are transferred from Shed 6 to the vessel have not been transferred to the Reviewed Licence.

Grounds: The infrastructure and equipment controls are either currently being used or, in the

case of bituminising the unsealed road alongside Berth 3 have been proposed works by the Licence Holder since as early as December 2014. In addition, the Licence Holder has previously described the unsealed haul road as potentially contributing to ambient particulate matter during target exceedance events and in response to community complaints. A key area for dust generation potential is considered to be the unsealed road along Berth 3, namely the truck turnaround point at the berth's end where the dust binding agent deteriorates fastest. It is necessary to include these controls based on the potential dust sources, materials handled and the risk to public health.

On the grounds that ambient air quality within Shed 6 satisfies occupational exposure level limits provided by Safe Work Australia for silica and particulate matter (refer to section 5.6.5), the risk to public health from spodumene loading is low. It is noted that monitoring was conducted where the spodumene handled had a moisture content above DEM and with low concentrations of respirable silica and mica as required under Amendment Notice 1.

The removal of the requirement under Amendment Notice 1 to place a lid on spodumene containers as they are being transported from storage sheds to the vessel is justified by the retention of product moisture content requirements. Compliance with minimum moisture content requirements of the Reviewed Licence will ensure that product moisture is maintained above DEM prior to and during shiploading and therefore the risk of dust emissions from containers during transport does not increase.

The outcome-based condition requiring the moisture content of spodumene to be maintained above the DEM level will also ensure that the risk of dust as a result of storing spodumene in Shed 5 is reduced to acceptable levels.

9.2.2 Construction requirements

Construction of the StormDMT filer system is authorised through infrastructure and equipment conditions of the Amended Licence. Specified requirements for the installation of the StormDMT filter system have been added to ensure that management conditions during copper spill events can be complied with (refer to section 9.6.4).

9.3 Product restrictions and monitoring

No limits are imposed on the annual or daily amounts of total bulk granular material handled at the Premises. These throughputs were considered within the risk assessment and any proposed increase to Premises throughputs would require a further risk assessment of both dust and an application from the Licence Holder in accordance with s.53 of the EP Act.

The material monitoring and reporting requirements are necessary and justified by the moderate risk of dust associated with the handling of bulk granular material at the Premises.

9.3.1 Spodumene and iron ore monitoring and reporting

As the Licence Holder has limited ability to condition bulk spodumene (moisture, composition, size etc) at the Premises, it is important that it is received appropriately conditioned.

The moisture content which is considered 'ideal' for dust control is the DEM number.

The Licence Holder must:

- only accept spodumene if it meets the relevant DEM level and minimum specifications for mica and crystalline silica;
- have the DEM level determined on at least an annual basis for spodumene and iron ore;
- undertake monitoring of the moisture content of spodumene when loaded into each storage hold of the ship and iron ore at Moisture Analyser CV09; and
- report on moisture content and compliance with DEM level on a quarterly basis.

The methodology to achieve DEM level is outlined through the Australian Standard AS4156.6, *Determination of Dust/moisture Relationship for Coal*. Moisture content for iron ore and spodumene must be determined using the method outlined in Australian Standard *AS1289.2.1.1 Methods of testing soils for engineering purposes – Soil moisture content tests – Determination of the moisture content of a soil – Oven drying method (standard method)*.

Minimum requirements for iron ore moisture content to meet DEM level do not form a condition of operation within the Reviewed Licence. However, moisture content monitoring is required.

Grounds: Moisture content of bulk materials is a critical factor in the generation of fugitive dust. Being at or above DEM level at the point of acceptance will reduce the dust generation potential of iron ore and spodumene handling. In addition to maintaining spodumene moisture above DEM level, the low assumed concentration of mica and crystalline silica within the product, based on application details, provides justification for the low risk rating applied in section 8.7.7.

The specified action will be required in the event that the moisture content of iron ore is above DEM level in accordance with requirements derived from Ministerial Statements 681.

9.4 Specified actions

9.4.1 Visible dust

Where visible dust is escaping the hatch of the vessel the Licence Holder will be required to apply water sprays directly at the loading chute (ring spray). The Licence Holder is also required to continuously monitor the moisture content of incoming iron ore and submit averaged data through reporting for high dust events.

Specified infrastructure requirements and actions are derived from those currently undertaken by the Licence Holder and required through MS 681.

Grounds: Licence conditions must not be contrary to, or otherwise that in accordance with, an implementation agreement or decision Part IV of the EP Act. Therefore the Amended Licence has removed the requirement for ring sprays to be operational at all times when iron ore is received with a moisture content below the iron ore product's DEM level.

Controls within the Amended Licence for other products handled at the Premises are designed to manage respirable dust for the purpose of reducing public health risks. It is expected that these controls will also manage visible dust to acceptable levels.

9.4.2 Spill and stormwater discharges to the marine environment

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for spill and stormwater discharge management:

- Spill plates to be in place whenever grab buckets or bulka bags are used to prevent entry of material to the Esperance Inner Harbour. These plates may be fitted to the container crane or placed on Berth 2 and rested against the vessel.
- Berths to be vacuumed or swept to recover spills during loading/unloading within 72 hours.
- Hume interceptors to be emptied of stormwater on a minimum monthly basis.
- Captured stormwater to be treated at either the WWTP.

Specified infrastructure requirements and actions are derived from those currently undertaken by the Licence Holder. The requirements also align with Licence Holder commitments in the case of using spill plates to recover any spilt material. No additional controls are necessary.

Grounds: The infrastructure, equipment and actions are currently being used by the Licence

Holder.

9.4.3 Stormwater and wash water discharges to Land

The following environmental controls, infrastructure and equipment should be maintained and operated onsite for stormwater and wash water discharges:

- Stormwater and wash waters must be treated at the WWTP prior to discharge at the Reclaim Area or used for dust suppression around the Premises.
- The WWTP must be maintained so that it is capable of treating contaminated stormwater and wash waters to a quality that meets ANZECC Guidelines for the marine environment prior to the release of dissolved metals beyond the Premises rock wall.

Specified infrastructure requirements are derived from those currently undertaken by the Licence Holder. No additional controls are necessary.

Grounds: The infrastructure and equipment is currently being used by the Licence Holder.

9.4.4 Boat maintenance activities

No boat maintenance activities are currently undertaken on the Premises. However, the Licence Holder has requested that they remain on the Reviewed Licence to authorise any future maintenance activities.

Conditions on the former Licence were directly transferred to the Reviewed Licence in February 2018. No additional controls are necessary.

Grounds: Licence Holder controls currently conditioned on the Licence are sufficient to prevent any direct discharge to the Esperance Inner Harbour. As such risks associated with boat maintenance are considered acceptable due to conditions of the most-recently amended Licence and the Licence Holder not undertaking boat building and maintenance beyond what has been assessed.

9.5 Monitoring requirements

9.5.1 Monitoring infrastructure

The ambient air quality monitoring network is required to be operated in accordance with relevant Australian Standards and provide 24-hour data on PM_{10} and metals.

BAMs are known to measure significantly higher PM_{10} concentrations than when referenced against a TEOM (DEFRA, date unknown; Air Resources Board, date unknown) and are likely to more accurately represent ambient air quality in Esperance. The upgrade of the ambient monitoring system from TEOMs to BAMs is in accordance with Australian Standards and enables analysis of metals and materials to assist investigations in identifying the source of ambient dust exceedances.

At the time of the Licence Review, the licence authorises the replacement of TEOMs with BAMs for the purposes of monitoring PM_{10} at Sites 1 to 4. A time limit for the replacement of monitoring equipment was placed on the Reviewed Licence to ensure that monitoring data across all sites is comparable. The Licence Holder notified DWER in July 2018 that TEOMs at Sites 1 to 4 had been replaced by BAMs with Site 5 replacement still scheduled for completion by 31 December 2018.

Ambient air quality reporting requirements have remained unchanged following the replacement of TEOMs with BAMs for the monitoring of ambient PM_{10} concentrations at Sites 1 to 4.

The requirement to monitor TSP will be replaced by the requirement to monitor PM_{10} at Site 5. The monitoring of PM_{10} over TSP better represents potential impacts to human health and is

consistent with other port licences in Western Australia. Air quality monitoring at Site 5 for TSP will continue to be required by the Licence until such a time as a BAM monitor is installed and commissioned.

9.5.2 Monitoring reportable events

Ambient particulate monitoring at Sites 1 to 4 will be required to continuously measure PM_{10}. The Licence Holder will be required to report when levels are greater than 50 µg/m^3 for PM_{10}. Further, a condition to install a BAM at Site 5 to measure PM_{10} has been placed on the Reviewed and Amended Licence.

Reporting action is currently undertaken by the Licence Holder when levels of PM_{10} are detected above 50 µg/m^3 at Sites 1 to 4. Targets on the Licence in-force prior to the Reviewed Licence for PM_{10} (50 µg/m^3) are now referred to as Reportable Events.

The criteria for TSP (90 µg/m^3) over a 24-hour averaging period has been removed from the Licence.

Grounds: Reportable events for PM_{10} are based on NEPM criteria, which have been based upon the risk to human health from fine particulates. Previous TSP criteria was extracted from the *Environmental Protection (Kwinana) (Atmospheric Wastes) Regulations 1992* and is therefore not applicable to the local setting of Esperance. PM_{10} is a more accurate measure of potential impacts to public health as particulates smaller than 10µm in diameter have a greater propensity to be drawn deep into the lungs.

The Amended Licence requires continuous monitoring and specified action to be undertaken for significant sources of dust emissions within the Esperance air-shed.

To ensure monitoring data remains comparable at all sites, the Licence Holder will be required to install the same type of monitoring unit (BAM) at Site 5, to what is installed at Sites 1 to 4. As discussed in section 8.4.2.

9.5.3 Monitoring reports

Particulate matter

A key recommendation of the Parliamentary Inquiry presented to the Legislative Assembly on 6 September 2007, was for the Part V Licence (L5099/1974/14) to include conditions for the monitoring of dust emissions using sensitive monitoring equipment.

Monitoring reports for speciation are to be provided annually, noting any exceedance of 50 µg/m^3.

Monitoring is currently undertaken and reported by the Licence Holder on an annual basis. The Licence Holder also reports to DWER whenever PM_{10} is detected at the boundary monitoring network above 50 µg/m^3 and TSP above 90 µg/m^3. However, monitoring requirements in the Reviewed Licence no longer include:

- TSP target levels (90 µg/m^3);
- lead in TSP monitoring;
- depositional dust monitoring.

With the introduction of spodumene export the Licence Holder has committed to measuring suspended lithium in air at HVAS monitoring sites. Reporting of ambient air quality monitoring has been amended to 90 days after the anniversary date or within 14 days following a departmental request.

Grounds: Lead is no longer handled at the Premises, thereby removing the source of potential lead in ambient air.

Depositional dust monitoring was included on the Part V Licence following the Parliamentary Inquiry after the 2007 lead incident (refer section 4.2) as a method for detection of potential impacts to human health. The removal of lead bulk handling at the Premises using a chute-type loading system has significantly reduced the risk of health impacts to the community.

Deposition of fertiliser products was also not considered due to the numerous external sources displaying similar properties making it technically not feasible to link deposited material in deposition gauges with fertiliser handled at the Premises.

Results from dust speciation monitoring using HVAS at Sites 1 to 5 will continue to be used as an indicator of the Premises contribution to dust and identify the greatest risks associated with Port activities. A very low baseline (less than 0.01 µg/m^3) for lithium in TSP was calculated over the monitoring period between May 2010 and April 2013. This will be a useful indicator of dust from spodumene operations since lithium constitutes approximately 4 to 6% of spodumene.

Stormwater discharges

The risk of contaminants being directly discharged to the marine environment is medium based on the assessment provided in section 8.5. The Licence Holder is required to monitor and report on the quality of stormwater discharged from Hume interceptors.

The requirement to monitor for lead and manganese in stormwater discharges has been removed from the Licence.

Grounds: Lead is no longer handled at the Premises and recent stormwater monitoring reports have indicated that lead concentrations are well below ANZECC Guidelines and commonly below detectable limits. Other parameters that are either handled at the Premises as a concentrated material, are found within products handled or within stormwater monitoring results will continue to be monitored at discharge locations and reported to DWER with the exception of manganese. Manganese, although present in stormwater, is not handled in bulk and has a low toxicity at the concentrations present in marine discharges, which have remained stable over recent annual periods.

Water treatment

Treated stormwater and wash water at the WWTP is either reused for dust suppression or is discharged to the Reclaim Area.

The Licence Holder currently undertakes quarterly monitoring following treatment from the WWTP.

Grounds: The requirement to monitor on a quarterly basis has been amended to a requirement to monitor monthly during the periods at which treated wastewater is directed to the Reclaim Area. Generally this is limited to the months of June, July and August when the demand for water to be used in dust suppression is low.

9.6 Amendments to Licence October 2018

9.6.1 Product restrictions and monitoring

Based on the risks to human health associated with some nickel species, restrictions have been applied to the Amended Licence to ensure that nickel subsulfides are not handled at the Premises. In addition, all nickel and copper concentrates accepted at the Premises must have a moisture content at, or above the DEM level.

Note: DWER's assessment of health risks associated with nickel and copper is based on the low/no nickel subsulfide content.

To ensure that product quality is maintained for existing and potential future nickel and copper concentrates, product quality information must be maintained on an annual basis.

Grounds: Ambient air quality data reviewed as part of the risk assessment contained within this Decision Report was obtained during the handling of nickel and copper concentrates that had a moisture content greater than the DEM level for each product. To provide confidence that ambient air quality will be maintained at similar levels to that witnessed during the trial period, the same product quality controls have been applied.

9.6.2 Specified actions

The requirement of the works approval (W5840/2015/1) to ensure:

that all containers used for the transport of nickel or copper concentrate remain closed at all times when outside of the ship's hold with the exception of containers opened for the purposes of sampling product,

has been transferred to the Amended Licence. In addition, misting/fogging sprays must continue to be operated during nickel and copper concentrate loading.

Note: Specified actions are designed to reduce the source of nickel/copper dust before it enters either the atmospheric (public health) or marine environment.

Grounds: DWER's assessment of risks to public health and the marine environment have been based on Licence Holder controls implemented during the trial period. To ensure that the risk to both human and environmental receptors does not increase, these controls have been determined as necessary during the ongoing shipment of nickel and copper concentrates.

9.6.3 Ambient air quality monitoring and limits

Short term (24 hour averaged) limits have been applied to ambient nickel and copper concentrations as PM_{10} at receptors. These limits have been applied based on targets established by DoH for the protection of human health against acute symptoms.

Note: Annualised guidelines for nickel concentrations as PM_{10} have not been applied as limits on the Amended Licence as guidelines are conservatively based on a lifetime of exposure (70 year period) and for higher risk compounds of nickel (subsulfides) that are not authorised for handling. In addition, the determination of compliance against long-term health targets is not possible using a year-to-year compliance regime.

DWER requires more frequent monitoring of nickel and copper as PM_{10} compared to other parameters (iron and lithium). The Licence Holder will be required to report exceedances of these limits within 24 hours of becoming aware of each breach. Further reporting is required within 7 days following the initial notification date to provide time for more detailed investigation and provision of information to DWER.

Grounds: To assess air quality data against annualised health guidelines for nickel, DWER requires nickel (as PM_{10}) to be monitored at a greater frequency. In addition, to ensure compliance with Licence limits, the Licence Holder will be required to monitor 24-hour averaged nickel and copper concentrations every day where nickel and/or copper concentrates are loaded in bulk at the Premises.

DWER looks to DoH for advice on appropriate limits for ambient air quality to ensure the protection of public health. Advice from DoH has confirmed that short-term limits are appropriate for the prevention of acute health impacts. In consultation with, and on advice of DoH, DWER has determined that the proposal to handle nickel concentrates using the Rotabox system will not present an increased risk of chronic symptoms amongst residential receptors.

9.6.4 Stormwater management and monitoring

Conditions of the works approval (W5840/2015/1) for the management of copper contaminated stormwater have been transferred to the Amended Licence. Following the

construction of the StormDMT filter system the requirement to clean out sumps (H2, H3 and H4) before and after each shipment will cease.

In the event of a spill of copper at Berth 2 the Licence Holder will be required to close the discharge point from the StormDMT filter system. Prior to reopening the discharge point and following berth washdown the Licence Holder must sample the contents of the first flush tank to ensure that stormwater does not contain copper in concentrations greater than the maximum concentrations specified in Table 20 of this Decision Report (200 µg/L).

Note: Transferred conditions are designed to restrict the flow of copper contaminated stormwater to the Esperance Inner Harbour.

Following further assessment of risks associated with nickel in stormwater, the detention of stormwater during nickel loading is not required under normal operating conditions. This decision is based on the insoluble and non-bioaccumulative nature of nickel as well as the limited potential for nickel to enter the stormwater catchment area on Berth 2 when handled using the Rotabox system.

Although stormwater retention conditions in the event of a spill are specified for copper only, the Licence Holder is not restricted from applying the same principles in the event of spills of fertilisers (for ammonia retention) or nickel.

Grounds: While copper concentrates handled at the Premises are known to be mostly insoluble, dissolved copper can result in toxic impacts to marine organisms at low concentrations. In addition, copper bioaccumulates through the food chain and has the potential to impact marine organisms beyond the Esperance Inner Harbour.

The StormDMT filter system has a greater capacity to remove dissolved metals (and solids) stormwater prior to discharge when compared to Hume interceptors. The Licence Holder will be required to regularly replace filter media and remove sludges from the StormDMT filter system to maintain the effectiveness of stormwater treatment. Sludges will need to be removed to a drainage area that diverts water to the WWTP.

Risks to the marine environment from fertilisers and nickel have been assessed as medium and low respectively and can be managed by existing and proposed controls that have been placed on the Licence. The handling method for nickel has been determined as the primary control for removing the pathway to the marine environment.

9.6.5 Odour management

Restrictions on the migration of xanthate odours across the Premises boundary, and affecting amenity for receptors, have been applied to the Amended Licence. DWER notes the position based on the New Zealand Ministry for the Environment (2016) *Good Practice Guide for Assessing and Managing Odour* that odour affects amenity and its impact can vary depending on the sensitivity of the person affected. As such it is usually insufficient for an odour to simply be detected at or beyond the boundary of a site. The odour must be sufficient to create an adverse effect and the odour must be objectionable or offensive, as determined by the common law concept of ‘the ordinary reasonable person’. However, due to the low detection thresholds for an ordinary reasonable person, and to ensure the enforceability of odour conditions in the Licence, the Delegated Officer has elected to condition against any xanthate odours crossing the boundary.

Grounds: DWER has considered odour monitoring conducted during the trial loading of nickel concentrates and notes that the presence of odour depends solely on processes conducted at the mine site including the application and removal of xanthate.

Therefore odours may be generated from the bulk handling of nickel products from alternate suppliers that do not place similar controls for the addition or removal of xanthate when

processing nickel ore. The decomposition of xanthate produces odorous compounds which have low human odour thresholds.

9.6.6 Iron ore monitoring and reporting

The Licence Holder has applied for the removal of iron ore moisture content monitoring at in-load (Condition 12 of the Reviewed Licence) on the grounds that the condition presents regulatory duplication with Ministerial Statement 681. Further Licence Holder arguments in support of the removal of the condition include:

- Moisture monitors are taken offsite for calibration in winter months when weather conditions reduce the risk of dust;
- The Licence Holder does not have an on-site laboratory capable of conducting the required calibration;
- Additional data storage, analysis and reporting is required;
- The Licence Holder relies on a visual assessment to determine stop-loading procedures and activations of product conditioning and dust suppression systems; and
- Moisture content at in-load is not correlated to environmental dust emissions because dust is contained within the enclosed in-loading system, which is equipped with dust extraction and suppression systems.

Implementation condition 2-1 of Ministerial Statement 681 requires the implementation of environmental management commitments, which include the implementation of an Environmental Management Plan. Within this Environmental Management Plan, the Licence Holder commits to a program of monitoring the moisture of iron ore at in-load "so that the levels of dust can be correlated to the product moisture."

Note: The Licence Holder must continue to undertake monitoring of the moisture content of iron ore at the moisture analyser located at conveyor CV09.

Changes to moisture monitoring requirements for iron ore have been made to allow for offsite calibration of equipment. Further changes have also been made to reporting conditions to remove the requirement for annual reporting on iron ore moisture content comparisons against the DEM level.

The Licence Holder will be required to supply the Department with moisture content monitoring data upon request.

Grounds: DWER notes the Licence Holder's comments. Since the provision of the initial draft to the Licence Holder, DWER considers that there is no provision within the EP Act that requires DWER to remove duplicative conditions with any Minister's decision. However, in accordance with section 59B(7) of the EP Act, DWER must not amend the licence in such a way that may be contrary to, or otherwise than in accordance with, an implementation agreement or decision under Part IV of the EP Act.

To avoid contradicting the Minister's decisions under Part IV of the EP Act this Decision Report does not assess dust risks associated with iron ore handling. However, iron ore remains a prescribed material that is handled in bulk at the Premises and has been identified as a source of dust emissions under Part IV. Therefore DWER has elected to retain conditions on the Amended Licence that support the Minister's decision to issue MS 681 and MS 325. These conditions align with controls specified within Ministerial Statements and SPA's Environmental Management Plan D16/1054.

The Delegated Officer has determined it necessary to duplicate requirements of Ministerial Statement 681 through the Part V licence for the purpose of increasing regulatory oversight of dust emissions at the Premises. The Licence Holder will be required to supply moisture content monitoring data to DWER following a Reportable Event for ambient dust as PM_{10}, as

recorded at any of Sites 1 to 5 (inclusive) where the level is equal to, or greater than 50 µg/m^3 in a 24-hour period (refer to section 9.5.2).

Therefore the Delegated Officer has determined that the retention of former Reviewed Licence Condition 12 is consistent with *Guidance Statement: Setting Conditions*.

9.6.7 Trial conditions

Existing infrastructure and management controls at the Premises have been demonstrated through the nickel and copper concentrate trial (authorised under Works Approval W5840/2015/1) to effectively manage risks associated with the handling of these materials. The trial period allowed DWER to obtain reliable and detailed data on product quality and ambient air quality following the implementation of controls proposed through the works approval application. Therefore the addition of trial conditions to the Amended Licence is appropriate and necessary to allow for sufficient data collection that allows for a detailed risk assessment of new products proposed for handling through the Premises in the future.

The trial shipments not extending beyond 12 months in duration or a cumulative throughput of 1 million tonnes will provide sufficient information through monitoring data for DWER to conduct a detailed risk assessment of each trialled product.

It is the responsibility of the Licence Holder to determine appropriate handling methods for each product being trialled following demonstrated consideration given to each hazard associated with the trial product. However, DWER reserves the ability to suspend or terminate the trial at any time prior to, or during a trial period where the risk to public health, amenity and the environment is determined by the CEO to be unacceptable or require further, more detailed assessment of the product.

Trial conditions on the Amended Licence prevent the handling of high risk products such as those which contain elevated concentrations of asbestos, respirable silica or radiation. Wastes, or waste-derived products with the exception of clean fill are also not authorised for handling under trial conditions.

DWER's decision making processes for determining what products are suitable for trial shipments are further detailed in the *Industry Regulation Fact Sheet: Port Authority Trial Shipments* (Category 58 and 58A), which is available at DWER's website (www.dwer.wa.gov.au).

Category 58A has been applied to the licence to authorise the loading of salt products and other evaporites such as gypsum and potash[2] under trial conditions. This is an administrative amendment that does not increase the risk of bulk material handling at the Premises.

No increase in daily throughputs is authorised through the addition of Category 58A or trial conditions to the Amended Licence.

The conditions in the Revised Licence have been determined in accordance with DWER's *Guidance Statement: Setting Conditions*.

Condition Ref	Grounds
Emissions 1	This condition is valid, risk-based and consistent with the EP Act.
Trial conditions 2, 3, 4, 5, 6, and 7	These conditions are valid, risk-based and contain appropriate controls (refer to *Industry Regulation Fact Sheet: Port Authority Trial Shipments*)

[2] Depending on the method of production/extraction, gypsum and potash products may be better described as evaporites and more closely align with a salt product.

Infrastructure and equipment 8, 9, 10, 11 and 12	These conditions are valid, risk-based and contain appropriate controls (see section 8 of this decision report).
Product restrictions and management 13, 14, 15, 16, 17, 18, 19, 20, 21, 22 and 23	These conditions are valid, risk-based and consistent with the EP Act.
Ambient air quality monitoring 24, 25 and 26	These conditions are valid, risk-based and consistent with the EP Act.
Stormwater and industrial wash water management and monitoring 27, 28, 29, 30 and 31	This condition is valid, risk-based and consistent with the EP Act.
Meteorological Monitoring 32	This condition is valid, risk-based and consistent with the EP Act.
Information 33, 34, 35 and 36	These conditions are valid, risk-based and consistent with the EP Act.

DWER notes that it may review the appropriateness and adequacy of controls at any time, and that following a review, DWER may initiate amendments to the licence under the EP Act.

10. Conclusion

This assessment of the risks of activities on the premises has been undertaken with due consideration of a number of factors, including the documents and policies specified in this decision report.

Based on this assessment, it has been determined that the Amended Licence will be granted subject to conditions commensurate with the determined controls and necessary for administration and reporting requirements.

Digitally signed by Danielle Eyre
Date: 2018.10.01 17:39:50 +08'00'

Danielle Eyre
Senior Manager, Industry Regulation (Resource Industries)
delegated officer under section 20 of the *Environmental Protection Act 1986*

Appendix 1: Key Documents

	Document Title	Availability
1.	Licence L5099/1974/14 – Port of Esperance	der.wa.gov.au
2.	Licence L5099/1974/14 – Amendment Notice 1	der.wa.gov.au
3.	Licence L5099/1974/14 – Amendment Notice 2	der.wa.gov.au
4.	Works Approval W5840/2015/1 – Nickel rotainer trial	der.wa.gov.au
5.	Works Approval W4694/2010/1 – Boat building	DWER records (A314891)
6.	Works Approval W4805/2010/1 – Galaxy spodumene	DWER records (A354724)
7.	DER *Guidance Statement: Decision Making* (November 2016)	der.wa.gov.au
8.	DER *Guidance Statement: Regulatory principles* (July 2015)	
9.	DER *Guidance Statement on Setting conditions* (September 2015)	
10.	DER *Guidance Statement: Licence duration* (November 2014)	
11.	DER *Guidance Statement: Licensing and works approvals processes* (September 2015)	
12.	DER *Guidance Statement: Risk Assessments* (November 2016)	
13.	Agency for Toxic Substances and Disease Registry (2004) Toxic Substances Portal – Copper. U.S. Department of Health and Human Services, Atlanta.	Accessed at: http://www.atsdr.cdc.gov/PHS/PHS.asp?id=204&tid=37
14.	A. Pinsino, V. Matranga and M. Carmela Roccheri (2012) Manganese: A New Emerging Contaminant in the Environment. InTech, Croatia.	Accessed at: http://www.intechopen.com/books/environmental-contamination/manganesea-new-emerging-contaminant-in-the-environment
15.	Air Resources Board (date unknown) Chapter 5: Measurement of Particulate Matter. California Environmental Protection Agency.	Accessed at: http://www.arb.ca.gov/aaqm/qa/qa-manual/vol4/Chapter5.pdf
16.	ANZECC and ARMCANZ (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality.	Accessed at: https://www.environment.gov.au/system/files/resources/53cda9ea-7ec2-49d4-af29-d1dde09e96ef/files/nwqms-guidelines-4-vol1.pdf
17.	Bureau of Meteorology (2016) Climate statistics for Australian locations - Monthly climate statistics graph: Esperance Aero.	Accessed at: http://www.bom.gov.au/jsp/ncc/cdio/cvg/av
18.	Campbell, L., Norstrom, R., Hobson, K., Muir, D., Backus, S. and Fisk, A. (2005) Mercury and other trace elements in a pelagic Arctic marine food web (Northwater Polynya, Baffin Bay). Science of the Total Environment.	Accessed at: http://web4.uwindsor.ca/users/f/fisk/main.nsf/0/48abbaa50ed52cc08525724a006839ac/$FILE/STOTEN%202005%20Campbell%20element%20trophic%20transfer.pdf
19.	Department for Environment, Food & Rural Affairs (date unknown) Chapter 5: Methods for monitoring particulate concentrations	Accessed at:

		https://uk-air.defra.gov.uk/assets/documents/reports/aqeg/ch5.pdf
20.	Department of Health (2015) Bulletin: Monitoring Results for Air-Borne Nickel Dust in Esperance. Department of Health, Perth.	DWER records (A974896)
21.	Department of Health (2011) 2009 Report on Nickel Dust Monitoring in Esperance. Department of Health, Perth.	Accessed at: http://www.public.health.wa.gov.au/cproot/4279/2/2009%20Report%20on%20Nickel%20Dust%20Monitoring%20in%20Esperance.pdf
22.	Department of Health (2008) Letter to DER "RE: Inclusion of ambient nickel health guidelines in the Esperance Port Authority environmental licence".	DWER records (A974901)
23.	Drew and Frangos (2010) Air guideline values for selected substances. Toxikos, East Victoria.	Available online
24.	Duffus (2009) "Esperance, Relevant Air Quality Guidelines, and the Interpretation of Monitoring Data Based on these Guidelines", The Edinburgh Centre for Toxicology, Edinburgh.	Available online
25.	Duffus (2009a) "Assessment of the Potential for Health Problems Associated with the Export of Sulfidic Nickel Concentrate Through the Port of Esperance", The Edinburgh Centre for Toxicology, Edinburgh.	Available online
26.	E. Prato, F. Biandolino and C. Scardicchio (2005) Test for Acute Toxicity of Copper, Cadmium, and Mercury in Five Marine Species. Institute for Coastal Marine Environment, Taranto, Italy.	Accessed at: http://journals.tubitak.gov.tr/zoology/issues/zoo-06-30-3/zoo-30-3-8-0508-11.pdf
27.	Environmental Protection Authority (2015) Environmental Assessment Guideline for Protecting the Quality of Western Australia's Marine Environment.	Accessed at: http://edit.epa.wa.gov.au/EPADocLib/EAG%2015%20Marine%20EQMF-March2015.pdf
28.	Esperance Visitor Centre (2016) Weather.	Accessed at: http://visitesperance.com/pages/weather/
29.	Galaxy Lithium Australia Limited (2012) *Ravensthorpe Spodumene Project: Annual Environmental Report M74/244 & L74/46 – 1 September 2011 – 31 August 2012.* Prepared by Keith Lindbeck and Associates.	DWER records (A577378)
30.	Goetzmann (2009) Establishing an Air Guideline Value for Nickel Compounds in Ambient Air for the Western Australian Department of Health. Published by the School of Medical Sciences, RMIT University.	DWER records (A1708255)
31.	IMA Europe (2014) Position Paper (January 2014): Classification and labelling of crystalline silica (fine fraction).	Accessed at: http://www.ima-reach-hub.eu/index.php?option=com_docman&task=doc_download&gid=141
32.	J. Stauber, M. Ahsanullah, B. Nowak, R. Eriksen and T. Florence (1996) "Supervising Scientist Report 112: Mount Lyell Remediation - Toxicity assessment of waters from Macquarie Harbour, western Tasmania, using algae, invertebrates and fish", Department of Environment and Land Management; and Supervising Scientist.	Accessed at: http://www.environment.gov.au/science/supervising-scientist/publications/ssr/toxicity-assessment-waters-macquarie-harbour

33.	MBS Environmental (2017) Nova Project: Esperance baseline Air Quality Assessment, prepared for Independence Group NL.	DWER records (A1677277)
34.	Ministry for the Environment (2016) Good Practice Guide for Assessing and Managing Odour. New Zealand Government.	Accessed at: http://www.mfe.govt.nz/sites/default/files/media/Air/good-practice-guide-odour.pdf
35.	Muhle (1992) "Chronic effects of Intratracheally Instilled Nickel Containing Particles in Hamsters. In Nickel and Human Health: Current Perspectives" John Wiley and Sons, New York, p 467 – 480.	Available online
36.	National Environment Protection Council (2011) National Environment Protection (Assessment of Site Contamination) Measure: Schedule B5a - Methodology to Derive Ecological Investigation Levels in Contaminated Soils	Accessed at: http://www.scew.gov.au/system/files/resources/93ae0e77-e697-e494-656f-afaaf9fb4277/files/schedule-b5b-guideline-methodology-derive-eils-sep10.pdf
37.	National Environment Protection Council (2016) National Environment Protection (Ambient Air Quality) Measure as amended 25 February 2016.	Accessed at: https://www.legislation.gov.au/Details/F2016C00215
38.	Nickel Institute and Nickel Producers Environmental Research Association (2015) Inhalation Exposure: Sulfidic Nickel.	Accessed at: http://www.nickelinstitute.org/en/NiPERA/WorkplaceGuide/ToxicityOfNickelCompounds/SulfidicNickel.aspx
39.	Nickel Producers Environmental Research Association (2015) Fact Sheet 3: Data Compilation, Selection, and Derivation of PNEC Values for the Marine Aquatic Compartment.	Accessed at: https://www.nickelinstitute.org/NiPERA/EnvironmentalScience/FS3-MarineAquatic.aspx
40.	North Carolina State University (Date unknown) The Sulfur Cycle.	Accessed at: http://www4.ncsu.edu/~franzen/public_html/Poland/Poznan08a/Sulfur_Cycle.pdf
41.	S. Perez and R. Beiras (2009) The mysid *Siriella armata* as a model organism in marine ecotoxicology: comparative acute toxicity sensitivity with Daphnia magna. Ecotoxicology, Volume 19, Issue 1, pp 196-206.	Accessed at: http://www.ncbi.nlm.nih.gov/pubmed/19757032
42.	RIVM (2001) Re-evaluation of Human-toxicological Maximum Permissible Risk Levels. Report 711701 025. Netherlands National Institute of Public Health and the Environment (RIVM)	Accessed at: https://www.rivm.nl/dsresource?objectid=64dcca44-7807-46ce-b296-1580c215f413&type=org&disposition=inline DWER records (A1708273)
43.	Safe Work Australia (2013) Guidance on the Interpretation of Workplace Exposure Standards for Airborne Contaminants.	Accessed at: https://www.safeworkaustralia.gov.au/system/files/documents/1705/guidance-interpretation-workplace-exposure-standards-airborne-contaminants-v2.pdf
44.	Safe Work Australia (2013) Crystalline silica - Hazardous Chemicals Requiring Health Monitoring.	Accessed at: http://www.safeworkaustralia.gov.au/sites/SWA/about/Publications/Documents/797/Crystalline%20Silica.pdf
45.	Schaumloffel (2012) Nickel Species: Analysis and Toxic Effects. J. Trace Elements in Medicine and Biology, 26 (2012), pp. 1-6.	Available online
46.	Southern Ports Authority (SPA) (2014) Monthly Wastewater and Storm Water Monitoring Report, October 2014.	DWER records (A849335)

47.	Southern Ports Authority (SPA) (2015a) Annual Ambient Air Quality Monitoring Report – 1 October 2014 to 30 September 2015.	DWER records (A1024247)
48.	Southern Ports Authority (SPA) (2015b) Annual Metals Wastewater Treatment Plant Monitoring Report – 1 October 2014 to 30 September 2015.	DWER records (A1024244)
49.	Southern Ports Authority (2016) Annual Audit Compliance Report 2016	DWER records (A1024239)
50.	Southern Ports Authority (2016) Annual Report 2016	Accessed at: http://www.southernports.com.au/publications
51.	Southern Ports Authority (SPA) (2016) Monthly Water Monitoring Report – June 2016.	DWER records (A1145742)
52.	Southern Ports Authority (SPA) (2016) 1 – 5 Year Development Plan	DWER records (A1381636)
53.	Southern Ports Authority (SPA) (2017) Southern Ports Authority – Port of Esperance – Environmental Management Plan D16/1054	DWER records (A1426635)
54.	Southern Ports Authority (SPA) (2017) Monthly Water Monitoring Report – March 2017.	DWER records (A1429367)
55.	Southern Ports Authority (SPA) (2017) Dust sampling during Spodumene out loading. Email correspondence from Jill Oldfield, received 28 March 2017.	DWER records (A1420009)
56.	ToxConsult (2018) Esperance Port Annual Nickel 'Comparison Values'.	
57.	U.S. Department of Health and Human Services (2005) Toxicological Profile for Nickel. Public Health Service Agency for Toxic Substances and Disease Registry.	Accessed at: http://www.atsdr.cdc.gov/ToxProfiles/tp15.pdf
58.	US Environmental Protection Agency (2000) Nickel Compounds.	Accessed at: https://www.epa.gov/sites/production/files/2016-09/documents/nickle-compounds.pdf
59.	WillyWeather (2016) Esperance Wind Forecast.	Accessed at: http://wind.willyweather.com.au/wa/goldfields/esperance.html
60.	World Health Organization (2000) Air Quality Guidelines: Chapter 6.10 – Nickel. Second edition.	Accessed at: www.euro.who.int/__data/assets/pdf_file/0014/123080/AQG2ndEd_6_10Nickel.pdf
61.	Yanong (2013) "Use of copper in Marine Aquaculture and Aquarium Systems", University of Florida.	Available online.

Appendix 1: Changes to the Reviewed Licence

Reviewed Licence condition (former)	Amendment condition number	Changes made
Licence amendment October 2018		
Trial shipments N/A – new conditions	2 to 7	Additional conditions applied to authorise the trial shipment of new products under specific requirements for monitoring, duration, throughput, reporting and restrictions. Refer to *Fact Sheet: Port Authority Trial Shipments* on DWER's website.
Infrastructure and equipment Conditions 2 to 6	8 to 12	Condition number change. Requirement to replace TEOMs with BAMs at Sites 1 to 4 has been removed. Construction of the StormDMT authorised through Row 3 (added). Minor administrative changes to Condition 12 (former Condition 6).
Product restrictions and management Conditions 8 to 12	13 to 23	Conditions 13 to 18 inserted for nickel and copper concentrate acceptance and monitoring. Spodumene acceptance and monitoring (former Conditions 8 to 10) now Conditions 19 to 21. Iron ore acceptance and monitoring (former Conditions 11 and 12) now Conditions 22 and 23. Minor amendments to allow for annual calibration offsite.
Ambient air quality monitoring Conditions 13 and 14	24 and 26	Monitoring requirements for copper applied. Limits applied for ambient nickel and copper concentrations as PM_{10} to be measured three days before each shipment, during and three days after each shipment. Sulfur as PM_{10} removed from ambient monitoring requirements. Condition 25 added to require the reporting of limit exceedances within 24 hours of each exceedance.
Stormwater and industrial wash water management and monitoring Condition 15	27 to 31	Conditions 27 to 30 added for the management of marine discharges during copper concentrate handling for Hume interceptors 2 to 4 and once the StormDMT filter system is operational. Former Condition 15, now Condition 31, amended to include copper monitoring requirements

Reviewed Licence condition (former)	Amendment condition number	Changes made
		and stormwater/wash water monitoring at the StormDMT filter system once operational.
Meteorological monitoring Condition 16	32	Condition number change.
Information Conditions 17 to 20	33 to 36	Condition number changes. Minor administrative amendments to incorporate the reporting of monitoring data and logbook recordings.
Schedule 2 General description	Schedule 2 General description	Category 58A applied to authorise the trial of salt products at the Premises. Minor changes to Tables 9 and 10 to reflect changes to Premises operations.
Schedule 3 Infrastructure and equipment	Schedule 3 Infrastructure and equipment	Additional requirements applied for the management of stormwater following the construction of the StormDMT filter system. Additional requirements for the handling of nickel and copper concentrate applied.
Schedule 4 Monitoring	Schedule 4 Monitoring	Changes to reportable event requirements to include the investigation of limit exceedances. Inclusion to report the moisture content of iron ore during reportable events for particulate matter.

Appendix 2: Summary of Licence Holder's Comments

<table>
<tr><th>Condition</th><th>Summary of Licence Holder Comment</th><th>DWER Response</th></tr>
<tr><td>5 (c)</td><td>Insert the red text as the guideline does not appear to be applicable to radionuclides that are beta emitters such as Rb87 commonly found in spodumene:

The Licence Holder must not Trial the bulk handling of materials that:
(c) Exceed the radiation transport limit of 10 Bq/g (gamma radiation only (U/Th)); or</td><td>Radiation transport limits set in ARPANSA's code of practice for the Safe Transport of Radioactive Material (2012 Edition) is interpreted by DMIRS to refer to the combined concentrations of gamma emitters Uranium-238 and Thorium-232. Rubidium-87 is a beta emitter and therefore inhalation is considered the only exposure route that presents a risk to human health. Therefore the condition has been amended to address the difference in risk between products containing beta radiation and those containing gamma radiation decay schemes.</td></tr>
<tr><td>15, Table 3, Column 4</td><td>After consultation with IGO and their Metallurgist at Nova on the most practical and effective testing given the production process, we suggest the following:
<table>
<tr><th>Material</th><th>Location</th><th>Parameter</th><th>Sample</th><th>Frequency</th><th>Method</th></tr>
<tr><td>Cu Con
Ni Con</td><td>Mine Site</td><td>Moisture Content</td><td>A representative sample of at least one consignment or load from the mine site is to be taken

The representative sample is to be taken prior to departure from site</td><td>Weekly</td><td>AS1289.2.1-2005 undertaken by onsite laboratory with technical results in a written monthly report</td></tr>
<tr><td>Ni Con</td><td>Mine Site</td><td>Nickel subsulfide (Ni_2S_3)</td><td>A representative blended sample of the Nickel concentrate

A representative sample is a blended composite sample (of at least two subsamples) from one weeks production of nickel.</td><td>Annually</td><td>Reputable Laboratory validating methodology and technical results provided on an annual basis in a written report</td></tr>
</table></td><td>Agreed. Changes made with clarification that one "consignment or load" refers to a truck load.</td></tr>
<tr><td>30</td><td>Delete "30." As it is part of Condition 29;</td><td>Agreed. Changes made.</td></tr>
<tr><td>32</td><td>Table 8 Column 3 Delete "m" and above ground from rows 3, 4 and 5 and insert text into header after "Height"</td><td>Noted. Changes made.</td></tr>
<tr><td>33 (f)</td><td>After "Maintenance logs" Insert "or inspections"</td><td>Noted. Wording changed to "Maintenance and/or inspection logs" to acknowledge that maintenance will not be required upon every inspection.</td></tr>
</table>

Schedule 2, Table 10 Row 5	Delete “NA” and replace with 11.5 MTPA approved by Ministerial Statement 681	Noted. In accordance with DWER’s *Guidance Statement: Setting Conditions*, DWER will not unnecessarily duplicate requirements imposed on the Licence Holder by the Ministerial Statement. This means that any amendment to MS681 to increase authorised iron ore throughputs at the Premises will not result in the requirement for an amendment to the Part V licence unless overall throughput amounts exceed 14.5 Mtpa. No changes made.
Schedule 2, Table 10 Row 6	Delete 12.5 MTPA and replace with 14.5 MTPA as this is the sum of the individual Assessed Volumes of approved Category 58 products plus the 11.5 MTPA of iron ore approved by Ministerial Statement 681.	Accepted. Tonnages provided in Schedule 2 have been amended to reflect what has been risk assessed in this Decision Report.
Schedule 3, Table 11 Row 3	Delete “Sludges from the first flush sump must be removed at least monthly” and replace with, “Sludges from the first flush sump will be automatically removed via a sludge pump”	Noted. Changes made.
Schedule 3, Table 11 Row 4	Remove reference to Berth 1 as only non-prescribed activities occur on it.	Noted. Monthly stormwater reports submitted in accordance with previous licence conditions indicate that prescribed activities at Berth 2 have an impact on the quality of stormwater at Berth 1. Therefore no changes have been made.
Schedule 3, Table 11 Row 6	Remove reference to Bulka Bags as this is a non-prescribed activity.	Agreed. However, any discharge into the environment that occurs as a result of handling of product using bulka bags is subject to other provisions of the EP Act.
Licence Holder comments on draft Decision Report		
Section	**Summary of Licence Holder Comment**	**DWER Response**
4.5	Exclusive control of leasehold areas: Insert “subject to occupation and control”	Disagreed. Southern Ports has exclusive control over the Port of Esperance and is required by the *Port Authorities Act 1999* to “control business and other activities in the port or in connection with the operation of the port”, regardless of contractual arrangements held with third parties.
5.6.1	After first sentence, insert “Washwaters from fertilisers are also taken to the Myrup liquid waste facility or back to the receiver for reuse for sale as liquid fertiliser.	Changes made.
5.6.1	Delete “nutrients from grain and fertiliser loading” and insert “from general road sweeping.”	Noted. General road sweeping does not accurately state the sources of nutrients, which are primarily grain and fertiliser handling. No changes made.
5.6.1	Stormwater quality monitoring 2016/17 Second paragraph: Delete “has advised DWER of intent to” and insert “is considering with its clients the potential to”	Noted. Changes made.
5.6.1	Stormwater quality monitoring 2015/16 Delete “a factor of 9.76” and insert “nearly ten-fold” or “by nearly an order of magnitude”;	Noted. Changes made.
5.6.5	Baseline Monitoring Table 9 Row 6 Delete “Nickel” and replace with “copper”	Noted. Changes made.
5.6.5	Baseline Monitoring Key Finding. (c) Units are ug/filter not ug/m3 as per baseline report. This equates to 0.0015 ug/m3 copper and 0.0006 ug/m3 nickel.	Noted. Changes made.
8.6.2	After “Historical dredging” delete and “exporting activities” insert “to ensure seaways remain navigable;	Noted. Changes made.

8.6.2	After first sentence insert: “This is akin to the impacts of roadways in the terrestrial environment.”	Noted. Wording not added.
8.6.3	First sentence after Table 20: Delete “In the event that dissolved nickel or copper exceeds” and insert “Following an event such as a spillage making it likely that dissolved nickel or copper will exceed;	Noted. Changes made.
8.6.3	First sentence after “either”: Insert “remove the first flush for disposal offsite or treat the water. Water treatment will include adding”	Noted. Changes made.
8.6.3	After third sentence created above: Insert “Verification of concentrations against targets requires laboratory analysis of at least one spot sample of water;	Noted. Changes made.
8.6.5	Copper concentrate page 53 top of page Delete: “this is not the case for marine flora and fauna: and insert "it is generally eliminated/detoxified more slowly by marine biota.”	Noted. Changes made.
8.6.5	Copper concentrate page 53 Third paragraph Delete paragraph and Insert “Previous annual sediment surveys have shown historical contamination of metals restricted to sediments within 50m of the berth. This area has reduced ecological value as it is periodically dredged and used frequently for navigation of large trading vessels. The slow oxidation of any spilt copper (Chalcopyrite) to soluble forms in this area will ensure rapid dispersion of any soluble copper to below concentrations causing biological effects. Therefore, effect on marine biota will be localised due to this low exposure to bioavailable copper and effects restricted to less than a few metres of any spill concentrate or contaminated sediments. Although bioavailable copper is acutely toxic, it does not biomagnify up the food chain causing persistent effects through the food chain” Considering the additional facts, and the loading controls in place, suggest a risk rating of “Moderate” remains precautionary to the environment and a rating of “Major” is unrealistic.	Noted. Although it is agreeable that copper is not likely to biomagnify up the food chain, in its dissolved state copper may bioaccumulate and have toxic effects amongst organisms near to prescribed activities. In accordance with Table 15, where mid-level offsite impacts are anticipated at a local scale, the consequence is assessed as major. Therefore the risk assessment is in accordance with DWER’s *Guidance Statement: Risk assessment* and no changes have been made to the overall assessment.
8.6.6	Nickel concentrate Delete “96 hours at” insurt “the duration and”	Noted. Changes made.
8.7.3	MWTP: Search and Replace within the document all references to Metals Wastewater Treatment Plant (MWTP) and replace with Waste Water Treatment Pland (WWTP) Defer to most recent wastewater report for an updated description of WWTP simplified treatment process. Delete first paragraph under WWTP and insert “Treatment of the wash waters consists of primary settlement in a sump before being drawn through a series of zeolite mineral filters before being held in rainwater tanks before reuse.	Noted. Changes made.
9.6.3	Grounds Delete “to be monitored at a greater frequency”.	Noted. It is necessary for DWER to provide justification for requiring increased monitoring of copper and nickel in ambient air. The reason for requiring more regular speciation monitoring for nickel and copper in ambient air has been further clarified in section 9.6.3.
9.6.4	Delete “Shut off the Berth 2 stormwater discharge point will cease” and insert “clean out sumps (H2, H3 and H4) before and after each shipment will cease”.	Noted. Changes made.

Appendix 3: Summary of Stakeholder and Community Comments

The Table below provides a list of submissions received during the consultation period presented as verbatim along with DWER's direct response.

Theme	Submission	DWER response to comment
Health impacts	The nickel concentrate being exported through the Port of Esperance has the potential to affect the health of Esperance residents and port workers. The International Agency for Research on Cancer (IARC) classifies all nickel compounds as carcinogenic. The safety data sheet for the product being exported through the port also states that "Soluble nickel compounds are a known human skin sensitiser, respiratory sensitiser by inhalation, Class 1 (IARC – International Agency for Research on Cancer) carcinogen and possible reproductive toxin. Soluble nickel comprises approximately 0.3 to 0.4% of the material by weight based on solubility testing (Section 9) but this is still sufficient for classification as carcinogenic and a reproductive toxin."	Noted. DoH describes the nickel concentrate currently exported through Esperance as being rapidly cleared from the body even if inhaled (DoH, 2011; DoH 2015). Nickel handled through the trial presents itself in the concentrate predominantly as pentlandite ($(Ni, Fe)_9S_8$), which is a nickel sulfide. This type of nickel is insoluble in water and expected to be rapidly cleared from the body. DWER has applied restrictions through the licence on the product quality to ensure that nickel does not pose any risks to long-term health.
	The government made a commitment to comply with the World Health Organisation (WHO) guideline of 0.003mcg/m^3 for airborne nickel in Esperance. Even with a fully containerised system, the port is unable to contain fugitive dust and comply with this guideline. An open loading system will only worsen this situation. I note that the recent air quality data for total suspended particles for nickel (01/10/2017- 28/02/2018 which includes the nickel handling during the trial period), shows elevated levels of nickel at all four community monitors near the port when compared with the same period in 2016/2017. This increase in nickel levels detected would appear to indicate emissions from nickel handling during the trial shipments on the open handling system.	Noted. As provided in response to submissions received for works approval W5840/2015/1 for the trial shipment of nickel and copper concentrates, DWER refers to the DoH for the establishment of public health criteria. World Health Organisation (WHO) guidelines that have been adopted by the DoH recommend that annualised nickel concentrations in ambient air remain at or below 0.003 µg/m^3 at continuous exposure over a lifetime period of 70 years. The guideline is considered highly conservative as it requires continuous exposure at concentrations greater than 0.003 µg/m^3 over a 70-year period. Not taken into consideration within this guideline is the type of nickel being handled at the Premises. The toxicity of nickel is now known to be strongly dependent on the chemical and physical form of the element (WHO, 2000; USEPA, 2000). Nickel in the nickel sulfide concentrates proposed for export is present primarily as the naturally occurring mineral pentlandite. An international study of 80,000 workers in various occupations with nickel exposure concluded that for workers in nickel mining that there is no statistical evidence that lung

		cancers of miners is nickel (pentlandite) related (International Committee on Nickel Carcinogenesis in Man, 1990). A study of high doses of pentlandite instilled intratracheally into hamsters did not produce lung tumours (Muhle, 2012) whereas in similar studies where nickel subsulfide and amorphous nickel sulfide have been tested, tumours were consistently produced (Schaumloffel, 2012).
Regulatory controls	The current proposal has inadequate monitoring and licence limits to protect the environment and health and amenity of the Esperance community (as shown by the continued exceedance of the WHO guideline over numerous years whilst not exceeding the licence limits). The proposal has been assessed against these inadequate licence limits, which is totally unacceptable where the primary objective should be protecting the community (an assurance given by the Western Australian Government- see last dot point below).	WHO guidelines are conservatively measured against more carcinogenic forms of nickel such as nickel subsulfide (Ni_2S_3), which is not contained within ore prior to smelting. Nickel handled in the trial and proposed for ongoing shipment, has not been smelted and, according to the 2018 toxicological investigation (ToxConsult, 2018), nickel subsulfide has not been detected in the product proposed for export. This assessment is also supported by renowned Professor John Duffus of The Edinburgh Centre for Toxicology in his 2009 report on relevant air quality guidelines for Esperance, which concluded that the export of nickel concentrate through the Premises is not likely to have caused any health hazard as a result of nickel in ambient air (Duffus, 2009). Duffus (2009) argues that the WHO Guideline is overly conservative and that "0.020 µg/m^3 total nickel compounds, in the PM_{10} size fraction, is a more appropriate annual mean." In addition, annualised monitoring results from 2012-2015 have been reviewed by DoH who conclude that exposure to recorded concentrations would not be expected to increase the risk of respiratory cancer in the community.
	The baseline air quality assessment provided by the proponent states that "review and discussion of relevant human health guideline or comparison values for assessment of airborne copper or nickel is not addressed in the current report" and "no long term (annual) targets for copper or nickel were indicated in the Work Approval". Not addressing these criteria is clearly failing to address the issues relevant to Esperance residents.	DWER looks to the DoH for advice on matters relating to public health. DoH has advised that they will be conducting a review into the establishment of appropriate guidelines for nickel in ambient air. To achieve this DoH needs to complete an assessment of all available data. In the interim, DWER's continued application of the 24 hour averaged licence limit for nickel as PM_{10} (0.14 µg/m^3) is supported by DoH. DoH acknowledges that long term (annual) health guidelines are conservative and may not be an accurate representation of risks to public health for all nickel types.
	The proposed dust control measures suggested by the proponent to "Stop loading where visible dust escaping from the ship's hold" was shown to be a totally inadequate method of reducing fugitive dust emissions in the lead and nickel contamination incident of 2006/2007 and cannot be relied upon to protect the environment and community.	Noted. DWER has implemented a range of regulatory controls relating to product specifications including moisture and speciation limits, handling methods (Rotabox), dust mitigation controls during loading and stormwater management. The Licence Holder will also be required to monitor and report annually the ambient nickel and copper concentrations as PM_{10} providing DWER with the regulatory oversight to enable the ongoing management

		risks to public health and environment. The Delegated Officer has determined that these controls reduce risks to acceptable levels.
	The Port of Esperance is in a unique position, where the town envelopes the port, there is no buffer between the town and the port, and the strong, dry, hot summer prevailing winds blow directly towards the town. All of these factors increase the risk of contamination of the Esperance community from bulk exports through the Port of Esperance.	As above.
Monitoring results	The proponents own monitoring shows that during the ideal conditions of a trial shipment (where loading rates and dust suppression measures would be heavily enforced), a total suspended particle nickel concentration of 0.033µg/m³ was detected at Site 4 on 3rd February 2018. Whilst this is well below the licence assessment limit, it would clearly lead to an exceedance of the WHO guideline and is well above background levels in the community. Clearly the trial shipment demonstrates that the open loading system is inadequate to protect the health and amenity of the Esperance community.	WHO Guidelines refer to an annualised average that cannot be compared against 24-hour averaged data in isolation. Therefore the guideline allows for occasional exceedances of the 0.003 µg/m^3 value from time to time so long as the average over the year falls below this number. In reference to nickel dust in Esperance the DoH has stated that "although the annual guideline was exceeded, the large number of days with nickel below the guideline provided sufficient time for excess nickel to be excreted from the body." (DoH 2015). Note that during 2009, when nickel was loaded using an open materials handling system, the concentration of nickel in air was below the limit of detection for 45% of the year. Data submitted to DWER as part of the application indicates that nickel as PM_{10} is likely to fall below the 0.003 µg/m^3 value at receptors in most circumstances. This includes periods where winds placed monitors downwind of bulk shiploading events for periods longer than 12 hours (cumulative) in a 24 hour period.
	The portable dust monitoring results from the trial shipments also show concerning results, with PM_{10} values elevated during the loading of MV Lefkoniko on 28th December 2017 and MV Transformer on 15th March 2018 (compared to background levels). This indicates there are emissions from the ships hold under controlled loading procedures. This is totally unacceptable.	As above. Toxicology studies have provided no evidence to suggest that the nickel species being exported (pentlandite) is a carcinogen (Duffus, 2009; WHO, 2000; USEPA, 2000; Nickel Institute and Nickel Producers Environmental Research Association, 2015). Further, in a review of the potential health risks associated with exporting nickel through Esperance Port, Duffus contends that there is no "epidemiological evidence to associate exposure to any nickel compound, and certainly not nickel metal or alloys, to any increased incidence of cancer." (Duffus, 2009a).
	Given that the Port of Esperance is still not compliant with the WHO guideline for airborne nickel, how can less stringent handling practices be contemplated? Have we learnt nothing from historic contamination events in this town?	As discussed above.
Other	In 2009, the Western Australian Government spent $25 million and 3	Noted.

	years cleaning up lead and nickel contamination as a result of fugitive dust from bulk handling activities at the Port of Esperance. Given there are no natural sources of nickel in Esperance soil, sentinel monitoring has shown the town to be free of contamination and the Western Australian State Government has given a commitment "to ensuring future exports and imports through the Port of Esperance do not pose a risk to the health or amenity of the Esperance community", who will be liable should levels of nickel above background levels be detected in the community?	The type of conditions that DWER applies to licences issued under Part V of the EP Act is set out through section 62A of the EP Act. The conditions that have been applied to this licence are consistent with section 62A of the EP Act. All Licence Holders are required to pay annual Licence fees commensurate with operational scale as well as authorised emissions and discharges. As detailed in this Decision Report, DWER does not anticipate contamination to occur as a result of the bulk handling activities within the Premises. Since the 2007 *Inquiry into the cause and extent of lead pollution in the Esperance area*, DWER in consultation with the DoH, conducted a risk assessment of bulk nickel concentrate handling conducted at Esperance. A primary focus of this risk assessment was the review of monitoring data received from trial shipments. PM_{10} has been determined to be the most appropriate measure of impacts to human health as it is the finer particles that have the potential to be drawn deep within the lungs. Air quality investigations for nickel (as PM_{10}) detected concentrations at ambient monitors between a range of below detectable levels (0.00066 µg/m^3) and 0.02 µg/m^3 95% of samples below 0.002 µg/m^3. Although maximum concentrations exceed the 0.003 µg/m^3 value for nickel as PM_{10} from time-to-time, these measurements are over a 24 hour period and cannot be compared with annualised guidelines averaged over 70 years. Based on monitoring data submitted to DWER, and the implementation of the regulatory controls described above, the Delegated Officer has determined that nickel and copper concentrate handling at Esperance pose an acceptable level of risk to public health and the environment. With reference to the commitments of previous governments to build a closed loading facility, DWER understands that these commitments have not been provided for in recent State budgets. It should be noted that despite being defined as an open loading system, Rotabox technology significantly limits the exposure of products to the open air. This technology had not been tested in Western Australia at the time that commitments to develop a 'closed' loading system were made and was therefore not considered.
	Since the bulk handling of nickel concentrate was ceased in 2011, nickel concentrate has been safely and effectively transported through the Port of Esperance using a fully containerised system. Only recently has the reintroduction of an open loading system for this product been under consideration. I maintain that the safest method for handling nickel concentrate through the Port of Esperance is with a fully containerised transport system, not	The rotating tipping frame method proposed has been successfully implemented for the export of metal concentrates at other ports in Western Australia. Loading of nickel concentrate at the Premises prior to 2012 involved the use of a conveyor system that loaded a drier product from a height. The proposed method reduces the risk of product being exposed to wind and involves the use of water being applied to the product at dust extinction moisture concentrations.

	the open loading system that is being trialled at the present time. Containerisation has proven to be an effective and safe method of transportation since bulk handling was ceased due to contamination issues in 2011 and should be the only way a high value product with the safety profile of nickel should be handled.	Therefore the overall potential for dust generation is significantly reduced when compared to previous open materials handling methods. Furthermore the effects of nickel dust on human health at predicted concentrations are anticipated to be negligible.

Appendix 4: Summary of Licence Holder's Comments on Reviewed Licence (First Draft)

Condition	Summary of Licence Holder Comment	DWER Response
Notification of Material Change Conditions 2 to 4	The Licence Holder supports the concept of material change that conditionally allows a new activity to occur without undergoing a lengthy licence amendment process that can continue subject to a risk assessment demonstrating no significant increase in risk to the environment. However, to clarify DER's expectations on how this new condition would work, the Licence Holder would appreciate some examples on how this may work.	Noted. Examples of Material Change conditions for similar operations include licences for Pilbara Port Authority's Utah Point Multi-User Facility (L8937/2015/1) and Eastern Operations (L4432/1989/14). Example Material Change conditions have been transferred across to the draft Reviewed Licence. Note that the Material Change Notification conditions are an optional suite of conditions.
Notification of Material Change Conditions 2 to 4 and Condition 11	The Licence Holder considers that Schedule 2 through the bulk granular material volumes specified are effectively being used as process limits (import and export tonnages) and requests their removal for the following reasons: a) A cap on the volume of product handled at the Port does not correlate with environmental risk. The Licence Holder argues that the method of handling has a greater impact on environmental risk and that there is no clear correlation between the risk of emissions and the volume of material being loaded or unloaded. The Licence Holder gives preference to the use of handling controls in the Licence.	Noted. Schedule 2 is intended to represent the relevant aspects of the premises, which have been considered by the Delegated Officer in the determination of risk. The prescribed premises activities, associated infrastructure and equipment, type and annualised and daily amounts of bulk granular material handled at the premises have been considered material factors by the Delegated Officer in the determination of risk. DWER considers that the specified annual amounts of individual materials handled at the Premises, as detailed in Schedule 2, do not represent a process or regulatory limit rather is a reflection of the primary activities and the extent of those activities at the premises. Note - there are a number of avenues for the Licence Holder has in relation to changes to these aspects including Material Change Notification (particularly when the Licence Holder considers there is no change in risk to public health, amenity or the environment), a Licence Amendment or provision of alternative (design/future) volumes through this review.
	b) The following handling controls in the licence effectively control the risk of emissions: i. Handling methodology (e.g. Not over-filling grab so it does not leak) ii. Infrastructure (e.g. enclosed sheds, bunded berth) iii. Operational (e.g. berth sweeping) iv. Product quality to minimise dust via: • existing licence conditions for spodumene; • commercial conditions currently under negotiation for sulfur; and • not required for fertiliser due the consistent density and cohesiveness of the granules not causing visible dust during handling.	Noted. Refer to response above.

	v. Outcome-based criteria on acceptable emissions including limits such as real time PM10 monitoring against NEPM criteria and stormwater quality against ANZECC-ARMCANZ (2000) criteria. vi. Loading procedures on specific products can be made available as required.	
	c) The imposition of process limits is inconsistent with Table 3 (pages 9-10) of DER's policy "Risk Assessments" which states that process limits are not required for low to medium risk events. In this case, all of the materials handled are rated low or medium. Accordingly the licence is inconsistent with DER policy.	Noted. DWER notes that the former EPA has considered throughputs in their assessment of dust risks associated with iron ore handling. DWER considers that the *Guidance Statement: Risk Assessments* does not preclude DWER from applying further regulatory control in the case of low to medium risk events. The amount of material handled at the Premises is directly related to the assessment of risk within this Decision Report. Therefore it is appropriate to condition throughput limits to manage cumulative dust from the Premises.
	d) Medium risk ratings in Table 18 of the decision support document for sulphur in dust (row 3), sulphur in stormwater (row 6) and fertiliser dust (row 3) should be reduced from medium to low risk since: i. Sulphur is: • insoluble as indicated by the SDS for both products handled at the Port, not "moderately soluble" as stated in the assessment on page 22 of Section 8.5.5; • sulphur that does slowly dissolve as it oxidises will have negligible effect since any acidification will be absorbed by the high buffering capacity of seawater and consequent dilution in the southern ocean, with no residual effect; and • spillage from the sulphur circuit into the marine environment is minimal as it is handled using a land-based crane and empties into a large hopper (with surfactant sprays) that feeds into an enclosed conveyance system to a storage shed.	Noted and partially agreed. DWER has amended the description of sulfur as insoluble although considers that there is the potential for minor volumes of sulfur to dissolve. The Delegated Officer agrees that environmental impacts will be insignificant based on minor operational discharges. However, the Delegated Officer has considered larger spills in the risk assessment which has been informed by historical incidents (note: two fertiliser spills reported in 2015, resulted in one or more tonnes of fertiliser being released into the marine environment). DWER has amended wording to further clarify the assessment of a 'minor' consequence acknowledging that there is a potential for low level impacts to amenity for recreational users in the area. The Delegated Officer considers that although there have not been any spills of sulfur in the last five years; the method of unloading is similar as that for fertilisers. Therefore the likelihood remains as 'possible' and the overall risk remains as 'medium'. Based on this assessment, and in accordance with the *Guidance Statement: Risk Assessments*, DWER finds it appropriate to condition the use of spill plates wherever grab buckets are in use.
	ii. Sulphur dust emissions do not significantly contribute to levels of sulphur in ambient dust. The baseline for sulphur dust at the Port boundary is measured by laboratory assay of Total Suspended Particulates sampled by a High Volume Air Sampler. The long-term time series of sulphur in TSP shows no significant change in sulphur following the re-commencement of sulphur operations in July 2011 following cessation of operation in January 2009 (refer to air quality reports submitted to DER)	DWER notes that at times sulfur product may be variable in form. Further, dust speciation sampling occurs only every sixth day and does not identify individual plumes that may occur over shorter averaging periods. As such there is the potential that short periods of elevated dust emissions occur when sulfur ships are being unloaded that are not being identified by ambient monitors.

		The Delegated Officer also acknowledges that the risk event will probably not occur in most circumstances and that short term, off-site impacts are likely to be minimal. The overall risk rating has not changed.
	iii. Fertiliser handling operations during unloading at the Port of Esperance are not dusty due to the density and cohesiveness of the granules.	Noted. Following further consideration the Delegated Officer has amended the likelihood rating to 'rare' thereby reducing the risk rating for fertiliser dust to 'Low'. Row 9 of Table 9 of the Licence has been modified to only require the operation of sprays on the sulfur hopper.
	e) Process limits provide an unnecessary administrative burden on all parties, especially given the length of the term of the licence. Fifteen years is a considerable time over which to impose process limits.	Noted. Note that the Reviewed Licence duration does not restrict the Licence Holder from submitting amendment applications ahead of the expiry date in 2032.
Condition 5 Row 1 of Table 2	Delete 31 December 2017 and replace with 31 December 2018 in Row 1 Table 2 of Condition 5 to allow for the budgetary cycle to fund purchase and installation of a BAM monitor at the community monitoring Site 5. SPA considers the benefits of this monitor as minimal since: b) PM10 results likely to be confounded by multiple dust sources in the community including vehicles, bushfires, woodfires and CBH grain loading operations c) Site 5 has HVAS monitors positioned at this site as emissions of nickel or specific metals can be identified on the dust samples, and these measurements can be better associated with the Port if these specific metal concentrates are being handled.	Noted. DWER accepts this amendment. In response to the additional points made by the Licence Holder, the DWER notes that for PM_{10} at the Premises boundary to be comparable to background data (Site 5), the same monitoring equipment should be used. In addition, TSP is not considered an accurate measure of respirable dust and potential health impacts to community members.
Condition 5 Row 2 of Table 2	Row 2, Column 4 of Table 2 SPA requests deletion of text to be replaced with "30% completion of sealing works on existing unsealed haul road from truck entrance to Berth 3 to be completed by July 2018, with 100% completed by July 2022. There is little evidence that dust from these roads (measured as Total Suspended Particulate using High Volume Air Samplers) at the Port's boundary is a significant contributor to the dust surrounding the Port or that it impacts on the health of the community. In fact, dust has more correlation to grain handling activity and inland sources of dust (e.g. bushfires). Ambient dust is from multiple sources that cannot be practically identified.	Noted. DWER has noted that the Licence Holder has previously described the unsealed haul road as potentially contributing to ambient particulate matter during target exceedance events and in response to community complaints. Sealing of the Berth 3 haul road and truck turnaround point is a forecast project of the *Port of Esperance 1 to 5 Development Plan* that targets completion within 12 months. The Plan was received by DER in April 2016 and DWER understands that the sealing of haul roads has been in the Licence Holder's financial planning since as early as December 2014. DWER accepts that the timeframe can be extended with the turnaround point to be sealed by July 2018. However, DWER disagrees that the improvements should take five years and so requires completion by July 2020.
Condition 5 Row 3 of Table 2	Delete Row 3 Table 2 works to seal container storage areas.	Noted. DWER agrees that the sealing of container storage areas should not be conditioned on the basis that materials handling using closed containers is not a prescribed activity under Schedule 1 of the EP Regulations.

Materials Restriction Condition 12	Delete the “The licence holder must only accept spodumene at the Premises which meet the following specifications:” and replace with “The licence holder must advise the mine site that no more product can be received at the Port if testing results are received that indicate the product does not meet the listed specifications below and the Licence Holder cannot receive more product until it receives results that show the product meets the below specifications:”	Noted. DWER does not agree. The risk of spodumene dust is low based on Licence Holder controls being conditioned. It is the Licence Holder’s responsibility to ensure that the spodumene product meets the listed specifications. Any arrangements with the supplier of product are to be made externally to the Licence and can be made ahead of any non-compliance with licensed product specifications.
Materials Restriction Condition 12 Rows 1 and 2 of Table 3	Delete the wording “Representative sample taken *every* 12 hours” in column 3 of Table 3 and replace with “*12 hourly Representative sample*”, to avoid conflict with the “*Weekly*” frequency as indicated in column 4.	Noted and accepted. Amendment made.
Reportable Events Condition 16, Schedule 4	Insert the following clarifications for Reportable Events: a) No further investigation is required if the port is not upwind of any reportable event; b) If an event occurs during spodumene loading, the following text needs clarification “Comparison of boundary dust levels against dust levels recorded at Sites 1 to 4 ambient air quality dust monitoring stations (24-hour average)." This is conflicting itself since Sites 1 to 4 are on the Port’s boundary. c) Please explain DER requirements and expectations for the “Dust forecast tool”. As discussed, following thorough exploration of available modelling products on the market and discussions with other Ports who have experience using these products, the Port will not be proceeding with the purchase of these products in the foreseeable future. However, simple dust planning at the start of a stevedoring shift using the weather forecast will be considered as an option for high risk products.	Noted. DWER provides the following: a) Noted and accepted. This is established through the investigation step outlined in Schedule 4, through determination of source and consideration of meteorological conditions. No further action is required by the Licence Holder in the event that the activities didn’t contribute to exceedance. This has been further clarified. b) Noted. The bullet point has been reworded to state “comparison of dust levels from all dust monitoring sites (Sites 1 to 5)”. c) Noted. The point on implementation of dust forecast tool has been removed.
Condition 17 Row 1 of Table 5.	Delete requirement to sample at end of discharge pipes and replace with sampling in Hume Interceptor pits. It is not safe or practical to sample at end of the discharge pipes.	Noted and accepted. Column 1 of Table 5 has been amended to require sampling from the Hume Interceptors depicted in Figure 2 of Schedule 4.
	Send SPA a list of required changes to the premises map, SPA will amend using GIS and maintain a Master copy. Changes will include: a. Removing the unsealed container storage area from within the prescribed premises boundary; b. Inserting the new position of MWTP; and c. Inserting the location of boat maintenance area.	Noted. DWER has detailed required locations within the draft Licence.
Schedule 2: General Description – Infrastructure and equipment Table 7	Delete woodchip and fuel from Row 1 since both are non-prescribed.	Noted and accepted. DWER has removed Woodchips and fuel have been removed from Table 7.
	Delete “Sulfur pond” and rename “Sulphur Water Treatment Plant (SWTP)”, Row 21.	Noted and accepted. DWER has amended reference to the Sulfur Pond with the SWTP throughout the Licence.
	Request use of Australian-English spelling “Sulphur” throughout licence.	Noted. The spelling of the word sulfur, with an ‘f’, is the preferred spelling of the International Union of Pure and Applied Chemistry. No changes to spelling have been made.
Schedule 2: General	Delete Row 4 of Table 8 that refers to handling processes for Nickel concentrate.	Noted and accepted. DWER has amended the Licence to remove reference to handling nickel in containers.

Description – Bulk materials loaded and unloaded Table 8	Delete Row 5 of Table 8 that refers to iron ore, as per Section 3.2 of the Decision Report, iron is excluded from assessment (iron ore is instead regulated by Ministerial Statements).	DWER notes the Licence Holder's comments. Since the provision of the initial draft to SPA, DWER considers that there is no provision within the EP Act that requires DWER to remove duplicative conditions with any Minister's decision. However, in accordance with section 59B(7) of the EP Act, DWER must not amend the licence in such a way that may be contrary to, or otherwise than in accordance with, an implementation agreement or decision under Part IV of the EP Act. To avoid contradicting the Minister's decisions under Part IV of the EP Act this Decision Report does not assess dust risks associated with iron ore handling. However, iron ore remains a prescribed material that is handled in bulk at the Premises and has been identified as a source of dust emissions under Part IV. Therefore DWER has elected to place conditions on the Reviewed Licence that support the Minister's decision to issue MS 681 and MS 325. These conditions align with controls specified within Ministerial Statements and SPA's Environmental Management Plan D16/1054. A draft copy of the Reviewed Licence has been forwarded to the EPA for consideration.
Schedule 3: Infrastructure and Equipment Table 9	Row 1 Column 2 Amend to read "MWTP receives stormwater, washwater and road sweep water for treatment…", road sweep water is the main influent to MWTP.	Noted and accepted. Amendment made.
	Row 3 Column 2 and Column 3 Remove reference to Berth 1 as it is no longer in boundary of licence	Noted and accepted. Amendment made.
	Row 3 Column 3 Delete "The Hume Interceptors must be emptied at least monthly" and replace with "The Hume Interceptors must be cleaned at least monthly". Note that the Hume Interceptors are sediment traps and solids are required to be cleaned out at regular intervals to maintain their sedimentation capacity.	Noted and accepted. DWER has amended to "The Hume Interceptors must be cleaned (sediments and solids removed) at least monthly for the purposes of maximising stormwater capacity".
	Row 3 Column 3 Delete "Each berth must be designed to prevent the direct drainage of stormwater into the marine environment" and insert the following text: "Contaminated, first flush stormwater run-off (according to Department of Water Best Practice Guidelines on stormwater management stormwater) from the seaward edge of the berth during or directly after bulk loading activities, is to be collected in rainwater tanks for further treatment. Uncontaminated stormwater running off the berth (after first flush) may be discharged to Harbour waters." Any contaminated stormwater collected in the tanks is taken to the Myrup liquid waste management facility or treated at the onsite wastewater treatment plant and reused on site.	DWER acknowledges that the condition is not clear in its intent. The condition was not intended to restrict the Licence Holder from allowing some stormwater discharges to the marine environment, but rather to ensure that stormwater passes through infrastructure designed to remove contaminants before any possible discharge. The conditions has been reworded to state: *Stormwater and washwater at Berths 1 and 2 must either be collected for reuse or disposal; or pass through a Hume interceptor prior to discharge to the marine environment.*

	Row 5 Column 3 After “Berth 2”, insert “or associated infrastructure” as spill plates may not be fixed to the berth, for example sulphur spill plates are fixed to container crane.	Noted. The term “associated infrastructure” is vague and may be misinterpreted to mean other berths or unloading infrastructure. There is no requirement for spill plates to be fixed to the berth.
	Delete Row 6 Table 9 for operational requirements for handling empty containers (including nickel, spodumene, copper and gold concentrates).	Noted and accepted. Reference to the handling of nickel has been removed on the basis that handling nickel using a closed material loading system is not a prescribed activity. Further, the risk to the marine environment from discharges of spodumene from damaged containers is assessed as ‘low’ and does not require conditioning.
	Row 7 Remove requirement for any sulphur spills to be contained with a “berm” or boom, this condition is unnecessary since: a) Sulphur granules sink, only the dust will float as a result of surface film tension and quantities of sulphur dust on Port waters are unlikely to have exceeded a kilogram at any time. b) Less than a kilogram of sulphur dust is insignificant as seawater is well-buffered against acidification from sulphur and the effect is diluted to nothing in the southern ocean as no bioaccumulation will occur.	Noted. DWER disagrees that there will be no dispersion of sulfur following a spill event. It is considered that sulfur received at the Port may vary in consistency and some material may not be properly granulated. Therefore there remains a risk that a significant spill of sulfur could result in finer sulfur product spreading quickly and impacting amenity. Despite only small volumes of sulfur being discharged in the past and the consequence being rated as ‘minor’, the operation of grab hoppers increases the likelihood of discharges to ‘possible’. Therefore the risk rating is ‘medium’.
	Row 8 Delete requirement for the sulphur conveyor system to be totally enclosed as the risks of explosion and asphyxiation from potential gases and dust require vents in the conveyors and storage shed, conversely the risks of these emissions to the environment are relatively low.	Noted and partially accepted. The description of the sulfur conveyor has been changed from “enclosed” to “covered (top, sides and bottom) for the purpose of reducing the product’s exposure to wind.”
	Delete Row 9 as the use of sprays on ground hoppers, this is not required because: a) Fertilisers are not dusty due to their dense, granular form; b) Iron ore hoppers are inside storage sheds with dust extraction.	Noted and partially accepted. DWER considers that conditioning of ground hopper sprays was not originally intended for mobile fertiliser or covered iron ore hoppers. The operation of sprays whenever visible dust is being generated during sulfur unloading is still required to address the risk of fugitive emissions.
	Row 10 Delete “Exhaust systems must be operated at all times when doors are open and sulfur is being stockpiled or moved”. Sulphur shed has no doors and has no exhaust system. Shed is designed to be open to allow ventilation and dissipation of any gases or dust to avoid asphyxiation or explosion. Therefore, there is no negative pressure or dust extraction system. Dust control by product conditioning and granule quality from the manufacturer, and addition of surfactant solution from sprays from the shed apex is the main means of dust control.	Noted. The Delegated Officer has determined that the application of surfactant solution during Sulfur stockpiling is required to reduce the risk of fugitive dust emissions from stockpiling and loading of trucks within Shed 5.
	Rows 10 and 11 SPA requests removal of the requirement for the Shed 6 door to be shut during filling of containers in parallel to truck inloading since: a) The risk of spodumene has been assessed as low. We submit that this condition is not proportionate to the level of risk assessed by the DER. b) The Shed 6 door being open presents a significantly lower risk than those posed by the product being unloaded into the ship hold which is not fully enclosed. c) Closure of the door is not practical due to • Truck movements into the Shed occurring in parallel to the infilling and out-loading of containers;	Noted. DWER agrees to the removal of the requirement to keep the shed door shut during handling on the grounds that product specification limits sufficiently reduce risk.

	A personnel door at the eastern end of the Shed is also required to be open, to allow dissipation of vehicular diesel fumes to avoid breaching occupational limits.	
	Row 12 Column 3 Insert the following at end of text “or loading of bulk granular materials (Category 58)”	Noted and accepted. Amendment made.
	Row 13 Column 3 Delete text and replace with a more outcome focused condition: “Manage dust emissions from unsealed areas to ensure no nuisance dust is emitted from the licensed premises with the potential to impact on the environment”.	DWER disagrees with the suggested text as it is unenforceable due its ambiguity. No changes have been made to Row 13 (now Row 12).
General comment	Please advise why the changeover from TEOM to BAM technology in Table 2 requires DER approval as BAMs comply with relevant accreditation and standards. In future, will the material change avoid the requirement for a lengthy approval process?	The Existing Licence specifies the type of monitor to be used to measure PM_{10}. Any changes to Licence conditions require either an application by the Licence Holder or to be undertaken by the CEO (or Delegated Officer under delegated authority) The Material Change Notification condition is an optional condition intended to allow for additional flexibility for the Licence Holder.
Comments on Decision Report		
Section	**Comment**	**DWER Response**
Row 2, column 3 of Table 3 (page 5)	Delete "Stored within a negative pressure shed (Shed 5)". Refer to paragraph 15 above for explanation.	Noted and accepted. Amendment made.
Paragraph 1 on page 4	Delete "CBH lease an area to the south…" since grain loading is not-prescribed. If DER wish to regulate grain and other organic products such as woodchips, the activity must be prescribed and in the case of CBH's activities on Berth 1, a temporal licence will need to be issued to CBH (refer to examples at NSW Ports) since they are the occupier during grain loading operations.	Noted. DWER considers that the relationship of adjacent activities and responsible parties is important context for the premises review. In addition this extends to what has and has not been considered in the Licence.
Rows 4 and 5 of Table 3 (page 5)	Delete both rows as woodchips and grain are not prescribed under Category 58 Bulk granular product. Both of these products are handled outside new boundaries of the prescribed premise on Berth 1.	Noted. Table 3 provides an overview of all bulk granular material currently handled at the Port of Esperance. No changes made to the table. References to woodchips and grain have not been included in the Licence.
Section 4.4 page 9	Delete second paragraph and replace with “The Port is the Decision Making Authority for building and infrastructure in its jurisdiction and the Port is required under the Port Authorities Act and Port Authority Regulations to build to Building Standards Australia and consult with the local municipality to ensure alignment with planning schemes and usage.”	Noted and accepted. Amendment made.
Section 5.6.1 (page 15)	Delete following text “In most instances these spikes can be explained by the type of material handled in the previous month, for example, when fertilisers received in a drier condition than usual or when damaged nickel containers have been stored onsite. “ There is no evidence to support the above statements. As documented in wastewater compliance reports sent to DER, the only two incidents of nickel above relevant criteria in stormwater in 347 stormwater samples were due to a mine site loading slops and small amounts of nickel being washed off the external surface of nickel containers after receipt from the mine site. There has also been no evidence to suggest an association between	DWER agrees that the word “most” should be replaced with the word “some”. However, evidence provided by the Licence Holder indicate there are instances where spikes in surface water monitoring have been attributed to handling and cleaning procedures not being followed. The reference to fertilisers being received in a drier condition as a possible reason for nutrient spikes has been removed.

	dry fertilisers and increased dust or stormwater emissions. In fact wet fertiliser is more likely to be dusty as it causes breakdown of the granules. Fertilisers are hygroscopic, absorbing water from the air, while this may reduce some dust at low levels, too much moisture has the reverse effect causing more dust. The above underlines the importance of DER involving the Port in its risk assessment so that issues are correctly understood	
Page 15	Correct page numbers that go from page 15 and then restart at page 2	Noted. Amendment made.
Section 5.6.4, page 17	Delete the following text: "For both the 2013/14 and 2014/15 annual periods iron ore dust presented the most significant portion of deposited dust out of the parameters monitored under the existing licence." This misleads the reader into thinking iron ore is a "major contributor" of total dust. The % of total iron in ambient dust (TSP (HVAS data 2014-2017)) averages about 3%, and this value does not account for other sources of iron.	Noted. DWER notes that the paragraph goes on to outline that iron ore dust is not a significant contributor to overall dust emissions. The contribution percentage has been changed from "up to 5%" to "on average 3%" based on HVAS data between 2014 and 2017 to avoid misleading representation of iron ore's contribution to dust emissions.
Table 5	Correct numbering of Tables-there are two Table 5s	Noted. Amendment made.
Table 5 (page 18)	Delete distances from nearest residential premises that relate to Berth 1 where no prescribed activities are conducted and are outside the premises boundary.	Noted. DWER considers that all distances noted in Table 5 provide the reader context of Port-related emission sources in relation to public access areas and private dwellings. Discussion in section 3.2 of the Decision Report notes that CBH is the operator of grain loading infrastructure at Berth 1. No changes have been made.
Row 6 column 4 of Table 8 (page 24)	Delete the following text "Toxic impacts that can result in acute or chronic toxic effects on marine organisms where hydrocarbons, cleaning and painting chemicals are present in wash water at elevated concentrations. " Replace with a more objective statement such as: "Hydrocarbons, cleaning and painting chemicals in uncontained wash water may impact marine biota. " Various statements in the decision report are emotive and need re-writing in a more objective, risk-based style.	Noted and accepted. Amendment made.
Section 8.4.1 (page 26)	After "No material handled at the Port has been assessed as toxic", delete the following text: a. "with the exception of silica, which can be present in spodumene and presents health risks at occupational levels only". Since: • The Port does not handle "silica" as a product; • The Global Harmonisation System, requires no classification for products with <1% respirable silica, so it is not toxic (IMA Europe Position Paper, January 2014) Classification and labelling of crystalline silica (fine fraction)).	Noted and accepted. DWER has amended the wording throughout to further clarify that silica forms only a small fraction of spodumene product handled at the Port and at levels that are not considered toxic.

Section 8.4.1 (page 26)	Delete “The proposal to export spodumene out of Berth 2 will result in an average of five extra trucks per day accessing the Port. These trucks will turn around to exit the Premises using the unsealed stretch of road and turnaround point adjacent to Berth 3, which is a significant source of dust emissions from the Premises.” There is little evidence that dust from traffic on these roads (measured as Total Suspended Particulate) is any more than a potential source of dust at the Port’s boundary, and no evidence to suggest it is a significant contributor to the dust surrounding the Port, or that it impacts on the health of the community. Dust levels surrounding the Port have more correlation to grain handling activity and inland sources of dust (e.g. bushfires). Ambient dust is from multiple sources and its sources cannot be practically identified.	Noted. DWER notes that in its reporting of target exceedances for ambient particulate matter where the Port has been down wind of monitors, the Licence Holder has identified the unsealed road and truck turnaround point as a potential source of dust emissions. No changes have been made.
Section 8.4.1 (page 12)	Delete the following text: “The key hazard associated with dust generated at the Premises is Particulate Matter finer than 10 microns (PM10). These small particles have the potential to be drawn deep within the lungs causing possible respiratory and cardiovascular problems for nearby receptors. Long term repeated exposure is more detrimental than short term sporadic exposure. The most severe effects being reduced life expectancy due to long-term exposures. In addition, dust can cause eye irritation and reduced amenity. Residential receptors to the Port are as close as 100 m from the premises boundary.” Replace with: “The key hazard associated with dust generated at the Premises is respirable Particulate Matter finer than 10 microns (PM10). These small particles can cause respiratory and cardiovascular problems at high exposure, eye irritation and reduced amenity. However, the emissions from SPA’s Port operations to residential premises are unlikely to cause these effects.” Deleted text is emotive. Distance from source is important, not distance from boundary.	Noted. It is agreed that the distance from the source is more important than the distance from the boundary. Reference to the premises boundary has been replaced with reference to the nearest storage shed (Shed 2) and the Berth 2 shiploader. Note that the General Hazard Characterisation section does not discuss likelihood. Therefore the statement that PM_{10} has the potential to cause respiratory and cardiovascular problems for nearby residents, has been changed to state that the potential for these issues is based on high exposures.
Section 8.4.1 (page 12)	Include the following text to the last paragraph of page 26, "SPA is not the occupier of the grain handling operations".	Noted. Further text has been added to note that SPA is not the operator of grain handling infrastructure.
Section 8.4.5	There is no basis for the assessment that considers “PM10 from dust generated through all Primary Activities will result in the recommended health criteria (NEPM) being at risk of not being met”. Majority of PM10 exceedances are correlated to grain loading and bushfires. There is no basis for the Delegated Officer to determine how much the lesser contributions of Category 58 activities are likely to contribute. In fact, Category 58 activities typically constitute less than 5% of TSP dust based on concentrations of metals expressed against total dust. A similarly low proportion of Category 58 emissions can be assumed in the PM10 fraction of dust. Therefore delete: “The Delegated Officer considered PM10 from dust generated through all Primary Activities will result in the recommended health criteria (NEPM) being at risk of not being met resulting in the consequence rating moderate.” Replace with words using above information recommending a low risk rating.	Noted and accepted. The Delegated Officer has determined that the wording should be changed to: “The Delegated Officer considers PM_{10} from dust generated through all primary activities may result in low level offsite impacts at a local scale resulting in the consequence rating moderate.”

Row 4 Table 14 (page 34)	Remove the following text: “Waters from the sulfur pond are deposited directly onto the sulfur stockpile” and replace with “Treated sulphur waters are reused on site for dust suppression and road sweeping.” Washwaters are no longer returned to the stockpile as it causes excessive moisture in the stockpiles causing issues with shed floor, transportation and at the mine site furnace.	Noted and accepted. Amendment made.
Table 15	Licence Holder Management Controls for Spills: - Row 3 At the end of text insert “to recover spilt material from the harbour sediments”; - Row [5] Insert “Licence holder has two permanent cleaning contractors onsite that have wet sweeper, vacuum and controlled waste trucks”; - Row [6] Insert “Access to the Shire of Esperance managed Myrup Liquid Waste Management facility for disposal of industrial washwaters”; - Row [7] Insert “Licence holder has a spill container for leaking containers”; - Row [8] Insert “Spill kits on all berths and all fuelling stations”; - Row [9] Insert “Capacity for storage of spilt liquids in tanks and Sumps”;	Noted and accepted. Amendments made to Table 15.
Section 8.5.4	Delete Iron and sulphur as key stormwater contaminants, they have no relevant water quality criteria on account of their insolubility and low toxicity.	The Delegated Officer disagrees that there will be slight, or no offsite impacts from a spill of sulfur or iron ore for the reasons presented in section 8.5.5. Based on the likelihood of a spill for each product, the Delegated Officer has determined that the overall rating for sulfur and iron ore is medium and low respectively.
Section 8.5.5	Consequences of water discharge: Delete text on deoxygenation impacting marine life in the context of Esperance Harbour waters. Risks of limitation to oxygen from fertilisers entering Esperance Harbour are negligible due to an algal growth response time of at least several days and the high dispersive energy of the Southern Ocean.	The Delegated Officer agrees with the Licence Holder’s comments and the consequence of a fertiliser spill is more clearly explained. The consequence of a fertiliser spill remains as minor as off-site impacts at a local scale are anticipated to be minimal.

Appendix 5: Summary of Licence Holder's Comments on Reviewed Licence (Second Draft)

Condition	Summary of Licence Holder Comment	DWER Response
Schedule 2, Column 1 of Table 9	Southern Ports (SP) is unable to accept DoWER's intent to effectively use "volumes assessed" for spodumene, sulphur and fertiliser (column 1 of Table 9) as process limits by Conditions 11 and Condition 23. We refer to our previous comments on this issue submitted to DoWER in relation to handling controls being the best means of reducing risks. This level of prescriptive control for low to medium risks of handling products in enclosed handling systems is inconsistent with the published DoWER Guidance Statement, "Risk Assessment". We further add that: a) DoWER's comments on the requirement of these process limits to manage cumulative dust is counter to the results of our Annual Air Quality reports showing that our category 58 products typically contribute less than 5% of overall dust generated at the Port; and b) We accept an overall limit for category 58 products consistent with that proposed in Clause 12(a), although we would be seeking to negotiate an agreed process to determine this value. Revised throughput volumes for assessment, as provided 9 August 2017 (summarised): • Fertilisers from 150,000 to 200,000 tonnes per annual period; • Sulfur from 500,000 to 650,000 tonnes per annual period; and • Spodumene from 120,000 to 1,000,000 tonnes per annual period. The Licence Holder noted that future spodumene product entering the Premises is expected to satisfy existing product specification requirements and be of similar quality to that supplied by Galaxy Resources.	Noted. DWER considers that there is a correlation between risk and the amount of product handled. The risk of emissions and discharges to the environment and public health has been assessed against the amounts of each material handled. DWER notes that the Licence Holder has provided revised throughput amounts that offer a buffer to current throughput amounts to meet flexible operational requirements. Although these revised amounts increase the likelihood of each risk event, the overall risk rating has not increased. Proposed Licence controls are expected to reduce risks to acceptable levels and there have been no further changes to conditions. The inclusion of assessed amounts in Schedule 2 provides a basis for assessment and the boundary within which conditions apply. As discussed, assessed amounts do not represent process limits. However, emissions or discharges that occur during operations after assessed throughput amounts have been reached are not specified through the Licence and therefore are not provided a defence by the Licence. Note that section 18 of the *Guidance Statement: Risk Assessments* states that "where applicant controls lower the assessed likelihood or consequence of a risk event, these controls will be conditioned in the regulatory instrument." Therefore the application of proponent controls as conditions within a licence is consistent with the Guidance Statement where the risk is assessed as low based on Licence Holder controls.
Condition 13	SP is unable to accept the wording in Condition 13 that holds SP accountable for accepting compliant product from the mine. For this to occur, SP is dependent on correct sampling and reporting results of product quality by the mine site conducted according to Table 3. This sampling and testing is not under our control, we can only interpret the results received and compare them to the licence criteria. The requested text in our first round of comments accurately describes what we can control.	Noted. As discussed through DWER's comments to the Licence Holder's initial comments provided in Attachment 2, it is the Licence Holder's responsibility to ensure that the spodumene product meets the listed specifications. DWER notes that the proportion of muscovite and respirable silica quartz within spodumene product is provided to the Licence Holder in the form of a laboratory report prior to receipt of the product. These reports are likely to be an acceptable measure

		of compliance so long as they are prepared by an accredited laboratory. Should the Licence Holder be in receipt of non-compliant product, the Licence Holder will be required to demonstrate that steps have been taken to prevent environmental and public health impacts from that product. The Licence Holder will also need to satisfy the CEO that the handling of future non-compliant products will be avoided.
Schedule 2, Row 4 of Table 9	SP requests removal of all conditions relating to containers in the Licence and Decision Report. We note DoWER's agreement on the basis that it is not a prescribed activity but note that not all references to controls on container handling have been removed and assume this is an oversight. On this basis, please remove: a) Row 4 of Table 9 that refers to handling processes for containers of Nickel concentrate.	Noted. Reference to containerised materials was left in error and has now been removed.
Condition 2, Table 2	SP have the following comments on Table 2 a) Row 2, Column 2 Replace "bituminised" with "sealed or paved" since there are several other ways to eliminate dust and create a trafficable surface subject to engineering recommendations, not just "bituminise"; b) Row 2, Column 4 SP agrees to completion of the "truck turn around point" (hairpin) to be completed by July 2018. c) SP is unable to complete 100% sealing works until July 2022 for the reasons submitted in the first round of comments. Additional comment provided 14 August 2017: [SPA is] seeking DWER's agreement to delay the implementation of the hairpin sealing by six months but include an extra control by sealing this second area. The changes we are seeking relate to Table 2 of the new licence to: • insert a new row to require sealing of the area in photo below used by the spodumene trucks (Shed 6 and Shed 2 entrance pad) by July 2018; and • amend row 3 of the table to push back the date of sealing of the hairpin bend (Truck turnaround) (shown in second photo below) to December 2018 (next budget cycle)?	Noted. Following further discussions with the Licence Holder DWER accepts proposed alternatives of what may constitute "sealed or paved" noting that temporary spray sealants are not considered adequate. Terminology has been changed to allow flexibility in the type of sealant used while ensuring that the outcome of reduced dust on Premises haul roads is minimised. DWER accepts that the timeframe can be extended with the turnaround point to be sealed by December 2018 as the sealing of the Shed 2 and 6 entrance point, another key emission source, was completed in November 2017. Improvements relating to the sealing of unsealed roads identified as dust sources requires completion by July 2022.
Condition 16	SP requests requirements to use the foaming system are deleted since: a) The foaming system is still in its development phase and is not yet working reliably without causing operational and carry-back issues on the conveyor belts. Works are scheduled to customise application of the foam to allow homogenous mixing in the transfer points. Should these works be a success, we will set-up the system for automatic activation according to the moisture meters. b) The enclosed nature of the iron ore circuit and the fogging at the shiploader means dust levels are managed without using the foaming system until the moisture of the ore is significantly below the DEM.	DWER notes that the foaming system is in a commissioning phase as the Licence Holder defines what product moisture content trigger levels are appropriate for the management of dust. In addition, it is noted that the Licence Holder projects that this commissioning phase will approximately be complete by early 2018. The Delegated Officer has determined that existing controls including the: • enclosure of the iron ore conveyor circuit;

	c) The risks of iron ore dust are low as demonstrated by the lack of major dust releases from the Port and low ambient concentrations of iron summarized in our triennial performance reports to the OEPA. The risks from iron ore dust from our enclosed loading facility do not warrant further prescriptive regulation from the DoWER in addition to those implemented by the outcome-based conditions on Ministerial Statements that have successfully managed iron ore handling since 1993. We respectfully suggest DoWER adhere to outcome based controls for this low risk activity in accordance with Table 3 (pages 9-10) of DoWER's own Guidance Statement: "Risk Assessments".	• dust extraction at transfer stations and RCD; • storage of iron ore within sheds; and • the operation of ring sprays at the ship loader and water sprays along the conveyor circuit, reduce the risk of dust from iron ore loading. DWER notes that the foaming system is considered more effective for the purposes of conditioning very dry ore that has become hydrophobic. As the foaming system remains in a commissioning phase the requirement for its operation has been removed. Moisture content monitoring conditions have been retained to improve future assessment of dust risks associated with iron ore handling.
Condition 16	SP requests requirements to calibrate moisture meters monthly using AS1289.2.1.1-2005 are deleted since this degree of prescription is unwarranted as risks of iron ore emissions are low as summarised in 5(c) above and; a) We have engaged NeoMet Engineering who provide expert calibration and technical services on this instrumentation to clients across the Pilbara ports where dust is more of an issue. b) Neomet recommend that: i. The standard method for moisture determination is incorrect (AS1289.2.1. 1-2005), the correct standard method for iron ore moisture determination is ISO3087:2011 ii. Calibration of the instruments when any of the following conditions are met: • Drift against reference materials (moisture standards placed in front of moisture meter) and other external checks occur; • There is a significant change in the geology of the ore being analysed; and • 12 months has passed since the last calibration. c) A full calibration of the CCS3000 moisture analyser, on a monthly basis would add very little value in the context of DEM monitoring and foaming system control. Updated information submitted by the Licence Holder on 2 August 2017: Based on Neomet's experience using the instruments within iron ore operations, annual calibrations are recommended unless there is a change in mineralogy in the ore, or the response to reference standards. Neomet's experience includes: • Management of 36 of the CCS3000 instruments operating within iron ore processing facilities;	DWER notes that annual calibration of the near infrared moisture analyser along the Iron Ore Circuit is sufficient as there is a low level of drift of readings from year-to-year. Minimum calibration requirements have been revised to annual.

	• All of these 36 instruments are on a recommended 12 monthly calibration cycle with two existing in a very stable environment that have been operating (by request from the owner) for two years without calibration.
	• All these instruments continue to exhibit very low levels of drift across a 12 month period since:
	  ○ The instruments are installed under cover in a stable physical environment; and
	  ○ Are not subject to excessive vibration or temperature swings.	

Row 3, Table 9 (Licence)	The sulphur shed may be used for spodumene storage instead of shed 6 with the handling of greater volumes of spodumene at the Premises. Could these alternate storage possibilities be included within the current assessment?	Noted. DWER accepts the alternate proposal to store spodumene in Shed 5. Note that the moisture content of spodumene must remain above the DEM level at all times during storage and transport at the Premises. Storage of bulk granular material offsite is not considered a primary activity and therefore does not require regulation through the Part V licence (refer to section 0). DWER notes that product quality and handling methodology for other spodumene products must remain consistent with that authorised for existing spodumene.
Row 6, Table 10 (Licence)	SP requests requirements for any sulphur spills to be contained with a “berm” or boom are removed since risks are over-estimated in the Decision Report (see below):	Agreed. Refer to response below.
Comments on Decision Report		
Section	**Comment**	**DWER Response**

Sections 8.5.5 and 8.5.6	a) SP requests the “possible” likelihood of spillage is replaced with “rare” in Section 8.5.6 on page 41 of the Decision Report since:
	  i. Observations indicate only the dust will float as a result of surface film tension and quantities of sulphur dust on Port waters has not exceeded over a kilogram at any time during any shipment;
	  ii. SP has worked with the sulphur client to ensure the sulphur is treated adequately with surfactant by the manufacturer and visual observations of dust at the unloading operations indicate localised dust at the hopper has declined significantly in the last 18 months;
	  iii. As described in Section 8.5.6 on page 41 of the Decision Report, there have been no incidents of sulphur spillages in the last five years, and there have been no larger spills of sulphur recorded as a result of the grab and hopper operations.
	  iv. The grab and hopper unloading for fertilisers and sulphur have entirely different risks of spillage since:
	  1. Fertiliser is unloaded using ships gear to unload from a moving ship, into small hoppers positioned on the edge of the berth which feed into a truck and as indicated by reported incidents and as assessed by DoWER has a medium risk of spillage;
		DWER partially agrees with the Licence Holder’s assessment of risk and has revised section 8.5 following the provision of updated information on the sulfur in-loading circuit. It is agreeable that the likelihood of a significant spill from the fixed-crane grab bucket is less than that from the fertiliser grab buckets. However, the consequence of a significant spill to the environment and public amenity remains the same.
		
		The likelihood has been reduced from “possible” to “unlikely” noting that increases in assessed throughputs mean that a likelihood rating of “rare” is not accepted. The overall risk rating remains as “Medium”. The request to remove the requirement for a berm to be available onsite has been removed due to the decreased likelihood.

	2. In contrast, the grab and hopper system for the sulphur operation: a) Uses a land-based harbour crane for more accurate movement of the grab; b) Hopper is much larger in proportion to the grab size than the fertiliser hopper and grab; c) Hopper is located about 15m from the water's edge so in the event that there is any spillage from the grab discharging to the hopper, it falls onto the berth to be recovered as product; d) Hopper has a surfactant spray system and feeds into a conveyor system and onto a storage shed; e) SP possesses two grabs to ensure at least one is working without any leakage; and f) If the grab does leak, there are fixed, engineered spill plates between the harbour crane and the ship to prevent spillage to the marine environment. b) Furthermore, we request the consequence rating for sulphur spillage of "minor" (Decision Report page 40, Section 8.5.5) is replaced with "slight" for the reasons listed above, particularly: i. Hopper being located about 15m from water's edge; ii. Only small spills can reasonable by expected; iii. Oxidation and dissolution of any spilt sulphur in the marine environment will occur extremely slowly; iv. Seawater is well-buffered against acidification; and v. Any effect will be extremely localised and diluted to negligible scales in the high energy environment of the southern ocean at Esperance. Accordingly, we request the overall risk be recorded as "medium" be reduced to "low on page 41, Section 8.5.7.	
Section 5.6.4	SP requests "to on average 3%" is replaced with "up to an average of 3%". The value of 3% is total iron, not just iron from iron ore.	Accepted.
Section 8.5.4	SP requests iron and sulphur are deleted as key stormwater contaminants as the main pathway into the marine environment is not via stormwater, rather direct spillage. As discussed in comments 7(a) and 7(b), the risks of sulphur spill are low, further, neither element have relevant water quality criteria on account of their insolubility and low toxicity.	DWER agrees that iron and sulfur discharges will have a low level impact on the marine environment. Both spills and discharges via stormwater outflows have been assessed in section 8.5.
Section 3.2	Remove reference to the "licence holder" in relation to grain handling activities in Section 3.2 since CBH are the occupier and controller of these activities.	DWER understands that the Licence Holder is not the operator of Berth 1 grain handling infrastructure. The Decision Report relates to the Licence Holder and any emission or discharge that may arise from, or within the vicinity of, the Premises. Therefore the reference to the Licence Holder not having a defence to an offence under the EP Act is relevant to this report and has been retained.

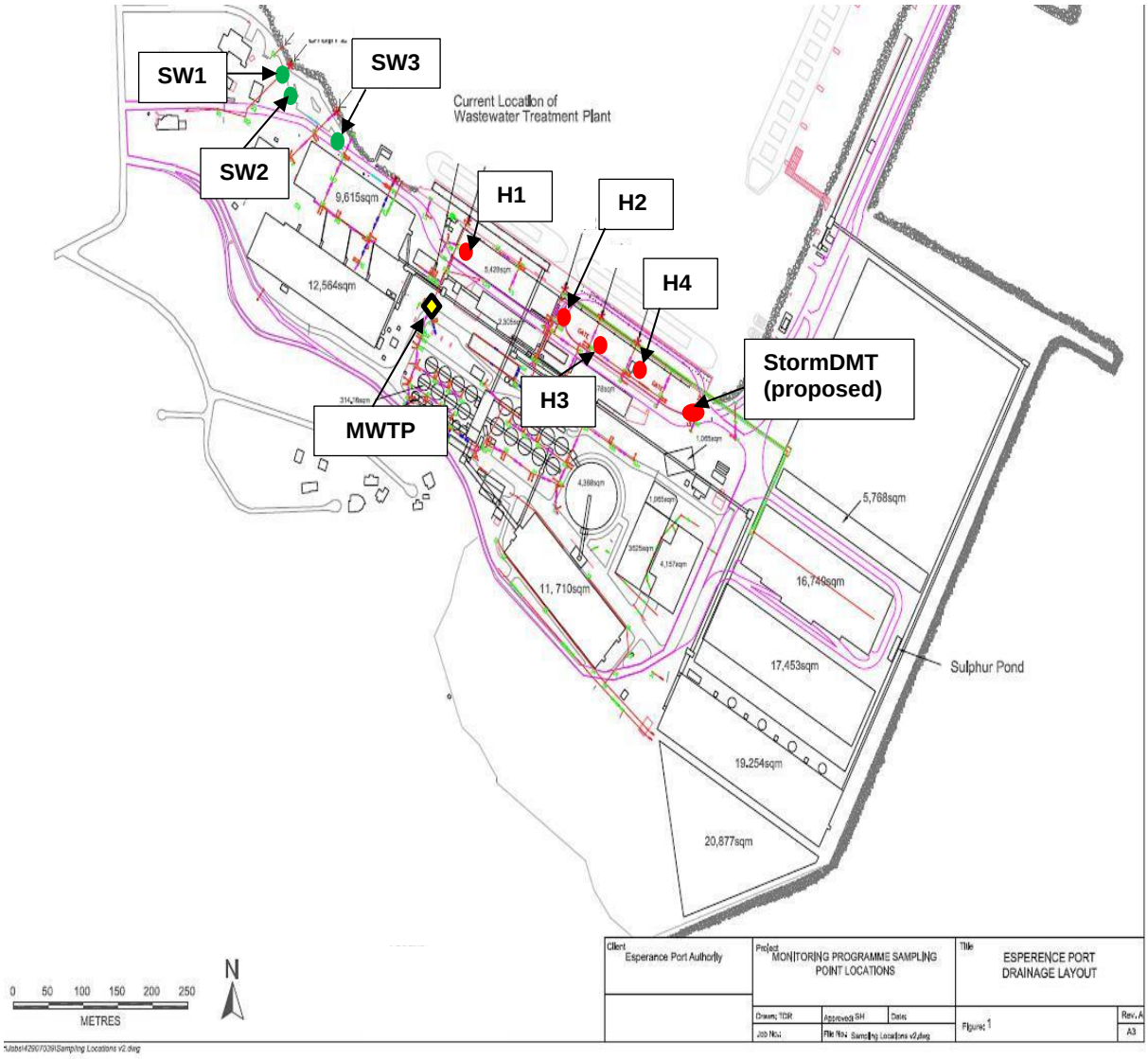
Appendix 6: Summary of Licence Holder's Comments on Reviewed Licence (Third Draft)

Condition	Summary of Licence Holder Comment	DWER Response
N/A	We acknowledge DWER's commitment to finding an alternative to Notification of Material Change in your letter dated 9 February 2018 and as agreed at the workshop between DWER, WA Ports and DoT on the 8th February 2018. A workable alternative is of utmost importance to provide commercial and operational flexibility to facilitate trade without compromising the environment, public health or amenity.	Noted.
Condition 2, Table 2	We request the date to complete the hairpin bend sealing works is extended to July 2019 based on revised project timelines.	Accepted. Sealing works on the hairpin bend must be completed by 30 June 2019.
Condition 7	Delete as this does not seem to add to Condition 6.	Disagreed. Table 10 in Schedule 3 does not specify maintenance requirements for all site infrastructure and equipment specified in column 1 of Table 10. Condition 7 ensures that all infrastructure and equipment is maintained in good working order.
Condition 12	Remove Condition 12 and amend Decision Report accordingly as it exceeds the conditions of our Part IV iron ore approvals (Ministerial Statements 325 (MS325) and 681 (MS681)). Esperance Port uses the moisture data to guide live decisions on turning on water sprays in different parts of the iron ore circuit. The operator accounts for the type of product being loaded, the loading rate and if there is any visible dust to support the decision to activate water sprays. Condition 12 does not serve to improve the dust outcomes specified in MS325 and MS681. Condition 12 requires comparison of longer term averages of the moisture data to a products DEM. A significant amount of additional data management would be required to separate the effect of product types, and loading rates as both these variables influence the moisture readings of the meter.	Implementation condition 2-1 of Ministerial Statement 681 requires the implementation of environmental management commitments, which include the implementation of an Environmental Management Plan. Within this Environmental Management Plan, the Licence Holder commits to a program of monitoring the moisture of iron ore at in-load "so that the levels of dust can be correlated to the product moisture." The Delegated Officer has determined it necessary to duplicate requirements of Ministerial Statement 681 through the Part V licence for the purpose of increasing regulatory oversight of dust emissions at the Premises. The Licence Holder will be required to supply moisture content monitoring data to DWER upon request and in accordance with iron ore acceptance and monitoring conditions of the Licence. Such a request may be made following a Reportable Event specified in Table 5 of the Licence for the purpose of determining the source of elevated ambient dust measured at monitoring locations. Therefore the Delegated Officer has determined that the inclusion of former Condition 12 of the Reviewed Licence is consistent with *Guidance Statement: Setting Conditions*.

Schedule 2 Table 9 Row 4, Column 1	Remove reference to Cliffs Natural Resources as iron ore is regulated by MS325 and MS681 under Part IV of the EP Act (1986). Esperance Port can reassure DWER that any iron ore from new clients will be fully tested for product quality to ensure risks from dust are acceptable. Esperance Port is currently in discussion with four iron ore clients in the Yilgarn area following the recent notification by Cliff Natural Resources that they will cease their operations at Koolyanobbing.	Agreed. In accordance with *Guidance Statement: Setting Conditions*, licence conditions cannot be "contrary to, or otherwise than in accordance with, an implementation agreement or decision under Part IV of the EP Act". DWER notes that the Ministerial Statements (325 and 681 does not specify the supplier or product specifications of iron ore. Therefore reference to Cliffs Natural Resources has been removed from the Licence.
Schedule 3 Table 10 Row 8 Column 3	Delete text requiring foaming spray to be applied to ore with a moisture content below DEM consistent with the deletion of text in Condition 11.	Agreed. Specifications on the operation of the foaming spray circuit were left on the draft in error.
Schedule 4: Monitoring Reportable Event Reports	Remove temperature from required parameters for meteorological station as a single point temperature measurement is not going to provide sufficient information on dust dispersion and temperature also not listed in Table 7 of licence.	Agreed.

Attachment 1: Amended Licence L5099/1974/14

Attachment 2: Stormwater Infrastructure



H = Hume interceptor.
SW = stormwater drain
MWTP = Metals Water Treatment Plant

Attachment 3: Site Plan