



## Department initiated Amendment

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

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<b>Licence Number</b>	L8846/2014/1
<b>Licence Holder</b>	Phosphate Resources Ltd
<b>ACN</b>	009 396 543
<b>File Number</b>	DER2014/002338-2
<b>Premises</b>	Christmas Island Phosphates Christmas Island INDIAN OCEAN TERRITORIES WA 6798  Legal description –  Being Lot 47 and 48 on Plan 218106, Lot 51 on Plan 218108, Lot 53 on Plan 218110, Lot 197 on Plan 218134, Lot 482 and 488 on Plan 219653, Lot 554 on Plan 221294, Lot 622 on Plan 43303, Lot 637 on Plan 43304, Lot 3001 and 3002 on Plan 41813, and Lot 3022 on Plan 43297.  As defined by the Premises maps in Schedule 1 attached to the Revised Licence
<b>Date of Report</b>	12 June 2024
<b>Decision</b>	Revised licence granted

**SENIOR INDUSTRY REGULATION OFFICER  
REGULATORY SERVICES**

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

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## 1. Decision summary

Licence L8846/2014/1 is held by Phosphate Resources Ltd (PRL, the Licence Holder) for Christmas Island Phosphates (CIP, the premises), located at Christmas Island, Indian Ocean Territories WA 6798.

This Amendment Report documents the assessment of potential risks to the environment and to public health from proposed changes to the emissions and discharges during the operation of the premises. As a result of this assessment, Revised Licence L8846/2014/1 has been granted.

The Revised Licence issued as a result of this amendment consolidates and supersedes the existing Licence previously granted in relation to the premises.

## 2. Scope of assessment

### 2.1 Regulatory framework

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

### 2.2 Amendment summary

On 23 March 2023, the Licence Holder submitted an application to the department requesting several amendments to Licence L8846/2014/1. Most of the requested amendments were assessed in the Amendment Report dated 6 November 2023, with a subsequent amended licence being issued on 6 November 2023. The Amendment Report determined that the remaining requested amendments relating to air quality monitoring would be assessed as a separate department-initiated amendment.

The Licence Holder's proposed amendments relating to air quality monitoring which will be considered as part of this licence amendment are listed in Table 1 below.

**Table 1: Licence Holder requested amendments**

Item	Condition which amendment relates to	Description of proposed amendment (JBS&G, 2023)
8	Monitoring of point source emissions to air, condition 3.2.1	<p>Amendment requested to reduce the frequency of stack monitoring from quarterly to annually. The existing licence requires monitoring of incinerator stack and dryer stack emissions to be undertaken quarterly. The licence holder has advised that there are significant costs involved in monitoring and issues around timing for the planning of monitoring events. There are limited flights to Christmas Island and it is difficult to plan monitoring for a time that the test team, dryer, incinerator, and flights are available. Flight delays occur frequently and there can also be changes in dryer and incinerator operational status which results in cancelled monitoring events.</p> <p>The Licence Holder provides the following justifications for reducing the frequency:</p> <p><i>“Data gained up to Quarter 4 2018 was used to inform air dispersion modelling (Air Assessments 2019). The assessment concluded that:</i></p>

		<ul style="list-style-type: none"> <li>• Predicted ground level concentrations (GLCs) from the dryer and incinerator emissions are all below the criteria adopted;</li> <li>• Predicted maximum GLCs from incinerator emissions occur within 50 m of the stack and decrease rapidly with distance; and</li> <li>• The incinerator stack emissions are negligible contributors to the GLCs for most species and averaging periods assessed when considered cumulatively with the dryer emissions.</li> </ul> <p>A review of the monitoring results gained since 2019 shows that the results are comparable to historical results and as used in the modelling assessment.</p> <p>Emissions from the dryer are driven by the fuel composition, combustion conditions (including moisture content of the feed material) and performance of the baghouse filters. PRL has invested considerable time and resources in improving management of these aspects to ensure that emissions are controlled:</p> <ul style="list-style-type: none"> <li>• The rotary dryers use a consistent fuel source, with the sulfur content limited by Condition 1.3.8 of the licence;</li> <li>• PRL has focussed on process sensors and monitoring to improve burner and combustion management, and management of the bagfilters. This includes:             <ul style="list-style-type: none"> <li>○ installation/replacement of sensors (e.g., baghouse differential pressure monitors);</li> <li>○ improved management of data through the Citect SCADA (Supervisory Control and Data Acquisition) system – such as, fuel usage, feed material and product moisture content, and baghouse differential pressures...; and</li> </ul> </li> <li>• Maintenance of pressure monitors in the bagfilters as required by Condition 1.3.9 of the licence.</li> </ul> <p>PRL will continue to focus resources on process operations. An annual frequency is considered sufficient to provide a snapshot of emissions and highlight any significant deviations from the established baseline.</p> <p>If any significant deviations are identified through the annual stack test, PRL will investigate the cause and implement corrective actions as necessary, including carrying out additional stack tests if required.”</p>																				
10	Monitoring of ambient air quality, condition 3.5.1	<p>Amendment requested to remove the use of a tapered element oscillating microbalances (TEOM) monitor to monitor ambient air quality due to ongoing operational issues with the equipment. Amendments to Table 3.5.1 are proposed as follows:</p> <table border="1" data-bbox="507 1496 1401 1653"> <thead> <tr> <th>Monitoring point reference and location</th> <th>Parameter</th> <th>Units</th> <th>Averaging period</th> <th>Frequency</th> <th>Method</th> </tr> </thead> <tbody> <tr> <td rowspan="2">TEOM 2 sampler</td> <td>Dust as particulates PM<sub>10</sub></td> <td rowspan="2">µg/m<sup>3</sup></td> <td rowspan="2">24 hrs</td> <td rowspan="2">Continuous</td> <td rowspan="2">AS 3580.9.3</td> </tr> <tr> <td>Dust as Total suspended particles (TSP)</td> </tr> <tr> <td rowspan="2">Portable dust monitors</td> <td>Dust as particulates PM<sub>10</sub></td> <td rowspan="2">µg/m<sup>3</sup></td> <td rowspan="2">Hourly</td> <td rowspan="2">During ship loading activities</td> <td rowspan="2">AS 3580.9.3</td> </tr> <tr> <td>Dust as TSP</td> </tr> </tbody> </table> <p>The TEOM monitors have not been found suitable for use in high humidity and coastal environments as they are sensitive to moisture. The Licence Holder believes that the portable monitors that are already being used to monitor air quality during ship loading are sufficient to monitor dust emissions from the premises.</p>	Monitoring point reference and location	Parameter	Units	Averaging period	Frequency	Method	TEOM 2 sampler	Dust as particulates PM <sub>10</sub>	µg/m <sup>3</sup>	24 hrs	Continuous	AS 3580.9.3	Dust as Total suspended particles (TSP)	Portable dust monitors	Dust as particulates PM <sub>10</sub>	µg/m <sup>3</sup>	Hourly	During ship loading activities	AS 3580.9.3	Dust as TSP
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Portable dust monitors	Dust as particulates PM <sub>10</sub>	µg/m <sup>3</sup>	Hourly	During ship loading activities	AS 3580.9.3																	
	Dust as TSP																					

Due to issues identified with the existing air quality monitoring network at Christmas Island Phosphates and limited availability of reliable ambient dust monitoring data, the Delegated Officer considered it appropriate to undertake a detailed review of the air quality monitoring program for the premises.

Following this review, the department is initiating an amendment to Licence L8846/2014/1, for the design of a new air quality monitoring network and program which meets the following objectives:

1. Air quality monitoring facilitates dust management; and
2. enables the assessment of potential human health impacts to sensitive receptors that reside near the wharf operations.

Meteorological monitoring location and requirements have also been reviewed as part of this assessment to assist in meeting the above objectives.

### 2.2.1 Overview of existing ambient air monitoring network

The current ambient air quality monitoring network consists of portable PM<sub>10</sub> dust monitors (DustTrak and Casella Microdust Pro Aerosol Monitoring Systems) and two tapered element oscillating microbalances (TEOMs) to monitor ambient air quality. The licence holder has experienced issues with the TEOMs having a reduced sensitivity and providing inaccurate measurements. This is due to the highly humid conditions on Christmas Island interfering with the monitor's temperature and humidity control system. The portable PM<sub>10</sub> dust monitors are currently used to monitor dust emissions during ship loading and to undertake background monitoring to compare with data gathered during ship loading activities.

Due to problems with the functioning of the TEOMs, meteorological monitoring is currently being undertaken at the weather station located at the ship loading system on the "South-Arm" instead of at the existing TEOM air quality monitoring sites.

Issues with the TEOM monitors have been reported to the department through Annual Environmental Reports and Annual Audit Compliance Reports.

Existing monitoring locations are shown in Figure 1.



Figure 1: Existing monitoring locations

## 2.2.2 Monitoring network proposed by Licence Holder

The licence holder proposed to remove the use of TEOMs and use only portable PM<sub>10</sub> dust monitors for dust and ambient air quality monitoring. The proposed monitoring locations are shown in Figure 2.

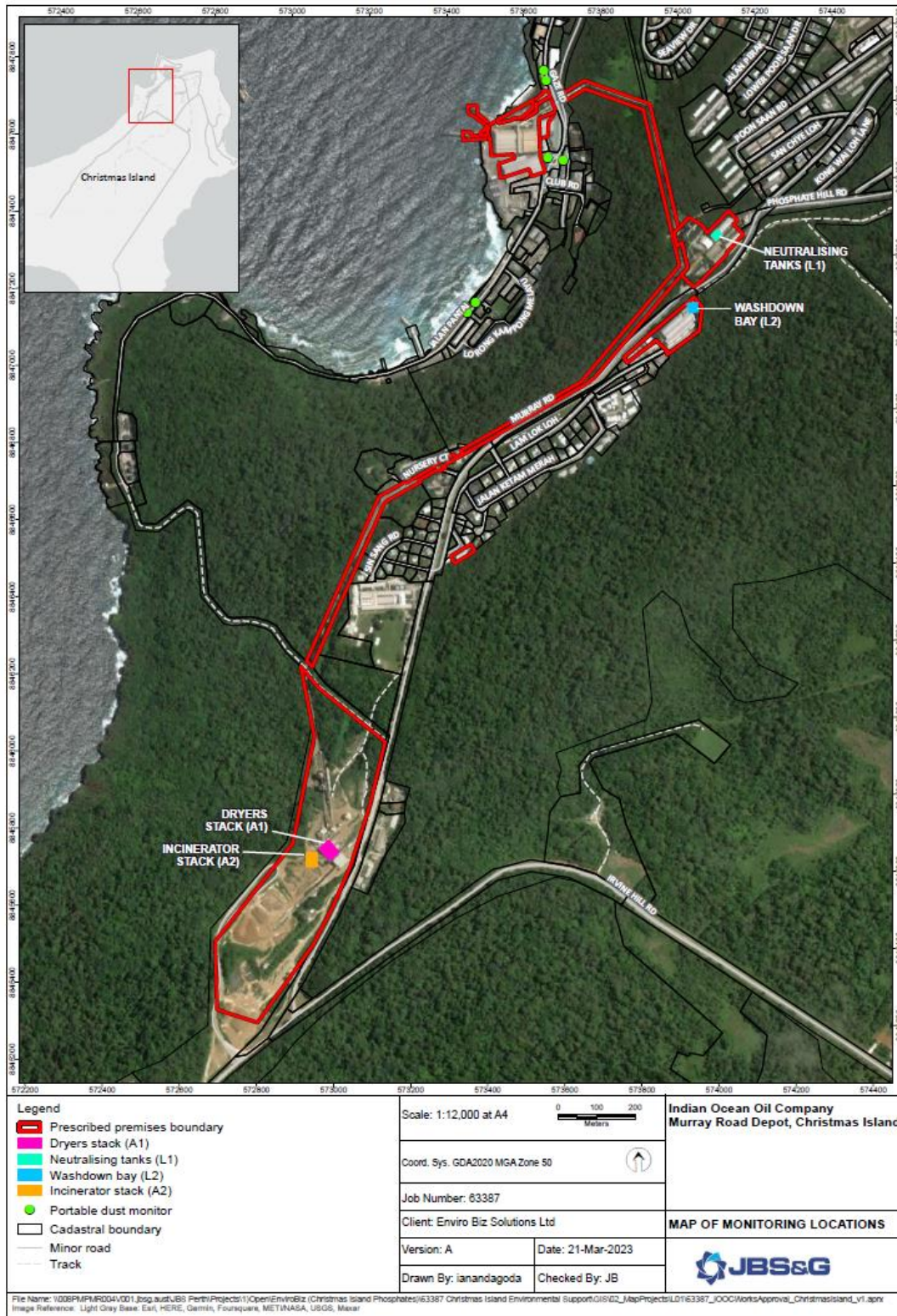


Figure 2: Proposed monitoring locations

### 3. Review of existing monitoring data

As part of this assessment, the department has conducted an in-depth review of the available ambient air quality network, modelling, and monitoring data up until 2023, including:

- stack emissions monitoring reports (from 2015-2023);
- summary of Dryer Stack Testing data (from 2010-2023);
- ambient monitoring datasets;
- incinerator and dryer log sheets; and
- *2019 Air Quality Assessment* (Air Assessments, May 2019).

#### 3.1 Key findings

**The Delegated Officer has reviewed the data provided and has found:**

1. While the supplied dryer stack emissions dataset has limitations, overall emissions from the dryers have decreased since 2016. Particle stack concentrations are generally low.
2. Incinerator emissions data shows consistently low emission levels and community impact is suggested to be low as indicated by modelling results (Air Assessments, 2019).
3. Ambient dust monitoring data provided by CIP indicates that the 24-hr PM<sub>10</sub> NEPM standard (50 µg/m<sup>3</sup>) is routinely exceeded (noting that the data are generated by instruments that do not conform with Australian Standards for ambient air monitoring).
4. Meteorological data provided for preliminary analysis of wind direction during ship loading were not suitable for analysis.
5. There is currently insufficient fit-for-purpose dust/ambient air quality monitoring data to assess the risk to human health posed by operations at the port/wharf precinct.

### 4. Risk assessment

The department assesses the risks of emissions from prescribed premises and identifies the potential source, pathway, and impact to receptors in accordance with the *Guideline: Risk assessments* (DWER 2020).

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.

#### 4.1 Source-pathways and receptors

##### 4.1.1 Emissions and controls

The key emissions and associated actual or likely pathway during premises operation which have been considered in this Amendment Report are detailed in Table 2 below. Table 2 also details the control measures the Licence Holder has proposed to assist in controlling these emissions, where necessary.



Table 2: Licence Holder controls

Emission	Sources	Potential pathways	Proposed controls
Gaseous and particulate emissions from incinerator and dryer stacks	<p>Operation of the incinerator for incineration of hydrocarbon-contaminated wastes</p> <p>Operation of dryers for treatment of phosphate rocks</p>	Air/windborne pathway	<ul style="list-style-type: none"> <li>• The maximum rated capacity of the incinerator is 95 kg/hr which is less than the 100 kg/hr design capacity threshold for a Category prescribed premises under the EP Act.</li> <li>• The incinerator operates for less than 600 hours per year from two cycles per day, up to four days a week.</li> <li>• The emissions from the incinerator are estimated to contribute to 0.05% of total emissions authorised by the licence from the dryers stack and emissions testing has confirmed that pollutants pose a low risk to sensitive receptors.</li> <li>• The rotary dryers use a consistent fuel source, with sulfur content limited by the existing licence conditions</li> <li>• PRL has focused on process sensors and monitoring to improve burner and combustion management, and management of bag filters.</li> <li>• Sensors have been replaced/installed (e.g. baghouse differential pressure monitors)</li> <li>• PRL has improved management of data through the Citect Supervisory Control and Data Acquisition system (such as fuel usage, feed materials and product moisture content, and baghouse differential pressures)</li> <li>• Pressure monitors in the bagfilters have been maintained as per existing licence conditions.</li> <li>• If any deviations are identified through the proposed annual stack test, PRL will investigate the cause and implement corrective actions as necessary.</li> </ul>
Dust	<p>Processing and crushing of phosphate ore</p> <p>Bagging of phosphate rock and phosphate dust</p> <p>Loading of phosphate rock/phosphate dust</p>	Air/windborne pathway	<ul style="list-style-type: none"> <li>• Controls in place as per existing licence.</li> <li>• Baghouse/dust extraction units, enclosed transfer houses, covered conveyors, Cleveland cascading chutes, dust settling boxes on conveyor transfer points and a fogging machine on the South Arm Cantilever are in place to reduce dust emissions.</li> </ul>

Emission	Sources	Potential pathways	Proposed controls
	onto ships		<p>Equipment is serviced and maintained regularly.</p> <ul style="list-style-type: none"> <li>Existing air quality monitoring during ship loading using portable dust monitors (two Casella Microdust Pro Aerosol Monitoring Systems).</li> <li>Ad-hoc background monitoring is carried out using the abovementioned handheld monitors.</li> <li>Meteorological monitoring is conducted at the weather station located on the 'South-Arm' of the ship loading system.</li> </ul>

#### 4.1.2 Receptors

In accordance with the *Guideline: Risk assessments* (DWER 2020), the Delegated Officer has excluded employees, visitors, and contractors of the Licence Holder's from its assessment. Protection of these parties often involves different exposure risks and prevention strategies and is provided for under other state legislation.

Table 3 below provides a summary of potential human and environmental receptors that may be impacted as a result of activities upon or emission and discharges from the prescribed premises (*Guideline: Environmental siting* (DWER 2020)).

**Table 3: Sensitive human and environmental receptors and distance from prescribed activity**

Human receptors	Distance from prescribed activity
Unallocated Crown Land (UCL)	Surrounds significant areas of the Prescribed Premises boundary (west and east)
'Recreation' zoned land use	Adjoining the wharf precinct area of the Prescribed Premises
Commercial premises	Commercial area adjacent to wharf precinct to the east Commercial area appx. 150m south of wharf precinct
Christmas Island District High School	Appx. 500 m north of the incinerator and dryer stacks Appx. 1 km south south-west from the wharf precinct prescribed premises boundary
Residential premises	Appx. 650m north of incinerator and dryer stacks Appx. 40 m east, 180 m south and 260 m northeast from premises boundary (wharf precinct)
Environmental receptors	Distance from prescribed activity
Groundwater	Approximately 50 m – 100 m bgl, fresh to brackish

	quality
Christmas Island National Park	Directly surrounds the prescribed premises boundary
<p>Surface waters:</p> <p>Indian Ocean</p> <p>'Hosnie' springs</p> <p>'Dales' springs</p>	<p>Appx. 560 m west of southern area premises boundary (where incinerator is located)</p> <p>&gt;4 km south-east from prescribed premises boundary</p> <p>&gt;10 km south-west from prescribed premises boundary</p> <p>The Delegated Officer considers that due to the distance from the premises to 'Hosnie' and 'Dales Springs' that they are unlikely to be affected by emissions and have not been considered further in the risk assessment.</p>

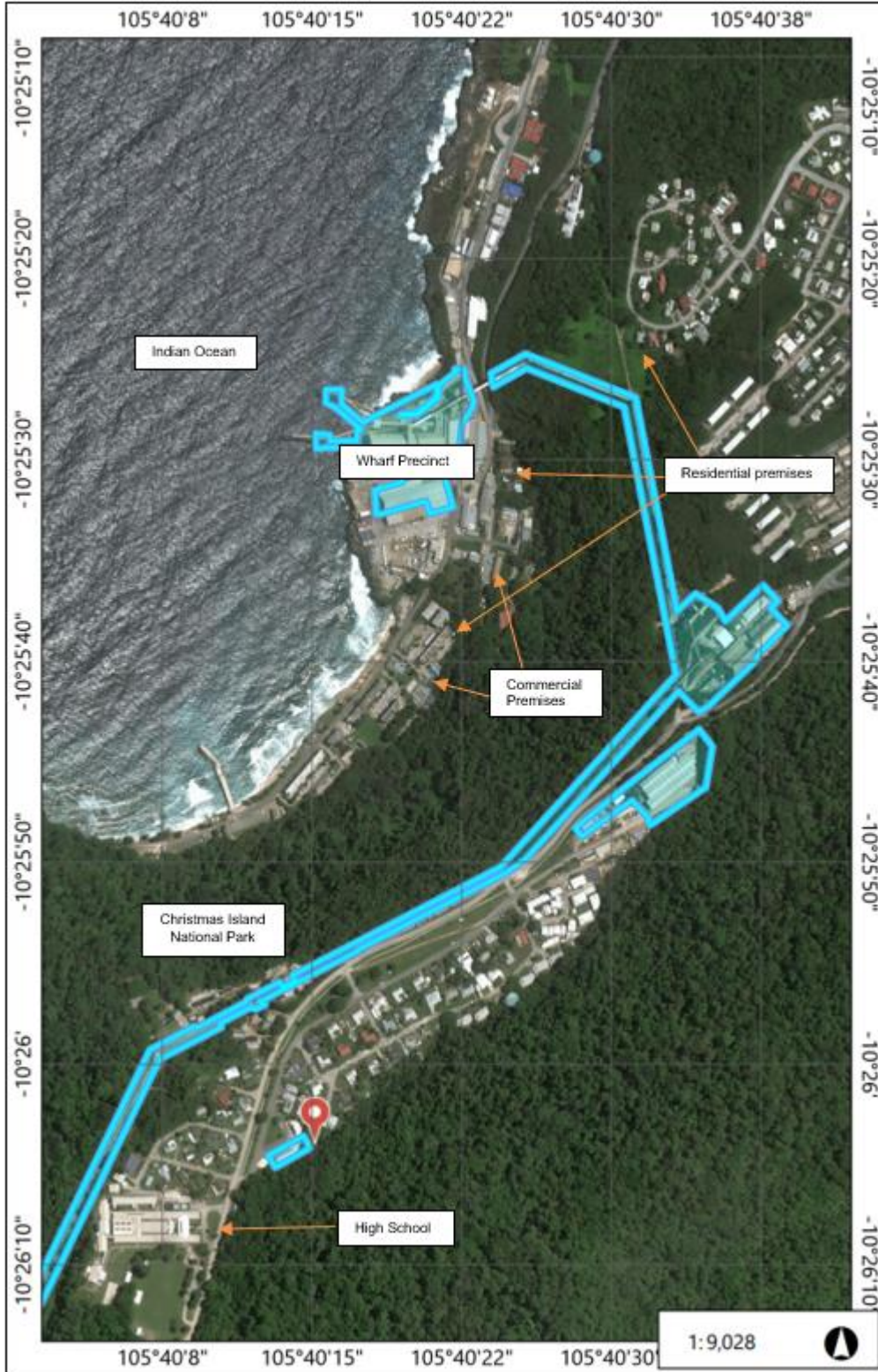


Figure 3: Distance to sensitive receptors from northern part of prescribed premises

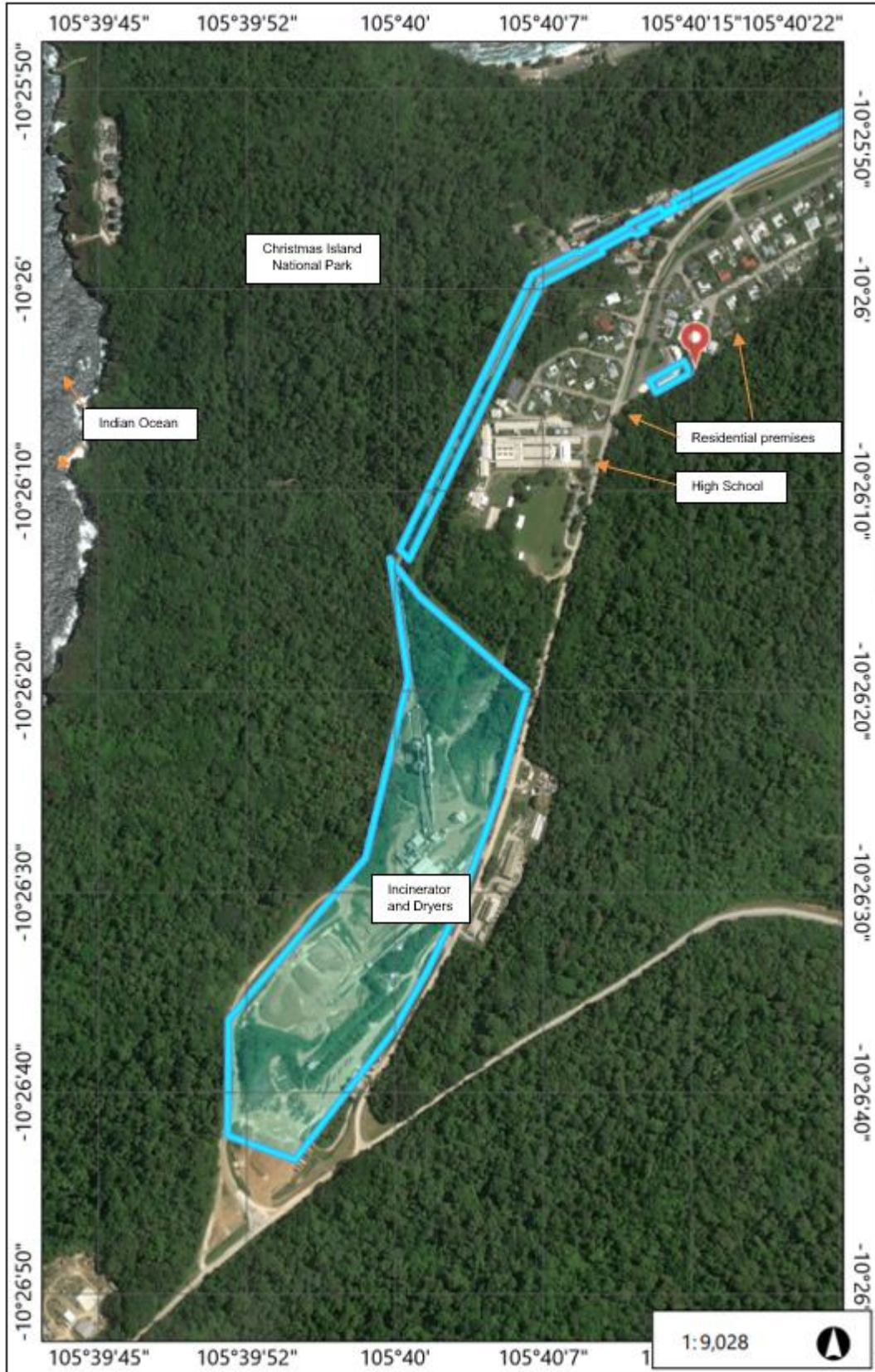


Figure 4: Distance to sensitive receptors from southern part of prescribed premises

## 4.2 Risk ratings

Risk ratings have been assessed in accordance with the *Guideline: Risk Assessments* (DWER 2020) for those emission sources which are proposed to change and takes into account potential source-pathway and receptor linkages as identified in Section 4.1. Where linkages are incomplete they have not been considered further in the risk assessment.

Where the Licence Holder has proposed mitigation measures/controls (as detailed in Section 4.1), these have been considered when determining the final risk rating. Where the Delegated Officer considers the Licence Holder's proposed controls to be critical to maintaining an acceptable level of risk, these will be incorporated into the licence as regulatory controls.

Additional regulatory controls may be imposed where the Licence Holder's controls are not deemed sufficient. Where this is the case the need for additional controls will be documented and justified in Table 4.

The Revised Licence L8846/2014/1 that accompanies this Amendment Report authorises emissions associated with the operation of the Premises.

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

**Table 4. Risk assessment of potential emissions and discharges from the Premises during operation**

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
<b>Operation</b>								
<p>Operation of the incinerator for incineration of hydrocarbon-contaminated wastes</p> <p>Operation of dryers for treatment of phosphate rocks</p>	Gaseous and particulate emissions	Air/windborne pathway causing impacts to health and amenity	<p>Residential premises appx 650 m north of incinerator</p> <p>Christmas Island District High School</p>	Refer to Section 4.1	<p>C = Moderate</p> <p>L = Unlikely</p> <p><b>Medium Risk</b></p>		<p>Conditions 1, 8, 10, 13, 14, 16, 17, 20, 38</p> <p><b><u>Condition 26</u></b></p>	<p>The delegated officer does not support reducing monitoring of the incinerator and dryer stacks to annually. Annual monitoring would not provide sufficient data-points to accurately represent emissions and enable scientific assessment of related risks to environment and/or human health.</p> <p>However, the annual dryer and incinerator emissions data provided to DWER show consistently low emission levels and the modelling results suggest low community impact. Therefore, the delegated officer supports a reduction in both incinerator and dryer stack monitoring frequency to biannually.</p>
<p>Processing and crushing of phosphate ore</p> <p>Transfer of ore into crushers</p> <p>Loading of crushed material onto overland conveyors</p> <p>Bagging of phosphate rock and phosphate dust</p> <p>Loading of phosphate rock/phosphate dust onto</p>	Dust	Air/windborne pathway causing impacts to health and amenity	<p>Commercial premises adjoining the wharf precinct area</p> <p>Residential premises appx. 60 m east and 260 m northeast from the</p>	Refer to Section 4.1	Refer to Section 4.3 below			

Risk Event					Risk rating <sup>1</sup> C = consequence L = likelihood	Licence Holder's controls sufficient?	Conditions <sup>2</sup> of licence	Justification for additional regulatory controls
Source/Activities	Potential emission	Potential pathways and impact	Receptors	Licence Holder's controls				
ships			wharf precinct premises boundary					

Note 1: Consequence ratings, likelihood ratings and risk descriptions are detailed in the *Guideline: Risk assessments* (DWER 2020).

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



## 4.3 Detailed risk assessment for dust emissions

### 4.3.1 Description of dust emissions

The processing of phosphate ore and bulk material loading of phosphate rock and dust onto vessels may generate dust emissions in the form of airborne particulate matter (PM), which could result in health and amenity impacts to receptors. The potential sources of dust related to this amendment are:

- processing and crushing of phosphate ore;
- transfer of ore into crushers;
- loading of crushed material onto overland conveyors;
- bagging of phosphate rock and phosphate dust; and
- loading of phosphate rock and phosphate dust onto ships.

### 4.3.2 Identification and general characterisation of emission

Particulate matter can be classified as total suspended particulates (TSP), PM<sub>10</sub> and PM<sub>2.5</sub>. The term TSP applies to particles of any size, suspended in ambient air. Other categories of dust are differentiated as size fractions with PM<sub>10</sub> describing particles of up to 10 µm diameter and PM<sub>2.5</sub> particles of up to 2.5 µm diameter respectively.

The proportion of coarser particles within a dust plume is larger, the closer a sample is taken from the originating source. With increasing distance from the source, larger and heavier particles will settle out and only finer particles travel over extended distances. Human health effects from dust tend to be associated with the PM<sub>10</sub> and PM<sub>2.5</sub> size fractions. These smaller particles tend to remain suspended in the air for longer periods and can penetrate into the lungs. The larger particle size fraction captured within TSP is more relevant to amenity and nuisance impacts but can also pose some health impacts, especially when the dust contains contaminants.

### 4.3.3 Description of potential adverse impacts

Dust emissions have the potential to impact public health when inhaled; affecting both the respiratory and cardiovascular systems. Factors that may influence the health effects related to exposure to particles include chemical composition and physical properties of the particle, the mass concentration of airborne particles, the size of the particles and duration of exposure.

Amenity may also be impacted by visible dust plumes and the deposition of material on a variety of surfaces such as vehicles, dwellings, clothing, and products.

Wind direction and strength may impact the intensity and direction of dust impacts. The Delegated Officer considers the receptor most likely to be at risk from dust emissions to be offsite residential receptors. The premises is situated in close proximity to residential areas, with the closest residential premises located approximately 40 metres east of the wharf precinct boundary. Workers and customers at nearby commercial sites may also be impacted by dust emissions due to their close proximity.

### 4.3.4 Dust complaint history

As part of this assessment, the department has reviewed the dust monitoring data and incidents/complaints data reported through the Annual Environmental Reports (AERs) as well as complaints received by the department regarding premises activities relating to dust.

For the past annual period (1 July 2022 - 30 June 2023), the licence holder reported that they had 8 environmental incidents/complaints regarding dust emissions (6 dust complaints were

received from the public). The complaints related to dust emissions during product transfer, or from Van Gelder chimneys and silos. This compared to a total of 13 dust related incidents/complaints reported for the 2021 - 2022 annual period, 15 for the 2020 - 2021 annual period, 7 for the 2019 - 2020 annual period and 16 for the 2018 - 2019 annual period.

A search of the Department's records identified a history of complaints regarding dust emissions from the premises. These have decreased over the years as works have been undertaken to address dust and repair infrastructure and equipment involved in phosphate ore processing and transport operations. However, the Department is continuing to receive dust complaints, most recently in relation to dust produced in the wharf precinct, during ship loading and from conveyors.

The premises also has a history of non-compliance with ambient air quality monitoring licence conditions using TEOM monitors. TEOM monitors have not been operational since 2017 and air quality monitoring has been undertaken using portable dust monitors instead, which are not compliant with Australian Standards for ambient air quality monitoring.

#### 4.3.5 September 2023 site visit

The Department's Air Quality Branch visited the premises on 19 to 22 September 2023, which included an inspection of the premises, processes, and the existing air quality monitoring network. The purpose of the inspection was to assess the suitability of the current ambient air monitoring undertaken onsite and to determine where improvements could be made to achieve ambient air quality monitoring objectives.

The department representatives observed fugitive dust in the vicinity of the port from the two conveyors filling rock and dust bins, as well as separate dust emissions from ship loading operations. There were several locations emitting fugitive dust during ship loading, including from conveyors, transfer points, cantilever arms and the ship hold where the telescoping chutes were deployed.

The two air quality monitoring sites previously established for the TEOMs were inspected, and both found to have a power supply, fencing and meteorological masts. One site was located at the Port and the other at the Visitor Centre car park. The Port site also had a working airconditioned double enclosure with space for two air quality instruments and supporting equipment.

There were no remote communications in place between the air quality monitoring instruments used onsite and the control rooms. Therefore, high PM<sub>10</sub> concentrations and faults were not able to be identified remotely to ensure a timely response.

#### 4.3.6 Applicant controls

Section 4.1.1 above (Table 2) details the control measures the applicant has proposed in controlling dust emissions.

#### 4.3.7 Criteria for assessment

The relevant criteria for assessment of dust emissions as PM<sub>10</sub> is 50 µg/m<sup>3</sup> over 24 hours, and PM<sub>2.5</sub> is 25 µg/m<sup>3</sup> over 1 day as specified in the *National Environment Protection (Ambient Air Quality) Measure* (NEPM). The NEPM is the relevant criteria for assessment in relation to human health and wellbeing.

Amenity impacts can also be assessed against the general provisions of the EP Act, specifically whether fugitive dust unreasonably interferes with the health, welfare, convenience, or comfort of any person.

#### 4.3.8 Key findings

**The Delegated Officer has reviewed the information regarding dust emissions and has for the purposes of the risk assessment found:**

1. The current dust and ambient air quality monitoring being undertaken at the site provides insufficient data to assess the risk to human health posed by operations at the wharf precinct/port.
2. Portable PM<sub>10</sub> dust monitors are not suitable for ambient air quality monitoring as they do not comply with Australian Standards for particle monitoring. Therefore, they are not suitable alternatives to the TEOMs if data are to be used for assessment of potential health impacts.
3. With the correct equipment, training, and procedures, it would be possible for the Licence Holder to operate an ambient air quality network and program which meets the following objectives:
  - Air quality monitoring facilitates dust management; and
  - enables the assessment of potential human health impacts to sensitive receptors that reside near the wharf operations.
4. Beta Attenuation Monitors (BAMs) are considered a suitable alternative to the TEOM in conditions of high humidity and conform with Australian Standards for ambient air quality monitoring.
5. The two existing air quality monitoring sites established for the TEOMs are considered suitable ambient air quality locations due to the infrastructure available to accommodate monitoring equipment and their location between fugitive dust sources and sensitive receptors.
6. Ambient air quality monitors should have data logging software and communications systems able to upload data and instrument status hourly to the Licence Holder's computer systems or mobile devices, including the ship control room, to facilitate management actions if required.
7. The two existing air quality monitoring sites have meteorological masts and meteorological monitoring could be undertaken from these sites to be compliant with AS 3580.14. Logging of 5- or 10-minute averages would allow integration with PM<sub>10</sub> data and facilitate analysis during high dust events.
8. The use of portable PM<sub>10</sub> dust monitors equipped with heated inlets to remove condensation in high humidity environments are considered suitable for real-time dust management during ship loading operations. These should be used at the Kampong, roundabout, or other sites adjacent to receptors (depending on forecast wind direction).
9. Each dust monitor should have data logging software and communications systems able to upload data and instrument status hourly to CIP, including the ship loading control room to facilitate management actions if required.
10. Short-term management triggers (with SMS alarms) for PM<sub>10</sub> should be established, with instrument fault alarms integrated into the system to ensure timely responses.

#### 4.3.9 Consequence

Given that the distance to the nearest sensitive receptor is approximately 40 metres, and that numerous complaints have been received over the years regarding dust emissions from the

premises, the Delegated Officer has determined that off-site impacts of dust will have a mid-level impact to amenity and low-level adverse health effects. Therefore, the Delegated Officer considers the consequence of dust emissions to be **moderate**.

#### 4.3.10 Likelihood of risk event

Given the history of dust complaints received for the site, the nature of the activities being undertaken onsite, and the proximity to surrounding residences, the Delegated Officer considers that dust impacts to residential receptors will likely occur in most circumstances. Therefore, the Delegated Officer considers the overall likelihood of dust impacts occurring to be **likely**.

#### 4.3.11 Overall risk from dust emissions

The Delegated Officer has compared the consequence and likelihood ratings described above with the risk rating matrix and determined that the overall rating for the risk of dust emissions is **high**.

#### 4.3.12 Regulatory controls

The Delegated Officer has determined that PRL is required to engage the services of an air quality professional to design a new air quality monitoring network and air quality monitoring program to facilitate management of dust from the premises, therefore, controlling the risk of potential dust emission impacts to sensitive receptors.

This control will be a specified action under Licence L8846/2014/1. Once submitted, the proposed design of the air quality monitoring network and monitoring program will be evaluated by the Department.

## 5. Consultation

Table 5 provides a summary of the consultation undertaken by the department.

**Table 5: Consultation**

Consultation method	Comments received	Department response
Licence Holder was provided with draft amendment on 22 January 2024	Comments were received from PRL on 1 April 2024. PRL advised that they had engaged air quality specialists to assist in monitoring network design, implementation, and commissioning.  Therefore, it was requested that the licence conditions remain flexible to allow for an air quality monitoring network and program to be implemented based on their air quality specialist's recommendation.	A second draft licence will be issued to remove conditions regarding the implementation of a specific air quality monitoring network and to include a requirement for the licence holder to engage their own consultant to design an air quality monitoring network for DWER review.
Licence Holder was provided with second draft amendment on 20 May 2024	See Appendix 1	See Appendix 1

## 6. Conclusion

Based on the assessment in this Amendment Report, the Delegated Officer has determined that a Revised Licence will be granted, subject to conditions commensurate with the determined

controls and necessary for administration and reporting requirements.

Summary of amendments Table 6 provides a summary of the proposed amendments and will act as record of implemented changes. All proposed changes have been incorporated into the Licence as part of the amendment process.

**Table 6: Summary of licence amendments**

Condition no.	Proposed amendments
1, Table 1, Row 8	Weather station location changed to Wharf Precinct to align with previous licence conditions. Reference to Australian Standard updated.  Weather station location is to be reviewed as part of the Licence Holder's review of the whole air quality monitoring network.
1, Table 1, Row 10	Deletion of TEOMs from site infrastructure and equipment table. TEOMs are not currently in use on the premises. The development of a new air quality monitoring network and Air Quality Monitoring Program has been required as a specified action in condition 21 for appropriate monitoring equipment to replace the TEOMs.
21	Addition of a specified action for the Licence Holder to design a new air quality monitoring network and prepare and submit to the CEO an Air Quality Monitoring Plan.
26, Table 10	Monitoring of point source emissions to air frequency amended from quarterly to biannually.
29, Table 13	Removal of TEOM 2 sampler to align with deletion of TEOMs in Condition 1, Table 1, and removal of requirement to monitor dust as TSP as this is redundant.
31, Table 14	Removal of "TEOM 2" and replacement with "Wharf Precinct within the prescribed premises boundary shown in Schedule 1"
Table 18	Definition added for "air quality professional" and "NEPM", deletion of redundant Australian Standards

**Table 7: Consolidation of licence conditions in this amendment**

Existing condition/s	Condition summary	Revised licence condition	Conversion notes
21 - 37	N/A	Renumbered to 22 - 38	Renumbered due to insertion of new condition

## References

1. Air Assessments 2019, *Christmas Island Phosphates 2019 Air Quality Assessment*, Canning Vale, Western Australia
2. Department of Environment Regulation (DER) 2015, *Guidance Statement: Setting Conditions*, Perth, Western Australia.
3. Department of Water and Environmental Regulation (DWER) 2020, *Guideline: Environmental Siting*, Perth, Western Australia.
4. DWER 2020, *Guideline: Risk Assessments*, Perth, Western Australia.
5. JBS & G Australia Pty Ltd 2023, *Licence L8846/2014/1 – Christmas Island Phosphates – Licence Amendment Application*

## Appendix 1: Summary of Licence Holder’s comments on risk assessment and draft conditions

Condition	Summary of Licence Holder’s comment	Department’s response
1, Table 1 - TEOMs	The Licence Holder has requested the removal of row 10 in Table 1 as TEOMs are not currently operational at the premises and will not be in future.	The delegated officer has resolved to remove TEOMs from the infrastructure and equipment requirements table as the licence includes a specified action to develop a new air quality monitoring network and Air Quality Monitoring Plan. Through the development of a new air quality monitoring network, the TEOMs will be replaced with other appropriate air monitoring equipment.
21, Table 9 – Action 1	The Licence Holder has advised that the air dispersion model will be completed by 31 July 2024 and that the design of the network will occur after this and by 30 September 2024.	The delegated officer has changed the date of completion for all specified actions to 30 September 2024
21, Table 9 – Action 2	The Licence Holder has requested that the Ambient Air Quality and Dust (PM <sub>10</sub> ) Monitoring Plan be named “Air Quality Monitoring Plan” instead to keep things simple.	The delegated officer has resolved to change the wording to “Air Quality Monitoring Plan” as requested as this is solely a name change and does not change any of the requirements of the plan.
29, Table 13	The Licence Holder has requested the removal of “TEOM 2 sampler” as the TEOMs are not operational and will not be in future.  The removal of Dust as Total Suspended Particles (TSP) as a parameter has also been requested as this has been carried over from a historical licence and is no longer applicable.	The delegated officer has removed TSP as it is redundant.  The delegated officer has also resolved to remove the TEOM 2 sampler to align with the removal of TEOMs in Table 1.
Definitions, Table 19	The Licence Holder requested for the definition of “Air Quality Professional” to be amended to <i>“installation of the ambient air monitoring network is undertaken by an individual with suitable expertise”</i> as suggested in an email to DWER dated 2 May 2024. This definition was requested as PRL’s air quality consultants advised that the below original definition was too difficult to meet:  <i>“means a person who:</i>  <i>a) holds a Bachelor of Science qualification, or an Air Quality Science-related tertiary level qualification; and</i>  <i>b) has a minimum of at least 3 years experience working in the field of air quality monitoring and assessment;</i>  <i>or is otherwise approved by the CEO to act in this capacity.”</i>	The delegated officer considers “an individual with suitable expertise” to be too vague. The licence requires an Air Quality Professional to design a new ambient air quality monitoring network. The licence does not refer to the person installing the air monitoring network.  The original definition was amended to replace the “and” between the required qualifications and the required years of experience with “or” to allow for more flexibility. However, the delegated officer determined that 3 years of experience without qualifications was insufficient for the design of an air quality monitoring network. After consideration, the delegated officer has resolved to allow a minimum of 5 years experience.