PERDAMAN INDUSTRIES

CHEMICALS & FERTILISERS

Attachment 3B

Project Ceres – Category 12 – Screening, etc of material

Burrup Peninsula, Western Australia

Proponent:
Perdaman Chemicals and Fertilisers Pty Ltd.
ABNL 31 121 263 741

Date: 5 February 2024

SAIPEM clough

SCJV

Document History

Version	Effective Date	Description of Revision	Prepared by	Reviewed by	Approved by
Preliminary Draft	5 February 2024	Preliminary for Client Review	EPC Contractor	Perdaman	Perdaman
1	5 February 2024	Final for Submission	EPC Contractor	Perdaman	Perdaman

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1 Introduction

1.1 Background

Perdaman Chemicals and Fertilisers Pty Ltd (Perdaman) proposes to establish a state-of-the-art urea production plant within the proposed Burrup Strategic Industrial Area (BSIA), approximately 8 kilometres (km) from Dampier and 20 km north-west of Karratha on the north-west coastline of Western Australia (Attachment 2, Figure 01), known as Project Ceres.

Perdaman has engaged an EPC Contractor to deliver Project Ceres consisting of a Joint Venture (JV) composed by Saipem Australia PTY Ltd. (Saipem) and Clough Projects Australia PTY Ltd (Clough).

This Licence Application has been prepared by the EPC Contractor, and was reviewed and approved by Perdaman.

Project Ceres will have a urea production capacity of approximately 2.046 million tonnes per annum (Mtpa) consisting of a world-scale 3,500 tonnes per day (tpd) ammonia plant feeding a 6,200 tpd urea plant with loading and conveying facilities to the Dampier Port Public Wharf and associated support facilities. Project Ceres will be self-sufficient with respect to power and other utilities.

Project Ceres will convert natural gas to urea through a series of chemical processes. Natural gas is first converted to syngas which is then purified to produce separate hydrogen and CO_2 streams. Ammonia is synthesised by compressing the hydrogen with nitrogen and a catalyst, and the ammonia produced by this process is then reacted with CO_2 to form urea. The urea will be transported via conveyor belt from the Plant to Dampier Port for deep sea export.

Works Approval (W6630/2021/1) for Category 12 - Screening etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated, (authorised amount of 450,000 tonnes (T)), was granted on 14 July 2022.

On 5 August 2022, Perdaman received notification that appeals had been lodged for works approval W6630/2021/1, which went through investigation with the Office of the Appeals Convenor (OAC) and the Government of Western Australia's Department of Water and Environmental Regulation (DWER). After consideration of matters raised in the appeals and further information received from Perdaman, a report was prepared for the Minister of Environment (the Minister).

On 1 November 2023, the Minister determined to allow the appeal in part to the extent that the works approval conditions are amended to address matters relating to exclusion of certain risks associated with crushing and screening, and conditions relating to the management of dust emissions from crushing and screening. A copy of the Minister's Appeal Determination and OAC's report can be obtained from the Appeals Convenor's website at: www.appealsconvenor.wa.gov.au (reference 028/22).

The Minister determined that while the requirements of the works approval were generally appropriate, consistent with advice of DWER and the OAC, the following changes to the requirements specified in Table 2 of Condition 6 are required:

- The crushing and screening plant must only operate in locations that are greater than 100 metres from heritage sites as identified and defined in the approved Cultural Heritage Management Plan (Cultural Heritage Management Plan, Perdaman Urea Project, Version PCF 6, 11 May 2022).
- The water systems are to be used to minimise dust generation at material transfer points, crusher, and materials stockpiles whenever materials are being processed by the crushing and screening plant.

As such, DWER amended the works approval to give effect to the Minister's determination dated 1 November 2023, as required under section 110 of the *Environmental Protection Act 1986* (WA) (EP Act).

Further information relating to the appeals can be found under Section 3.4.

1.2 Purpose

DWER regulates industrial emissions and discharges to the environment through a works approval and licensing process, under Part V of the EP Act. Industrial premises with potential to cause emissions and discharges to air, land or water are known as prescribed premises and trigger regulation under the EP Act. Prescribed premises categories are outlined in Schedule 1 of the Regulations.

The purpose of this document is to provide information to support an on-line application to DWER for a Licence for the operation of infrastructure for Category 12 (Screening, etc.).

This licence application includes detail on proposed timelines, as well as outlining emissions, pathways, receptors and intended management measures for operations.

Information presented in this document aims to assist DWER in assessing the adequacy of proposed pollution prevention and control measures to ensure adverse environmental impacts are prevented or minimised to levels where appropriate environmental standards can be complied with. This application has been prepared consistent with the requirements of the Works Approval W6330/2021/1 (as amended).

This document has been developed to support the Part V Application Form and includes technical information relevant to Project Ceres.

1.3 Licensee and Occupier Premises

Perdaman Chemicals and Fertilisers Pty Ltd.

ABN 31121263 741

Level 17, 58 Mounts Bay Road, Perth, Western Australia.

1.4 Project Name

Project name is “Project Ceres”.

1.5 Document Index

Table 1 summarises the information required by the licence application and where applicable, relevant information is provided for within this supporting document.

Table 1 - References to Application Form Requirements

Application Form Requirement	Supporting Document Location
Part 1 – Application Type	Refer to Licence Application Form
Part 2 – Applicant details.	Refer to Licence Application Form and Section 1.3
Attachment 1A – Proof of Occupier Status	Refer to Attachment 1A.
Attachment 1B – Company extract	Refer to Attachment 1B.
Attachment 1C – Authorisation to act as representative of the occupier	Refer to Attachment 1C.
Part 3 – Premises details	Refer to Licence Application Form and Section 1.6
Attachment 2 – Premises maps	Refer to Attachment 2: Figure 01 – Project Overview Figure 2 – Site C Overview Figure 3 – Site F Overview Figure 4 – Land Tenure Overview Figure 5 - Land Tenure Site C Figure 6 - Land Tenure Site F Figure 7 - Proximity Industrial Receptors Figure 8 - Proximity Natural Receptors Figure 9 - Approved Locations for Crushing and Screening Plant – Sites C and F, heritage sites with 100 metres buffer Figure 10 - Location of crushing and screening plant in Site C Figure 11 - Location of crushing and screening plant in Site F Figure 12 - Location of Baseline Noise Locations - Llyod George Acoustics, 2019

	Figure 13 - Location of Baseline Air quality monitors - GHD, 2022 Figure 14 - Location of Construction Noise Monitors - Perdaman, 2023 Figure 15 - Location of Construction Ambient Air Quality (Dust deposition gauges) - Perdaman, 2024 Project Development Area shapefiles Construction Footprint shapefiles
Part 4 – Proposed activities	Refer to Licence Application Form and Section 2.
Part 5 – Other DWER approvals	Refer to Section 3 and Licence Application Form
Part 6 – Other approvals and consultation	Refer to Section 3 and Licence Application Form
Attachment 5 – Details of other approvals	Refer to Attachment 5: • City of Karratha - Development Approval DA21261 • EPA - MS 1180 • EPBC Approval 2018-8383 • DBCA – s40 Authorisation to take or disturb threatened fauna • DPLH - section 18(3) – MIN 2021-0354 • RiWI - Permit to Obstruct PMB209045(1) • DWER - Works Approval - W6630-2021-1
Part 7 – Applicant history	Refer to Licence Application Form
Part 8 – Emissions, discharges and waste	Refer to Sections 5 and 6
Part 9 – Siting and location	Refer to Section 1.6.1 and Licence Application Form
Part 10 – Submission of any other relevant information	Refer to Licence Application Form
Attachment 8 – Additional information submitted	Refer to Attachment 8: SCJV Construction Environmental Management Plan (CEMP) (0000-ZA-E-09071) (Revision 3), including: • Air Quality Management Protocol • Greenhouse Gas Emission (GHGE) Management Protocol • Noise Management Protocol • Hydrocarbons & Hazardous Substances Management Protocol CEMP sub-plans (0000-ZA-E-09033 to 09039), including: • Solid Liquid Waste Management Sub-plan (SLWMsP) 0000-ZA-E-09738 Perdaman (Confirmed) Management Plans: • Confirmed Flora Management Plan (FMP)

	(PCF-PD-EN-FMP) • Confirmed Fauna Management Plan (FaMP) (PCF-PD-EN-FaMP) • Confirmed Threatened Species Management Plan (TSMP) (PCF-PD-EN-TSMP_PCF5) • Confirmed Solid Liquid Waste Management (SLWMP) (PCF-PD-EN-SLWMP_PCF2) • CONFIDENTIAL Confirmed Cultural Heritage Management Plan (PCF-PD-EN-CHMP_PCF7 FULL) • REDACTED Confirmed Cultural Heritage Management Plan (PCF-PD-EN-CHMP_PCF7 Redacted) Construction Dust Management Procedure (000-ZA-E-02850) Acid Sulfate Soils Management Plan (0000-ZA-E-09745) W6630 - 028-22 - Appeals Convenor Report W6630 - 028-22 Ministers Appeal Determination
Part 11 – Proposed fee calculation	Refer to Section 8
Part 12 – Commercially sensitive or confidential information. Attachment 11 – Grounds for claiming exemption	Attachment 11 of the Application form
Part 13 – Submission of application	Refer to Licence Application Form
Part 14 – Declaration and signature	Refer to Licence Application Form.

1.6 Premises Details

1.6.1 Location and Siting

Project Ceres infrastructure including the main production facility (urea plant), administration, maintenance and storage infrastructure, conveyor and port storage and ship loading facilities are situated within the BSIA, approximately 8 km from Dampier and 20 km north-west of Karratha on the north-west coastline of Western Australia. The estate's proximity to gas, port and other key infrastructure makes it an ideal location for Project Ceres.

The BSIA is in close proximity to the Murujuga National Park which covers an area of 4,913 hectares (ha) on the Burrup Peninsula. The area is considered to host the largest concentration of ancient rock art in the world.

The location of Project Ceres is presented in Attachment 2, Figure 01. This figure shows the location of Site C and Site F, inside which the crushing and screening plant will be operated.

1.6.2 Development Envelope

The Project Ceres Development Envelope is consistent with the envelope approved in W6630/2021/1. No changes have been made to the Project Ceres Development Envelope.

1.6.3 Sensitive Human and Environmental Receptors

Table 2 provides the summary of potential human and environmental receptors within close proximity to Project Ceres that have been considered during development of appropriate mitigation strategies.

Table 2 - Sensitive human and environmental receptors and distance from Project Ceres

Human Receptors	Distance from Project Ceres Development Envelope
Neighbouring industrial premises	Yara Pilbara Fertiliser/Yara Pilbara Nitrates, Business Park: Immediately adjacent to Project Ceres. Toll Dampier Supply Base: 0.8 km to the west of Site C. King Bay Support Facility: 1.5 km to the west of Site C. Pluto LNG Plant: 0.6 km to the north-west of Site C.
Hearson's Cove: a popular public recreation and fishing beach	2.0 km to the east of Sites C and F.
Dampier Townsite	6 km to the south-west of Site F.
Environmental Receptors	**Distance from prescribed activity boundary**
Murujuga National Park	Directly north, south and east of Project Ceres site.
Ngajarli (Deep Gorge)	1.0 km to the east of Site F.
Tidal flat	Between Sites C and F.

Table 3 provides the summary of the relevant cultural heritage as specified within the Confirmed Cultural Heritage Management Plan (PCF-PD-EN-CHMP PCF 6) (CHMP) that have been considered during development of appropriate mitigation strategies.

Table 3 - Relevant Cultural Heritage (Confirmed Cultural Heritage Management Plan)

Cultural Heritage Receptors	Summary of Location
• Site F, Artefacts / Scatter, Engraving – Men's Restricted • Site F, Man Made structure / engineering • Boundary Corridor, Artefacts/Scatter, Engraving, Grinding Patches/Grooves, Midden/Scatter • Boundary Corridor, Engraving, Grinding Patches, Grooves • Boundary Corridor, Engraving • Site C, Engraving • Boundary Corridor, Engraving • Boundary Corridor, Engraving, Grinding Patches / Grooves • Boundary Corridor, Grinding patch • Boundary Corridor, Engravings - Men's Restricted • Site C, Engraving - isolated on a small rock • Boundary Corridor, Engraving • Boundary Corridor, Engraving – Men's Restricted • Boundary Corridor, Engraving – Men's Restricted • Site F, Engraving – isolated on a small rock • MAC-002, Boundary Corridor Engraving • MAC-003, Engraving – Men's Restricted • MAC-004, Engraving	Recorded Aboriginal Heritage Sites within the Project Ceres Development Envelope
• Site F, Artefact / Scatter, Midden Scatter • Site F, Artefacts / scatter, engraving • Boundary Corridor, Engraving • Site C, Artefacts / scatter; Midden / scatter • Boundary Corridor, Engraving, Grinding Patches, Grooves • Boundary Corridor, Artefacts / Scatter • Site C, Artefacts / scatter; Midden / scatter • Site C, Isolated artefacts • Site C, Grinding patch • Site C, Engraving • Site C, Engraving	Recorded Aboriginal Heritage Sites confirmed not in the Project Ceres Development Envelope

• Boundary Corridor, Grinding Patches / Grooves • Fish Thalu • Yatha	
• Man Made Structure / Engraving • Engraving, Grinding patches/grooves • Engraving	Recorded Aboriginal Heritage Sites within the Project Ceres Development Envelope that are coincident with the NHP

Note: Refer to CHMP for further detail.

1.6.4 Tenure

Perdaman has secured an Option to Lease over parts of Crown Land parcels as listed in Table 4. The Option to Lease document is included as Attachment 1A.

Table 4 - Tenure for the Project Ceres – Sites C and F

Lot		Project Components
Lot 700 on Plan P411759	Crown Lease	Site C and Causeway
Lot 3014 on Plan P042282		
Lot 3013 on Plan P042282		
Lot 701 on Plan P411760	Crown Lease	Site F
Lot 706 on Plan P411760		

1.6.5 Prescribed Premises Category

This application specifically seeks a licence for the operation of the Prescribed Premises Category 12, Screening, etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated, 50,000 tonnes or more per year.

This application also seeks an increase in annual throughput up to 850,000 tonnes (T).

Works Approval W6630/2021/1 (as amended) was granted to Perdaman authorising a throughput of 450,000 T. This throughput was based on calculations conducted during the Front End Engineering Design (FEED) stage.

The increase in volume is directly associated with additional geotechnical investigations conducted since FEED (between February 2022 – September 2023). The geotechnical factual data obtained from these investigations have resulted in amendments to volumes required to be crushed and screened to achieve the desired elevation levels of the Project.

However, it should be noted that the EPC Contractor and its subcontractors are continually assessing material re-use options on the project to mitigate the volume of material to be processed. Consequently, the EPC Contractor has committed to not exceeding a revised threshold of 850,000 T within the applicable reporting period.

1.7 Transitioning from a Works Approval to a Licence

Time Limited Operations commenced under Works Approval W6630/2021/1 (as amended) on 7 November 2023.

Where a licence application relates to a matter in which a works approval has been granted, the CEO (or their delegate) must be satisfied that the conditions of the works approval have been complied with before they can consider the licence application (section 57(2)(a)(ii)(A) of the EP Act) (DWER, 2019d).

On 7 November 2023, the EPC Contractor submitted the Environmental Compliance Report (ECR) to DWER, to advise of the period of time limited operations.

On 15 November 2023, DWER sent the EPC Contractor a request for further information (RFI), in relation to installed screening/crushing infrastructure and requested further confirmation regarding dust suppression infrastructure installed.

On 20 December 2023, the EPC Contractor provided DWER a supplementary ECR as a supporting document to the original ECR submitted on 7 November and the ECR RFI submitted to the EPC Contractor on 15 November 2023. In accordance with 2(a) an audit of compliance with the requirements of condition 1 was completed on 29 and 30 November 2023.

The works approval holder may apply for a licence only once the report required under the works approval conditions are submitted.

2 Proposed Activities

This section presents the key characteristics of the proposed crushing activities.

The operation of the crushing infrastructure at Sites C and F at Project Ceres meets the definition and production capacity threshold for Prescribed Activity:

> *Screening, etc. of material: premises (other than premises within category 5 or 8) on which material extracted from the ground is screened, washed, crushed, ground, milled, sized or separated, 50,000 T or more per year.*

The detail of the crushing and screening equipment is provided in the proceeding sections.

2.1.1 Overview

Bulk earthworks associated with the urea plant will include the use of a mobile crushing and screening plant for processing of material. Processed material will be used as fill to level the site in preparation for construction of the urea plant and pavement materials for site roads. Material to be crushed and screened includes virgin material excavated from the Sites C and F, processed treated acid sulfate soils material and sand dunes.

The mobile crushing and screening plant will be used at various locations within the prescribed premises boundary (shown in Figure 01). Further restrictions on the location of the crushing and screening equipment were described in the W6630/2021/1 amendment. The mobile crushing and screening plant will only operate within the *Approved Locations for Crushing and Screening Plant – Sites C and F*, as shown in Figure 1.

A description of the crushing and screening process was provided in the Application for Works Approval, dated 10 November 2021.

Dust mitigation includes the use of water systems installed on the screening and crushing equipment, to minimise dust generation at material transfer points, crusher, and material stockpiles whenever materials are being processed by the crushing and screening plant. Water trucks are operated on roads and open areas, and stockpiles do not exceed 5 meters (m) in height above ground level. Dust mitigation is in accordance with W6630/2021/1.

Refuelling and hazardous chemicals management is carried out in accordance with the Decmil *Project Ceres – Perdaman Bulk Earthworks Environmental Management Plan* (Document number 10253-DEC-EN-PLN-0001/0000-ZA-E-80004), 8 November 2023 (Rev 2), and sub-plans (Decmil CEMP). The Decmil CEMP was prepared in accordance with the *SCJV Project Ceres - Construction Environmental Management Plan* (Document number 0000-ZA-E-09071), provided in Attachment 8.

2.1.2 Throughput

The annual throughput is set at a maximum of 850,000 T, based on the justification provided in Section 1.6.5.

2.1.3 Schedule

Crushing and screening activities commenced on 7 November 2023 under W6630/2021/1, and subsequently the amended version of W6630/2021/1.

The bulk earthworks are expected to be carried out until September 2025, however, crushing activities are expected to be completed by December 2024, based on current bulk earthworks scheduling.

The anticipated schedule is set out below:

- **7 November 2023 to 28 January 2024** – actual throughput 306,517.09 tonnes, with an average daily throughput of 3,693 T.
- **28 January 2024** to **27 February 2024** – maximum allowable throughput expected to be reached at 450,000 tonnes.
- *Anticipated Licence issue **27 February 2024***
- **26 February 2024 to 16 May 2024** - best case scenario 5,000 tonnes per day (perfect conditions), (based on WA 450,000 limit increase to 850,000 under licence), therefore throughput will be reached on 16 May 2024.
- **16 May 2024** – Decmil will stop works when 850,000 tonnes is reached.
- **18 May 2024** - Sub-contractor demobilisation.

- **13 July 2024** - end of annual period 2023/2024 (throughput limit 850,000 tonnes).
- **14 July 2024** – start of annual period 2024/25 (0-850,000 tonnes recommences).
- **14 July 2024 to 30 December 2024** (Sub-contractor remobilisation, Phase 2) - anticipated 850,000 tonnage will be reached 30 December 2024 (end of crushing and screening program). Phase 2 includes: backfilling; construction of ponds and batters; roadways; inground services; causeway; drainage batters; and, pads for tanks.

Further justification can be found in Table 5, Table 6, Table 7 and Table 8, below.

Table 5 – Actual crushing and screening throughput

Date	Tonnes per day	General fill produced	Structural fill produced	Cumulative (tonnes)
07-Nov-23	5,905.00	5,905.00	nil	5905.00
08-Nov-23	3,058.00	3,058.00	nil	8963.00
09-Nov-23	2,895.00	2,895.00	nil	11858.00
10-Nov-23	477.00	477.00	nil	12335.00
11-Nov-23	4,607.00	4,607.00	nil	16942.00
12-Nov-23	3,410.00	3,410.00	nil	20352.00
13-Nov-23	3,955.00	3,955.00	nil	24307.00
14-Nov-23	3,199.00	3,199.00	nil	27506.00
15-Nov-23	3,602.00	3,602.00	nil	31108.00
16-Nov-23	4,469.00	4,469.00	nil	35577.00
17-Nov-23	2,074.00	2,074.00	nil	37651.00
18-Nov-23	1,576.00	1,576.00	nil	39227.00
19-Nov-23	1,576.00	1,576.00	nil	40803.00
20-Nov-23	2,562.00	2,562.00	nil	43365.00
21-Nov-23	2,876.00	2,876.00	nil	46241.00
22-Nov-23	-1,796.00	1,796.00	nil	44445.00
23-Nov-23	4,911.00	4,911.00	nil	49356.00
24-Nov-23	6,131.00	6,131.00	nil	55487.00
25-Nov-23	5,390.00	5,390.00	nil	60877.00
26-Nov-23	2,426.00	2,426.00	nil	63303.00
27-Nov-23	4,606.00	4,606.00	nil	67909.00
28-Nov-23	4,290.00	4,290.00	nil	72199.00
29-Nov-23	4,500.00	4,500.00	nil	76699.00
30-Nov-23	3,222.00	3,222.00	nil	79921.00
01-Dec-23	5,424.00	3,834.00	1590.00	85345.00
02-Dec-23	6,405.00	4,501.00	1904.00	91750.00
03-Dec-23	3,233.00	1,621.00	1612.00	94983.00
04-Dec-23	7,306.00	4,053.00	3253.00	102289.00
05-Dec-23	4,677.00	3,028.00	1649.00	106966.00
06-Dec-23	6,040.00	3,531.00	2509.00	113006.00
07-Dec-23	5,408.00	3,049.00	2359.00	118414.00
08-Dec-23	5,600.00	2,883.00	2717.00	124014.00
09-Dec-23	4,309.00	2,900.00	1409.00	128323.00
10-Dec-23	5,561.00	3,318.00	2243.00	133884.00
11-Dec-23	4,472.00	3,204.00	1268.00	138356.00
12-Dec-23	6,043.00	3,933.00	2110.00	144399.00
13-Dec-23	6,497.00	6,497.00	nil	150896.00
14-Dec-23	4,506.00	4,506.00	nil	155402.00
15-Dec-23	3,893.00	3,893.00	nil	159295.00
16-Dec-23	7,571.00	7,571.00	nil	166866.00
17-Dec-23	8,089.00	8,089.00	nil	174955.00
18-Dec-23	6,518.00	6,518.00	nil	181473.00
19-Dec-23	8,212.00	8,212.00	nil	189685.00
20-Dec-23–03-Jan-24	0.00	Christmas shutdown		189685.00

04-Jan-24	1,437.60	1,437.60	nil	191122.60
05-Jan-24	5,192.75	5,192.75	nil	196315.35
06-Jan-24	5,089.17	5,089.17	nil	201404.52
07-Jan-24	5,697.54	5,697.54	nil	207102.06
08-Jan-24	4,664.43	4,664.43	nil	211766.49
09-Jan-24	7,317.00	7,317.00	nil	219083.49
10-Jan-24	5,567.00	5,567.00	nil	224650.49
11-Jan-24	4,151.25	4,151.25	nil	228801.74
12-Jan-24	3,550.29	3,550.29	nil	232352.03
13-Jan-24	5,706.70	5,706.70	nil	238058.73
14-Jan-24	4,931.48	4,931.48	nil	242990.21
15-Jan-24	6,790.18	6,790.18	nil	249780.39
16-Jan-24	4,871.28	4,871.28	nil	254651.67
17-Jan-24	3,977.78	3,977.78	nil	258629.45
18-Jan-24	4,989.61	4,989.61	nil	263619.06
19-Jan-24	4,660.31	4,660.31	nil	268279.37
20-Jan-24	4,227.81	4,227.81	nil	272507.18
21-Jan-24	3,695.91	3,695.91	nil	276203.09
22-Jan-24	4,866.34	4,866.34	nil	281069.43
23-Jan-24	3,950.66	3,950.66	nil	285020.09
24-Jan-24	4,188.00	4,188.00	nil	289208.09
25-Jan-24	4,084.00	4,084.00	nil	293292.09
26-Jan-24	3,865.00	3,865.00	nil	297157.09
27-Jan-24	3,919.00	3,919.00	nil	301076.09
28-Jan-24	5,441.00	5,441.00	nil	306517.09

Note 1: 20 December 2023 to 3 January 2024 – Christmas shutdown (no production)

Predicted production figures from 29 January 2024 to 27 February 2024, until 450,000 tonnes is reached, can be found in Table 6.

Table 6 – Predicted crushing and screening throughputs until annual throughput limit under W6630/2021/1 is reached

Date	Tonnes per day	Cumulative (tonnes)
29-Jan-24	5,000.00	311517.09
30-Jan-24	5,000.00	316517.09
31-Jan-24	5,000.00	321517.09
01-Feb-24	5,000.00	326517.09
02-Feb-24	5,000.00	331517.09
03-Feb-24	5,000.00	336517.09
04-Feb-24	5,000.00	341517.09
05-Feb-24	5,000.00	346517.09
06-Feb-24	5,000.00	351517.09
07-Feb-24	5,000.00	356517.09
08-Feb-24	5,000.00	361517.09
09-Feb-24	5,000.00	366517.09
10-Feb-24	5,000.00	371517.09
11-Feb-24	5,000.00	376517.09
12-Feb-24	5,000.00	381517.09
13-Feb-24	5,000.00	386517.09
14-Feb-24	5,000.00	391517.09
15-Feb-24	5,000.00	396517.09
16-Feb-24	5,000.00	401517.09
17-Feb-24	5,000.00	406517.09
18-Feb-24	5,000.00	411517.09
19-Feb-24	5,000.00	416517.09
20-Feb-24	5,000.00	421517.09
21-Feb-24	5,000.00	426517.09
22-Feb-24	5,000.00	431517.09

23-Feb-24	5,000.00	436517.09
24-Feb-24	5,000.00	441517.09
25-Feb-24	5,000.00	441517.09
26-Feb-24	5,000.00	446517.09
27-Feb-24	3,482.91	450000.00

Table 7 - Predicted crushing and screening throughputs, until 850,000 tonnes is reached (Jul 2023 – Jul 24 annual period)

Date	Tonnes per day	Cumulative (tonnes)
28-Feb-24	5,000.00	461517.09
29-Feb-24	5,000.00	466517.09
01-Mar-24	5,000.00	471517.09
02-Mar-24	5,000.00	476517.09
03-Mar-24	5,000.00	481517.09
04-Mar-24	5,000.00	486517.09
05-Mar-24	5,000.00	491517.09
06-Mar-24	5,000.00	496517.09
07-Mar-24	5,000.00	501517.09
08-Mar-24	5,000.00	506517.09
09-Mar-24	5,000.00	511517.09
10-Mar-24	5,000.00	516517.09
11-Mar-24	5,000.00	521517.09
12-Mar-24	5,000.00	526517.09
13-Mar-24	5,000.00	531517.09
14-Mar-24	5,000.00	536517.09
15-Mar-24	5,000.00	541517.09
16-Mar-24	5,000.00	546517.09
17-Mar-24	5,000.00	551517.09
18-Mar-24	5,000.00	556517.09
19-Mar-24	5,000.00	561517.09
20-Mar-24	5,000.00	566517.09
21-Mar-24	5,000.00	571517.09
22-Mar-24	5,000.00	576517.09
23-Mar-24	5,000.00	581517.09
24-Mar-24	5,000.00	586517.09
25-Mar-24	5,000.00	591517.09
26-Mar-24	5,000.00	596517.09
27-Mar-24	5,000.00	601517.09
28-Mar-24	5,000.00	606517.09
29-Mar-24	5,000.00	611517.09
30-Mar-24	5,000.00	616517.09
31-Mar-24	5,000.00	621517.09
01-Apr-24	5,000.00	626517.09
02-Apr-24	5,000.00	631517.09
03-Apr-24	5,000.00	636517.09
04-Apr-24	5,000.00	641517.09
05-Apr-24	5,000.00	646517.09
06-Apr-24	5,000.00	651517.09
07-Apr-24	5,000.00	656517.09
08-Apr-24	5,000.00	661517.09
09-Apr-24	5,000.00	666517.09
10-Apr-24	5,000.00	671517.09
11-Apr-24	5,000.00	676517.09
12-Apr-24	5,000.00	681517.09
13-Apr-24	5,000.00	686517.09
14-Apr-24	5,000.00	691517.09
15-Apr-24	5,000.00	696517.09

16-Apr-24	5,000.00	701517.09
17-Apr-24	5,000.00	706517.09
18-Apr-24	5,000.00	711517.09
19-Apr-24	5,000.00	716517.09
20-Apr-24	5,000.00	721517.09
21-Apr-24	5,000.00	726517.09
22-Apr-24	5,000.00	731517.09
23-Apr-24	5,000.00	736517.09
24-Apr-24	5,000.00	741517.09
25-Apr-24	5,000.00	746517.09
26-Apr-24	5,000.00	751517.09
27-Apr-24	5,000.00	756517.09
28-Apr-24	5,000.00	761517.09
29-Apr-24	5,000.00	766517.09
30-Apr-24	5,000.00	771517.09
01-May-24	5,000.00	776517.09
02-May-24	5,000.00	781517.09
03-May-24	5,000.00	786517.09
04-May-24	5,000.00	791517.09
05-May-24	5,000.00	796517.09
06-May-24	5,000.00	801517.09
07-May-24	5,000.00	806517.09
08-May-24	5,000.00	811517.09
09-May-24	5,000.00	816517.09
10-May-24	5,000.00	821517.09
11-May-24	5,000.00	826517.09
12-May-24	5,000.00	831517.09
13-May-24	5,000.00	836517.09
14-May-24	5,000.00	841517.09
15-May-24	5,000.00	846517.09
16-May-24	3482.91	850000
16 May 2024 to 13 July 2024	Anticipated contractor demobilisation. Crushing and screening recommence 14 July 2024.	

Table 8 - Predicted crushing and screening throughputs, until 850,000 tonnes is reached (Jul 2023 – Jul 25 annual period)

Date	Tonnes per day	Cumulative (tonnes)
14-Jul-24	5,000.00	5000
15-Jul-24	5,000.00	10000
16-Jul-24	5,000.00	15000
17-Jul-24	5,000.00	20000
18-Jul-24	5,000.00	25000
19-Jul-24	5,000.00	30000
20-Jul-24	5,000.00	35000
21-Jul-24	5,000.00	40000
22-Jul-24	5,000.00	45000
23-Jul-24	5,000.00	50000
24-Jul-24	5,000.00	55000
25-Jul-24	5,000.00	60000
26-Jul-24	5,000.00	65000
27-Jul-24	5,000.00	70000
28-Jul-24	5,000.00	75000
29-Jul-24	5,000.00	80000
30-Jul-24	5,000.00	85000
31-Jul-24	5,000.00	90000
01-Aug-24	5,000.00	95000
02-Aug-24	5,000.00	100000

03-Aug-24	5,000.00	105000
04-Aug-24	5,000.00	110000
05-Aug-24	5,000.00	115000
06-Aug-24	5,000.00	120000
07-Aug-24	5,000.00	125000
08-Aug-24	5,000.00	130000
09-Aug-24	5,000.00	135000
10-Aug-24	5,000.00	140000
11-Aug-24	5,000.00	145000
12-Aug-24	5,000.00	150000
13-Aug-24	5,000.00	155000
14-Aug-24	5,000.00	160000
15-Aug-24	5,000.00	165000
16-Aug-24	5,000.00	170000
17-Aug-24	5,000.00	175000
18-Aug-24	5,000.00	180000
19-Aug-24	5,000.00	185000
20-Aug-24	5,000.00	190000
21-Aug-24	5,000.00	195000
22-Aug-24	5,000.00	200000
23-Aug-24	5,000.00	205000
24-Aug-24	5,000.00	210000
25-Aug-24	5,000.00	215000
26-Aug-24	5,000.00	220000
27-Aug-24	5,000.00	225000
28-Aug-24	5,000.00	230000
29-Aug-24	5,000.00	235000
30-Aug-24	5,000.00	240000
31-Aug-24	5,000.00	245000
01-Sep-24	5,000.00	250000
02-Sep-24	5,000.00	255000
03-Sep-24	5,000.00	260000
04-Sep-24	5,000.00	265000
05-Sep-24	5,000.00	270000
06-Sep-24	5,000.00	275000
07-Sep-24	5,000.00	280000
08-Sep-24	5,000.00	285000
09-Sep-24	5,000.00	290000
10-Sep-24	5,000.00	295000
11-Sep-24	5,000.00	300000
12-Sep-24	5,000.00	305000
13-Sep-24	5,000.00	310000
14-Sep-24	5,000.00	315000
15-Sep-24	5,000.00	320000
16-Sep-24	5,000.00	325000
17-Sep-24	5,000.00	330000
18-Sep-24	5,000.00	335000
19-Sep-24	5,000.00	340000
20-Sep-24	5,000.00	345000
21-Sep-24	5,000.00	350000
22-Sep-24	5,000.00	355000
23-Sep-24	5,000.00	360000
24-Sep-24	5,000.00	365000
25-Sep-24	5,000.00	370000
26-Sep-24	5,000.00	375000
27-Sep-24	5,000.00	380000
28-Sep-24	5,000.00	385000
29-Sep-24	5,000.00	390000

30-Sep-24	5,000.00	395000
01-Oct-24	5,000.00	400000
02-Oct-24	5,000.00	405000
03-Oct-24	5,000.00	410000
04-Oct-24	5,000.00	415000
05-Oct-24	5,000.00	420000
06-Oct-24	5,000.00	425000
07-Oct-24	5,000.00	430000
08-Oct-24	5,000.00	435000
09-Oct-24	5,000.00	440000
10-Oct-24	5,000.00	445000
11-Oct-24	5,000.00	450000
12-Oct-24	5,000.00	455000
13-Oct-24	5,000.00	460000
14-Oct-24	5,000.00	465000
15-Oct-24	5,000.00	470000
16-Oct-24	5,000.00	475000
17-Oct-24	5,000.00	480000
18-Oct-24	5,000.00	485000
19-Oct-24	5,000.00	490000
20-Oct-24	5,000.00	495000
21-Oct-24	5,000.00	500000
22-Oct-24	5,000.00	505000
23-Oct-24	5,000.00	510000
24-Oct-24	5,000.00	515000
25-Oct-24	5,000.00	520000
26-Oct-24	5,000.00	525000
27-Oct-24	5,000.00	530000
28-Oct-24	5,000.00	535000
29-Oct-24	5,000.00	540000
30-Oct-24	5,000.00	545000
31-Oct-24	5,000.00	550000
01-Nov-24	5,000.00	555000
02-Nov-24	5,000.00	560000
03-Nov-24	5,000.00	565000
04-Nov-24	5,000.00	570000
05-Nov-24	5,000.00	575000
06-Nov-24	5,000.00	580000
07-Nov-24	5,000.00	585000
08-Nov-24	5,000.00	590000
09-Nov-24	5,000.00	595000
10-Nov-24	5,000.00	600000
11-Nov-24	5,000.00	605000
12-Nov-24	5,000.00	610000
13-Nov-24	5,000.00	615000
14-Nov-24	5,000.00	620000
15-Nov-24	5,000.00	625000
16-Nov-24	5,000.00	630000
17-Nov-24	5,000.00	635000
18-Nov-24	5,000.00	640000
19-Nov-24	5,000.00	645000
20-Nov-24	5,000.00	650000
21-Nov-24	5,000.00	655000
22-Nov-24	5,000.00	660000
23-Nov-24	5,000.00	665000
24-Nov-24	5,000.00	670000
25-Nov-24	5,000.00	675000
26-Nov-24	5,000.00	680000

27-Nov-24	5,000.00	685000
28-Nov-24	5,000.00	690000
29-Nov-24	5,000.00	695000
30-Nov-24	5,000.00	700000
01-Dec-24	5,000.00	705000
02-Dec-24	5,000.00	710000
03-Dec-24	5,000.00	715000
04-Dec-24	5,000.00	720000
05-Dec-24	5,000.00	725000
06-Dec-24	5,000.00	730000
07-Dec-24	5,000.00	735000
08-Dec-24	5,000.00	740000
09-Dec-24	5,000.00	745000
10-Dec-24	5,000.00	750000
11-Dec-24	5,000.00	755000
12-Dec-24	5,000.00	760000
13-Dec-24	5,000.00	765000
14-Dec-24	5,000.00	770000
15-Dec-24	5,000.00	775000
16-Dec-24	5,000.00	780000
17-Dec-24	5,000.00	785000
18-Dec-24	5,000.00	790000
19-Dec-24	5,000.00	795000
20-Dec-24	5,000.00	800000
21-Dec-24	5,000.00	805000
22-Dec-24	5,000.00	810000
23-Dec-24	5,000.00	815000
24-Dec-24	5,000.00	820000
25-Dec-24	5,000.00	825000
26-Dec-24	5,000.00	830000
27-Dec-24	5,000.00	835000
28-Dec-24	5,000.00	840000
29-Dec-24	5,000.00	845000
30-Dec-24	5,000.00	850000

Note: 14 July 2024 is the start of the 2024/25 annual period for W6630/2021/1

2.1.4 Operating hours

Consistent with existing approvals, crushing and screening activities will only be carried out during daylight hours. Hours of operation will however vary seasonally. Crushing and screening activities are occurring 7 days a week.

2.1.5 Limitations on Location of Activities

In accordance with W6630/2021/1 (as amended), the mobile crushing and screening plant shall only operate at:

a) Locations within the clearing boundary, and

b) Locations that are greater than 100 meters (m) from heritage sites.

Figure 1 shows the *Approved Locations for Crushing and Screening Plant – Sites C and F* as defined in W6630/2021/1 (as amended), where the plant is permitted to be established.

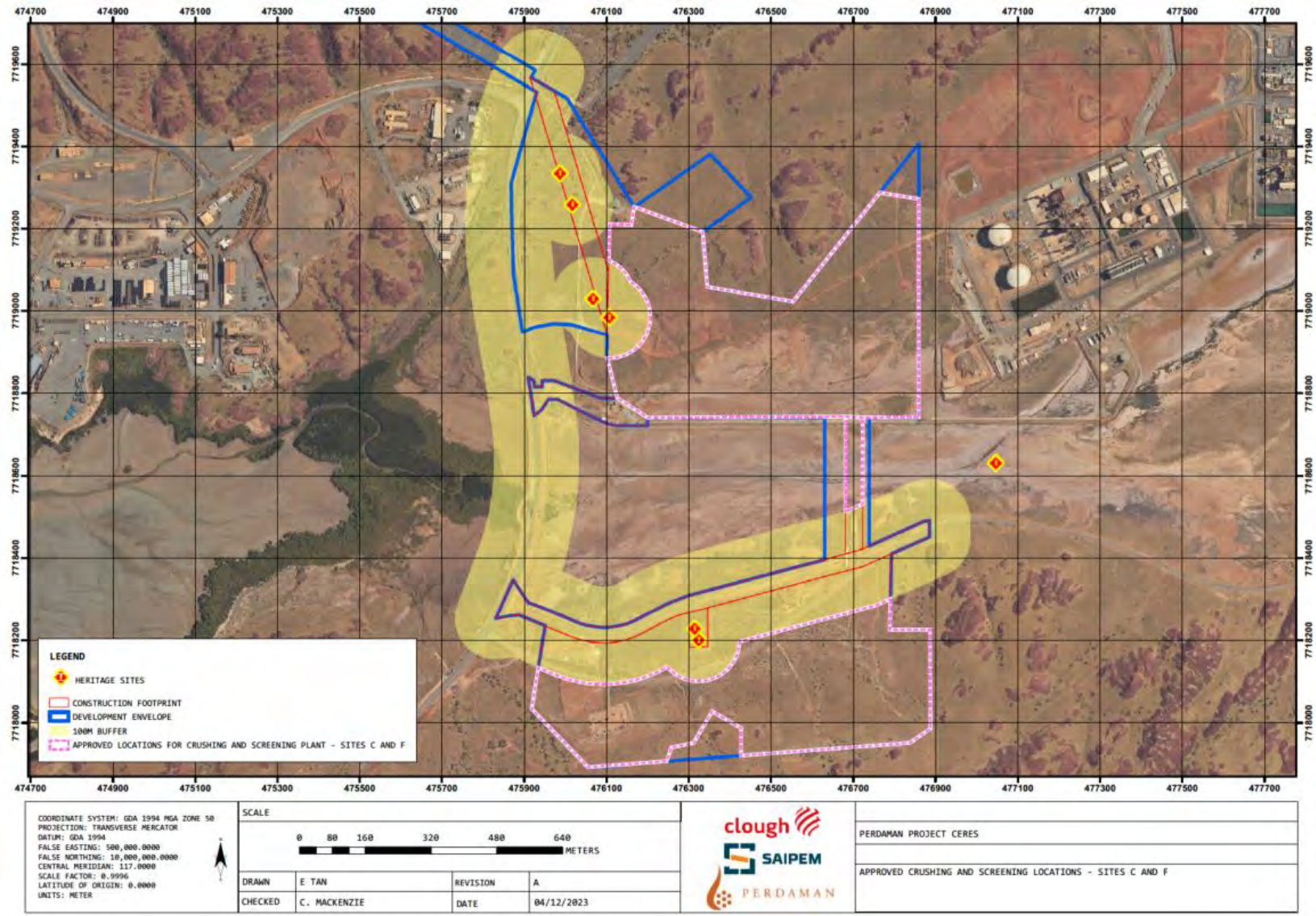


Figure 1 - Approved Locations for Crushing and Screening Plant – Sites C and F, heritage sites that require greater than 100 metres buffer

2.1.6 Operating Locations

Crushing and screening plants have been established within the approved locations at both Sites C and F, as presented in Figure 1.

Equipment will be relocated as required within the approved locations based on operational requirements.

In January 2024, the crushing and screening plant was established in Site C and Site F according to the layouts presented in Figures 2 and Figure 3 respectively.

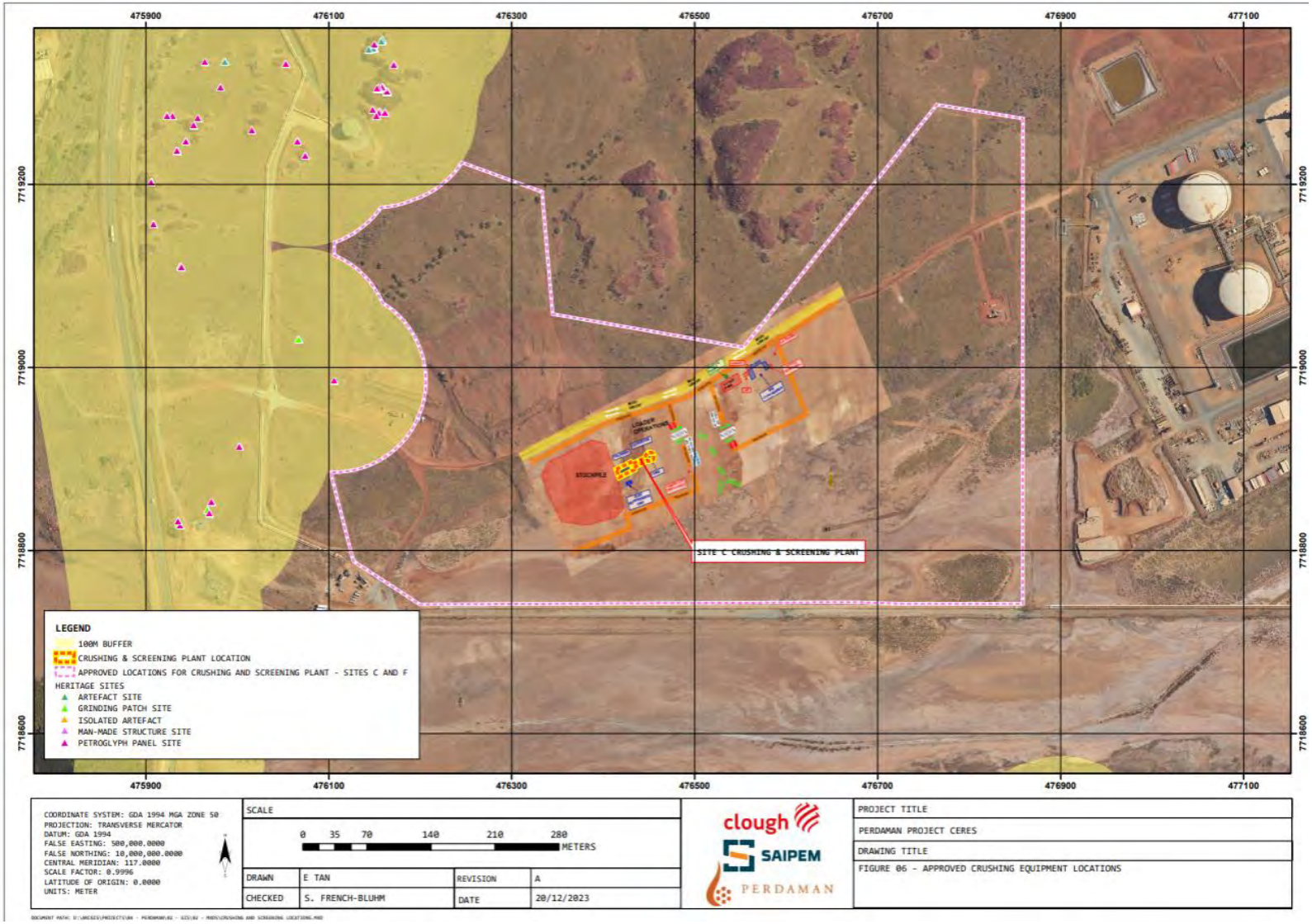


Figure 2 - Location of crushing and screening plant in Site C Note: Heritage sites with a buffer greater than 100 metres buffer from this location

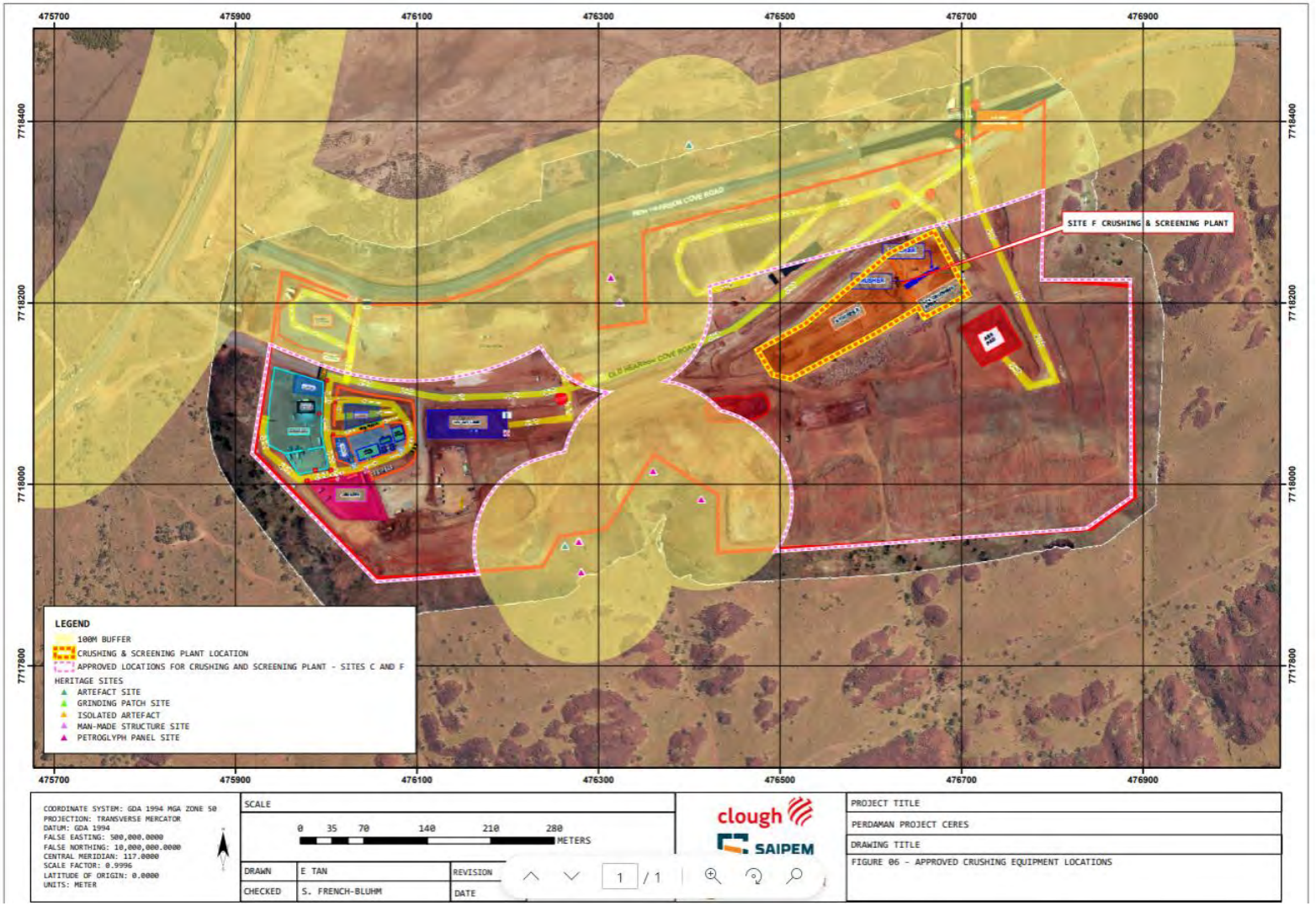


Figure 3 - Location of crushing and screening plant in Site F Note: Heritage sites with a buffer greater than 100 metres buffer from this location

2.1.7 Operational Elements

2.1.7.1 Crushing and Screening Equipment

The mobilisation and construction of crushing and screening plant consists of the following equipment:

Site C

- Site C Mobile Crushing (and Screening) Plant incorporates:
  - Primary jaw crusher with dust suppression sprays
  - Secondary cone crusher with dust suppression sprays
  - Incline screen/track mounted stacker (approximately 80 feet) (transfer conveyor) with dust suppression sprays
- Supporting infrastructure includes:
  - Dust suppression water tank, with generator
  - Excavator (loading tool or equivalent)
  - Loaders
- Other back-up equipment:
  - Secondary cone crusher, with dust suppression sprays, as spare on site at all times
  - Primary jaw crusher with dust suppression sprays
  - Incline screen
- Site C crushing and screening plant is configured to make general fill, however, can change crushing capability to make structural fill.

Site F

- Site F Mobile Crushing (and Screening) Plant incorporates:
  - Primary jaw crusher with dust suppression sprays
  - Secondary cone crusher with dust suppression sprays
  - Incline screen
  - Track mounted stacker (approximately 80 feet) (transfer conveyor) with dust suppression sprays
- Other or alternative (back-up) equipment:
  - Primary jaw crusher with dust suppression sprays
- Supporting infrastructure includes:
  - Dust suppression water tank, with generator
  - Excavator (loading tool or equivalent)
  - Loaders
- Site F plant is currently set up to make sub-base material and all of the above aforementioned plant is being utilised. Site F plant can be rearranged to make structural fill or general fill by re-configuring or removing plant to make the desired product.

The two crushing and screening plants (at Sites C and F) shall be used concurrently.

All plant has been equipped with exhaust mufflers, not to exceed the Original Equipment Manufacturer's specifications.

2.1.7.2 Plant Layout – Site C and F

Figures 4 to Figure 6 show examples of plant layout of the crushing and screening circuits installed at Site C (20 January 2024).

Figure 4 - As of 20 January 2024, crushing and screening circuits at Site C

Figure 5 - As of 20 January 2024, crushing and screening circuits at Site C

Figure 6 - As of 20 January 2024, crushing and screening circuits at Site C

Figure 7 to Figure 9 show an example layout of the crushing and screening circuit installed at Site F (19 January 2024).

Figure 7 – As of 19 January 2024, crushing and screening circuits at Site F

Figure 8 – As of 19 January 2024, crushing and screening circuits at Site F

Figure 9 – As of 19 January 2024, crushing and screening circuits at Site F

Figure 10 to Figure 12 show examples of the supporting infrastructure and equipment for the crushing and screening circuits, installed at both Site C and F (19 January 2024).

Figure 10 – Supporting infrastructure - 9,000 litre (L) dust suppression tank, with generator, that dust suppression equipment is supplied from.

Figure 11 – Supporting equipment - Hitachi ZX490lch-5 excavator.

Figure 12 – Supporting equipment - Hitachi ZW370-5 loader.

2.1.7.3 Earthen Bunds

In accordance with Condition 1, Table 1 of W6630/2021/1 (as amended) the crushing and screening areas are established with an earthen bund (750 mm windrows, with dedicated access/exit points into the crushing and screening circuit) to prevent surface water run-off from the crushing and screening plant and associated processed material stockpiles being discharged from the premises. Dedicated site signage has been established with exclusion zones for crushing and screening work access.

The earthen bunds installed at Site C and F on 20 January 2024, are shown in Section 2.1.7.2.

2.1.7.4 Stockpile Height

Stockpile heights are maintained at a maximum of 5 m above existing ground level. Stockpiles at Site F on 19 January 2024, are shown in Section 2.1.7.2.

2.1.7.5 Dust Suppression

Watercarts are operating on haul roads to ensure dust generation is kept to a minimum.

The Decmil CEMP includes parameters for the use of water carts to ensure dust suppression is maintained when required.

Images of water carts in use at Site C roads on 20 January 2024, is provided in Figure 13 and Figure 14.

Figure 13 – The two different types of water carts in use, on Site C roads, 20 January 2024

Figure 14 – Water Cart in use on Site C, 20 January 2024

In accordance with the requirements of W6630/2021/1 (as amended), Condition 1, Table 1, dust suppression sprays are installed at material transfer locations on the jaw crusher, and cone crusher. Figure 15 to Figure 21 demonstrate the sprays installed on the required equipment to ensure compliance with the condition.

In accordance with Condition 6, Table 2, water systems are used to minimise dust generation at material transfer points, crusher, and material stockpiles whenever materials are being processed by the crushing plant, and this requirement is incorporated into the Decmil CEMP.

Figure 15 - Dust suppression sprays on Terex Pegson Maxtrak 1300 (secondary cone crusher) used on Sites C and F

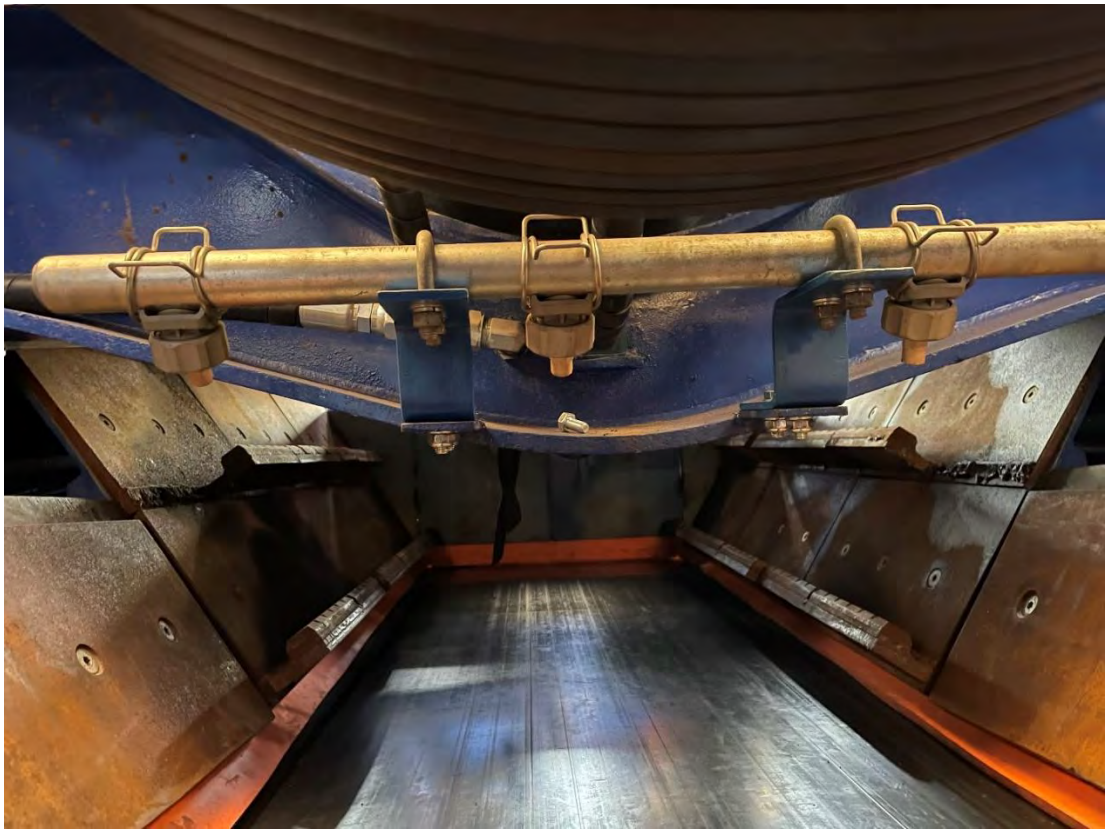


Figure 16 - Dust suppression sprays on Terex Pegson Maxtrak 1300 (secondary cone crusher) used on Sites C and F

Figure 17 - KES 8048 Stacker Track Mounted (transfer conveyor) with dust suppression sprays on spray bar and transfer chute used on Sites C and F

Figure 18 - Striker JM1310 Metso C125 (primary jaw crusher) Dust suppression Manifold used on Site C

Figure 19 - Striker JM1310 Metso C125 (primary jaw crusher) head drum spray bar in transport mode used on Site C

Figure 20 - KES 8048 Stacker Water Manifold inlet used in both Site C and F Site F

Figure 21 - KES 8048 Stacker Transfer Chute with dust sprays used on both Site C and F Site F

2.1.8 Sub-Contractor Audits

The EPC Contractor conducts audits of the bulk earthworks contractor on an approved schedule, in accordance with the SCJV CEMP. These audits include the assessment of compliance of the sub-contractor with the requirements of the W6630/2021/1 (as amended) works approval, as well as additional requirements as stipulated by the EPC Contractor.

The sub-contractor is also required to conducts internal audits as per the following schedule:

1. **Upon completion of construction of the equipment at the premises, sub-contractor must:**

Requirement		Date Checked	Compliant (Y/N/NA)	Comment (including name of verifier)
1.1	Ensure that dust suppression sprays installed at:			
	Material transfer locations Jaw Crusher(s)			
	Material transfer locations on the Cone Crusher(s)			
	Material transfer locations on the product stackers			
1.2	Plant to be equipped with exhaust mufflers from the OEM or systems meeting or exceeding the OEM specifications			
1.3	Ensure an earthen bund is installed around the crushing plant boundary			
1.4	Provide to the SCJV Environmental Superintendent:			
	As-constructed plans of the infrastructure, including the printed name, position, and signature of a person authorised to represent Decmil.			
	A detailed site plan demonstrating: a. the location of the plant is within the Approved Area for Crushing Equipment. b. The location of dust suppression sprays installed at material transfer locations on the Jaw Crusher(s), Cone Crusher(s)s, product stackers. c. The earthen bund The plan is to include the printed name, position, and signature of a person authorised to represent Decmil.			

2. On a daily basis, during the operation of the crushing equipment at the premises, sub-contractor must:

Requirement		Date Checked	Compliant (Y/N/NA)	Comment (including name of verifier)
1.5	Ensure water systems are being used whenever materials are being processed by the plant, to minimise dust generation at:			
	Material transfer points			
	Crushers			
	Material stockpiles			
1.6	Ensure chemical dust suppressants or water trucks are being operated on roads and open areas to ensure dust is minimised.			

3. On a weekly basis during operation of the crushing equipment at the premises, sub-contractor must:

Requirement		Date Checked	Compliant (Y/N/NA)	Comment (including name of verifier)
1.7	The report must:			
	Report on the amount of rock excavated and processed for the week			
	Provide all completed daily checklists for Requirements 1.5 and 1.6 as an attachment.			
	Identify non-compliances, and provide measures Decmil will take to meet them, and timeframes for implementation.			
	Provide information on complaints received about the crushing plant.			
	Provide records of maintenance carried out on infrastructure to ensure compliance with Requirements 1.5 and 1.6 as an attachment.			

3 Other Approvals and Consultation

3.1 Statutory Approvals

Table 9 presents the necessary statutory approvals with various regulatory authorities.

Table 9 - Summary of Project Ceres Statutory Approvals relevant to Category 12 works

Approval Type	Agency	Date of Issue	Approval reference
Environmental Protection Act 1986 (EP Act) Part IV	Environmental Protection Authority	24 January 2022	EPA Report 1705 and Ministerial Statement 1180. Refer to: https://www.epa.wa.gov.au/1180-perdaman-urea-project
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Sections 130(1), 133(1) and 134(1A)	Commonwealth Department of Climate Change, Energy, the Environment and Water	26 February 2022	EPBC Approval 2018/8383. Refer to: http://epbcnotices.environment.gov.au/referralslist/8383
EP Act Part V (Works Approval) Application	Department of Water and Environmental Regulation	Pending	Works Approval W6785/2023/1 for Category 52: Electric Power Generation, Category 58: Bulk Material Loading, Category 73: Bulk Storage of Chemicals, Category 85: Sewage Treatment Plant
Aboriginal Heritage Act 1972 Section 18(3)	Department of Planning, Lands and Heritage	27 January 2022	Refer to Attachment 5.
City of Karratha Local Planning Scheme No.8 Development Approval (DA)	Regional Joint Development Assessment Panel, City of Karratha	17 March 2022	Refer to Attachment 5.
Biodiversity Conservation Act 2016 Section 40 Authorisation to Take or Disturb Threatened Fauna in a Management Operation	Department of Biodiversity, Conservation and Attractions	28 June 2023	Refer to Attachment 5.

3.1 Part IV of the EP Act

Project Ceres was referred to the EPA under Part IV of the EP Act on 7 May 2018 and was assessed through a Public Environmental Review (PER) assessment process. The EPA released its report and recommendation on Project Ceres (EPA Report 1705) and Ministerial Statement (MS) 1180 was granted on 24 January 2022.

A summary of MS 1180 conditions relevant to the Category 12 Licence for crushing and screening is included in Table 10.

Table 10 - Summarised conditions of MS 1180 relevant to Category 12 works

Environmental Factor	Conditions	Condition summary
Limitations and extent of proposal	1	Physical, operational and timing elements shall not exceed stipulated limits.
Air quality management	2-1	The proponent shall ensure that implementation of the proposal achieves the following environmental outcome: (1) ensure that no air emissions from the proposal have an adverse impact accelerating the weathering of rock art within Murujuga beyond natural rates.
Surface water	8-1 8-4 8-5 8-6	The proponent shall implement the proposal to achieve the following environmental objective: (1) maintain the hydrological regimes and quality of surface water so that environmental values are protected. The proponent must implement the most recent versions of the Confirmed Surface Water Management Plan.
Cultural heritage	9-1 9-4 9-5 9-6 9-7	The proponent must implement the proposal to meet the following objectives: (1) avoid, where possible, and otherwise minimise direct and indirect impacts to social, cultural, heritage, and archaeological values within and surrounding the development envelope; (2) allow ongoing Traditional Owner and Custodian access to enable traditional activities and connection to culturally significant areas within and surrounding the development envelope as shown in Figure 2; (3) allow Traditional Owner and Custodian access to the development envelope following decommissioning of the proposal as shown in Figure 2; and (4) avoid, where possible, and otherwise minimise direct and indirect impacts to visual and amenity impacts to social and cultural places and activities. The proponent must implement the most recent version of the Confirmed Cultural Heritage Management Plan.

3.3 Stakeholder Consultation

Perdaman has carried out stakeholder consultation for the development of Project Ceres, which is summarised in Table 11 below:

Table 11 – Stakeholder summary for the development of Project Ceres

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Perdaman Response
8 January 2024	Murujuga Aboriginal Corporation (MAC) and Circle of Elders	MS 1180 EPA Plans annual review and consult session	• Flora Management Plan • Fauna Management Plan • Threatened Species Management Plan • Light Management Plan • Cultural Heritage Management Plan • Surface Water Management Plan	None required.
August 2023	Murujuga Aboriginal Corporation (MAC) and Circle of Elders	MS 1180 EPA Plans review and consult session	• Flora Management Plan • Fauna Management Plan • Threatened Species Management Plan • Light Management Plan	None required.
April 2022 (various follow up meetings during this period).	Murujuga Aboriginal Corporation (MAC) and Circle of Elders	Site visit / Presentation / Endorsement of salvage and relocation methodology	Presentation on the proposed salvage and relocation methodology for sites ID18615, ID19239 and ID19874, and the process for detailed salvage assessments. Addition of Cultural Significance and Cultural Risk sections to the detailed salvage assessments. Endorsement of the detailed salvage assessments and methodology for salvage and relocation by MAC and the Circle of Elders.	MAC endorsed and approved proposed relocation strategy of sites to Reserve 43195. MAC request that Perdaman engage the services of a Marban man to oversee relocation of site ID18615 to ensure cultural safety of those involved in the relocation process. Perdaman to engage MAC to monitor all salvage and relocation activities.
30 Mar 2022	Murujuga Aboriginal Corporation (MAC) and Circle of Elders	Presentation / Meeting	Presentations on design modifications applied to avoid Cultural Heritage Sites in the PDE.	Commitment by Perdaman to engage in further meetings held on country to gain a further understanding of sites endorsed for salvage and relocation.

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Perdaman Response
31 Jan 2022	Murujuga Aboriginal Corporation (MAC) and Circle of Elders	Presentation / Meeting / Endorsement of CHMP	Presentation of the salvage and relocation proposal for the CHMP (Cultural Heritage Management Plan).	Endorsement of the amended CHMP and of the salvage and relocation methodology.
24 Jan 2022	Murujuga Aboriginal Corporation (MAC)	Site visit/ Presentation	MAC Board Presentation of key aspects of this amended Surface Water Management Plan for discussion. Opportunities Potential challenges and solutions.	None Required.
2019 & 2020 (Various times during this period)	Hon. Alannah MacTiernan	Presentation / Meeting	Project update including: • Community stakeholder consultation & feedback • Environmental Impact Assessment • Common-user infrastructure • Social benefits • Employment opportunities • Training opportunities	Details discussed including potential social and economic benefits. Commercial arrangements with Pilbara Ports Authority and the Water Corporation
January 2020	MAC	In principle Endorsement of Heritage Charter	Perdaman Urea Project Overarching Position for Heritage Interaction and management, including Rock Art and Murujuga.	In principle (subject to final Part IV approval of Project) endorsement of Proponent commitment to its overarching position which will underpin Aboriginal Heritage Management Plans, protocols and actions for life of Project Ceres
November & December 2019	Hon. Mark McGowen, Premier	Presentation / Meeting	Project update including • Community stakeholder consultation & feedback • Common-user infrastructure • Social benefits • Employment opportunities	Details discussed including potential social and economic benefits Commercial arrangements with the Pilbara Ports Authority and the Water Corporation

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Perdaman Response
			• Training opportunities	
November 2019	Hon. Ben Morton, Assistant Minister to the Prime Minister and Cabinet	Presentation / Meeting	Project update including: • Community stakeholder consultation & feedback • Environmental Impact Assessment • Common-user infrastructure • Social benefits • Employment opportunities • Training opportunities	Details discussed including potential social and economic benefits Commercial arrangements with State GTEs and common-user infrastructure requirements
27 November 2019	MAC	Agreement Signing	Signing of Commercial Agreement, transformative opportunities	Agreement on mutual support for future aspirations of both parties
14 October 2019	Kevin Michel MLA, Karratha	Briefing	Update on the Environmental Impact Assessment Update on liaison with other community stakeholders	Details discussed
14 October 2019	City of Karratha, PDC	Meeting	Update on the Environmental Impact Assessment Discussions about the housing strategy, City of Karratha is supportive of a strategy that will provide long-term benefits to the community	Details discussed Accommodations for Project Ceres will be integrated to the local community rather than building isolated camps
14 October 2019	Circle of Elders	Presentation / Meeting	Access to the meeting site in the south-west corner to Site F Location of the proposed infrastructure on site Transformative opportunities	The fence that will be installed aims at preventing site workers to access the cultural site and will not block access for the Traditional Owners (TO) Refer to Figures in Appendix A of the ERD Commercial Agreement to be signed with MAC.

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Perdaman Response
14 October 2019	MAC	Workshop	Commercial Agreement, transformative opportunities	Further discussions to be held between MAC and the Proponent
September 2019	Hon. Ben Wyatt, Treasure	Presentation / Meeting	Update on Project including the Environmental Impact Assessment	Details discussed including potential social and economic benefits
20 September 2019	MAC & Advisors	Meeting	Commercial Agreement, transformative opportunities	Further discussions to be held between MAC and the Proponent
4 September 2019	MAC & Advisors	Meeting	Commercial Agreement, transformative opportunities	Further discussions to be held between MAC and the Proponent
June-August 2019	Pilbara Ports Authority (PPS)	Online form, letter	Panamax size vessels Capacity of the shed at the Port	The Proponent will be using high tides to access the berth Storage capacity at the port changed to 65,000 tonnes
05 July 2019	MAC	Presentation / Meeting	Assessment timeline clarification Plant design	The Proponent provided clarification regarding the environmental approval processes. The Proponent provided an update on the plant design. MAC advised that they support the draft ESD and confirmed Project Ceres aligns with their core objectives (ref. email to the EPA of the 8th July 2019).
June 2019	Karratha, Roebourne, Dampier and Wickham Community	Information booths, online form	Project timeline Employment opportunities	Refer to Section 2.3.7 of the ERD.
16 May 2019	Pilbara Development Corporation (PDC)	Meeting	PDC indicated a preference for flexible working hours for employees so they can pursue activities/sports Visual amenity	The Proponent is committing to give the opportunity to all employees to request flexibility to pursue nominated activities / hobbies / sports. Refer to Section 4.9.5 (ERD)

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Perdaman Response
16 May 2019	NYFL	Presentation / workshop	Approach to monitoring and detriment to rock art NYFL Chairman requested information about continuous access for Aboriginal people to NHL area thought to be associated with "Fish Thalu" site within the boundary of site F. Any changes to access into Ngajarli as a result of Hearson Cove Road realignment. Access to the meeting site in the south-west corner of site F. Visual aspects and opportunities.	The Proponent worked with Woodside to obtain a comprehensive regional airshed model (Section 4.8.5 and Appendix D (ERD)). An Air Quality Management Plan and Heritage Management Plan have been developed (Appendix K (ERD)). The Proponent will make access arrangements whereby those with connection to the NHL site would be met at the gate and escorted to the sacred site. The sacred "Fish Thalu" site is outside the operational site boundary (refer to plan layout, Figure 3, Appendix A of the ERD). Hearson Cove Road will be realigned to its official gazetted alignment. Access to Ngajarli will be maintained. The construction-phase boundary has been modified to ensure this cultural site is outside of the fenced area and its use is not impaired. Discussed opportunities to use the wall surfaces of Project buildings and facilities as a medium for Aboriginal artworks and as a visual medium to communicate heritage stories.
April 2019	Woodside	Meeting	Air Quality modelling	Data share agreement
February 2019	Senator Michaelia Cash, Federal Minister for	Meeting	Update on Project including: • Potential social benefits	Details discussed

Date	Stakeholder	Consultation Type	Issues, Topic Raised	Perdaman Response
	Employment, Skills, Small and Family		• Potential employment & training opportunities • Potential economic opportunities	
25 February 2019	Water Corporation	Letter	Discharge in the MUBRL and seawater intake	Appendix J of the ERD
12 February 2019	MAC City of Karratha	Site visit / Presentation	MAC: Construction phase, Site preparation, Plant erection Potential Heritage issues Plant emissions / impacts on Burrup Rock Art General processing plant understanding Employment, training and business opportunities MAC could benefit from Work undertaken to evaluate a Project location at Maitland City of Karratha: The City of Karratha would prefer that the Dampier public wharf be used, and the shed located north of proposed options A & B.	Section 2.3.3 of the ERD Section 2.2.4 of the ERD Third option 'C' added to the Port infrastructure location options. Refer to Section 2.2.6 of the ERD

3.3.1 Community Reference Group

Perdaman shall establish and operate a Community Reference Group (CRG) for Project Ceres and shall be supported by the Community Engagement and Indigenous Participation Plan (CEIP).

The CRG will serve as a platform for effective communication, collaboration, and engagement between the project, stakeholders, and the local community.

3.3.1.1 Objectives

The objectives of the CRG are as follows:

- To facilitate open and transparent communication between the Project and the local community regarding the construction project.
- To provide a forum for stakeholders and community members to express their concerns, provide feedback, and seek clarification on project-related matters.
- To ensure that the project considers and addresses community concerns and aspirations in the decision-making process.
- Opportunity for community members and stakeholders to share information that have identified would support the effective collaboration and engagement between the Project and the Community.

3.3.1.2 Attendees

The CRG shall invite representatives from the following groups to attend the meetings.

- Local government representatives.

- Environmental and conservation groups.
- Business and industry representatives.
- Other relevant stakeholders identified during the project scoping phase.

3.3.1.3 Roles and responsibilities

The project shall provide:

- Briefings of the project's progress, milestones, and any significant changes.
- Seek input and feedback from the attendees on project-related matters that affect or involve the community, including environmental, social, and economic impacts.
- Provide relevant project information and documentation to the CRG in a timely manner.

The CRG attendees can:

- Provide information and seek feedback.
- Actively participate in discussions and if required any decision-making processes.
- Represent the interests and concerns of their respective groups and stakeholders.
- Provide constructive feedback, suggestions, and recommendations to the project.
- Promote effective communication and collaboration within the CRG and the wider community.

3.3.1.4 Meetings and Communication

- The CRG shall meet regularly, with the frequency and format of meetings determined by mutual agreement between the project and the CRG attendees.
- Meetings may be held in person, via teleconference, or through other suitable means, considering the preferences and accessibility of the attendees.
- The project shall provide meeting agendas, relevant project updates, and supporting documentation to attendees who have confirmed attendance at least one week prior to scheduled meetings.
- Minutes of each meeting shall be recorded and distributed to attendees within two weeks of the meeting.
- The project shall ensure that project-related information is made available to the wider community through various channels, including public notices, project websites, social media.

3.3.1.5 Duration and Review

- The CRG shall be established for the duration of the construction project.
- The Terms of Reference shall be reviewed annually or as deemed necessary by the project and the attendees with any proposed amendments subject to mutual agreement.

3.3.1.6 Conclusion

The establishment of a Community Reference Group for project aims to foster effective communication, collaboration, and engagement between Project Ceres, stakeholders, and the local community. By adhering to the Terms of Reference, the CRG will contribute to the successful implementation of the project while addressing community concerns and aspirations.

3.3.2 Principles for Complaints Management

A stakeholder database will be used to manage the complaints process and will be maintained by the Community and Stakeholder Engagement Team on the project across the construction and commissioning phase. Staff will ensure that all complaints are acknowledged courteously, and stakeholders are provided with the correct information when they are lodging a complaint.

3.4 Appeals to Works Approval (W6630/2021/1)

3.4.1 Summary

Works Approval W6630/2021/1 for Category 12: Screening, etc. of material (authorised throughput of 450,000 tonnes per year), was granted on 14 July 2022.

On 5 August 2022, Perdaman received notification that appeals had been lodged against the conditions of W6630/2021/1, in accordance with section 102 of the EP Act. These appeals were submitted by three separate appellants.

The appellants raised several issues specific to the crushing and screening operations, summarised below:

1. Inappropriate exclusion of certain risks associated with crushing and screening, and
2. Inadequate conditions relating to dust emissions from crushing and screening.

3.4.2 Appeals Convenor Report

Appellants raised several issues specific to the crushing and screening operations that they believe should have been assessed by DWER and had conditions placed on the works approval. These concerns relate to:

- Management of site water (sediment or contaminant laden stormwater or process water) from the crushing and screening process and working areas
- Management of hydrocarbons from crushing and screening plant and equipment
- Management of ASS during the crushing and screening process
- Noise and light emissions from crushing and screening
- The impact of dust from crushing and screening on vegetation (OAC, 2023a).

The OAC found that there is justification for exclusion of these risks because they are being managed under other approvals.

While the OAC understood that appellants raised concerns in relation to other activities and risks that may occur on site, DWER advised these are not part of the crushing and screening activity. In this regard, the OAC noted that the construction of the urea production plant is authorised under MS 1180 and this works approval authorises a specific activity associated with the overall proposal. The OAC, therefore considered many of the issues raised to be out of scope of the appeal, however for completeness have discussed the extent to which these matters are managed as 'Other issues' in section 2.5 of the OAC's report (OAC, 2023a).

The OAC found that DWER was justified in limiting its consideration to the risks from the crushing and screening to dust emissions in its assessment of the works approval. OAC's reasons for this were that:

- DWER are required to consider the extent to which Part IV manages a risk and a works approval is required to be consistent with any MS (including the conditions and approved management plans), and
- The risks identified by the appellants are being managed by Part IV management plans required by the MS (OAC, 2023a).

Although the OAC found that DWER was justified in limiting its assessment of emissions from the crushing and screening activity to dust emissions, the OAC found that the way this was described in the W6630 Decision Report could have been improved. In particular, the OAC noted that while DWER cannot apply conditions to a works approval that are contrary to or otherwise in accordance with an implementation agreement, in this case there may have been benefit in DWER providing details on how other requirements, such as the conditions required by MS 1180, control or are expected to manage the identified environmental risks (OAC, 2023a).

The OAC found that although it was not well communicated in the W6630 decision documents, DWER did have regard to the significance of the surrounding rock art. DWER assessed the risk using its risk framework and took a relatively conservative approach. This is reflected in the selection of a consequence rating of 'severe' (highest impact rating) whereas in the absence of the rock art the consequence would have been assessed as minor (second lowest rating). However, the likelihood of the risk occurring was assessed as 'rare' (least likely rating) (OAC, 2023a).

DWER advised that although a conservative approach was taken to determining the risk to rock art it acknowledged that there are some uncertainties associated with the risk. Because of these uncertainties, the OAC agreed that the assessment warranted a cautious approach when identifying conditions (OAC, 2023a). While the OAC found that normal controls recommended by industry guidance to manage dust emissions from crushing and screening activities had been broadly applied as conditions of the works approval, given the heritage significance of the surrounding rock art, and the uncertainty of the role that dust may play in the degradation of rock art, the OAC considered that there should have been additional controls applied to the works approval (OAC, 2023a).

The OAC noted that DWER advised there were limited additional controls that could be applied to mobile crushing and screening, however in their review of industry guidance the OAC found several additional controls that could potentially be applied to the activities. The OAC found that increasing the distance between the crushing and screening plant and heritage sites would provide additional confidence in the existing controls and reduce the likelihood of dust emissions reaching these sites. Based on information relating to dust emissions from crushing and screening the OAC recommended that the distance between the identified heritage sites (as identified and defined in the approved CHMP) and the crushing and screening activity is at least 100m (OAC, 2023a).

The OAC also considered whether there would be benefit in including dust monitoring as this can assist in monitoring the performance of dust management controls. The OAC found that the use of real-time dust monitors is already included in management plans required by the DA and the CHMP which is approved under the MS 1180. For this reason, the OAC did not recommended this monitoring be duplicated on the works approval (OAC, 2023a).

The OAC recommend to the Minister that the appeals were allowed in part, with the following changes to conditions:

- Amend Condition 5, Table 2 'Operational requirement' so that the crushing and screening plant must operate only in locations greater than 100 metres from Aboriginal Heritage Site as identified and defined in the approved CHMP.
- Amend Condition 6, Table 2 'Operational Requirement' so that water systems are to be used to minimise dust generation at material transfer points, crusher and at the materials stockpiles whenever materials are being processed by the crushing and screening plant (OAC, 2023a).

As part of the OAC's investigation, they reviewed management plans approved under MS 1180 and found that although the plans do not specifically mention crushing and screening activities, they do include controls which would manage emissions and discharges associated with the appellants concerns. Although there were controls for many of the issues raised by appellants, the OAC found there are no controls specific for dust emissions from crushing and screening activities. On this basis, it was appropriate for DWER to consider the management of dust emissions within the works approval assessment (OAC, 2023a).

3.4.3 Minister's Decision

The Minister understood the appellants were seeking changes to the conditions of the works approval on the basis that the existing conditions do not adequately protect the rock art in the surrounding environment which the appellants contended has significance at a State, national, and international level (OAC, 2023b).

The Minister understood that the appellants had concerns about other activities and matters that are not authorised by the works approval. The Minister was advised that other activities related to the construction of the Urea Plant will occur under the conditions of the Ministerial Statement (MS 1180) and, where required, other future works approvals (OAC, 2023b).

The Minister determined that the operational requirements specified in Condition 6, Table 2 of W6630/2021/1 be amended so that:

- The crushing and screening plant must only operate in locations that are greater than 100 m from heritage sites as identified and defined in the approved Cultural Heritage Management Plan (CHMP).
- The water systems are to be used to minimise dust generation at material transfer points, crusher, and materials stockpiles whenever materials are being processed by the crushing and screening plant (OAC, 2023b).

The Minister also noted:

- When assessing works that have received approval under a Ministerial Statement, DWER is required to consider the extent a risk is managed under that approval and ensure the works approval is not contrary to, or otherwise than in accordance with the MS 1180. This includes being consistent with the conditions and any management plans approved under these conditions (OAC, 2023b).
- The Minister was advised that the risks that were excluded from the assessment have been addressed in management plans required by MS 1180 for the Perdaman Urea Plant. For this reason, he believed that additional conditions relating to these risks were not required (OAC, 2023b).
- While the Minister shared the appellants views about the significance of the surrounding area, which has local, national, and international significance, he considered that the selection of a consequence rating of 'severe' (highest impact rating) in DWER's risk assessment properly reflects the importance of the potential values that could be impacted by the activity. It is in this context that DWER has assessed the required controls, which the Minister considered are appropriate (OAC, 2023b).
- the use of real-time dust monitors is already included in management plans required by the [City of Karratha] DA and the approved CHMP required under MS 1180, and did not believe that this requirement should be duplicated as a condition of the works approval (OAC, 2023b).

The full Minister's decision and the investigation undertaken by the OAC can be found here: https://www.appealsconvenor.wa.gov.au/Appeal?id=31810 .

4 Existing Environment and Sensitive Receivers

The Pilbara region covers an area of over 500,000 kilometres squared (km^2) and is around 2.8 billion years old. The Pilbara region contains some of the earth oldest rock formations and most important mineral deposits. The Burrup Peninsula, approximately 22 km long and 5 km wide, was originally an island that formed part of the Dampier Archipelago. It was joined to the mainland in the mid-1960s by a road causeway, forming the Burrup Peninsula.

The Burrup Peninsula and surrounding Dampier Archipelago, traditionally referred to as Murujuga, is considered to be of international significance supporting significant natural environmental and Aboriginal heritage sites. The petroglyphs (Aboriginal rock art) are considered to be the most significant of all the Burrup's values (Department of Environment and Conservation, 2006). Murujuga is home to the largest collection of rock art in the world, which is of immense cultural and spiritual significance. In August 2018, the WA Government and Murujuga Aboriginal Corporation (MAC) have agreed to progress the UNESCO World Heritage nomination for Murujuga.

The Dampier Archipelago (including Burrup Peninsula) has been registered on the National Heritage List (NHL) since July 2007 (Place ID 105727). Project Ceres site is located close to Murujuga National Park.

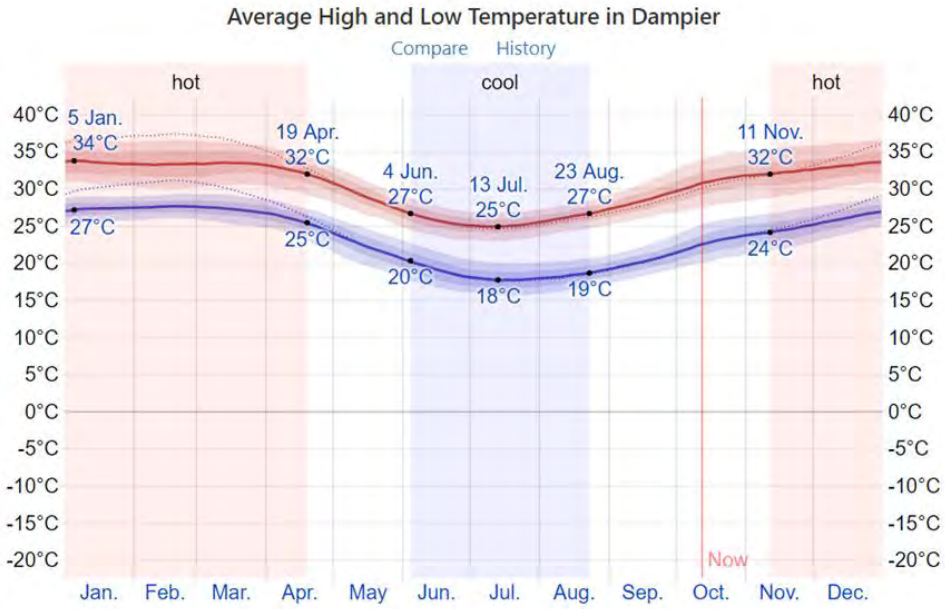
Murujuga National Park covers an area of 4,913 ha, it is freehold land on the Burrup Peninsula, owned by MAC and leased back to the State of Western Australia. The establishment of the National Park was a result of the Burrup Maitland Industrial Estates Agreement (BMIEA) between the Traditional Custodians and the State, which concluded in January 2013, allowing for the development of industry and customary use of the land.

The land use in the surrounding area is primarily industrial and comprises the Dampier Cargo Wharf and supporting infrastructure, the Woodside Pluto LNG Project (located 2.5 kilometres from the premises) and the Yara Fertilisers and Technical Ammonium Nitrate plant (Yara Fertilisers), which is located adjacent to the east of the premises. The Indian Ocean is situated approximately two kilometres west of the premises boundary.

4.1 Climate

Dampier, Karratha and the Burrup Peninsula experience a semi-arid climate with a tropical savannah climate influence. The general seasonal characteristics of this area are hot summers with periodic heavy rains (October to April) and mild winters with occasional rainfalls (May to September). Temperatures are warm to hot all year round. The mean daily maximum is generally in the order of 36 degrees Celsius (°C) in January and around 26°C during July and the cooler months (BoM, 2023). Average high and low temperatures for Dampier are shown in Figure 22.

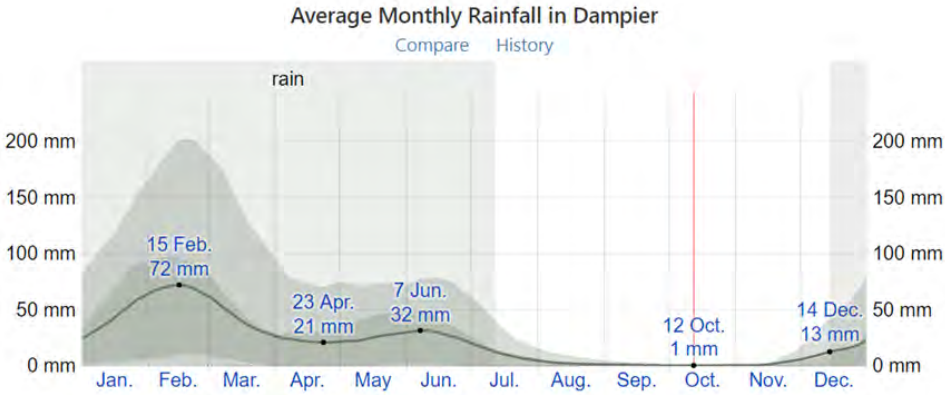
Karratha Aerodrome is the closest Bureau of Meteorology (BoM) weather station (ID: 004083), situated approximately 9 km south of Project Ceres site. Tropical cyclones can occur between the months of December and April, with wind speeds of up to 250 km/hr, heavy swells and torrential rains. The BoM website (accessed 16 January 2024) provides summarised climate statistics for the Karratha Aerodrome weather station, which indicates that the annual median rainfall is 259.4 mm with the majority of rain falling between January and March. Average monthly rainfall in Dampier is shown in Figure 23.



The daily average high (red line) and low (blue line) temperature, with 25th to 75th and 10th to 90th percentile bands. The thin dotted lines are the corresponding average perceived temperatures.

Average	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
High	34°C	33°C	33°C	32°C	29°C	26°C	25°C	26°C	29°C	31°C	32°C	33°C
Temp	30°C	30°C	30°C	29°C	25°C	22°C	21°C	22°C	24°C	27°C	28°C	29°C
Low	27°C	28°C	27°C	26°C	22°C	19°C	18°C	19°C	20°C	23°C	24°C	26°C

Figure 22 - Temperature Statistics for Dampier



The average rainfall (solid line) accumulated over the course of a sliding 31-day period centered on the day in question, with 25th to 75th and 10th to 90th percentile bands. The thin dotted line is the

Figure 23 - Average Monthly Rainfall in Dampier

The wind direction on the Burrup Peninsula is predominately from the east during the dry season between April and August with wind speeds ranging from 17 to 24 km/hour (h). Morning winds are associated with the east and south-easterly patterns and shifting to a north-easterly direction due to diurnal land temperature changes. Wind direction from October to February is predominately westerly in the morning and shifting to a north-westerly onshore wind in the afternoon. Mean wind speed ranges from 19 to 30 km/h.

4.2 Topography

Large outcrops and ranges of fractured red boulder slopes dominate the rugged landscape of the Burrup Peninsula. The land is elevated from the typically low and flat coastal plains of the west Pilbara. There are numerous gorges, creeks and drainage lines cutting across the landscape, which provide variety in the

landscape. This landscape is distinctive in its appearance and is restricted to the Burrup Peninsula and some nearby islands and adjacent mainland. In overall morphology, the Burrup Peninsula is divided into two sections.

Between Hearson Cove and King Bay, a low lying expanse of supratidal mud flat and sand dunes, between one and two km wide, effectively separating the northern and southern elevated rocky sections of the Peninsula. Tidal mud flats characterise the sheltered bays along both eastern and western coasts of the Peninsula including northern Conzinc Bay, Hearson Cove, Cowrie Cove, and Watering Cove (Cardno, 2019).

The following broad landscape character types can be found at or near Project Ceres site:

- Coastline – the Burrup Peninsula coastline and the waters of the Dampier Archipelago and the Indian Ocean, including the bays (Kings Bay, Withnell Bay, Conzinc Bay and Hearson Cove), Dampier Islands (approximately 54), and the foredunes, mangroves and sandy beaches.
- Lowlands – drainage channels and 'narrow valleys', scrublands, and the supratidal flats.
- Rocky outcrops; the steep rugged red rock scree slopes in the north and south of the Peninsula, and
- Industry/Urban – including the Burrup Strategic Industrial Area (BSIA) and the Dampier Port and wharves, industrial islands of Dampier and Karratha townships.

4.3 Geology & Soils

The Australian Soil Resource Information System (ASRIS, 2018) describes the landforms of the Pilbara Region as; dissected plateaus; hills and ridges; undulating plains; alluvial plains. The 1:500,000 Interpreted Bedrock geology map (Geological Survey of Western Australia, 2016) indicated that Project Ceres site is underlined by Gidley Granophyre described as fine to medium-grained granophyre; commonly porphyritic; underlain by gabbro.

The surface geology at Project Ceres site is described by Geoscience Australia 1:250,000 Dampier geological map sheet as Quaternary (Qc and Qs) and detailed as:

- Colluvium - sand, silt, and gravel in outwash fans; scree and talus; proximal mass-wasting deposits,
- Aeolian sand - red-yellow, wind-blown sand; local sand ridges, and
- Dolerite and Gabbro dykes may also occur.

Saline flats are located in a sediment-filled strait between King Bay and Hearson Cove. The soils of the mudflat area are typically alkaline due to the high carbonate content originating from marine sand and underlying calcrete bedrock.

Project Ceres site includes exposed granophyre bedrock, colluvium of sand, silt and gravel in outwash fans of the supra-tidal flats that run through the middle of Project Ceres area and indicate a soil profile associated with a low energy marine depositional environment. The soil profile is largely comprised of sandy loams to silty sands generally brown to grey in colour. The sediments are typically organically rich and often contain a thin veneer of shelly lenses.

4.4 Acid Sulfate Soils

The possible presence of Acid Sulfate Soils (ASS) is reported to be located within the southern section of Site C and within the supra-tidal flat area. It is categorised as Class 1 nature with a high to moderate disturbance risk (<3m from the surface). Due to the historical disturbance of native soil and rock for laydown area in Site F, there is minor potential for ASS to exist or develop in that area.

ASS were considered as a risk, however are not relevant to the crushing and screening activities. Notwithstanding the above, Perdaman has prepared an ASS Management Plan (PCF-PD-EN-ASSMP) for the management of ASS (ground-disturbing works) at Project Ceres.

4.5 Hydrology

There are no permanent surface water bodies occurring at Project Ceres site. The closest natural surface water features are features of the marine environment, King Bay, approximately 700 m west of the site at its closest point and Hearson Cove (Indian Ocean) 2 km east of the site.

Project Ceres is within the proclaimed Pilbara Groundwater and Surface water areas under the *RiWI Act* (DWER-034, DWER-037). Project Ceres does not occur within a Public Drinking Water Source Area (DWER-034) or an area subject to the *Country Areas Water Supply Act 1947*.

The greater project (Project Ceres), not directly related to the crushing and screening project, has a section 17 permit to obstruct or interfere (PMB209045(1)), which was granted on 21 August 2023. Authorised activities

include the construction of a causeway to provide access between Site C and Site F of the project. Perdaman shall ensure that the works does not act as an artificial barrier or levee, causing water to pond upstream.

Potable water to operate crushing and screening plant is currently carted to site, with no extraction of groundwater for drinking water or dust suppression is occurring onsite. Once the Multi-User Brine Return Line is installed by the Water Corporation, water will all come from here, but for the meantime everything is imported to site.

Rainfall onto the site is generally expected to directly infiltrate during periods of low groundwater levels migrating vertically towards groundwater, evaporate at the site surface, and/or be taken up by vegetation (root uptake). During periods of heavy prolonged rainfall and high groundwater levels (i.e. wet season) surface water is expected to migrate via overland flow through drainage channels. Drainage flow is northwards for Site F and southward for Site C, through small ephemeral creeks from the rocky outcrops towards the tidal flats between sites C and F. The mudflat area drains westward to King Bay. During periods of heavy rains and extreme spring tides, the tidal mudflats between sites C and F are subject to flooding.

In January and February 2022, Tetra Tech Coffey carried out a baseline contamination assessment of the Project Ceres to assess the potential presence of contamination at the site and to establish baseline environmental conditions prior to development in accordance with MS 1180 (Tetra Tech Coffey, 2022a).

Initially, up to five surface water samples were sought, however surface waters are significantly affected by both tidal activity and rainfall, and at the time of sampling, it was only possible to collect two surface water samples from available water from the eastern section of the supratidal flats in Site C.

A summary of the findings in relation to surface water is provided below:

- Two samples were collected from two judgemental locations from within the supratidal area at Site C in locations targeting possible migration pathways for upstream contamination sources. The samples were tested for nutrients to determine if surface water had been impacted by migration of Contaminants of Concern (COPCs) from primarily the Yara Fertilisers facility. The results reported have confirmed the presence of ammonia, total nitrogen (TN), total kjeldahl nitrogen (TKN) and total phosphorous (TP) in surface water. When TKN is compared to TN, it suggests TN consists of 100% organic nitrogen. It is possible that the source of nitrogen in surface water is organic in nature within the supratidal area. Regarding TP, the source of TP is undetermined but possibly naturally occurring such as leaching of TP from soils within the supratidal zone. It is noted that none of the reported concentrations of detected nutrients exceeded any adopted assessment criteria.
- PFAS compounds were detected in both surface water samples collected from within the supratidal zone with both sample locations down hydraulic gradient of the Yara Fertilisers facility. Surface water across the supratidal zone is influenced by the rise and fall of tides or tidal influence associated with King Bay. The possible source of PFAS in surface water is the Yara Fertilisers facility however, it is acknowledged that other difuse sources of PFAS may exist in general proximity to the Site which could contribute to PFAS impacts. No analytes exceeded the PFAS NEMP (interim marine 99% species protection) limits.

4.6 Hydrogeology

The groundwater resources in the Pilbara are mainly alluvial, sedimentary or fractured rock aquifers. The Department of Water (DoW) Hydrogeological Atlas details the site as being underlain by the Pilbara Fractured Rock Aquifer which consists of Precambrian granite-greenstone terrain overlain by superficial sediments in river valleys.

A groundwater monitoring event (GME) of four newly installed groundwater monitoring wells was conducted as part of the Tetra Tech detailed site investigation (Tetra Tech, 2022a), and groundwater samples submitted for laboratory analysis to ascertain the groundwater quality with respect to suspected COPCs. The objective of the groundwater study was to quantify baseline groundwater quality, groundwater flow directions, and the depth to groundwater beneath Sites C and F, and to ensure groundwater contamination can be readily detected and appropriate management measures be implemented.

A Baseline Hydrogeological Assessment was carried out by Tetra Tech Coffey (Tetra Tech Coffey, 2022b) to quantify a baseline in regard to hydrogeological conditions on site, including groundwater levels, groundwater quality and groundwater flow direction for both areas of the site (Site C and Site F). Monitoring was carried out at locations provided in Figure 24.

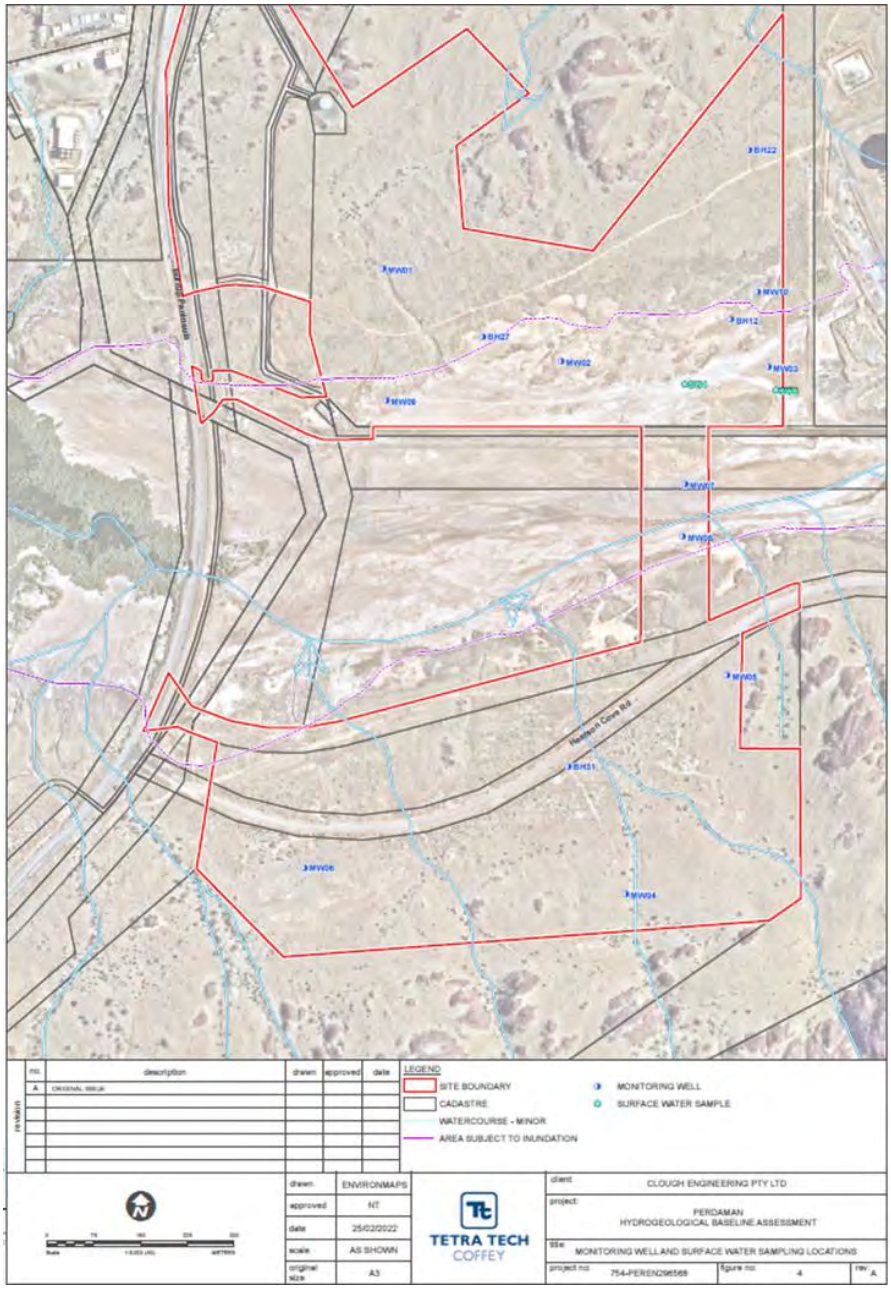


Figure 24 - Baseline Hydrogeological Assessment Monitoring Well Locations (Tetra Tech Coffey, 2022b)

4.6.1 Regional Hydrogeology

The main aquifer in the area is the Pilbara Fractured Rock Aquifer consisting of Precambrain granite-greenstone terrain overlain by superficial sediments in river valleys. These fractured aquifers are usually of low permeability with limited storage with yields controlled by the position, extent and size of fracturing. Superficial sediments may act as perched aquifer bodies where geological conditions allow this (Tetra Tech Coffey, 2022b).

4.6.2 Site Hydrogeology

In Project Ceres site area, the main aquifer bodies consist of the Gidley Granophyre bedrock aquifer, which is overlain by supratidal deposits. These are both considered to be unconfined in nature and in hydraulic connection with groundwater discharge within the intertidal zone. Previous studies have confirmed groundwater quality to be hypersaline with TDS concentrations greater than seawater (40,000-50,000 mg/L) which is thought typical of supratidal environment that are subject to greater evaporation rates.

Groundwater levels are noted to be particularly shallow within the supratidal areas and are noted to be expressed as surface waters during periods of high rainfall. Groundwater levels are also noted to be particularly

affected by tidal variation in this area and this is very likely to affect groundwater flow direction, with groundwater flow likely to be reversed during periods of high tide.

4.6.3 Groundwater Levels

Groundwater contours are presented on Figure 25.

Groundwater flow is toward the southwest in the Site C area and the northwest in the Site F area with eventual discharge shown to be into the Supratidal area with eventual discharge to King Bay to the west. The hydraulic gradient is shown to be reasonably gradual with water levels very close to surface within the supratidal areas and with surface waters in this area likely to be a surface expression of groundwater during high rainfall events.

Due to the heavy tidal influence in the area, it is likely that groundwater flow directions will change and may reverse during periods of high tide. An area of mounding was noted at monitoring well MW09, which is likely caused by pooling of tidal waters in this area and inundation of this well.

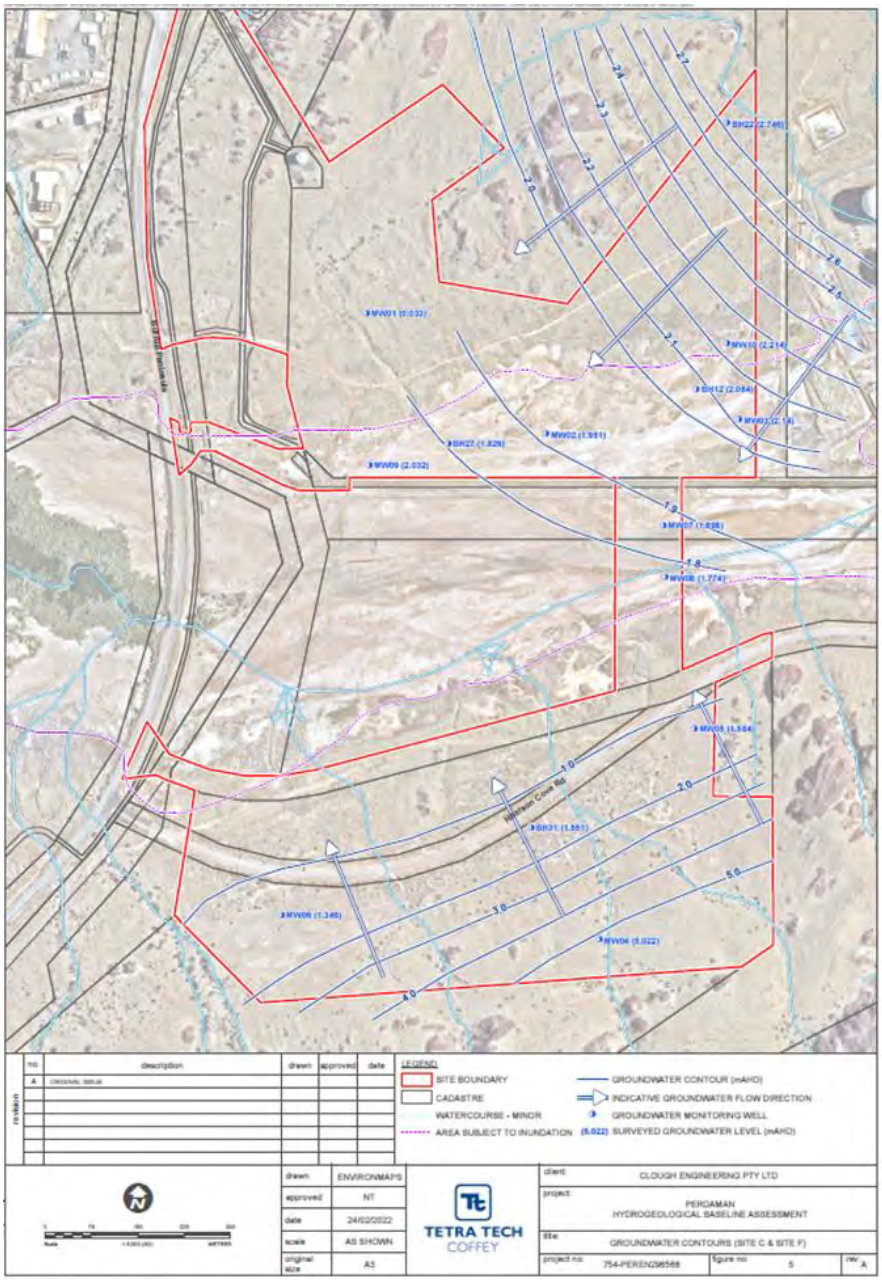


Figure 25 - Groundwater Contours (Tetra Tech Coffey, 2022b)

4.6.4 Groundwater Quality

Tetra Tech Coffey (2022b) noted the following in relation to groundwater quality:

- Reduction (redox) potential (Eh) measurements were seen to range from -68.6 mV to -169.2 mV within wells that were primarily screened within the granophyre bedrock showing predominantly reducing conditions. Within wells that were predominantly screened within the supratidal deposits, redox varied between 67.5 millivolts (mV) to 167.6 mV indicating significantly aerobic conditions, which will be a result of heavy aeration from significant interaction with the atmosphere and oxidised surface waters.
- Electrical conductivity ranged from 5,206 microsiemens per centimeter (uS/cm) to 189,810 µS/cm indicative of brackish to hypersaline conditions. Brackish conditions are noted to exist within wells screened predominantly within the granophyre bedrock away from the supratidal areas whereas hypersaline conditions are noted within wells adjacent to or within the supratidal areas demonstrating a significant tidal influence.
- Field pH measurements ranged from pH 6.56 to pH 7.76 indicating circum-neutral groundwater conditions.
- Temperature measurements ranged from 28.7°C to 32.2°C.
- Chemical indicators that may indicate that groundwater is being affected by, or has already been affected by, the oxidation of sulfides include:
    - a chloride:sulfate ratio less than 2,
    - a pH of less than 5, and/or
    - soluble aluminium concentration greater than 1 mg/L.

Tetra Tech Coffey (2022b) found the sources of nutrients and PFAS in groundwater (and surface water) are thought to emanate from the Yarra Fertilisers facility located upgradient to the east of the site with hydrocarbon contamination noted to be very localised in nature within the granophyre bedrock only. This would suggest that Project Ceres itself does not pose a significant risk to environmental values of the surrounding area including groundwater. In particular it should be noted that where TRH was identified in groundwater (BH22 and BH31) the wells were noted to be particularly low yielding. As a result of this and the likely localised nature of the contamination, this is unlikely to pose a risk to both surrounding groundwater and the wider environment. The low permeability of the granophyre bedrock with the absence of obvious fracturing in this area will result in significant retardation of this localised contamination, which is likely to mean that contamination will have likely degraded prior to impacting any significant receptor (i.e. superficial deposits or surface waters).

The EPC Contractor has undertaken additional four rounds of baseline groundwater monitoring from the existing wells in October 2022, April 2023, July 2023 and October 2023.

However, due to the location of existing groundwater monitoring wells and the project infrastructure, 13 of the 14 existing monitoring bores have been removed to allow for drill and blasting. One monitoring bore (BH22) remains outside the clearing boundary but within the project development envelope. The remaining 13 monitoring bores will be re-installed that will not be impacted by project infrastructure, by March 2024, for quarterly groundwater testing to occur in April 2024.

4.7 Ambient Air Quality

Air quality monitoring was carried out to assess baseline conditions for pollutants Ammonia (NH_3), Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2) and dust deposition, were undertaken in February and March 2022, with analysis of the results reported by GHD (2022), and presented below (GHD, 2022).

Dust deposition is the only pollutant relevant to the crushing and screening operations, which was monitored at three locations within the site's development envelope:

- Monitor One – Located to characterise the baseline compared to industrial pollutants being emitted by Project Ceres's operations.
- Monitor Two – Located to understand the pollutants south of the site and potential to migrate offsite. The monitor is downwind of the proposed location of the site during autumn and winter. Monitor Two is also to understand baseline conditions close to a cluster of rock art.
- Monitor Three - Capture deposited dust north of the site and understand baseline conditions to a nearby cluster of rock art.

The coordinates of the monitoring locations are shown in Table 12 and Figure 26.

Table 12 – Baseline Monitoring locations (GHD, 2022)

Monitor	Latitude	Longitude	Pollutants Monitored
Monitor One	-20.627736	116.770589	NH_3, NO_2, SO_2 and dust deposition
Monitor Two	-20.635266	116.772958	NH_3, NO_2, SO_2 and dust deposition
Monitor Three	-20.625237	116.773098	Dust deposition

The air quality monitoring for NH3, NO2 and SO2 have been excluded from this document, as they are not relevant for the crushing and screening operations.

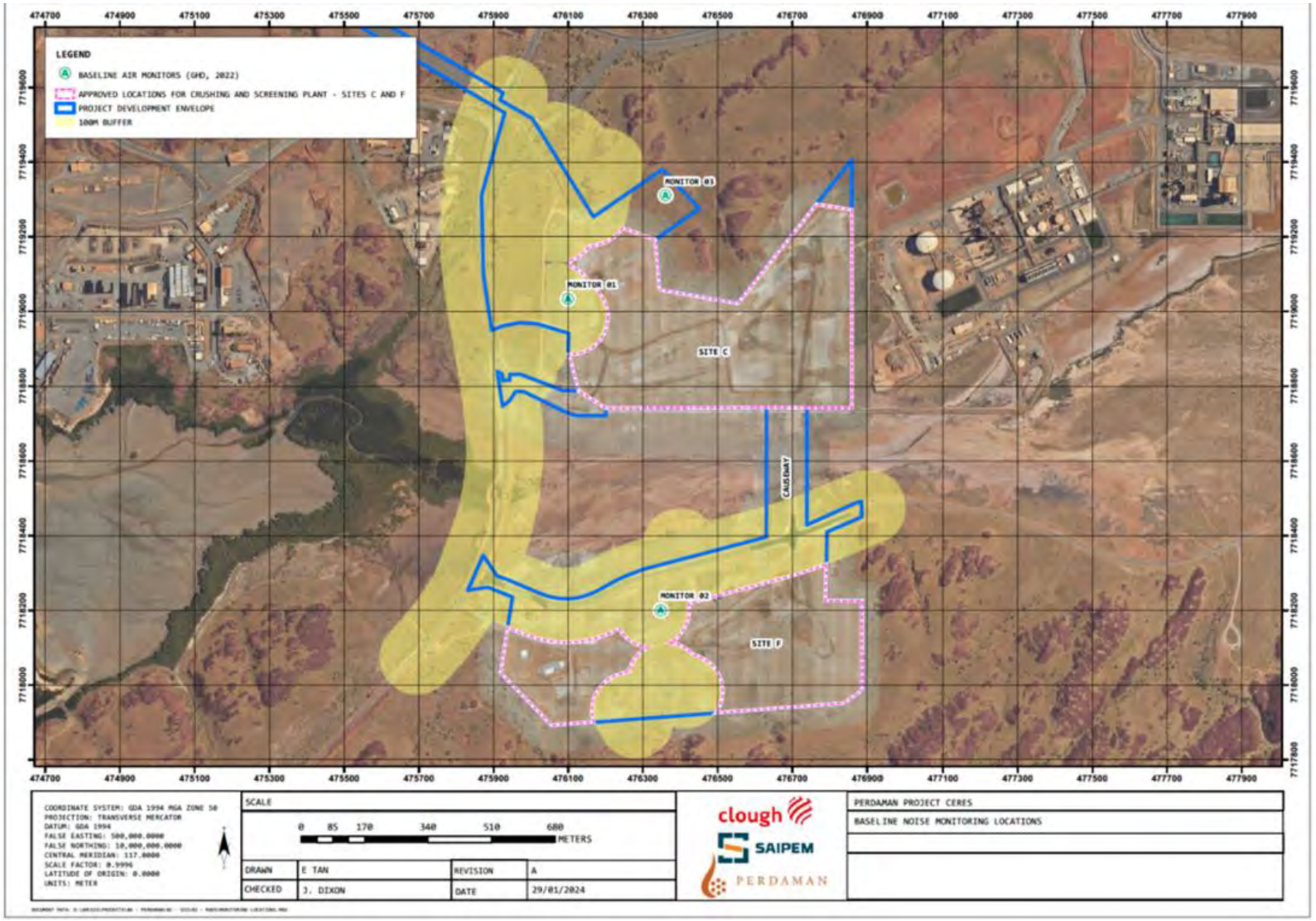


Figure 26 - Location of air quality monitors (GHD, 2022)

Key conclusions from the air quality monitoring are (GHD, 2022):

- No pollutants were detected at Monitor Two. This is likely due to Monitor Two located out of the wind direction arc of influence, or pollutants were likely dispersed prior to reaching the monitor.
- Deposited dust:
    - Monitor One and Monitor Three were both 0.2 g/m^2/mth and 5 percent of the criteria. Monitor Two was <0.1 g/m^2/mth and below the detection limit.
    - The detection of soluble matter at Monitor One and Monitor Three is likely to be due to the monitors being located closer the existing industrial sources, including Pluto LNG plant.
- No rainfall analysis could be conducted as there was no rainfall during the monitoring period.

The air quality monitoring was not intended to meet the requirements of MS 1180 Condition 2-3.

Perdaman will carry out further air quality monitoring prior to the Commencement of Operations, consistent with MS 1180 condition 2-3(2).

In September 2023, Perdaman installed four permanent dust deposition monitors around the crushing and screening plants in Sites C and F. They are located at the Yara boundary, Heritage Site 9439 and the West Industrial Area, as shown in Figure 27.

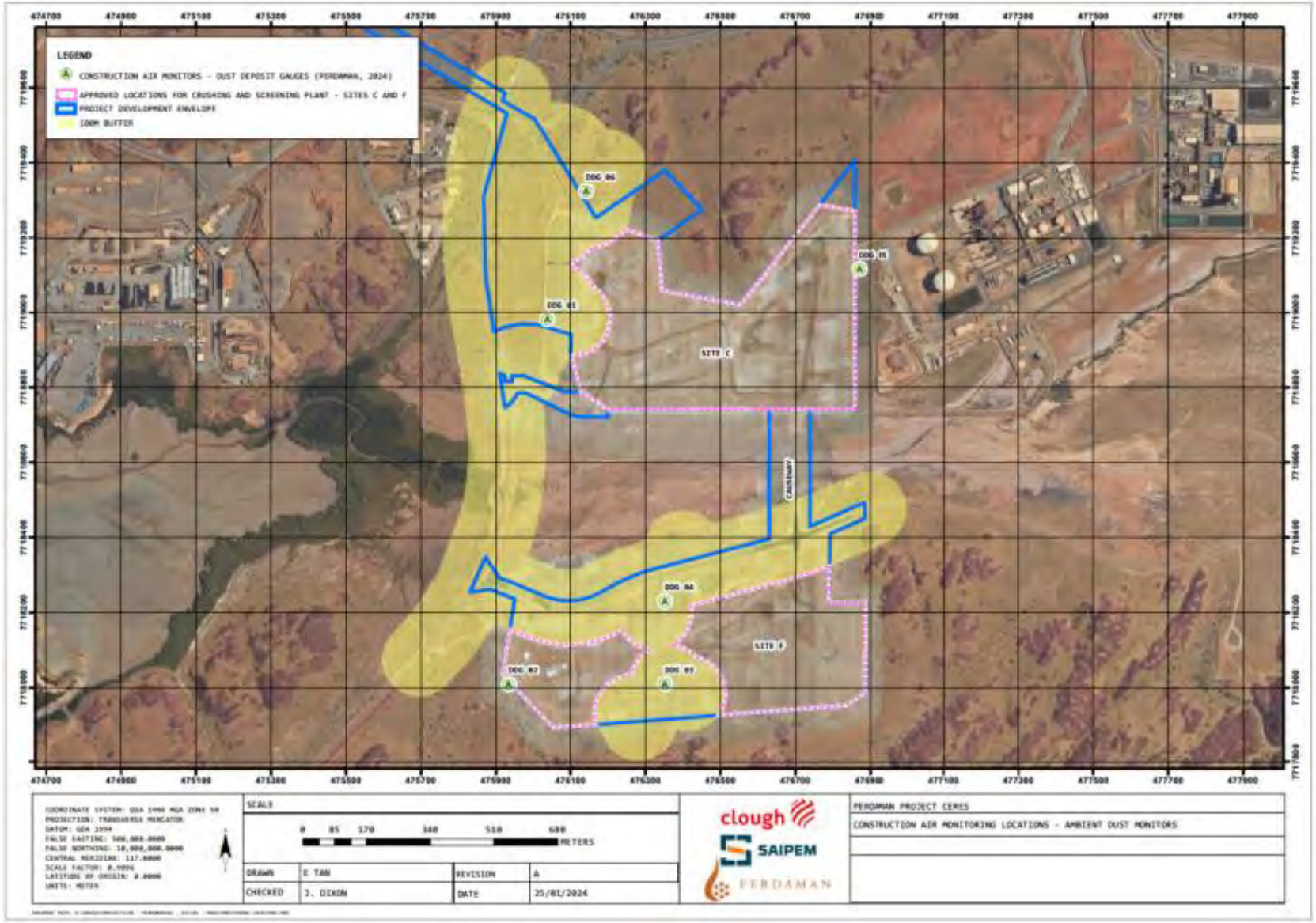


Figure 27 – Ambient dust deposition monitors for construction

4.8 Noise

As part of the environmental studies undertaken for Project Ceres, an environmental noise assessment, including ambient noise monitoring, was carried out by Lloyd George Acoustics (2019), in accordance with the requirements of the *Environmental Protection (Noise) Regulations 1997*.

The mobile crushing and screening plants within Site C and F are within a remote area with no residential areas in the vicinity. The following receiver locations were considered relevant for the noise assessment:

- Hearson Cove – located approximately 2 km to the east, it is understood to be a known local attraction and would be considered a sensitive use. However, although there are no buildings associated with the sensitive use, it is understood that an assigned noise level of 45 decibel (dB) L_{A10} at all hours has been applied by DWER at that location for the assessment of past and recent projects in the area. This level has been used in this assessment for consistency.
- Ngajarli (Deep Gorge) – located approximately 1.5 km to the southeast of the urea processing plant, it is an area known for rock art formations. The location could be considered noise sensitive, however it has no building associated with the sensitive use and is only a ‘day use’ area.
- Proposed urea plant and Yara industrial site boundaries.
- Eastern part of the industrial area located off Burrup Road.

Baseline noise monitoring undertaken by Lloyd George Acoustics (2019) utilised four monitoring locations within the project development envelope, as shown in Figure 28.

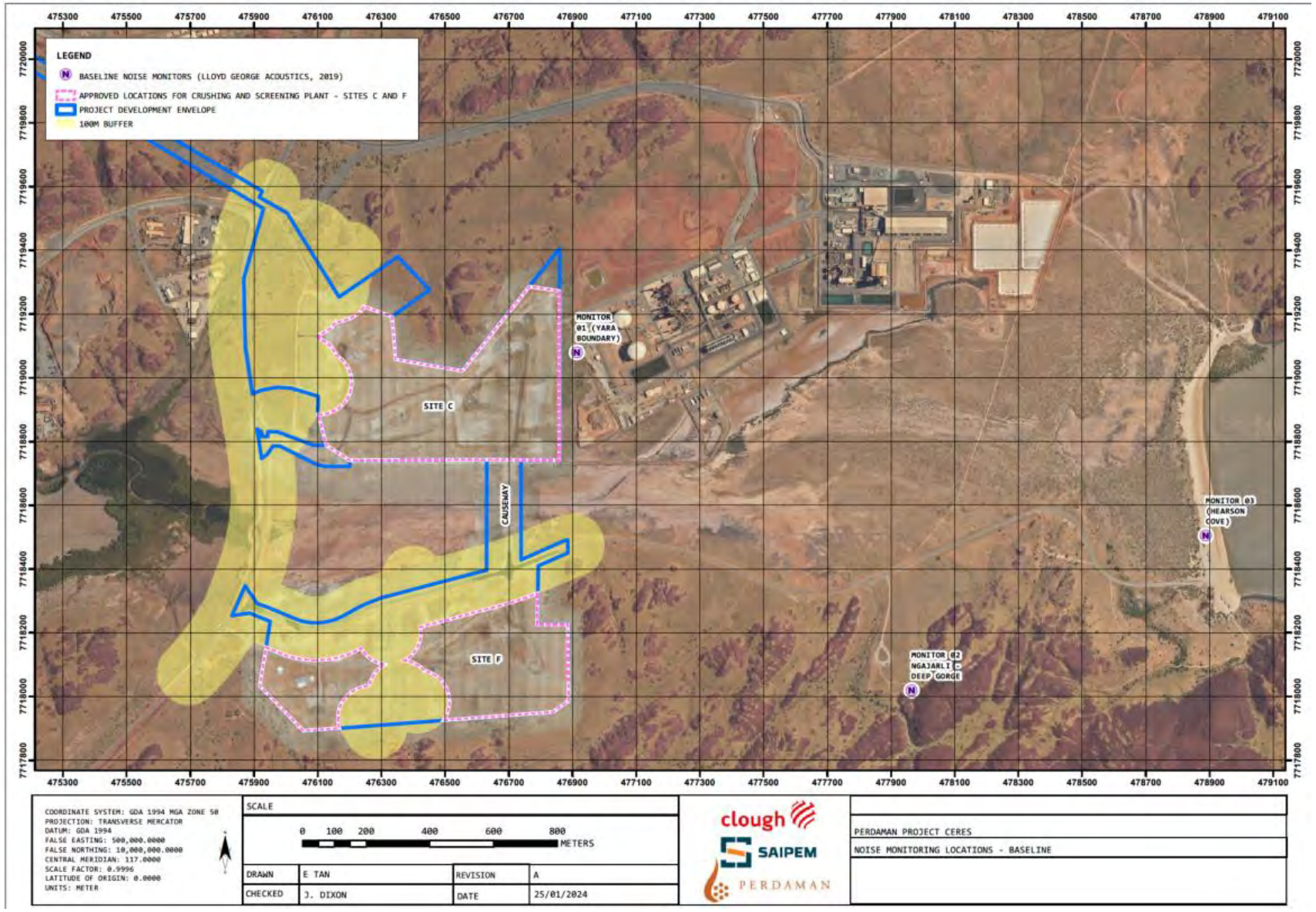


Figure 28 - Baseline Noise Locations

Lloyd George Acoustics (2019) estimated the noise impact from Project Ceres during operation, however the crushing and screening plant was not incorporated into this modelling.

During the day and night monitoring periods, background noise levels over 45 dB L_{A90} were consistently recorded at both Hearson Cove and Ngajarli sampling stations given that some local wildlife became more active.

Results of ambient noise monitoring show that the noise levels recorded at Hearson Cove and Ngajarli sampling station generally follow an 'inverted day-night' pattern whereby night-time noise levels are mostly higher than during the day.

Based on observations on site and the audio recordings, the background noise levels at these locations mostly consisted of wind induced noise, wildlife noise, some industrial noise and local or distant vehicular traffic. At Hearson Cove, it was also noted that local works were carried out during the monitoring period, which are likely to have influenced day-time noise level at this location.

At the Yara Ammonia Plant Boundary, the daytime noise levels were dominated by local works on site with background noise levels recorded between 55 dB L_{A90} and 60 dB L_{A90}.

4.8.1 Further Noise Studies

Permanent noise monitors were installed by the EPC Contractor in September 2023, as shown in Figure 29.

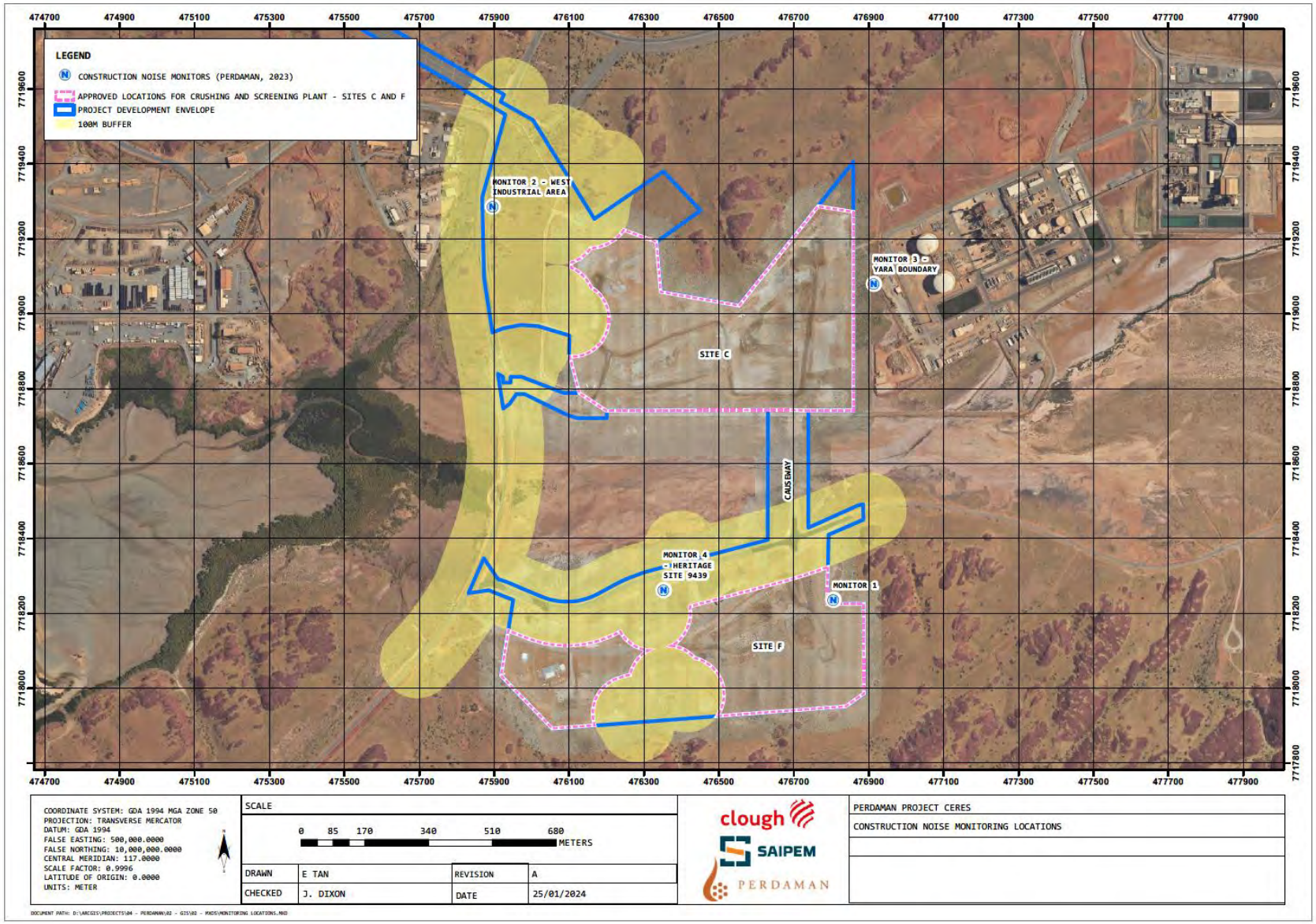


Figure 29 - Permanent noise monitor locations

4.9 Land-Use

Project Ceres will be located within the BSIA, a State designated area for industrial development with a focus on downstream processing projects based on the local resources, particularly natural gas (LandCorp, 2014). Site C and F of the estate have been allocated for the plant and associated infrastructure, and the conveyor through to the Port will be located within the existing East West Service Corridor.

A number of industries already operate on the BSIA such as:

- The Woodside-operated North West Shelf Venture project
- Woodside's Pluto LNG plant
- The Yara Pilbara Fertilisers plant, and
- Yara Pilbara Nitrates' technical ammonium nitrate plant.

The BSIA is located within the City of Karratha and the area is zoned 'Strategic Industry' under the City's Town Planning Scheme No.8. It is understood that Site L at the northern end of the BSIA, previously zoned for industrial use, was recently incorporated into the Murujuga National Park.

4.10 Environmentally Sensitive Areas

No Environmentally Sensitive Areas (ESA) occur within 10 km of Project Ceres site. The closest ESA (Dampier Archipelago) is situated approximately 8 km west of Dampier Port at its closest point.

4.11 Wetlands

There are no Ramsar or Directory of Important Australian wetlands at Project Ceres site, or within 10 km of the site.

The closest Ramsar wetland (Eighty-mile Beach wetland) is located approximately 310 km to the northeast of Karratha. The closest Directory of Important Australian wetlands (Leslie Salt Fields System) is located approximately 200 km to the northeast of Karratha.

4.12 Native Vegetation

Native vegetation within the project area is located within the Pilbara Interim Biogeographic Regionalisation for Australia (IBRA) region, with approximately 99.57 percent (%) remaining. The broad vegetation type (complex) across the project area is 117 – Roebourne (Hummock grassland), with approximately 98.51 % remaining (Government of Western Australia, 2019).

Clearing has been carried out in Sites C and F to facilitate the construction of the Project. This clearing allows for the operation of the crushing and screening operations.

Clearing undertaken to date includes the following approximates:

- Rocky Outcrops/Priority 1 PEC - 0.102 hectares
- Hummock Grasslands on Mid Slopes - 46.50 hectares
- Samphire Shrubland/ Supratidal Flats - 11.47 hectares
- Drainage Lines - 2.42 hectares
- Sub-total = 60.4 hectares (Approved area under MS 1180 64 hectares)
- Previously Disturbed - 11.838 hectares
- **Total = 72.33 hectares**

4.13 Conservation Significant Flora

The Confirmed Flora Management Plan (FMP) (PCF-PD-EN-FMP), considers Priority Flora and was assessed and approved by the EPA in accordance with MS 1180.

4.14 Ecological Communities

The Confirmed FMP considers ecological communities, and was assessed and approved by the EPA in accordance with MS 1180.

4.15 Conservation Significant Fauna

The Confirmed Threatened Species Management Plan (TSMP) (PCF-PD-EN-TSMP) considers conservation significant fauna species and was assessed and approved by the EPA and DCCEEW in accordance with MS 1180 and EPBC Approval 2018/8383. The Confirmed Fauna Management Plan (FaMP) (PCF-PD-EN-FaMP) considers short-range endemic fauna and was assessed and approved by the EPA in accordance with MS 1180.

4.16 Cultural Heritage

The Confirmed Cultural Heritage Management Plan (CHMP) (PCF-PD-EN-CHMP) considers cultural heritage and was assessed and approved by the EPA and DCCEEW in accordance with MS 1180 and EPBC Approval 2018/8383.

Further information can be found in Section 5 regarding potential impacts to rock art integrity, cultural heritage sites and heritage listings. Section 5.1 addresses potential dust impacts to rock art.

4.17 Contaminated Sites

Notice of a classification of a known or suspected contaminated site was given under section 15 of the *Contaminated Sites Act 2003* on 13 February 2023 for the following land:

- Lot 3013 on Deposited Plan 42282 as shown on certificate of title LR3139/36 known as Burrup WA 6714
- Lot 540 on Deposited Plan 221364 as shown on certificate of title LR3122/50 known as Burrup WA 6714
- Lot 640 on Deposited Plan 29300 as shown on certificate of title LR3003/200 known as Burrup WA 6714
- Lot 704 on Deposited Plan 411759 as shown on certificate of title LR3174/529 known as Burrup WA 6714
- Lot 703 on Deposited Plan 411759 as shown on certificate of title LR3174/528 known as Burrup WA 6714
- Lot 707 on Deposited Plan 411759 as shown on certificate of title LR3174/531 known as Burrup WA 6714
- Lot 705 on Deposited Plan 411759 as shown on certificate of title LR3174/530 known as Burrup WA 6714
- Approximate spatial representation of section of Lot 700 on Deposited Plan 411759 (Landgate PIN 12574931) as shown on certificate of title 4017/305, Burrup WA 6714

5 Potential Emissions, Discharges and Mitigations

The mobile crushing and screening plant will produce limited emissions and discharges during operation. The activities associated with the crushing and screening of materials are discussed in Section 2. The expected emissions and discharges are presented in the following sections, as well as the mitigation strategies established in supporting documents and implemented onsite during time limited operations of the crushing and screening equipment. Detailed management protocols are presented as Appendices within the *SCJV Construction Environmental Management Plan* (CEMP) (Revision 3) (0000-ZA-E-09071) and sub-plans.

5.1 Point Source Air and Dust Emissions

Air emissions have the potential to affect community and environmental health in nearby areas contributing to large scale and widespread issues such as climate change, ozone depletion and acid rain. Perdaman has previously determined that air emissions may be produced during construction of Project Ceres, mainly from equipment and mobile vehicles, the removal and installation of temporary and permanent plant equipment and lift off from soil stockpiles, particularly during the dry periods, and during earthworks.

List of point source emissions include:

- particulate matter
- nitrogen oxides
- sulfur dioxide
- carbon monoxide
- and volatile organic compounds.

Emissions produced during construction of Project Ceres are not considered to represent a significant source of emissions, and are only expected to have a minor, temporary impact on local air quality.

Perdaman acknowledges the key issue of concern for rock art is the potential for colour changes to occur due to natural weathering of the rock art being accelerated by industrial air emissions, in addition to the he potential damage to rock art from dust deposition.

The primary emissions from the crushing and screening plant are particulate matter, as Total Suspended Particulates (TSP) Particulate Matter (PM) PM2.5, and PM10). These emissions shall be collectively referred to as ‘dust emissions’.

Dust emissions and potential impacts, in so far as it relates to impacts to terrestrial fauna (including threatened species) and vegetation, has been assessed under the Part IV assessment process, and the FMP, FaMP and TSMP address the risks to native flora and fauna. Further mitigations have been implemented for the construction phase of Project Ceres, including during crushing and screening, as provided in the SCJV CEMP.

Dust emissions also have the potential to adversely impact cultural heritage sites, including rock art and public amenity.

Dust emissions are commonly associated with crushing and screening plants and therefore Perdaman shall ensure that dust emissions within the proposed prescribed premises area are managed to mitigate the potential risks posed by these emissions. Dust may be generated by the crushing and screening process, mobile vehicles driving around the site and from the associated stockpiles being exposed to wind conditions (lift off from stockpiles, particularly during the dry periods).

5.1.1 Murujuga Rock Art Strategy

The purpose of the Murujuga Rock Art Strategy (MRAS) is to protect the Aboriginal rock art by providing a long-term framework for the monitoring and analysis of changes to the rock art and describing a process by which management responses will be put in place to address adverse impacts on the rock art (DWER, 2019c).

The MRAS will establish an Environmental Quality Management Framework, including the derivation and implementation of environmental quality criteria, and Perdaman is committed to the implementation of the environmental quality criteria when such criteria is developed.

5.1.2 Mitigation and management measures

Consistent with the recommendations of the EPA, and Confirmed Management Plans and Construction Environmental Management Plan, a cautious, preventative approach will be taken to ensure air emissions from the crushing and screening operations do not cause an adverse impact on rock art within Murujuga beyond natural rates.

In considering the appeals against W6630/2021/1, the OAC made the following notes in its report (OAC, 2023):

1. There is no requirement for enclosures on the crushing and screening plant.
2. There is no requirement for dust exhaust ventilation.
3. There is no requirement for inspections of dust suppression controls or monitoring performance of controls.

5.1.2.1 Development Approval (DA21261) - City of Karratha

DA21261 stipulates that Perdaman is to implement dust management measures at all times during the construction and operational phases of the development in accordance with the required plans and any other relevant legislation and/or approvals applicable to this development.

> ***Condition 13****. The Construction Environmental Management Plan shall be implemented and adhered to through the construction phase of the development to the satisfaction of the City of Karratha.*
>
> ***Advice Note 6****. The applicant shall implement dust management measures at all times during the construction and operational phases of the development in accordance with the required plans and any other relevant legislation and/or approvals applicable to this development.*

5.1.2.2 Works Approval W6630/2021/1

Works Approval W6630/2021/1 was issued to Perdaman on 14 July 2022, and was amended 18 December 2023.

Consistent with the requirements of W6630, the following mitigations are implemented to mitigate and manage dust impacts from the activity:

- Dust suppression sprays are installed at material transfer locations and are used to minimise dust generation whenever materials are being processed by the crushing and screening plant,
- Plant is equipped with exhaust mufflers from the original equipment manufacturer or systems meeting or exceeding the OEM specifications,
- Earthen bunds are installed around the crushing and screening boundary to prevent surface water run-off from the crushing and screening plant and associated processed material stockpiles being discharged from the premises,
- The crushing and screening plant is only operated at locations:
- Within the clearing boundary as shown in Figure 1,
- Locations that are greater than 100 m from heritage sites as identified and defined in the cultural heritage management plan,
- Water trucks are operated on roads and open areas to ensure dust generation is kept to a minimum.
- Stockpiles do not exceed 5 m in height above ground level.

5.1.2.3 SCJV Construction Environmental Management Plan

The SCJV Construction Environmental Management Plan (SCJV CEMP) (0000-ZA-E-09071) has been prepared for the construction phase of Project Ceres, The SCJV CEMP includes an Air Quality Management Protocol (AQMP) was prepared by the EPC Contractor to comply with the requirement of MS 1180, and includes management controls specific to the construction methodology that will be applied during the Project Ceres construction program, including crushing and screening activities.

The AQMP describes the Scope of Work, addresses all requirements related to management of dust by the Project, and establishes the strategies, methods, processes which will be adopted to provide certainties in delivering successful execution of the project while adhering to environmental objectives for

the Project.

The AQMP presents in detail:

- Relevant conditions of the Project Approvals and confirmed management plans.
- Clear and concise descriptions of roles and responsibilities in relation to controls to minimise environmental impacts from air emissions for the duration of the construction works.
- Relevant legislation, standards and technical guidelines when developing preventative controls.
- Monitoring requirements during construction.

The AQMP was prepared and maintained by the EPC Contractor Environmental Team, and is a "live" Protocol. As such, the AQMP shall be reviewed periodically and revised as needed. The AQMP is to be read and implemented in conjunction with the most recent and approved version of the SCJV CEMP.

Air quality mitigation measures stipulated in the AQMP relating to crushing and screening include:

- A Dust Management Procedure will be developed for approval by the SCJV Environment & Heritage Manager prior to commencing Works likely to generate dust.
- Dust suppression techniques will be used on unsealed roads and access tracks, cleared areas and at locations of high dust risk.
- Dust suppression sprays installed at material transfer locations on the jaw crusher, cone crushers, triple deck screen and product stackers.
- Water systems to be used to minimise dust generation at material transfer points, crusher and at the materials stockpiles.
- Chemical dust suppressants or water trucks to be operated on roads and open areas to ensure dust generation is kept to a minimum.
- Stockpiles must not exceed 5 m in height above ground level.
- Dust suppression measures will be implemented where dust is visible, except during topsoil stripping.
- Saline water (> 5000 mg/L TDS) will not be used for dust suppression unless approved by the SCJV Environment and Heritage Manager, or delegate.
- Where the use of saline water for dust suppression (> 5000 mg/L TDS) is approved, dribble bars will be used to control overspray onto adjacent vegetation.
- A log of water used for dust suppression will be maintained and reported in the Monthly Environmental Report. Information reported will include, where relevant, the source of the water, date and time, volume removed (including meter reading at start and finish), location where water was used.
- Vehicle speeds on access tracks and around work sites will be reduced where necessary to minimise dust emissions.
- Vehicles will remain within designated roads and park only in allocated areas.
- Dust suppressant additives or methods that reduce overall water consumption should be used wherever practicable. This will include restricting traffic within cleared areas until access is needed.
- Vegetation clearing, grubbing and earthworks during high winds (>40 km/hr) should be avoided. Where these works are required to be conducted during high winds, additional management measures must be implemented to minimise and control dust emissions.
- Four dust monitors are to be installed, comprised laser-based Optical Particle Counter for the monitoring and recording of PM2.5 and PM10 during construction activities.
- The inclusion of cellular technology incorporated into the dust monitors will empower the SCJV to actively monitor dust emissions near-real time. In addition, six dust deposition

gauges will also be procured and deployed outside of the construction footprint adjacent to sensitive receptors (including petroglyphs) to monitor dust loading.

- One dust monitor shall be installed outside of the construction footprint and upwind of prevailing winds to monitor background dust concentrations while the remaining three monitors will be placed around the crushing and screening operations.
- Air emissions during operation of process plant and equipment will be within the Project's approved thresholds. Where monitoring results indicate higher emissions than those stated in the Project's approval conditions, corrective actions must be implemented as soon as practicable to reduce emissions below the permitted level.
- Where ground disturbance, including clearing activities are conducted either within the NHP or within 50m where the Lease abuts the NHP, ground preparation works in proximity to the NHP must be managed using water carts to decrease dust and blast mats will be used during blasting to prevent flying rock.
- Dust mitigation (i.e., water carts) will be utilised where activities are likely to cause dust pollution and nuisances to community visitors, tourists, traditional owners and MAC etc who are visiting culturally significant sites (i.e., during conveyor works or works adjacent to heritage sites within the Development Envelope.)
- Employ various methods onsite to reduce dust onsite, including dust suppression with water or stabilisers (i.e., dustex).
- Water tankers to be readily available to dampen exposed surfaces within construction and laydown areas, particularly ground disturbing activities.
- Any work activities prone to creating dust i.e., excavations or clearing, will be staged and conducted during low wind periods.
- Erosion and sediment control methods will be in place onsite to prevent soil from being deposited offsite and causing a dust nuisance later.
- Loads being transported to site, from site and within the site shall be damped down or covered where wind-blown material can cause nuisance.
- Ensure vehicles, plant and equipment are well maintained to reduce exhaust emissions to surrounding environment.
- Dust suppressant additives or methods that reduce overall water consumption should be used wherever practicable. This shall include restricting traffic within cleared areas until access is needed.
- Dust emissions during construction should not adversely impact the visual amenity for those visiting at culturally significant sites such as Hearson Cove, Yatha, Deep Gorge and Fish Thalu site.

5.1.2.4 Construction Dust Management Procedure

A Construction Dust Management Procedure (DMP) (000-ZA-E-02850) has been prepared for Project Ceres construction works.

The DMP was prepared by the EPC Contractor to comply with the requirement of the SCJV CEMP AQMP for the construction program including crushing and screening, the relevant Works Approvals issued by DWER and the City of Karratha Development Approval.

The DMP presents in detail:

- The dust emission management principle and EPA air quality objective.
- Potential air emissions project scope and context.
- Aspects and impacts.
- Legislation, guidelines, approvals, licences and permits.
- Applicable Licence and Works Approval Conditions.
- Management actions.

- Monitoring requirements.

The DMP is maintained by the EPC Contractor Environmental Team and is a “live” Procedure. As such, shall be reviewed periodically and revised as needed. The DMP must be read and implemented in conjunction with the most recent and approved version of the SCJV CEMP and AQMP.

Dust mitigation measures stipulated in the DMP relating to crushing and screening includes:

- Dust suppression techniques will be used on unsealed roads and access tracks, cleared areas and at locations of high dust risk.
- Dust suppression sprays installed at material transfer locations on the jaw crusher, cone crushers, triple deck screen and product stackers.
- Dust suppression controls will be in operation any time material is being processed through the crushing and screening equipment.
- Water systems to be used to minimise dust generation at material transfer points, crusher and at the materials stockpiles.
- Chemical dust suppressants or water trucks to be operated on roads and open areas to ensure dust generation is kept to a minimum.
- Stockpiles must not exceed 5 m in height above ground level.
- Dust suppression measures will be implemented where dust is visible, except during topsoil stripping.
- Saline water (> 5000 mg/L TDS) will not be used for dust suppression unless approved by the SCJV Environment and Heritage Manager, or delegate.
- Where the use of saline water for dust suppression (> 5000 mg/L TDS) is approved, dribble bars will be used to control overspray onto adjacent vegetation.
- A log of water used for dust suppression will be maintained and reported in the Monthly Environmental Report. Information reported will include, where relevant, the source of the water, date and time, volume removed (including meter reading at start and finish), location where water was used.
- Vegetation clearing and exposed surfaces will be kept to a minimum wherever practicable.
- Vehicle speeds on access tracks and around work sites will be reduced where necessary to minimise dust emissions.
- Vehicles will remain within designated roads and park only in allocated areas.
- Dust suppressant additives or methods that reduce overall water consumption should be used wherever practicable. This will include restricting traffic within cleared areas until access is needed.
- Vegetation clearing, grubbing and earthworks during high winds (>40 km/hr) should be avoided. Where these works are required to be conducted during high winds, additional management measures must be implemented to minimise and control dust emissions.
- Where ground disturbance, including clearing activities are conducted either within the NHP or within 50m where the Lease abuts the NHP, ground preparation works in proximity to the NHP must be managed using water carts to decrease dust and blast mats will be used during blasting to prevent flying rock.
- Dust mitigation (i.e., water carts) will be utilised where activities are likely to cause dust pollution and nuisances to community visitors, tourists, traditional owners and MAC etc who are visiting culturally significant sites (i.e., during conveyor works or works adjacent to heritage sites within the Development Envelope.)
- Employ various methods onsite to reduce dust onsite, including dust suppression with water or stabilisers (i.e., dustex).
- Water tankers to be readily available to dampen exposed surfaces within construction and laydown areas, particularly ground disturbing activities.

- Any work activities prone to creating dust i.e., excavations or clearing, will be staged and conducted during low wind periods.
- Erosion and sediment control methods will be in place onsite to prevent soil from being deposited offsite and causing a dust nuisance later.
- Loads being transported to site, from site and within the site shall be damped down or covered where wind-blown material can cause nuisance.
- Stockpiles will be covered or hydro mulched and inspected regularly for integrity and intactness.
- Disturbed areas on site will be stabilised as soon as practicable.
- Dust suppressant additives or methods that reduce overall water consumption should be used wherever practicable. This shall include restricting traffic within cleared areas until access is needed.
- Blasting or clearing within NHP or less than 50m of NHP boundary, use of dust control and blast mats.
- The crushing and screening plant will be located outside of a 100m buffer from sensitive sites, including petroglyphs and public roads.

As part of the DMP, Perdaman have incorporated the following dust monitoring requirements that relate to the crushing and screening operations and associated activities:

- Site inspections during windy days to ensure dust management controls are effectively applied.
- Opportunistic visual inspections daily to ensure dust controls are being implemented.
- Weekly environmental inspections to monitor project activities for dust emissions.
- Weekly dust suppression water quality field test using a calibrated pocket TDS meter to monitor no exceedance of 5,000 mg/L limit.
- Visual dust inspections conducted continually during dust generating activities.
- Quarterly inspect of vegetation for dust settlement on foliage during construction and impacts of poor water quality used for suppression.
- Annually conduct inspections on vegetation health and foliage for signs of dust impacts during operations.
- Regular inspections and auditing of complaints register and incident register / reporting system.
- Regular auditing of maintenance records to ensure vehicles, equipment and plant are being maintained according to schedules.
- Dust monitoring for PM 2.5 and PM10 shall be implemented continuously during construction works in the locations shown in Table 13.

Table 13 - Dust monitoring locations during construction works.

Monitor #	Easting	Northing
Monitor 1	476805.764	77718236.851
Monitor 2 – West Industrial Area	475895.889	7719286.703
Monitor 3 – Yara Boundary	476913.656	7719080.439
Monitor 4 – Heritage Site 9239	476352.224	7718262.91

5.1.2.5 Sub-Contractor Construction Environmental Management Plan

The bulk earthworks contractor engaged for the crushing and screening activities has prepared a Construction Environmental Management Plan, in accordance with the requirements of the SCJV CEMP. This document was reviewed and approved by the EPC Contractor, and is consistent with the requirements of the Perdaman approvals and management plans, as applicable to the crushing and screening works.

5.1.2.6 Applicable Legislation & Regulations

All crushing and screening works are undertaken acknowledging the concerns of the risk to rock art from the abrasive action of particulates from the activity, though these risks are not fully understood.

The crushing and screening shall be carried out in accordance with the following legislation, regulations, and best practice guidance:

- *Environmental Protection Act 1986*
- *Environmental Protection (Unauthorised Discharge) Regulations 2004*
- Draft Guideline: Dust Emissions (DWER, 2021).

Figure 30 to Figure 34 demonstrate the dust mitigation and management strategies employed for crushing and screening works.

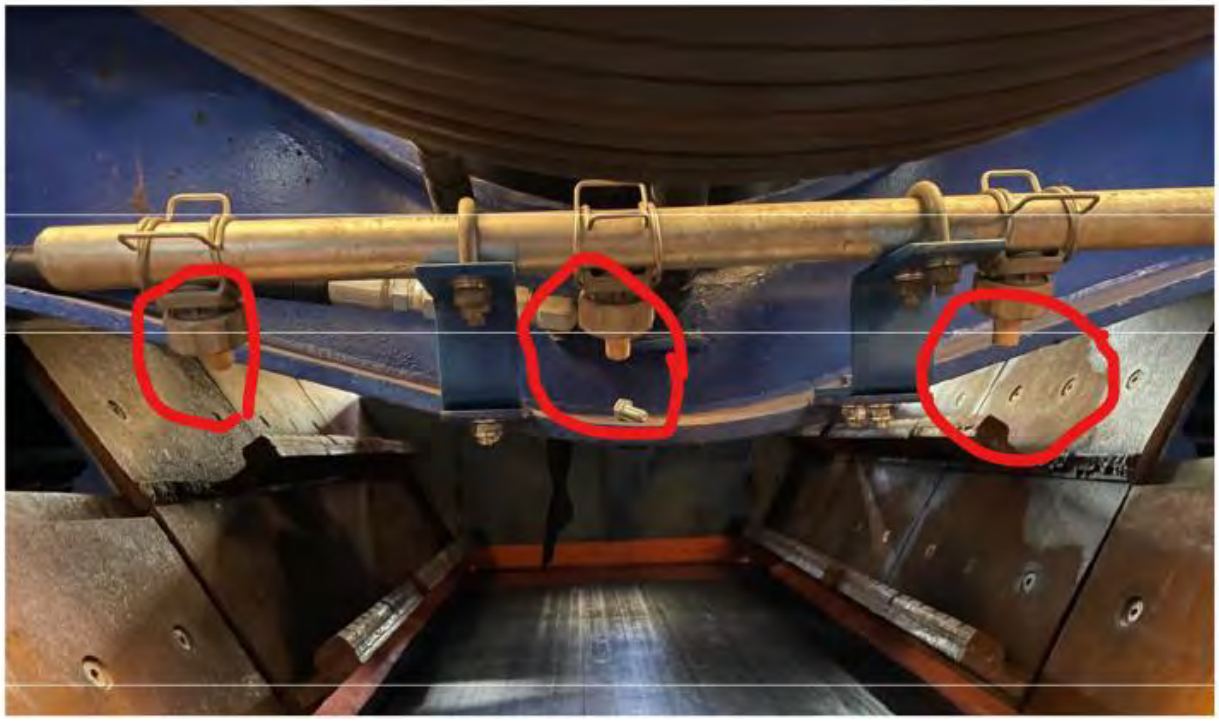


Figure 30 - Dust Suppression Sprays Crusher Point

Figure 31 - Transfer points with dust controls

Figure 32 - Stacker transfer with dust controls

Figure 33 - Transfer Chute with dust controls

Figure 34 - Jaw Crusher with spray bars

5.2 Greenhouse Gas Emissions

5.2.1 Emission

Potential sources of Greenhouse Gas Emissions (GHG)'s during crushing and screening includes:

- Emissions during operation and idling of plant, equipment, and machinery.
- Use of diesel and other fuels on site during construction
- Transport of materials required for construction to Project Ceres site.

5.2.2 Mitigation and management measures

The SCJV CEMP includes a Greenhouse Gas Management Protocol (GHGMP) that was prepared by the EPC Contractor to comply with the requirement of MS 1180, and includes management controls specific to the construction methodology that will be applied during the Project Ceres construction program, including crushing and screening activities.

The GHGMP describes the Scope of Work, addresses all requirements related to management of greenhouse gases by the Project, and establishes the strategies, methods, processes which will be adopted to provide certainties in delivering successful execution of the project while adhering to environmental objectives for the Project.

The GHGMP presents in detail:

- Relevant conditions of the Project Approvals and confirmed management plans.
- Clear and concise descriptions of roles and responsibilities in relation to controls to minimise environmental impacts from air emissions for the duration of the construction works.
- Relevant legislation, standards and technical guidelines when developing preventative controls.
- Monitoring requirements during construction.

The GHGMP was prepared and is maintained by the EPC Contractor Environmental Team, and is a "live" Protocol. As such, the GHGMP shall be reviewed periodically and revised as needed. The GHGMP is to be read and implemented in conjunction with the most recent and approved version of

the SCJV CEMP.

GHGMP mitigation measures include:

- Plan and optimise utilisation of construction crews, materials and services in a way that reduces GHG emissions, including sourcing materials and services from local resources to reduce transport emissions.
- Ensure vehicles, plant and equipment are well maintained to reduce exhaust emissions to surrounding environment.
- Ensure vehicles, plant and equipment are fitted with systems to reduce pollution where practicable.
- Maintain record on GHG emission sources, fuel consumption and energy consumption.
- Encourage personnel onsite to switch lighting and appliances off when not in use.
- Educate personnel using awareness reminders, posters and signage in offices, toilets and other facilities to encourage energy-saving strategies.
- Include timers and sensors on lighting in ablutions and outside offices to reduce energy use.
- Ensure vehicles, plant and equipment are not left idling unneccessarily.
- Utilise equipment and vehicles that conform with the highest emissions standards available.
- Ensure diesel used conforms with the national diesel fuel quality standard (AS)
- Avoid the onsite use of diesel- or petrol-powered generators or other equipment by substituting mains electricity or battery powered equipment where practicable.
- Reuse waste materials, demolition materials, soil material. Waste reduction strategies will be implemented where practicable.

5.3 Noise Emissions

5.3.1 Emission

The potential impacts of noise on any particular location can vary greatly depending on factors such as the relative proximity of sensitive receptors to the source of the noise, the overall duration of works undertaken, and the character of the noise generated by the works. Activities associated with the operation of the crushing and screening operations have the potential to increase localised noise, impacting on the community and public adjacent to the project area.

Noise emissions have the potential to adversely affect the welfare, health convenience, comfort and amenity of personnel onsite and outside of the prescribed premise. Noise emissions are regulated under the EP Act and the *Environmental Protection (Noise) Regulations 1997*.

The primary source of noise emissions from the activities will be the operation of the crushing and screening plant, including:

- Jaw and cone crushers,
- Screening units,
- Front end loader/excavator and trucks moving and stockpiling process materials,
- Vehicles carrying personnel around site.

5.3.2 Mitigation and management measures

The potential impacts by noise to aboriginal heritage sites and native fauna species during crushing and screening activities have been identified during the risk assessments for the construction phase and include the following:

- Noise pollution to local community, visitors, MAC, traditional owners and tourists visiting culturally significant places and sites (such as Hearson Cove, Yatha Site, Fish Thalu Site, Rock Art, Deep Gorge).

- Excessive vibration and noise during crushing and screening and other activities, i.e. movement of plant and vehicles and use of machinery impacting fauna species and amenity at culturally significant sites.
- Noise and vibration can act as a general stressor to fauna species and disturb ecosystem balance.
- Vibrations could disturb suitable burrowing/nesting sites of Short-Range Endemic (SRE) species.

The crushing activities will be remote from residential premises, approximately 7 km from Dampier. Noise impacts on personnel working on site will be managed in accordance with the *Occupational Health and Safety Act 1984*, the *Occupational Health and Safety Regulations 1996*, and Clough's Health and Safety procedures.

The SCJV CEMP includes a Noise Management Protocol (NMP) that was prepared by the EPC Contractor to comply with the requirement of MS 1180, and includes management controls specific to the construction methodology that will be applied during the Project Ceres construction program, including crushing and screening activities.

The NMP describes the Scope of Work, addresses all requirements related to management of noise by the Project, and establishes the strategies, methods, processes which will be adopted to provide certainties in delivering successful execution of the project while adhering to environmental objectives for the Project.

The NMP presents in detail:

- Relevant conditions of the Project Approvals and confirmed management plans.
- Clear and concise descriptions of roles and responsibilities in relation to controls to minimise environmental impacts from air emissions for the duration of the construction works.
- Relevant legislation, standards and technical guidelines when developing preventative controls.
- Monitoring requirements during construction.

The NMP was prepared and is maintained by the EPC Contractor Environmental Team, and is a "live" Protocol. As such, the NMP shall be reviewed periodically and revised as needed. The NMP is to be read and implemented in conjunction with the most recent and approved version of the SCJV CEMP.

NMP mitigation measures include:

- The NMP shall be implemented on site.
- Operating noise, vibration and potential mitigation measures, such as sound absorption devices, shall be specified when selecting equipment for the Project.
- Equipment shall be fitted with appropriate noise reduction devices.
- Regularly inspect, maintain and replace mobile equipment.
- Works within the development envelope shall only occur in daylight hours where practicable.
- Noise complaints investigated to determine source and implement further noise mitigation measures. Complaints to be responded to within 24 hours.
- For machinery lacking silencing devices, ensure plant, machinery and equipment are operated as far as practicable from sensitive receptors.
- Ensure compliance to speed limits.
- Personnel shall be educated on their surrounding sensitive receptors and warned against the use of loud offensive language that may disrupt or offend Project visitors, cultural visitors and personnel.
- Noise level targets may be developed and be set for project and noise levels monitored during noisy activities, i.e., clearing and excavating or following a complaint.

- Using non-vibrating or lower vibrating construction methodologies and/or operate plant as far as practicable from sensitive receptors.
- Provide temporary noise barriers where practicable e.g., impact hammers / rock breakers shrouded around the hammer mechanism or mobile plant.
- Broadband reversing alarms shall be installed on mobile plant.

5.4 Odour Emissions

Crushing and screening plants are not typically associated with the discharge of odour emissions.

5.5 Light Emissions

Operation of the mobile temporary crushing and screening plant will be carried out during daylight hours only.

5.6 Stormwater, Surface Water and Groundwater

5.6.1 Emission

Discharge of pollutants to surface or aquifers have the potential to adversely impact on the health of marine and freshwater flora and fauna. Pollution of local hydrological and hydrogeological receptors has a wider geographical impact on natural resources and recreational values.

Run-off from stockpiles may cause sedimentation and deposition of foreign/introduced/contaminated material into the environment.

Storage and handling of chemicals, hazardous materials has the potential for spills or leaks to contaminate the surrounding surface water values within and surrounding the site and impact natural chemistry.

Crushing and screening activities associated with bulk earthworks are unlikely to increase discharges to water.

5.6.2 Mitigation and management measures

As per W6630/2021/1 (as amended) earthen bunding is installed around crushing and screening plant, to reduce the risk of any impacts to surface or groundwater and stormwater.

The SCJV CEMP includes a Hydrocarbons and Hazardous Substances Management Protocol (HHSMP) that was prepared by the EPC Contractor to comply with the requirements of MS 1180, and includes management controls specific to the construction methodology that will be applied during the Project Ceres construction program, including crushing and screening activities.

The HHSMP describes the Scope of Work, addresses all requirements related to management of noise by the Project, and establishes the strategies, methods, processes which will be adopted to provide certainties in delivering successful execution of the project while adhering to environmental objectives for the Project.

The HHSMP presents in detail:

- Relevant conditions of the Project Approvals and confirmed management plans.
- Clear and concise descriptions of roles and responsibilities in relation to controls to minimise environmental impacts from hydrocarbons and hazardous substances for the duration of the construction works.
- Relevant legislation, standards and technical guidelines when developing preventative controls.
- Monitoring requirements during construction.

The HHSMP was prepared and is maintained by the EPC Contractor Environmental Team, and is a “live” Protocol. As such, the HSSMP shall be reviewed periodically and revised as needed. The HSSMP is to be read and implemented in conjunction with the most recent and approved version of the SCJV CEMP.

HSSMP mitigation measures include:

- Up to date Safety Data Sheets for all chemicals used on site will be readily accessible to all Project Personnel and emergency services authorities.
- A register of all hydrocarbon and hazardous substances stored on site will be prepared and will be readily accessible to all Project Personnel and reviewed regularly.
- Chemicals are to be stored on or within a bunded structure – capacity 110% of largest container, impermeable walls and floor (soil floors not sufficient) and roofed in accordance with Australian Standard AS1940:2004 The storage and handling of flammable and combustible liquids.
- Hydrocarbon and chemical storage sheds must be located where they will not pose a risk to the environment.
- Hydrocarbon and chemical storage areas will include appropriate signage and labels, in accordance with relevant legislation and Australian Standards.
- The amount of fuels and chemicals that are stored on-site will be minimised as far as practicable. Chemicals that are no longer required will be removed from site by approved transport and disposal methods.
- Spill kits will be located around the site, in particular at chemical storage locations and where fuels are transferred or decanted. The contents of the spill kit will be relevant to the area and the potential spill.
- Spill response procedures will be developed, communicated to all Project Personnel and implemented across the site.
- Fuel to support mobile plant and equipment at the site will be stored in bunded areas and or in self-bunded tanks. Appropriate licensing will be sought prior to operation of fuel storage systems. Volumes will not exceed threshold limits specified in relevant legislation without appropriate licensing.
- Refuelling mobile plant and equipment is to be undertaken within bunded refuelling areas suitably designed and operated to capture any spill or overflow associated with the refuelling process. The system must be installed to ensure surface water is excluded from the bund and any rain falling into the bund is safely held, without the risk of overflow, before being decanted and disposed of at a suitable waste management facility.
- Mobile refuelling procedures will be developed and implemented to minimise risk of harm to the environment. This includes but is not limited to ensuring mobile bunding is placed under the fuel delivery vehicle, the plant / machinery being refuelled and any joins in fuel delivery hoses to capture any spills or leaks associated with the refuelling process. The mobile refuelling procedure must form part of the induction for plant machinery operators and fuel delivery operators.
- Only manual trigger fuel nozzles are to be used during refuelling of plant and equipment. The operator is to manually hold the delivery trigger in the open position and must not lock the trigger to prevent it from automatically shutting off when the trigger is released.
- Any spills or leaks into bunded areas will be decanted and cleaned from the bund immediately after they occur. No further fuelling, transfer or decanting is to occur until the spill is cleaned up and reported.
- All appropriate licenses and permits, including but not limited to those required for the storage of fuel and chemicals, will be achieved prior to site storage of those products.
- All removals shall be recorded, and receipts will be kept as per methods in non-hazardous waste controls. Controlled Waste Tracking Forms/Controlled Waste Tracking numbers shall be kept and recorded for the removal of each load of controlled waste.
- Hazardous waste materials and dangerous goods will be disposed of in accordance with the relevant legislation and Project requirements at approved and certified facilities.
- Appropriate licences and management controls shall be in place for the transport, handling, storage and disposal of DGs in Minor Storage, Placarding and Manifest quantities prior to the delivery and activity being undertaken. All DGs shall be handled and transported in accordance with the Dangerous Goods Safety Act 2004, Australian Dangerous Goods Code and other

supporting regulations. The driver and vehicle must be licenced to carry HazMat's and DG (if applicable volumes are reached).

- Liaise with, obtain approvals from and keep all relevant Authorities fully informed of any hazardous materials stored on the site and of the contingency plans to be adopted for any spills.
- When selecting materials for the Project, the least hazardous substances will be selected in preference for the project, and risk assessments will be required for substances posing potential risk during use, as per the ChemAlert rating.
- All HazMat's will be correctly labelled in compliance with National Code of Practice for the Labelling of Workplace Substances NOHSC 2012:1994 to allow substances to be used in the safest manner that shall protect the environment. Signage shall be in accordance with Australian standard AS 1319
- Adhere to Safety Data Sheets for all handling, use and storage of chemicals and hazardous materials.
- SDS must be issued with Australian emergency contact details and be less than 5 years old, in addition to being supplied to waste contractors as per Guidelines of Controlled Waste Generators.
- When handling chemicals, the SDS must be in the immediate work area of the corresponding SWMS/JHA (SWMS/JHA must also be in the immediate work area). The SWMS/JHA document must consider environmental risks of using the chemical or DG (if applicable).
- A hard copy of SDS's will be kept in the immediate work area and the location for Hazardous Substances or Dangerous Goods storage, and electronic copies of SDS's will also be kept in the Project HSE office.
- Hazardous Materials and DG storage areas to be restricted access.
- If the contents of a container are unknown, it shall be tagged as out-of-service until it can be identified and labelled.
- Where substances are decanted at the construction site, the type of labelling shall depend on the period of time the product is consumed over. Where a product is not being spent immediately, the container the product must be decanted to must be labelled with:
    - The name of the product
    - The risk of the product to the environment (toxicity)
    - The risk phrases
    - The product HAZCHEM Code and Dangerous Good Code.
- Ensure all storage sites for oil and other contaminant materials and plant maintenance areas, are confined to specially designed areas, bunded and away from drains, water courses, wetlands and floodplains in accordance with Law. These areas must be constructed to ensure that any spillage is confined in accordance with Law. In addition, all fuels and lubricants must be stored in a bunded area under laid with plastic. Adequate quantities of suitable material to counteract spillage must be kept on relevant premises.
- Oily or contaminated products such as rags, filters, grease cartridges etc. are to be disposed into hydrocarbon bins or relevant containment and removed off-site by licenced contractor.
- Wastes that are not suitable to be disposed into provided waste receptacles i.e., product liquids, incompatible materials, impacted soils etc. will be containerised separately.
- Septic waste is to be pumped into a licenced liquid waste transport vehicle and taken to a licensed facility.
- Batteries will be stored on-site in bunding prior to being removed and recycled.
- Used engine coolant and lubricating oils will be containerised (IBC), for recycling at licenced waste facility.
- Waste oil to be stored on-site in a secure bunded area and periodically removed by a licenced waste contractor to a licenced waste facility.

- Empty printer and toner cartridges will be segregated and removed to a recycling service provider.
- Ensure tyres are not mixed with other waste streams and are to be removed by a licenced contractor for recycling. No greater than 100 tyres will be on-site at any time.
- Ensure hydrocarbon and hazardous waste skips are appropriate to the waste type (i.e., fitted with lid and sealed).
- Spills kits, drip-trays and other preventative devices shall be kept within fuel delivery vehicles at all times.
- Mobile refuelling activities must only be from trailers fitted with twin skinned tanks and separately bunded. All refuelling must be conducted using spill protection (i.e., drip trays).
- Spill trays and spill kits will be maintained on-site, available near fuel and other hazardous material storage and refuelling areas and be utilised to contain and clean-up any spills. Where inadequate stock in spill kits; immediately replace materials and stock in spill kits.
- Ensure spills are controlled prior to entering drainage lines and watercourses through spill clean-up and Erosion and Sediment Controls.
- Ensure all personnel working with hazardous materials are familiar with procedures, spill control and clean-up. Personnel will be trained in spill response procedures through inductions, Toolbox talks and additional training where required. Where spill is inadequately cleaned up, leaving unreported contaminated soils / water or improper disposal; provide additional training to personnel on clean-up and notification procedures, update incident report, rectify spill remediation and the handling of Hazardous Materials and DGs.
- No vehicle or mobile plant refuelling shall occur within 50 m of a watercourse or intertidal zone.
- Stationary plant (e.g., generators) shall be self-bunded. Bunds are to be inspected weekly and after heavy rains and emptied as required.
- Fuel truck/trailer operators shall not leave area whilst refuelling equipment or filling a tank in case there is a need for emergency shut-off.
- No ignition sources within at least a 10m radius of the fill point will be observed during refuelling.
- Petroleum products and used filters shall be drained into an appropriate container to remove any leftover product prior to disposal as solid hydrocarbon waste.
- Ensure bunds do not contain liquids. Following rain events bunds will be inspected and pumped dry, and if required into a controlled waste IBC for contaminated/ oily water for appropriate removal, treatment or disposal.
- In the case of a spill:
    - Prevent spill from spreading by using booms/socks in spill kit or by making a makeshift bund and control access to spill area.
    - Soak up the spill with absorbent material and ensure the surface is left clean. Collect used absorbent material in a heavy plastic bag or other suitable container and arrange for disposal at an appropriate facility.
    - Soils contaminated by spills are to be removed to an appropriate stockpile location for remediation or disposal.
    - Spills are to be contained immediately and remediated within 24 hours to minimise the potential for contaminants to enter groundwater.
    - If a spill cannot be cleaned up immediately, ensure it is appropriately isolated and contained.
    - Arrange to have a suitable third party available to attend to any major spill clean-up, not able to be adequately addressed with site spill kits.
    - Report all spills as an environmental incident using InControl system.

- Leaking vehicles must be reported and serviced before returning to the construction area. Where vehicles, equipment or containment showing evidence of leakage or wear; record in pre-start checklist, record as correction action, service vehicles, equipment and plant as per manufacturers specifications, repair and containment where applicable.
- Inspections are to be undertaken of storage areas regularly. Where general containment standards and storage requirements are not being met; record as a corrective action or incident, rectify the issue with the responsible party.
- No major vehicle or plant servicing shall be undertaken on-site, except in designated servicing areas. Servicing of mobile plant will be conducted within a designated and contained area to minimise risk to surrounding environment on-site. The area shall be identified on environmental control maps and site maps.
- Servicing of vehicles must be kept up to date at all times, and in the case of a vehicle or plant being overdue for servicing, it is to be tagged out of operation until a service has been conducted.
- Where evidence of maintenance or refuelling of vehicles, plant machinery and equipment not occurring in designated areas or with adequate controls; record as corrective action or incident if required, reiterate to personnel involved in this aspect of works, tag out of operation until servicing is complete.
- All contaminated stormwater (levels exceeding nominated criteria) i.e. runoff containing hydrocarbons >5ppm Total Petroleum Hydrocarbons (TPH) shall not be discharged into the environment without treatment under any circumstance.
- Minimise the use of products containing CFCs, or products manufactured by processes in which CFCs are used.

6 Wastes Generated

This section provides waste types generated with reference to *Landfill Waste Classification and Waste Definitions 1996* (as amended 2019) (DWER, 2019b) and the *Environmental Protection (Controlled Waste) Regulations 2004* (Controlled Waste Regulations) for solid wastes, and the Controlled Waste Regulations for liquid wastes.

6.1 Waste Types

6.1.1 Inert Waste

Inert wastes are defined as wastes that are largely non-biodegradable, non-flammable and not chemically reactive. Inert wastes are subdivided into three separate classes: Inert waste type 1, 2 or 3, depending on contaminant concentrations, biodegradability, flammability or material from a secondary waste treatment plant (DER, 2018a).

It is anticipated that small amounts of Inert Waste Type 2 will be generated from the crushing and screening office, which may include plastics.

6.1.2 Putrescible Waste

Putrescible waste is likely to become putrid – including wastes that contain organic materials such as food wastes or wastes of animal or vegetable origin, which readily bio-degrade within the environment of a landfill (DER, 2019a).

The crushing and screening office (and toilets) will generate small amounts of putrescible waste including food waste, office and packaging waste (paper, cardboard, plastics), sanitary napkins.

6.1.3 Hazardous Waste

Hazardous waste is waste which by its characteristics poses a threat or risk to public health, safety or the environment (includes substances which are toxic, infectious, mutagenic, carcinogenic, teratogenic, explosive, flammable, corrosive, oxidising and radioactive).

Small amounts of waste mineral oils unfit for their intended purpose may be generated as part of the operation of the equipment.

Small amounts of mineral oils including lubricating and hydraulic oils, hydrocarbons and emulsions, petroleum-based grease, rags and absorbent material wet/saturated with oil, diesel, waste mineral oil and coolant mixtures, and used oil filters containing free liquids may be generated.

6.1.4 Controlled Waste

Waste mineral oils unfit for their intended purpose may be generated as part of the operation of the crushing and screening equipment. Mineral oils including lubricating and hydraulic oils, hydrocarbons and emulsions, petroleum-based grease, rags and absorbent material wet/saturated with oil, diesel, waste mineral oil and coolant mixtures, and used oil filters containing free liquids may be generated.

As no vehicle wash-down bays associated with the crushing and screening plant, there is no associated waste oil sludge from the wash-down bays that needs collection.

6.1.4.1 Putrescible and Organic Wastes

As there is no toilet block associated with the crushing and screening plants, no sewage waste will be generated. Employees use the main administration building's toilet block, whereby wastes are contained on site and disposed of to a controlled waste disposal company.

6.1.4.2 Soils and Sludge

Leaks or spills (from oil, diesel etc) contained within the earthen bunding surrounding the approved crushing and screening locations, will generate contaminated soils, which will be collected and stored for removal offsite and treated as controlled waste.

Containers and drums contaminated with residues of controlled waste, in small amounts will be generated in association with the crushing and screening activities.

6.1.5 Mitigation and management measures

Management of liquid and solid wastes produced during crushing and screening activities shall be in accordance with:

- Perdaman Solid and Liquid Waste Management Plan (PCF-PD-EN-SLWMP)
- SCJV Construction Environmental Management Plan (0000-ZA-E-09071)
- SCJV CEMP Solid and Liquid Waste Management Sub-Plan (0000-ZA-E-09738)
- Sub-Contractor Construction Environmental Management Plan (10253-DEC-EN-PLN-0001/0000-ZA-E-80004) and sub-plans
- Applicable legislation and regulations, including the *Environmental Protection Act 1986*, *Environmental Protection Regulations 1987, Environmental Protection (Controlled Waste) Regulations 2004, Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007, Environmental Protection (Unauthorised Discharge) Regulations 2004, Litter Act 1979.*

The SCJV CEMP includes a Solid and Liquid Waste Management Sub-Plan (SLWMsP) that was prepared by the EPC Contractor to comply with the requirement of MS 1180, and includes management controls specific to the construction methodology that will be applied during the Project Ceres construction, including crushing and screening activities.

The (SLWMsP) describes the Scope of Work, addresses all requirements related to management of solid and liquid wastes generated by the Project, and establishes the strategies, methods, processes which will be adopted to provide certainties in delivering successful execution of the project while adhering to environmental objectives for the Project.

The (SLWMsP) includes:

- All environmental conditions, commitments and requirements relating to waste management during construction activities, as specified in relevant approvals and management plans.
- Waste management strategies for the construction period in accordance with the overarching Perdaman Solid Liquid Waste Management Plan and the Project Environmental Management Plan.
- Clear and concise descriptions of roles and responsibilities in relation to controls to minimise environmental impacts from waste generation for the duration of the construction works.
- Relevant legislation, standards and technical guidelines for the development of preventative controls.
- Monitoring requirements during construction.

The SLWMsP was prepared and is maintained by the EPC Contractor Environmental Team, and is a “live” Sub-Plan. As such, the SLWMsP shall be reviewed periodically and revised as needed. The SLWMsP is to be read and implemented in conjunction with the most recent and approved version of the SCJV CEMP.

The SLWMsP specifies:

- General controls
- Procurement policies and strategies
- Recycling initiatives
- Management strategies for each waste type
- Management protocols
- Management actions and targets
- Spill management
- Waste monitoring, triggers and thresholds
- Regulatory reporting requirements
- Sub-contractor reporting requirements
- Incident management, response, notifications and reporting requirements
- Auditing requirements.

7 Environmental Risk Assessment

An environmental risk assessment has been conducted in accordance with the DWER *Guidance Statement: Risk Assessments* (released by the then named Department of Environmental Regulation in 2017) for the potential emissions discussed in the preceding chapter, which are associated with the operation of the crushing and screening plants.

The criteria used to determine the consequence and likelihood of a risk event occurring as specified in DWER (2017) are provided in Table 1Table 14. The risk rating matrix is provided in

Table 15. The risk assessment is included in Table 16.

Table 14 - Risk Criteria

Consequence	Consequence description	
	Environment	*Public Health and Amenity*
Severe	On-site impacts: catastrophic Off-site impacts (local scale): high level Off-site impacts (wider scale): mid-level Mid to long term or permanent impact to an area of high conservation value or special significance	Loss of life Adverse health effects: high level or ongoing medical treatment Local scale impacts: permanent loss of amenity
Major	On-site impacts: high level Off-site impacts (local scale) mid-level Off-site impacts (wider scale): low level Short term to an area of high conservation value or special significance	Adverse health effects: mid-level or frequent medical treatment Local scale impacts: high level impact to amenity
Moderate	On-site impacts: mid-level Off-site impacts (local scale) low level Off-site impacts (wider scale): minimal	Adverse health effects: mid-level or occasional medical treatment Local scale impacts: mid-level impact to amenity
Minor	On-site impacts: low level Off-site impacts (local scale) minimal Off-site impacts (wider scale): not detectable	Local scale impacts: low level impacts to amenity
Slight	On-site impacts: minimal	Local scale impacts: minimal impacts to amenity

Likelihood	Likelihood description
Almost certain	The risk event is expected to occur in most circumstances
Likely	The risk event will probably occur in most circumstances
Possible	The risk event could occur at some time
Unlikely	The risk event will probably not occur in most circumstances
Rare	The risk event may only occur in exceptional circumstances

Table 15 - Risk Rating Matrix

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

Table 16 - Risk Assessment of Crushing and Screening Operations.

Project Activity	Potential Emissions	Potential Pathway	Potential Receptors	Potential Impacts	Proposed Controls	Likelihood	Consequence	Residual Risk Rating
Noise emissions generated during operation from: • Jaw crushers and cone crushers • Screening units • Front end loader/ excavator and trucks moving and stockpiling process materials • Vehicles carrying personnel around site	Noise	Air / Wind dispersion	No sensitive receptors in close proximity	No nearby sensitive receptors, therefore no impacts expected	As specified in Section 5.3.2 - Noise Mitigation and management measures.	Slight	Unlikely	Low
Dust generated by the crushing and screening process or from the stockpiles being exposed to wind conditions	Dust	Air / Windborne particulate (dust) emissions generated	No sensitive receptors in close proximity	No nearby sensitive receptors, therefore no impacts expected	As specified in Section 5.1.2 - Dust Mitigation and management measures. Ongoing monitoring of dust emissions ($PM_{2.5}$ and PM_{10}) using near-real time data. SMS and e-mail alerts to Contractor when dust trigger values are exceeded.	Slight	Possible	Low
			Cultural Heritage (Rock Art)	Potential impacts of dust to rock art within Murujuga beyond natural rates (MS 1180 condition 2-1)				
Storage and spills of hydrocarbons or chemicals	Discharges to land or water	Direct discharge to land	No sensitive receptors in close proximity	No nearby sensitive receptors, therefore no impacts expected	As specified in Section 5.6.2 - Mitigation and management measures.	Slight	Possible	Low

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