

Dixon Sand Haerses Road Quarry, Maroota Annual Review 2023 - 2024



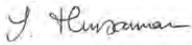
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Client: Dixon Sand (No. 1) Pty Ltd

Prepared by: Project Environmental Services Pty Ltd

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Name of Operator	Dixon Sand (No. 1) Pty Ltd
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Annual Review End Date	30 June 2024
Name of Authorised reporting officer	Hunsamon Churcher
Title of Authorised reporting officer	Environmental Advisor
Signature of Authorised reporting officer	
Date	30/09/2024

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Prepared by:	Hunsamon Churcher	Date:	30/09/2024
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Abbreviations

Annual Review	This document (also formerly known as 'Annual Environmental Management Report')
Biodiversity Stewardship Agreements	BSA
Biodiversity Conservation Trust	BCT
DA250-09-01	Development Consent DA250-09-01 for the Old Northern Road quarry
DA165-7-2005	Development Consent DA165-7-2005 for the Haerses Road quarry
DCCEEW - Water	Department of Climate Change, Energy, the Environment and Water – Water Division
Dixon Sand	Dixon Sand (No.1) Pty Ltd
DPE	Department of Planning and Environment (now Department of Planning, Housing and Infrastructure)
DPE (Resources Regulator)	Department of Primary Industries and Regional Development – Resources Regulator
DPE Water	Department of Planning, Industry and Environment – Water Division (now DCCEEW – Water)
DPHI	Department of Planning, Housing and Infrastructure
DPIRD	Department of Primary Industries and Regional Development
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EP&A Act	NSW <i>Environment Planning and Assessment Act 1979</i>
EPL12513	Environment Protection Licence 12513 for the Haerses Road quarry
LALC	Local Aboriginal Land Council
MEG	Mining, Exploration and Geoscience, within the Department of Regional NSW (now NSW Resources, Department of Primary Industries and Regional Development)
MTSGS	Maroota Tertiary Sands Groundwater Source
NRAR	Department of Planning and Environment – Natural Resources Access Regular
PIRMP	Pollution Incident Response Management Plan
PM10	Particulate matter <10um
SCBGS	Sydney Central Basin Groundwater Source
TEOM	Tapered Element Oscillating Microbalance

TSP

Total suspended particulates

WAL

Water Access License

1. Statement of Compliance

Table 1: Statement of Compliance

All Conditions of the relevant approval(s) were complied with?		
Haerses Road Quarry	DA165-7-2005	No
	EPL12513	Yes
	WAL 25941	Yes
	WAL 25956	Yes

Table 2: Non-Compliances

Relevant Approval	Condition #	Condition description (summary)	Compliance Status	Section addressed in Annual Review
DA 164-7-2005	Cond. 12 of Sch.5	Submission of Annual Review later than end of March 2024, however DPHI approved an alternative date	Non-compliant	Sections 2.2 and 11.1
<i>Compliance Status Key</i>				
Risk Level	Colour code	Description		
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence		
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • Potential for serious environmental consequences, but is unlikely to occur, or • Potential for moderate environmental consequences, but is likely to occur 		
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> • Potential for moderate environmental consequences, but is unlikely to occur, or • Potential for low environmental consequences, but is likely to occur 		
Administrative non-compliances	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)		

2. Introduction

2.1 Project Background

Dixon Sand Pty Ltd (Dixon Sand) operates two sand quarries at Old Northern Road (Lots 29 and 196 DP 752025 and Lots 1 and 2 DP 547255) and at Haerses Road (Lot 170 DP 664766, Lot 170 DP 664767, Lots A and B DP 407341, Lots 176 and 177 DP 752039 and Lot 216 DP 752039) in Maroota, New South Wales. The quarries are located approximately 40 kilometres north of Parramatta. The locations of the quarries are shown in Figure 1.

Extraction commenced at Haerses Road quarry in 2006. Sand is being transferred to Old Northern Road quarry for processing, blending and sales. Products are also permitted to be sold directly to the market from Haerses Road quarry. Modification to the development approval under Section 75W of the *Environmental Planning and Assessment Act 1979* was granted on 22 January 2018 which permits the expansion of the extraction areas. DA165-7-2005 Modification 4 permits a varied sequence of extraction and Modification 5 permits the relocation of the approved and to construct site facilities. Modification 6 permits the relocation of the site office and sandstone cutting shed.

Current extractions are occurring in Stage 1, Stage 2 and Cells 1A, 1B, 2A, 2B, 3A and 3B.

Environmental Monitoring locations for Haerses Road quarry are shown in Figure 2.

2.2 Scope of this document

The objective of this Annual Review is to report on the overall environmental performance and management of the operations and compliance of Haerses Road Quarry with the consent conditions issued by the Secretary of NSW Department of Planning, Housing and Infrastructure (DPHI). The reporting period is from 01 July 2023 to 30 June 2024, which is in line with the reporting period for Old Northern Road Quarry. Reporting for the rehabilitation assessment and ecological monitoring extends outside the specified period due to seasonal timing requirement for surveys.

The following consent conditions outline the requirement of the Annual Review.

Condition 12 of Schedule 5 of DA165-7-2005 (Modification 6) states:

By the end of March each year, or other timing as may be agreed by the Secretary, the Applicant must submit a review to the Department reviewing the environmental performance of the development to the satisfaction of the Secretary. This review must:

- (a) describe the development (including any progressive rehabilitation) that was carried out in the previous calendar year, and the development that is proposed to be carried out over the current calendar year;*
- (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous calendar year, which includes a comparison of these results against the:*
 - relevant statutory requirements, limits or performance measures/criteria;*
 - requirements of any plan or program required under this consent;*
 - monitoring results of previous years; and*
 - relevant predictions in the documents listed in condition 2(a) of Schedule 2;*
- (c) evaluate and report on:*
 - the effectiveness of the air quality and noise management systems; and*

- *compliance with the performance measures, criteria and operating conditions in this consent.*
- (d) *identify any non-compliance over the past calendar year, and describe what actions were (or are being) taken to ensure compliance;*
- (e) *identify any trends in the monitoring data over the life of the development;*
- (f) *identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies;*
- (g) *describe what measures will be implemented over the current calendar year to improve the performance of the development.*

The Applicant must ensure that copies of the Annual Review are submitted to Council and are available to the Community Consultative Committee (see condition 8 of Schedule 5) and any interested person upon request.

Dixon Sand requested approval from the DPHI for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPHI on 9 February 2018 to submit the Annual Review by the end of September each year.

This Annual Review will report on the environmental performance in relation to the requirements of DA165-7-2005 (Modification 6), Environment Protection License (EPL) # 12513 (dated 3 June 2022) and Water Access Licenses (WALs) 25941 and 25956. The Annual Review has been prepared in accordance with *Post-approval requirements for State Significant mining developments – Annual Review Guideline* (DP&E, 2015).

2.3 Haerses Road Quarry Approvals

Development consent was granted by the Minister for Planning on 14 February 2006 (DA165-7-2005) for the extraction of sand from Dixon Sand's properties at Lot 170 DP 664767, Lots A and B DP 407341, and Lots 176 and 177 DP 752039 Haerses Road in Maroota. Haerses Road quarry is approximately two kilometres south of the existing Old Northern Road quarry. Sand extracted from the Haerses Road site has been trucked, processed and stockpiled at the existing processing plant on Lot 196 DP 752025 (Lot 196) at Old Northern Road quarry. The development involves the blending and processing of variable quality sands from the Haerses Road site at the plant on Lot 196, and uses the existing processing plant and ancillary facilities such as the workshop, weighbridge and office, as well as the existing haul roads via the intersection with Old Northern Road. Direct sale of sandstone products (sand and sandstone block products) to local and regional markets from Haerses Road site commenced in 2015.

Under the original DA165-7-2005 Haerses Road quarry is permitted a maximum extraction quantity of 250,000 tonnes per annum, of which 190,000 tonnes may be transported to the Old Northern Road quarry for processing per annum.

Dixon Sand lodged a modification application to modify DA165-7-2005 to expand the quarry extraction area, process products on site and to extend the life of the quarry (Modification 1). Approval for DA165-7-2005 Modification 1 was granted on 22 January 2018.

A modification under Section 4.55(1) of the *Environment Planning and Assessment Act 1979* (EP&A Act) was subsequently lodged to correct an administrative error in Appendix 2 of the development consent. Approval for DA165-7-2005 Modification 2 was granted on 29 January 2019.

DA165-7-2005 Modification 3 was lodged to seek approval to increase:

- the extraction rate from 250,000 tpa to 495,000 tpa,
- overall truck movements from 56 movements to 180 movements per day,
- the disturbance footprint by 1 hectare in Stage 5 and accessing an additional 250,000 tonnes of resource,
- the maximum rate of VENM/ENM importation from 100,000 tpa to 250,000 tpa, for the purposes of site rehabilitation and reprocessing to produce blended products,
- altering some site plant and equipment, and
- increasing the number of full-time employees.

Modification 3 was approved on 23 July 2021.

DA165-7-2005 Modification 4 was lodged to seek approval to change the consented initial sequence of extraction to allow Dixon Sand to next access the more commercially viable sand in extraction Cell 1B instead of Cell 2A.

Modification 4 was granted on 30 June 2021.

Modification 5 was lodged to seek approval to:

- relocate the approved site office, workshop and weighbridge to a new site infrastructure location within the Tertiary Sand Extraction Area Stage 2 south of the current approved location,
- construct additional buildings (first aid room, lunchroom, weighbridge office, sandstone cutting shed), associated hardstand areas and carpark within the new site infrastructure envelope,
- introduce a new extraction method within the Sandstone Extraction Areas A and B involving sandstone cutting using an excavator fitted with a hydraulic circular saw attachment (enclosed or hollow drum saw) to produce large blocks of sandstone to supplement the approved dozer ripping extraction method,
- carried out final cutting of the large blocks of extracted sandstone using additional stone cutting saws (wet cutting) within a new dedicated sandstone cutting shed,
- increase the footprint of the site infrastructure envelope to accommodate new buildings, and
- updating figures associated with Porters Road Biobank site and Conceptual Final Landform.

Modification 5 was approved on 29 June 2022.

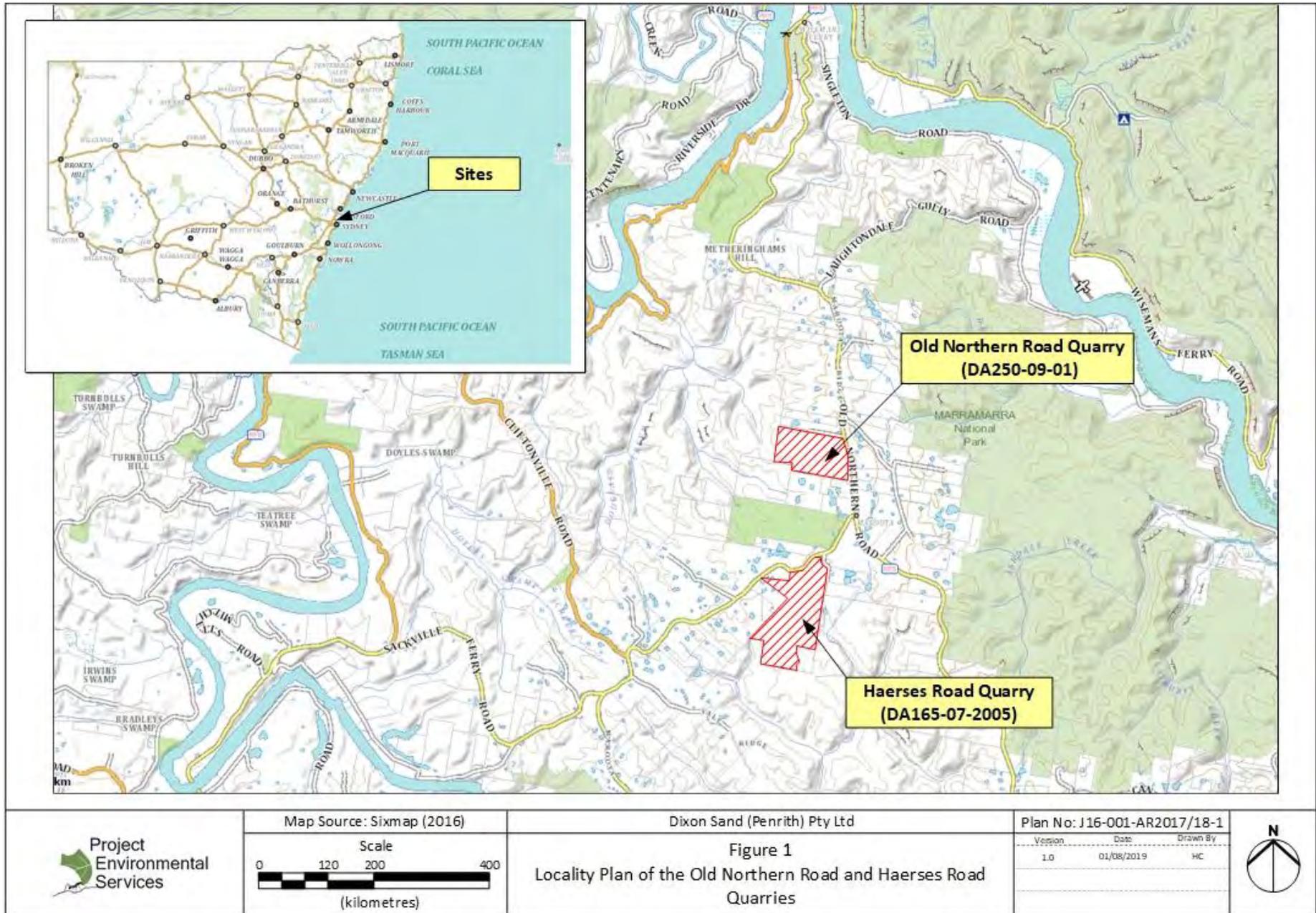
DA 165-7-2005 Modification 6 was lodged under section 4.55(3) of the EP&A Act to seek approval to relocate the approved site building envelope on Lot 177 approximately 90 metres to the north within Lot 176. Modification 6 was approved on 7 September 2023.

A summary of the development consent and modifications is provided in Table 3.

For the purpose of the reporting period which falls within this Annual Review, Development consent DA165-07-2005 Modification 6 is applicable to the timeframe and is the consent used for the assessment of Dixon Sand's environmental compliance and performance.

Table 3: Summary of Haerses Road Quarry Development Consents and Modifications

Development Consents	Status	Date of Determination	Comments
DA165-7-2005	Approved and superseded by Modification 1	14 February 2006	Approval for sand extraction, processing and rehabilitation for extraction stages 1 to 6 (inclusive)
DA165-7-2005 Modification 1	Approved and superseded by Modification 2	22 January 2018	Approval for the expansion of the quarry and additional sand extraction in Cells 1 to 5 (inclusive).
DA165-7-2005 Modification 2	Approved and superseded by Modification 4	29 January 2019	Correction applied to an administrative error in Appendix 2 of DA165-7-2005 Modification 1 consent conditions.
DA165-7-2005 Modification 4	Approved and superseded by Modification 3	30 June 2021	Approval for altering the sequence of approved extraction cell, by accessing Cell 1B instead of Cell 2A. Modification 4 was approved before Modification 3
DA165-7-2005 Modification 3	Approved and superseded by Modification 5	23 July 2021	Approval for the increased in extraction rate, truck movements, VENM/ENM importation quantity, expansion of disturbance footprint in Stage 5, and modifying site plant, equipment and number of employees.
DA165-7-2005 Modification 5	Approved and superseded by Modification 6	29 June 2022	Approval to construct approved and new site infrastructure and administration buildings (including sandstone cutting shed, weighbridge, weighbridge office, First Aid and lunchroom and carpark) to a new location
DA 165-7-2005 Modification 6	Approved and current	9 September 2023	Approval to relocate the previously approved site building envelope in Modification 5 on Lot 177 approximately 90m north within Lot 176. Relocation of the site office to Stage 4 extraction area



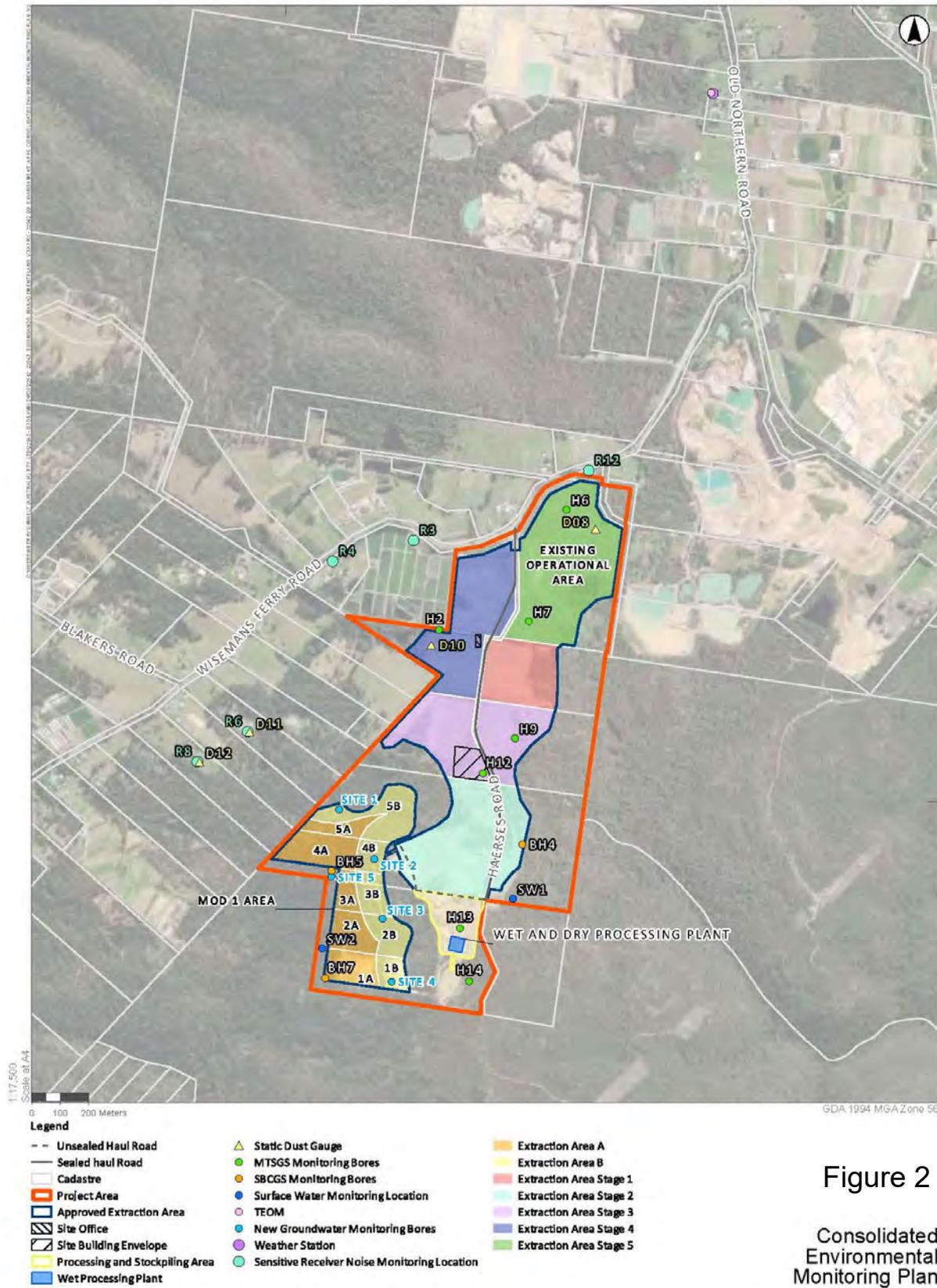


Figure 2

Consolidated Environmental Monitoring Plan

Image Source: ESRI Basemap (2021) Data source: NSW LPI (2021), NSW DSEI (2021), NPWS Estate (2019)

3. Operations Summary

3.1 Production and Vehicle Movements

All bulk sand truck movements from the Haerses Road quarry since commencement of extraction in November 2006 have delivered raw product to the Old Northern Road quarry for processing. Products have also been sold directly from Haerses Road quarry since 2015.

A total of **444,021** tonnes of product has been extracted at Haerses Road quarry, of which **187,755** tonnes were transferred to Old Northern Road and **256,266** tonnes of products have been sold directly to local and regional markets from the Haerses Road quarry during this reporting period. The quarry did not receive any ENM/VENM during this reporting period. Table 4 provides a summary of the annual production quantities, truck movement, direct sales and material transfers between Haerses Road and Old Northern Road quarries during the reporting period.

Table 4: Production Data & Truck Movements at Haerses Road Quarry.

Month	Total Transfers from Haerses Rd to Old Northern Road (t)	Total Sales from Haerses Rd (t)	Total Extraction (t)	Total Processed Materials (t)	Total ENM / VENM received (t)	Max Total Daily Truck (inclusive of transfers, direct sales and ENM/VENM import, in and out bound)	Max Daily Morning Truck between 6:00-7:00am (in and out bound)
Jul 2023	18,909	23,358.3	42,267	23,358.3	0	166	20
Aug 2023	20,262	24,757.9	45,020	24,757.9	0	160	20
Sep 2023	14,700	25,182.7	39,883	25,182.7	0	166	20
Oct 2023	16,137	25,268.9	41,406	25,268.9	0	160	20
Nov 2023	16,368	26,420.9	42,789	26,420.9	0	166	20
Dec 2023	9,669	17,813.8	27,483	17,813.8	0	156	18
Jan 2024	10,263	14,726.5	24,989	14,726.5	0	132	18
Feb 2024	17,325	21,592.0	38,917	21,592.0	0	160	20
Mar 2024	13,500	19,710.9	33,211	19,710.9	0	142	20
Apr 2024	16,500	20,388.2	36,888	20,388.2	0	162	20
May 2024	18,480	19,768.4	38,248	19,768.4	0	144	18
Jun 2024	15,642	17,277.3	32,919	17,277.3	0	142	16
Totals / Maximum	187,755	256,266	444,021	256,266	0	166	20
Annual Limit	190,000		495,000	320,000	250,000		
Daily Max Criteria						180	20

3.2 Submission of Quarry Production Data to MEG

Condition 16 of Schedule 2 of DA 165-7-2005 requires Dixon Sand to submit calendar year annual production data to the MEG (now NSW Resources, Department of Primary Industries and Regional Development (DPIRD)) using the standard form, and include a copy of this data in the Annual Review.

The DPIRD Minerals Return forms require reporting of extractive materials for the financial year, and not for the calendar year as specified in the consent condition above.

The Minerals Return form for the financial year 2023 – 2024 was submitted on 1 August 2024.

4. Actions Required from Previous Annual Review

The proposed recommendations contained in the previous 2022 – 2023 Annual Review and relevant actions undertaken by Dixon Sand are summarised in Table 5.

Table 5: Summary of Recommendations and Actions from the previous 2022 – 2023 Annual Review.

Recommendation from the 2022 - 2023 Annual Review	Actions
Noise Monitoring	
<ul style="list-style-type: none"> Continue with 6-monthly noise monitoring at nominated receivers as quarry operations are currently active in Modification 1 extraction cells. 	<ul style="list-style-type: none"> 6-monthly noise monitoring undertaken in December 2023 and June 2024.
Ground and Surface Water Management	
<ul style="list-style-type: none"> Continue with the review and submission of buffer zone groundwater monitoring data to be undertaken as per NRAR’s recommendation. Water sampling and laboratory analysis of surface water at SW1 and SW2 to continue when there is sufficient flow after rain events Commence data and trend interpretation for the new monitoring bore BH07, and Commence data and trend interpretation for surface water quality in quarry related basins. 	<ul style="list-style-type: none"> Review undertaken during the review of the requirement for additional borehole in the Modification 1 extraction area. Sampling at SW1 and SW2 undertaken when possible. Sampling was not possible after some storm events due to excessive rainfall leading to unsafe access to the sampling locations. Monitoring record commenced for BH07 Monitoring record commenced for surface water quality in quarry related basins.
Vegetation Clearing	

Recommendation from the 2022 - 2023 Annual Review	Actions
<ul style="list-style-type: none"> Continue to implement the pre-clearing survey and multistage habitat tree felling procedures prior to any vegetation felling. 	<ul style="list-style-type: none"> Pre-clearing survey and multistage habitat tree felling procedures implemented.
<p>Rehabilitation and Bush Regeneration</p>	
<p>Stage 1 Extraction Area</p> <ul style="list-style-type: none"> Undertake screening of stockpiled rehabilitation material to remove unsuitable larger rocks and boulders Spread out screened material to final landform to enable rehabilitation to Class 4 Agriculture. First agricultural planting event <p>Stage 2 Extraction Area</p> <ul style="list-style-type: none"> Continue to monitor the native vegetation growth to the west of the water storage dam. Dam wall repair / mitigation <p>Wisemans Ferry Road 30 metre Buffer Area</p> <ul style="list-style-type: none"> Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place <p>Buffer to Deerubbin LALC Property</p> <ul style="list-style-type: none"> Continue bush regeneration maintenance in the previously disturbed area Baseline monitoring locations established <p>Extraction Cells A and B</p> <ul style="list-style-type: none"> Continue monitoring of vegetation quadrats for establishment of baseline data. <p>Weed Management</p> <ul style="list-style-type: none"> Continue with weed management as per the recommendations contained in the Bush Regenerator and Ecologist's reports. 	<ul style="list-style-type: none"> Screen of stockpiled rehabilitation material commenced and will continue into the next reporting period. Parts of the screened material has been spread out in Stage 1 to commence rehabilitation. Agricultural planting will commence after suitable material has been placed to ensure cover crop can be supported. Native vegetation growth to the west of the water storage dam being monitored. Dam wall repaired. Remediation undertaken in the disturbed area and on-going monitoring and maintenance being undertaken. On-going regeneration maintenance undertaken in the previously disturbed area Baseline monitoring locations established. Vegetation survey being undertaken in accordance with the Biodiversity and Rehabilitation Management Plan Ongoing weed management undertaken as per Bush Regenerator and Ecologist's reports.

Recommendation from the 2022 - 2023 Annual Review	Actions
<p>Haerses Road and Porters Road Biobank Sites</p> <ul style="list-style-type: none"> Monitoring and Management of the Haerses Road and Porters Road biobank sites to be undertaken in accordance with the Biobanking Agreement and BCD reporting 	<ul style="list-style-type: none"> Haerses Road and Porters Road biobank sites are currently subject to Passive Management in accordance with the Biobanking Agreement (status in June 2024). Passive Monitoring and Management Report submitted to BCD. Porters Road biobank site is under Active Management from August 2024.

5. Environmental Performance

5.1 Air Quality

5.1.1 Dust Sources and Mitigation Measures

The objectives, criteria limits, procedures, response, reporting and responsibilities of air quality management are contained in the Haerses Road quarry Air Quality Management Plan.

The following potential sources of dust generated from Haerses Road quarry and mitigation measures have been identified in Table 6.

Table 6: Potential sources of dust and mitigation measures.

Potential Dust Sources	Mitigation Measures
<ul style="list-style-type: none"> topsoil stripping; ripping with a bulldozer; extraction with an excavator and truck; sandstone cutting with saw attachment sandstone cutting within the designated sandstone cutting shed crushing and screening wind erosion from stockpiles; loading sand products into trucks; vehicle movement and haulage on site; product transportation along unsealed haul roads; and occasional haul road grading. Rehabilitation and placement of VENM/ENM in the disturbed areas. 	<ul style="list-style-type: none"> minimising the area of disturbance by only clearing areas immediately prior to extraction; progressive rehabilitation; stabilising topsoil stockpiles by planting with a cover crop of non-invasive cereal or legumes; using a water cart to suppress dust on unsealed roads, during dry conditions on days of operation; sealing Haerses Road; limiting vehicle speed to 20 km/hr on internal unsealed access tracks; ensuring all loads leaving the site are covered; and regularly maintaining mobile and fixed equipment to minimise exhaust emissions. Utilisation of wet technique for sandstone cutting

5.1.2 Compliance Limits

Condition 10 of Schedule 3, DA165-7-2005 require Dixon Sand to operate a continuous air quality monitoring system to minimise the impacts at sensitive receivers such as the Maroota Public School. The following air quality criteria are to be complied with:

- dust deposition - 4g/m²/month (annual average) or 2g/m²/month increase;
- total suspended particulate matter (TSP) – 90µg/ m³ (annual mean); and
- particulate matter <10µm (PM10):
 - 50 µg/m³ (average for 24 hour period)
 - 30 µg/m³ (annual mean).

The NSW Environment Protection Authority (EPA) also requires the automatic alarm system of the Tapered Element Oscillating Microbalance (TEOM) continuous dust monitoring device to be set at a PM10 trigger value which triggers specific dust mitigation measure:

- 42 µg/m³ (average for rolling 24 hour period for wind directions between 180° and 240°)

Table 7 lists the relevant PM10 and Total suspended particulates (TSP) criteria as required by the Development Consent and Environment Protection Licence.

Table 7: PM10 and TSP Criteria.

Source	Condition	Criteria / Trigger Value	Comments
EPL12513	M2.3	42 µg/m ³ with prevailing wind direction from 180°-240°	Rolling average 24-hour PM10 criteria for enacting management plan strategies to notify the EPA, reduce dust emissions immediately and cease dust generating activities on site.
DA165-7-2005	Sch. 3, Cond. 9	30 µg/m ³	Annual average – long term impact assessment
EPL12513	O3.6		
DA165-7-2005	Sch. 3, Cond. 9	50 µg/m ³	24 hour average – short term impact assessment
EPL12513	O3.6		
EPL12513	O3.3	42 µg/m ³	Trigger value for PM ₁₀ automatic alarm and management plan strategies
DA165-7-2005	Sch. 3, Cond. 9	90 µg/m ³	Annual average criteria for TSP
EPL12513	O3.6		

5.1.3 Results

Climatic Data

Monthly climatic measurements were recorded by the weather station located adjacent to the Maroota Public School, in accordance with Condition M4.1 of EPL 12513. These results are shown in Table 8.

Table 8: Monthly Total Rainfall and Averaged Temperatures.

Month	Jul 2023	Aug 2023	Sep 2023	Oct 2023	Nov 2023	Dec 2023	Jan 2024	Feb 2024	Mar 2024	Apr 2024	May 2024	Jun 2024
Ave Temp (°C)	12.8	13.5	16.9	18.1	19.1	22.1	22.2	22.1	20.7	17.2	14.1	11.5
Total Rainfall (mm)	9.2	32.8	30.6	22.4	124.6	135.2	90.0	73.0	13.8	150.2	89.4	100.8

Data presented in Table 8 shows that the highest monthly rainfall of 150.2mm was recorded in April 2024 and the lowest monthly rainfall of 9.2mm was recorded in July 2023. The total annual rainfall recorded during this reporting period is 872mm, which is drier in comparison to the previous reporting periods which recorded 915.4mm (2022 – 2023), 1527mm (2021 - 2022) and 1090.4mm (2020 - 2021).

From the recorded monthly temperature data, January 2024 experienced the highest average temperature at 22.2°C whilst June 2024 experienced the lowest average temperature at 11.5°C.

Fluctuations in temperatures and rainfalls are generally influenced largely by the El-Nino and La-Nina climatic cycle. A reduction in total rainfall has been observed during this reporting period which was directly influenced by the conclusion of the La-Nina climatic event.

Dust Deposition

Four dust deposition gauges are located at Haerses Road quarry. Table 9 lists the locations of these dust gauges.

Table 9: Site location of dust deposition gauges

Dust Gauge I.D.	Location Reference
D08	Hitchcock Road, Olive Grove
D10	Haerses Road (EPL#12513, Monitoring Point 3)
D11	Haerses Road Receiver R6
D12	Haerses Road Receiver R8 (located on the boundary of R7 and R8)

Dust deposition results were collected and analysed monthly by a NATA accredited laboratory. Table 10 presents the monthly dust deposition results between July 2023 and June 2024. Table 11 contains the calculated rolling annual averages for the deposited dust.

The monthly laboratory results for dust deposition for this reporting period is presented in Appendix A.

Charts 1 to 4 illustrate the annual average dust deposition results for the reporting periods of 2020 - 2021, 2021 - 2022, 2022 - 2023 and 2023 - 2024 respectively.

Table 10: Dust Deposition Results: 26 July 2023 – 26 June 2024.

Dust Gauge Location	26/07/23	23/08/23	20/09/23	18/10/23	15/11/23	13/12/23	10/01/24	07/02/24	06/03/24	03/04/24	01/05/24	29/05/24
	23/08/23	20/09/23	18/10/23	15/11/23	13/12/23	10/01/24	07/02/24	06/03/24	03/04/24	01/05/24	29/05/24	26/06/24
D08 Hitchcock Rd / Olive Grove	0.8	0.6	1.1	1.3	1.4	1.4	0.7	0.6	0.8	1.9	0.8	0.5
D10 Haerses Rd (Pt 3, EPL12513)	3.2	8.5	0.6	2.4	2.4	1.3	12.8	19.6	10.5	ND	15.4	5.2
D11	0.5	0.4	0.7	0.5	1.9	1.8	1.0	1.2	1.1	0.9	0.2	0.7
D12	0.2	0.6	0.5	0.9	1.0	0.8	0.6	0.9	0.7	0.7	0.7	0.1

- Note:
- x.x* Vegetation / algae present in dust gauge
 - x.x* Insects / Spider web present in dust gauge
 - x.x* Bird dropping present in dust gauge
 - x.x* Ash present in dust gauge
 - x.x* Sand present in dust gauge
 - x.x* Dust present in dust gauge
 - ND Broken bottle – no data

Table 11: Calculated Rolling Annual Averages of Dust Deposition: 26 July 2023 – 26 June 2024.

Dust Gauge Location	26/07/23	23/08/23	20/09/23	18/10/23	15/11/23	13/12/23	10/01/24	07/02/24	06/03/24	03/04/24	01/05/24	29/05/24
	23/08/23	20/09/23	18/10/23	15/11/23	13/12/23	10/01/24	07/02/24	06/03/24	03/04/24	01/05/24	29/05/24	26/06/24
D08 Hitchcock Rd / Olive Grove	0.8	0.8	0.8	0.8	0.8	0.9	0.9	0.8	0.9	1.0	1.0	1.0
D10 Haerses Rd (Pt 3, EPL12513)	2.0	2.6	2.6	2.7	2.9	3.0	4.0	5.5	6.2	6.2	7.3	7.4
D11	1.1	1.0	0.9	0.8	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.9
D12	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.6

TEOM PM₁₀

In accordance with Condition 10 of Schedule 3, DA165-7-2005, the concentration of particulates with an aerodynamic diameter less than ten microns (PM₁₀) is monitored via the continuous dust monitor (TEOM) near Maroota Public School. The TEOM records data for the whole 360° angles, of which the 180° - 240° quadrant (southerly to south-westerly) indicate potential airborne contributions from Haerses Road Quarry. Chart 8 illustrates the PM₁₀ results for this reporting period, in comparison with relevant consent criteria. Charts 5 to 7 show the PM₁₀ results for the previous reporting periods of 2020 – 2021, 2021 - 2022 and 2022 – 2023 respectively.

No PM₁₀ exceedances were recorded during this reporting period. The following PM₁₀ criteria have been complied with:

- EPL 24-hour average PM₁₀ criteria of 42 µg/m³,
- NEPM 24-hour maximum PM₁₀ criteria of 50 µg/m³, and
- Annual average PM₁₀ criteria of 30 µg/m³.

The annual average PM₁₀ result for this reporting period is 14.6 µg/m³.

TSP

Reporting of TSP results commenced in December 2017. Charts 9 to 12 display TSP results during the 2020 – 2021, 2021 – 2022, 2022 – 2023 and 2023 – 2024 respectively.

No TSP exceedance occurred during this reporting period. The following TSP criteria has been complied with:

- Annual average TSP criteria of 90 µg/m³

The annual average TSP for this reporting period is 36.6 µg/m³

A copy of the full reports containing TEOM, TSP and meteorological data provided by CBased Environmental Pty Ltd are contained in Appendix B.

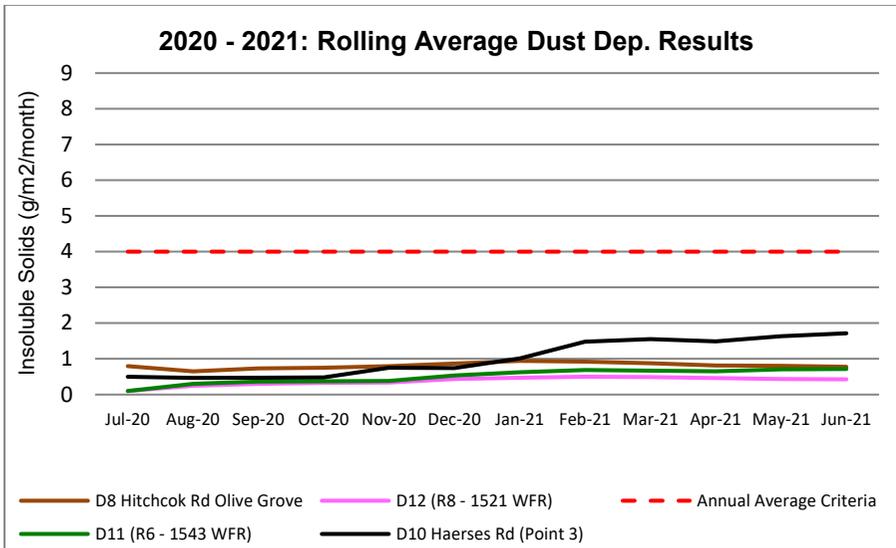


Chart 1: 2020 – 2021 Rolling Average of Dust Deposition Results

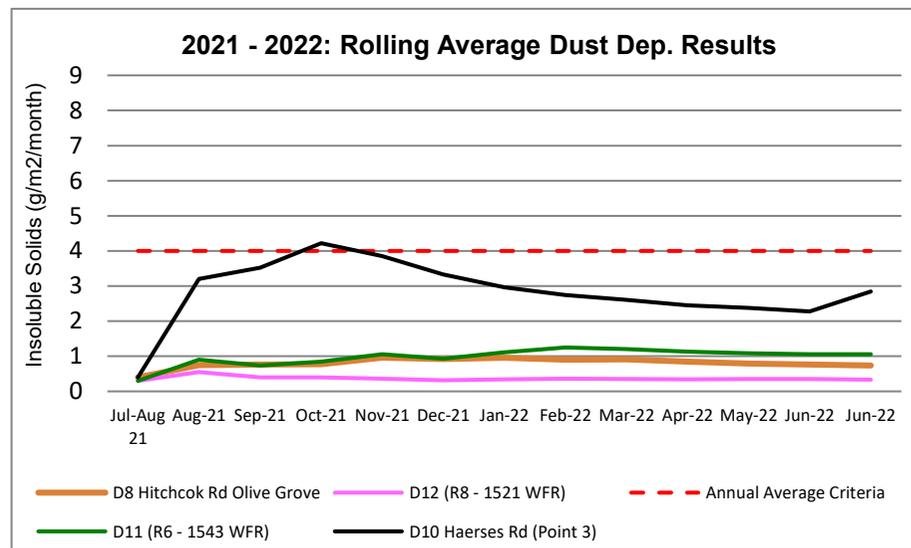


Chart 2: 2021 – 2022 Rolling Average of Dust Deposition Results

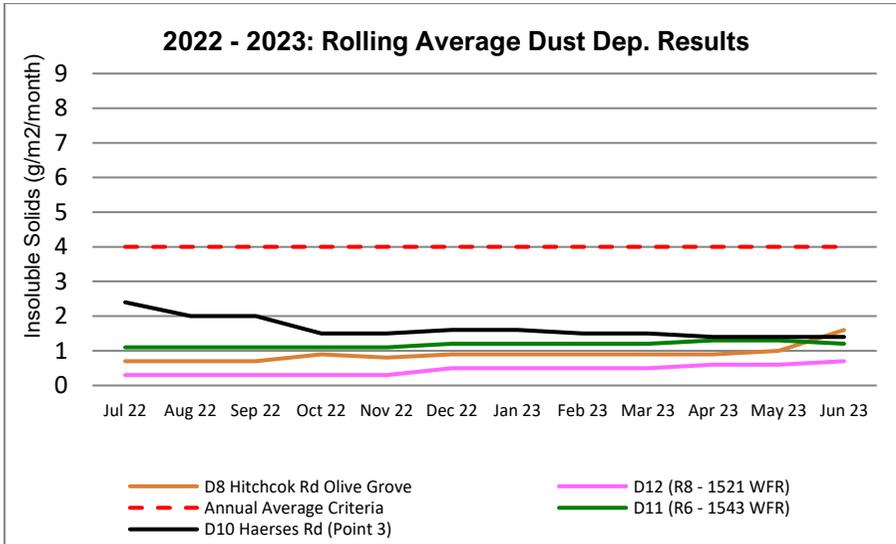


Chart 3: 2022 – 2023 Rolling Average of Dust Deposition Results

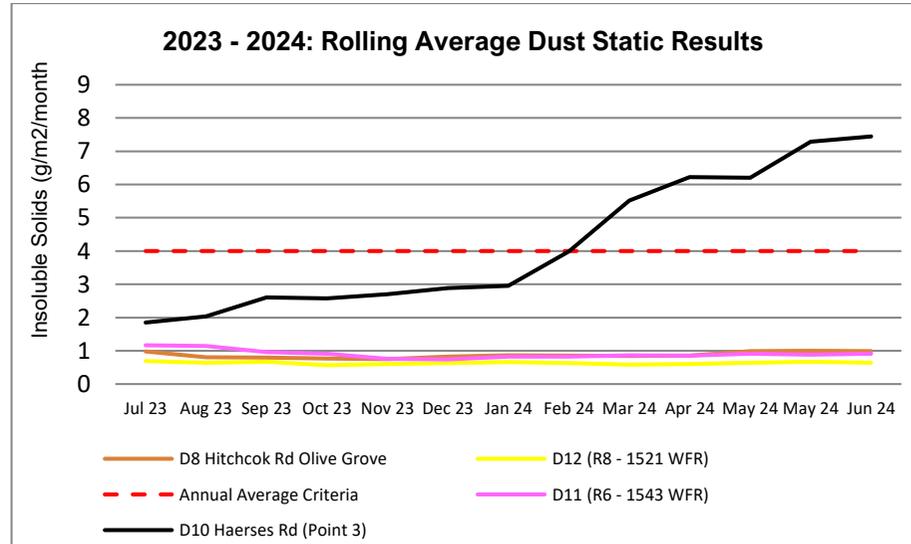


Chart 4: 2023 – 2024 Rolling Average of Dust Deposition Results

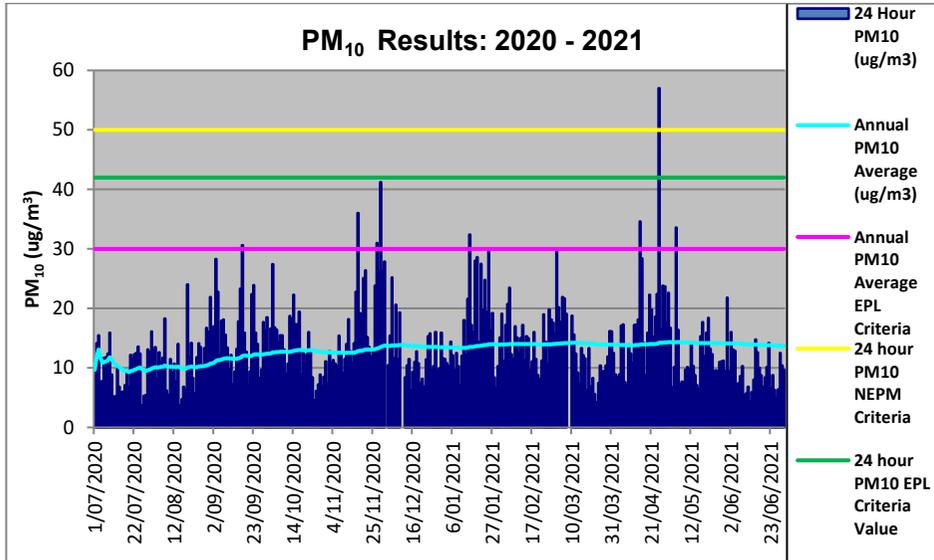


Chart 5: 2020 - 2021 PM10 Results and Criteria

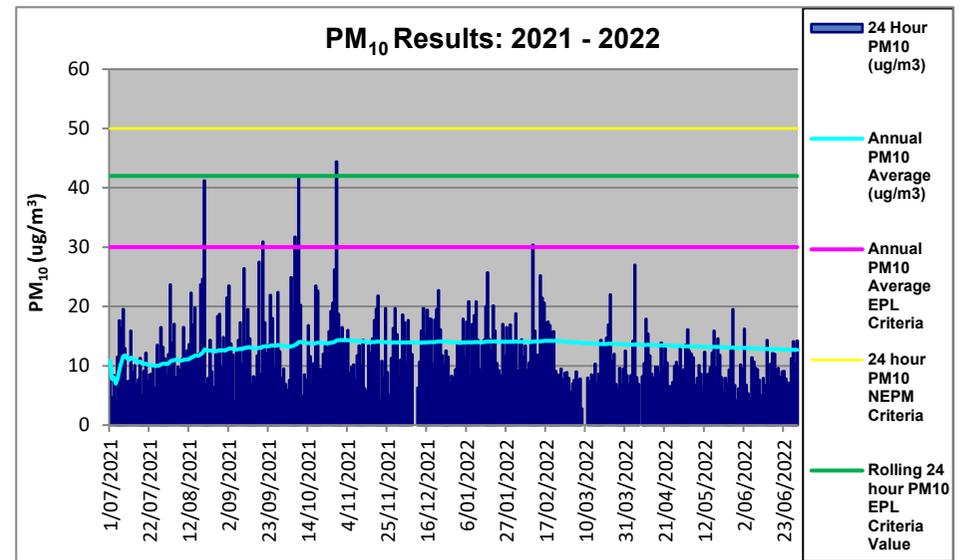


Chart 6: 2021 - 2022 PM10 Results and Criteria

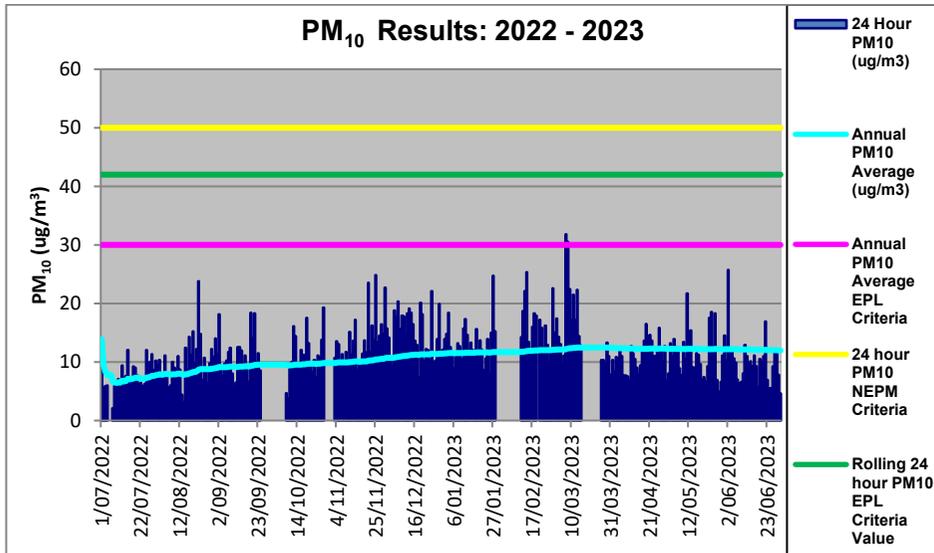


Chart 7: 2022 - 2023 PM10 Results and Criteria

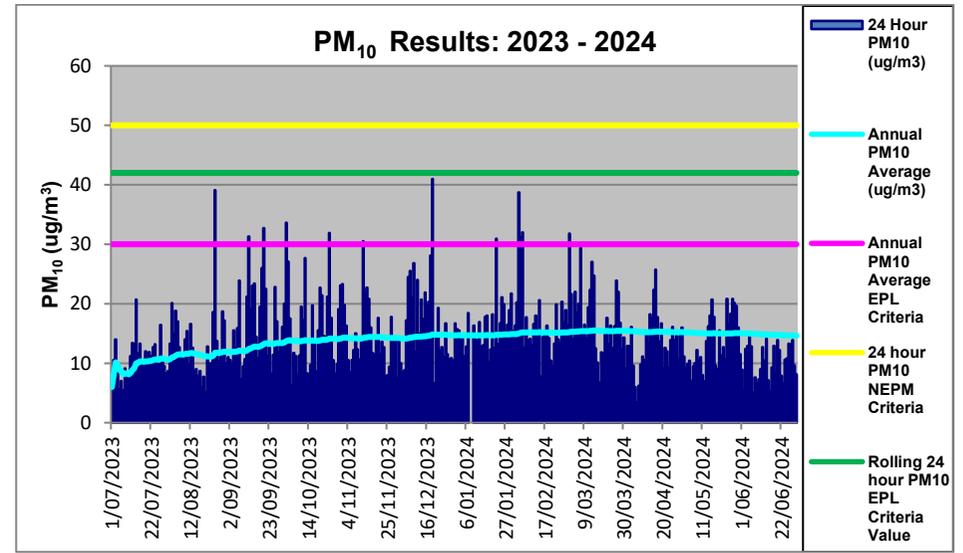


Chart 8: 2023 - 2024 PM10 Results and Criteria

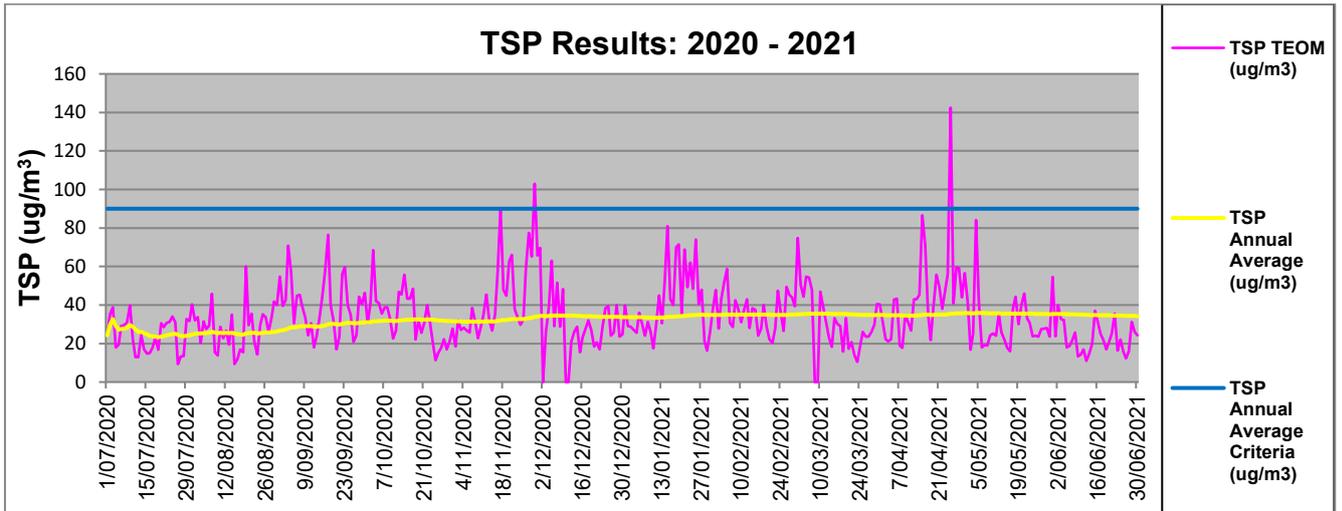


Chart 9: 2020 - 2021 TSP Results and Criteria

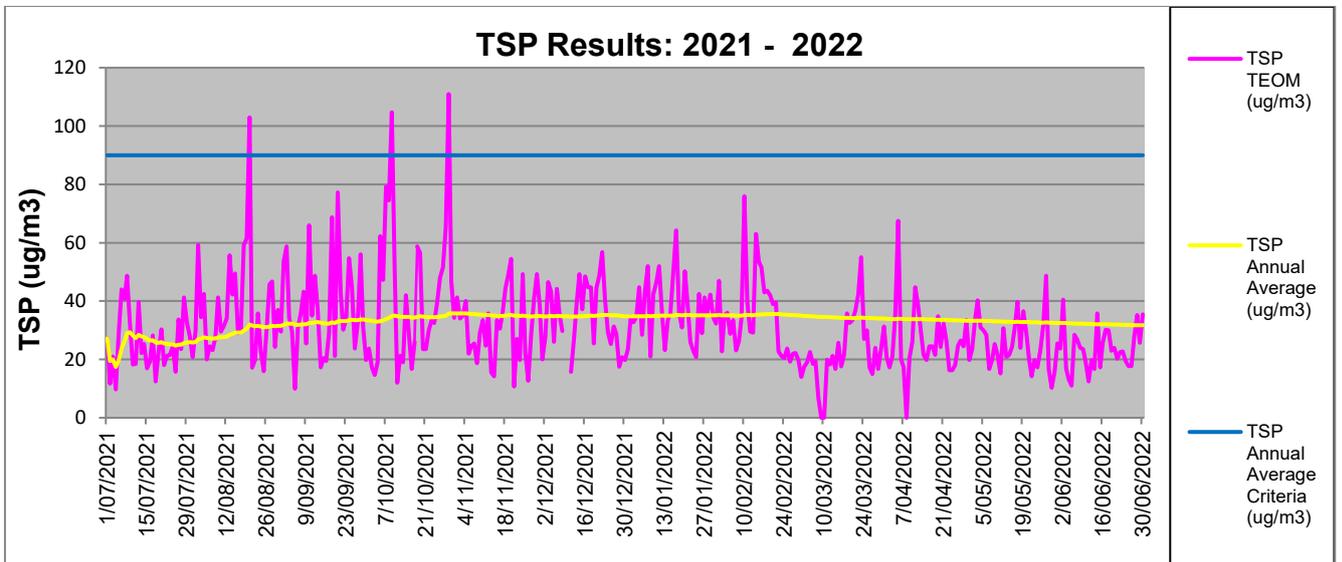


Chart 10: 2021 - 2022 TSP Results and Criteria

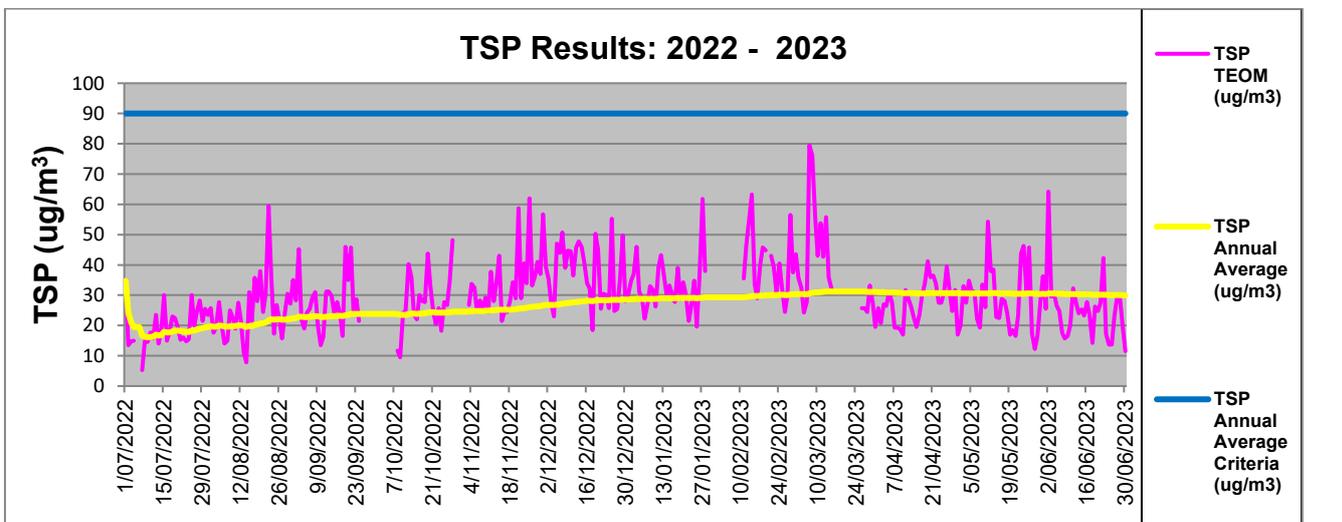


Chart 11: 2022 - 2023 TSP Results and Criteria

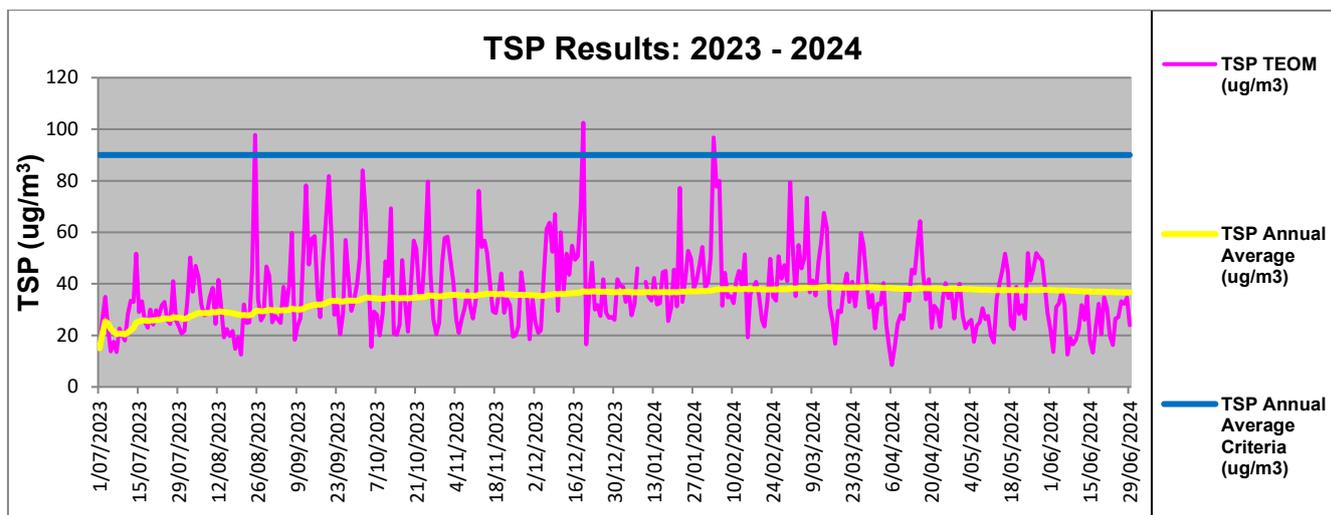


Chart 12: 2023 - 2024 TSP Results and Criteria

5.1.4 Analysis

Dust Deposition

Reporting Period 2023 - 2024

Four dust deposition gauges monitor potential dust impacts from Haerses Road quarry.

Monthly results and rolling annual average dust deposition averages dust gauges D08 (Olive Grove, Hitchcock Road), D11 (Receiver R6) and D12 (Receiver R8) for the July 2023 to June 2024 period were in compliance. All annual averages were in compliance with the 4 g/m2/month criteria.

Monthly dust deposition results at D10 (EPL Monitoring Point 3) were elevated for the seven months which resulted in the rolling annual averages exceeding the 4 g/m2/month criteria for the last five months of the reporting period.

An Air Quality Assessment (ERM, 2019) undertaken for the Modification Report MR3 (Umwelt, 2019) specifies the annual average dust deposition of 1.5 g/m2/month. Rolling annual averages for D8, D11 and D12 were lower than this predicted level whilst the rolling annual averages for D10 exceeded this predicted impact for the whole duration of the reporting period.

Historical Data

It can be seen from Charts 1 to 3 that the majority of the dust deposition results are in compliance over the previous 4 years of monitoring. Annual averages dust deposition at dust gauge D10 were exceeded for one month during the 2021 – 2022 monitoring periods due to impacts from prolonged earthwork activities, exposed ground surface in the neighbouring property, paddock slashing and poor air quality from bushfires and hazard reduction burns. Annual averages for D10 exceeded the 4.0 g/m2/month criteria for the last five months of the 2023 – 2024 monitoring period due to property maintenance involving paddock slashing for the site office precinct and farmers undertaking dust generating activities in the immediate neighbouring fields to the dust gauge.

PM10

Reporting Period 2023 - 2024

An Air Quality Assessment (ERM, 2019) undertaken for the Modification Report MR3 (Umwelt, 2019) specifies the long term annual average PM10 concentration to be 13.8 µg/m³, based on a 5-year average data collected at the TEOM located adjacent to the Maroota Public School. The annual average PM10 concentration for this reporting period is 14.6 µg/m³ which is slightly higher than the long-term average.

The rolling annual average PM10 values (light blue line on Chart 8) remained below the EPA long term criteria of 30µg/m³ (pink line on Chart 8) for this reporting period.

The 24-hour average PM10 levels (dark blue columns on Chart 8) remained below the 24 hour EPL management level of 42 µg/m³ (green line on Chart 8) and the 24 hour NEPM short term criteria level of 50 µg/m³ (yellow line on Chart 8) during this reporting period.

No PM10 exceedances were recorded during this reporting period.

Table 12: Elevated PM10 – EPL and NEPM Management criteria

Event No.	Event Date	Air Quality value	Applicable Criteria (ug/m³)	Comment
No PM10 criteria have been exceeded during this reporting period.				

Historical Data

It can be seen from Charts 5 to 8 that all the annual average PM10 results recorded at the TEOM comply with the annual average PM10 criteria of 30µg/m³ over the previous four years of annual review reporting.

A number of 24-hour average PM10 exceedances were recorded over the last four reporting periods with causes attributed to activities not related to quarry operations. Exceedances recorded during the 2019-2020 period were directly influenced by cumulative poor air quality associated with bushfires in the local, and regional and inter-state areas. Exceedances during the 2020-2021 period were attributed to forecast windy conditions and a number of hazard reduction burns across the region. Exceedance during the 2021-2022 period was associated with forecasted warm and windy conditions together with a local bushfire event occurring in Maroota. There were no 24-hour average PM10 exceedances during this 2023-2024 reporting period.

The rolling annual PM10 average for the 2023-2024 reporting period is 14.6 µg/m³, which is lower than the EPA criterion of 30µg/m³ and slightly higher than the predicted annual average of 13 µg/m³ contained in the Modification Report MR 3 (Umwelt, 2019). This annual average is comparable to the recorded historical values of 12.0 µg/m³ (2022-2023), 12.7 µg/m³ (2021-2022), 13.7 µg/m³ (2020-2021) and much lower than the 21.3 µg/m³ (2019-2020). The cause of the previous higher annual average of recorded 21.3 µg/m³ (2019-2020) is attributed to higher frequency of extraordinary events such bushfire and hazard reduction burns.

Total Suspended Particles

Reporting Period 2023 - 2024

The Total Suspended Particles (TSP) results are reported in Charts 9 to 12 inclusive. The annual average TSP for this reporting period is 36.6 µg/m³ which is lower than the annual average TSP criteria of 90 µg/m³ set out by the consent and EPL. Elevated TSP values were a reflection of high PM10 values.

Historical Data

Reporting of TSP commenced in December 2017. Historical annual average TSP values were 38.3 $\mu\text{g}/\text{m}^3$ (2017-2018), 40.0 $\mu\text{g}/\text{m}^3$ (2018-2019), 53.4 $\mu\text{g}/\text{m}^3$ (2019-2020), 34.3 $\mu\text{g}/\text{m}^3$ (2020-2021), 31.8 $\mu\text{g}/\text{m}^3$ (2021-2022) and 29.9 $\mu\text{g}/\text{m}^3$ (2022-2023). The higher annual average TSP value recorded in 2019-2020 were attributed to cumulative effects of poor air quality associated with bushfires in the local, and regional and inter-state areas.

5.1.5 Discrepancies between Predicted and Actual Air Quality Impacts**Dust Deposition**

The EIS (ERM, 2005) prepared for the original DA 165-7-2005 predicted dust deposition during quarrying Stages 1 and 5 to be between 2.2 and 3.0 $\text{g}/\text{month}/\text{m}^2$ for all receptors. During this reporting period, no extraction was undertaken in Stage 1, extraction was undertaken in Stage 2 west and stockpiling was undertaken in Stage 2 east. The most recent Air Quality Assessment undertaken for Modification Report MR 3 (Umwelt, 2019) predicted that quarry operations will not exceed the predicted EPA criterion of 2 $\text{g}/\text{m}^2/\text{month}$ and annual average of 4 $\text{g}/\text{m}^2/\text{month}$.

The EA (Umwelt, 2016) prepared for DA 165-7-2005 (Modification 1) predicted that no privately owned receivers are projected to experience ground level concentration of dust deposition above the assessment criteria, due to emissions from the modification only (Extraction Cells 1A-B to 5A-B inclusive). The highest predicted impacts occur at receivers R1, R3 and R13 with predicted incremental annual average dust deposition of 0.04 $\text{g}/\text{month}/\text{m}^2$. The Modification Report MR 3 (Umwelt, 2019) determined that quarry operations proposed under Modification 3 would not result in the EPA dust deposition criteria to be exceeded.

Monthly dust deposition at D8 ranged from 0.6 to 1.9 $\text{g}/\text{m}^2/\text{month}$ which in are line with the predicted air quality impacts. The rolling annual average dust deposition at D8 ranged from 0.8 to 1.0 $\text{g}/\text{m}^2/\text{month}$ which falls within the predicted dust levels.

Monthly dust deposition at D10 ranged from 1.3 to 19.6 $\text{g}/\text{m}^2/\text{month}$ with a number of monthly results exceeding the predicted air quality impacts. The rolling annual averages ranged from 2.0 to 7.4 $\text{g}/\text{m}^2/\text{month}$ with a number of the rolling annual averages exceeding the predicted dust levels.

Monthly dust deposition at D11 ranged from 0.7 to 1.1 $\text{g}/\text{m}^2/\text{month}$ with the rolling annual averages ranging from 0.7 to 1.1 $\text{g}/\text{m}^2/\text{month}$, which fall within the predicted dust impact levels, and compliant with the annual average criteria of 4.0 $\text{g}/\text{m}^2/\text{month}$.

Monthly dust deposition at D12 ranged from 0.6 to 0.7 $\text{g}/\text{m}^2/\text{month}$ with the rolling annual average dust deposition ranging from 0.6 – 0.7 $\text{g}/\text{m}^2/\text{month}$, with all dust levels falling within the predicted dust impact levels and compliant with the annual average criteria of 4.0 $\text{g}/\text{m}^2/\text{month}$.

PM10

Earlier PM10 predictions contained in the EIS (ERM, 2005) prepared for the original DA 165-7-2005 showed ground level concentrations of 24-hour average PM10 of 13 $\mu\text{g}/\text{m}^3$ and an annual average PM10 to be 12 $\mu\text{g}/\text{m}^3$. Recent Air

Quality Assessment undertaken for Modification Report MR 3 (Umwelt, 2019) specifies a slightly higher 24-hour average PM10 of 13.8 µg/m³ and an annual average PM10 to be 12 µg/m³. The Modification Report MR 3 (Umwelt, 2019) also predicted that under worst-case operational scenarios, the predicted combined background and quarry increment particulate levels would remain below the 24-hour average PM10 criteria of 50 µg/m³ which has been complied with during this reporting period.

Total Suspended Particle (TSP)

TSP predictions contained in the EIS (ERM, 2005) prepared for the original DA 165-7-2005 showed ground level concentrations of 24-hour average TSP of 26 µg/m³ and an annual average TSP to be 25 µg/m³. The EA (Umwelt, 2016) prepared for DA 165-7-2005 (Modification 1) predicted that no privately owned receivers will experience TSP above the assessment criteria. The highest predicted TSP will occur at receiver R4 as a result of Modification 1 extraction where the predicted incremental 24-hour TSP concentration is 1.5 µg/m³. Further to this, the Modification Report MR 3 (Umwelt, 2019) predicted an annual average TSP concentration of 34.5 µg/m³ which was calculated based on the assumption that 40% of the TSP is PM10.

During this monitoring period, the annual average of TSP of 36.6 µg/m³ was recorded, which is slightly higher than the predicted levels in the Air Quality Assessment undertaken for the Modification Report MR 3 (Umwelt, 2019).

5.1.6 Changes to Environmental Procedures

Dixon Sand is currently liaising with the EPA regarding the suitability of a number of dust deposition gauges in the air quality monitoring program. The outcome of the review will be implemented, and the Air Quality Management Plan revised accordingly.

5.2 Noise Management

5.2.1 Noise Sources and Mitigation Measures

The objectives, criteria limits, procedures, response, reporting and responsibilities of noise management are contained in the Noise Management Plan.

The potential sources of noise from Haerses Road quarry and mitigation measures have been identified in Table 13.

Table 13: Potential sources of Noise and mitigation measures.

Potential Noise Sources	Mitigation Measures
<ul style="list-style-type: none"> • Extraction by bulldozers and excavators; • Moving of materials and stockpiling by dump trucks and excavators; • Truck haulage including bogie trucks, truck and dogs; • Wet/dry processing of sand; and • 	<ul style="list-style-type: none"> • Construction of noise bunds in strategic locations as stipulated in the EIS/EAs and consent conditions; • Compliance with approved hours of operation; • Regular maintenance of road surfaces, vehicles and equipment to reduce noise emissions; and • Enforcement of speed limits for trucks and limited use of exhaust brakes in residential and school areas.

	<ul style="list-style-type: none"> • Enforcement of a 20km/h speed limit on quarry access road and haul roads. • Switch off plant when not in use and use of automatic idle shutdown. • Sealed sections of Haerses Road
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The Noise Management Plan requires attended noise monitoring to be undertaken every six months during the first two years of operation once extraction in Modification 1 area has commenced. After two years a review of the monitoring results will be undertaken and if deemed appropriate, approval will be sought from the DPHI to revert to annual attended noise monitoring for the remainder of operations in the Mod 1 extraction area.

During this reporting period, extraction has taken place in Stage 2 west (original extraction area) and Cells 1A, 1B, 2A, 2B, 3A and 3B (Modification 1 extraction area). Noise monitoring was undertaken in December 2023 and June 2024.

During the December 2023 monitoring, noise sources were generated from the following operational areas:

- Processing plant – 2 screens, crusher, front end loader, moxies, haulage trucks
- Quarry Stage 3: Excavator and haul truck, excavator building bund wall and roller undertaking preparation work for the Sandstone cutting shed.
- Quarry Cell 1A: Crusher, FEL, Excavator and Dozer
- Quarry Cell 3B: Excavator ripping stone, excavator loading truck, excavator with 4 blades saw from Haerses Road quarry during the attended noise monitoring in November 2023 were from crusher operations in the processing area and area 2, with noise contribution from dozers, excavators and saw cutting.

During the June 2024 monitoring, noise sources were generated from the following operational areas:

- Processing plant – Washplant, 2 screens, front end loader, excavator, haulage trucks
- Quarry Stage 2: in Pit - Rock saw, grinder, FEL and excavator; stockpiling area – screen, excavator and FEL
- Quarry Cell 1A: Rock saw, grinder and excavator ripping
- Quarry Cell 3B: Excavator ripping stone, Dozer pushing up and excavator loading moxies

5.2.2 Compliance Limits

Haerses Road's new noise criteria determined during DA Modification 3 are listed in Table 14. The locations of noise receivers are displayed in Figure 3. Noise criteria in Table 14 do not apply if the quarry has an agreement with the relevant landowner to exceed the noise criteria. Dixon Sand currently has a noise agreement in place with the following receivers:

- R2
- PF1, PF2 and PF3 (receivers on Hitchcock Road to the east of Haerses Road quarry), and
- R12

Approved hours of operation are contained in Table 15. Noise monitoring for the quarry is based on these criteria.

Table 14: Haerses Road Noise Criteria

Consent	Conditions																					
DA165-7-2005, Condition 3 of Schedule 3	<p>The Applicant must ensure that operational noise generated by the development (excluding acoustic bund construction) does not exceed the criteria in Table 2 at any residence on privately-owned land.</p> <p style="color: red; text-align: center;"><i>Table 2: Operational noise criteria dB(A)</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc;">Receiver</th> <th style="background-color: #cccccc;">Day</th> <th colspan="2" style="background-color: #cccccc;">Shoulder (6.00 am to 7.00 am)</th> </tr> <tr> <td></td> <td style="text-align: center;"><i>L_{Aeq} (15 minute)</i></td> <td style="text-align: center;"><i>L_{Aeq} (15 minute)</i></td> <td style="text-align: center;"><i>L_{A(max)}</i></td> </tr> </thead> <tbody> <tr> <td style="color: red;">R05, R06</td> <td style="text-align: center;">41</td> <td style="text-align: center;">35</td> <td rowspan="4" style="text-align: center; vertical-align: middle;">52</td> </tr> <tr> <td style="color: red;">R03</td> <td style="text-align: center;">40</td> <td style="text-align: center;">37</td> </tr> <tr> <td style="color: red;">R13, R14</td> <td style="text-align: center;">40</td> <td style="text-align: center;">36</td> </tr> <tr> <td style="color: red;">All other receivers</td> <td style="text-align: center;">40</td> <td style="text-align: center;">35</td> </tr> </tbody> </table> <p>Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the <i>NSW Noise Policy for Industry</i>.</p> <p>However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.</p> <p><i>Note:</i></p> <ul style="list-style-type: none"> Should an agreement with a landowner be terminated for any reason, the Applicant must comply with the noise criteria in Table 2. 	Receiver	Day	Shoulder (6.00 am to 7.00 am)			<i>L_{Aeq} (15 minute)</i>	<i>L_{Aeq} (15 minute)</i>	<i>L_{A(max)}</i>	R05, R06	41	35	52	R03	40	37	R13, R14	40	36	All other receivers	40	35
Receiver	Day	Shoulder (6.00 am to 7.00 am)																				
	<i>L_{Aeq} (15 minute)</i>	<i>L_{Aeq} (15 minute)</i>	<i>L_{A(max)}</i>																			
R05, R06	41	35	52																			
R03	40	37																				
R13, R14	40	36																				
All other receivers	40	35																				

Table 15: Haerses Road Approved Hours of Operation.

Consent Condition	Condition										
DA165-7-2005, Condition 1 of Schedule 3	<p>The Applicant must comply with the operating hours set out in Table 1.</p> <p style="color: blue; text-align: center;"><i>Table 1: Operating hours</i></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #cccccc;">Activity</th> <th style="background-color: #cccccc;">Permissible Hours</th> </tr> </thead> <tbody> <tr> <td>Quarrying operations (excluding truck arrival, loading and dispatch)</td> <td>7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays</td> </tr> <tr> <td>Truck arrival, loading and dispatch</td> <td>6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays</td> </tr> <tr> <td>Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road</td> <td>8.00 to 5.00 pm Monday to Friday At no time on Saturdays, Sundays or public holidays</td> </tr> <tr> <td>Maintenance</td> <td>At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations</td> </tr> </tbody> </table>	Activity	Permissible Hours	Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays	Truck arrival, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays	Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday At no time on Saturdays, Sundays or public holidays	Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations
Activity	Permissible Hours										
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays										
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Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday At no time on Saturdays, Sundays or public holidays										
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations										
DA165-7-2005, Condition 2 of Schedule 3	<p>The following activities may be carried out outside the hours specified in condition 1 above:</p> <ol style="list-style-type: none"> (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and (b) emergency work to avoid the loss of lives, property or to prevent environmental harm. <p>In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.</p>										

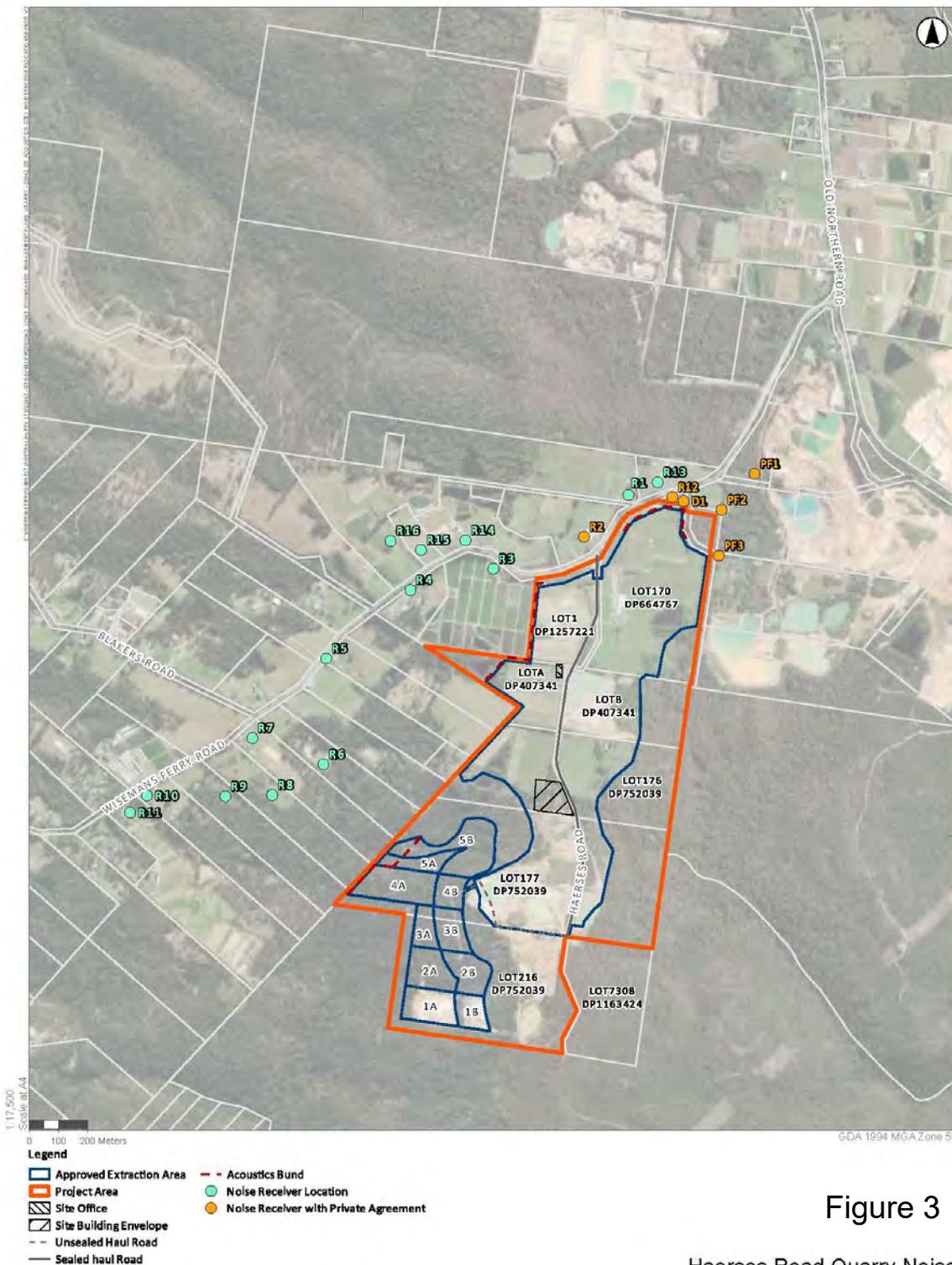


Figure 3

Haerses Road Quarry Noise Receiver Locations and Acoustic Bunds

Image Source : ESRI Basemap (2021) Data source : NSW LPI (2021), NSWDSFI (2021), NPWS Estate (2019)

5.2.3 Results

Attended noise monitoring for Haerses Road quarry was undertaken in December 2023 and June 2024. Attended noise monitoring was conducted at receivers (where permission to enter the property was granted) and at-source, in accordance with the staging requirement of the Noise Management Plan. In instances where extraneous noise such as road traffic and insects were found to be the dominant noise sources, noise levels were obtained at alternative locations closer to the quarry. Predicted noise levels are then extrapolated from the near-distance location to the sensitive receiver locations.

During the December 2023 monitoring, quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise in all cases the dominant source of noise. No L_{Amax} noise levels were attributable to the quarry in the shoulder period. During daytime period, quarry noise was inaudible or barely audible at monitoring locations.

During the June 2024 monitoring, quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise on Wisemans Ferry Road in all cases the dominant source of noise. No L_{Amax} noise levels were attributable to the quarry in the shoulder period. During daytime period, quarry noise was inaudible or barely audible at monitoring locations. Similarly, ambient noise dominated over quarry related noise.

On-site noise measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were taken to determine the L_{Aeq}15min to establish representative sound power levels of the quarry operation to facilitate calculation of extrapolated noise levels at receivers where background noise was too high to enable quarry noise contribution to be determined. Extrapolated noise results were calculated and are presented in Table 16. The full noise monitoring reports for December 2023 and June 2024 are contained in Appendix D.

Table 16: Extrapolated Noise Monitoring results, December 2023 and June 2024.

Receiver	Noise Criteria		Extrapolated Daytime noise level (L _{Aeq} 15 min) December 2023	Extrapolated Daytime noise level (L _{Aeq} 15 min) June 2024	Comment
	Shoulder (dBA)	Daytime (dBA)			
R3	37	40	37	39	All locations comply with noise limits. Results of attended monitoring and extrapolated noise levels demonstrate observed operations during shoulder and day periods were compliant with the noise criteria at each receiver under the meteorological conditions at the time.
R4	35	40	37	39	
R6	35	41	38	38	
R8	35	40	40	39	
All other receivers	35	40	See Figure 4	See Figure 5	

*Note:

- A noise agreement is in place between Dixon Sand and receivers R2, R12 and receivers located on Hitchcock Road (PF1, PF2 and PF3), therefore the noise criteria do not apply at these receivers.
- Dixon Sand owns the property at Receiver D1 and therefore the noise criteria does not apply at this location

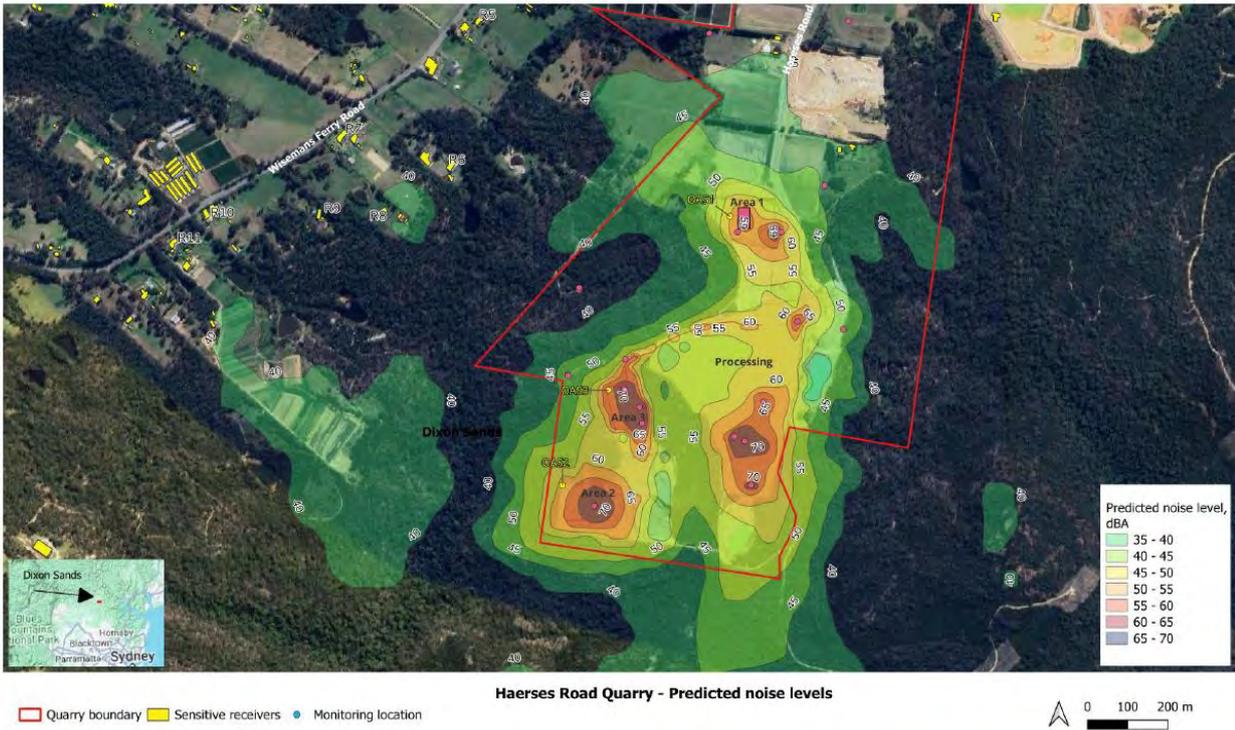


Figure 4 – Extrapolated noise levels from Haerses Road Quarry based on on-site measurements, December 2023.

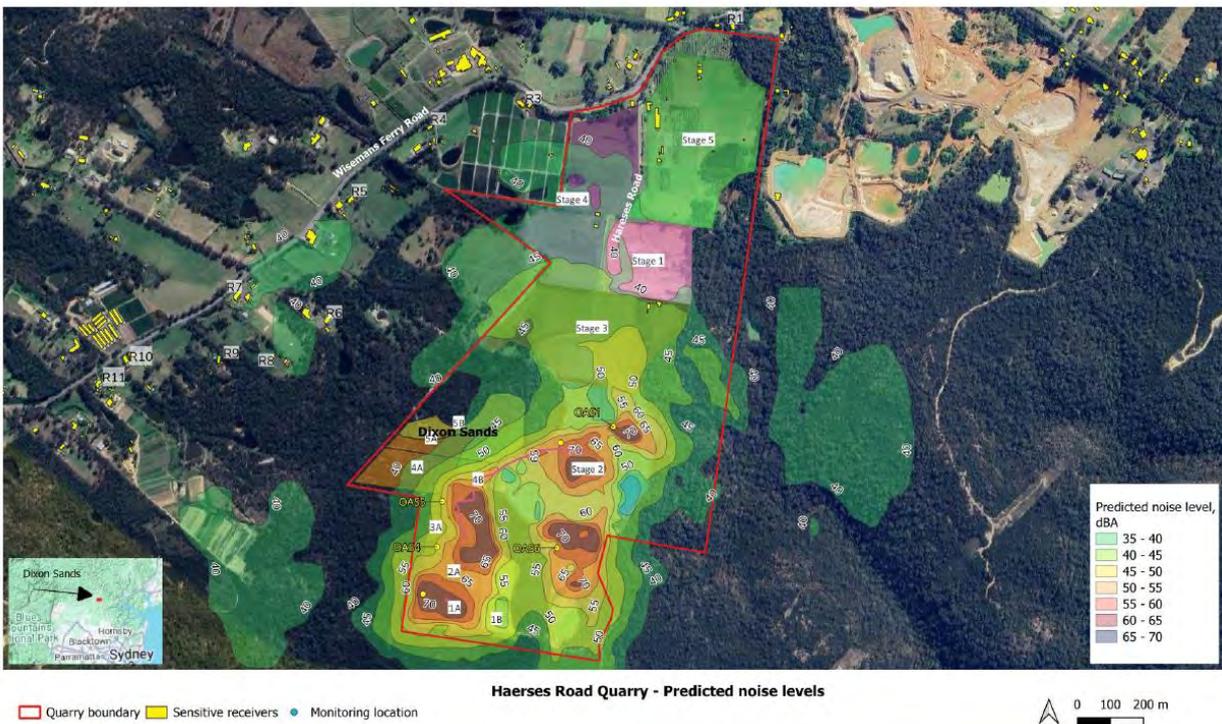


Figure 5 – Extrapolated noise levels from Haerses Road Quarry based on on-site measurements, June 2024.

5.2.4 Analysis

Results of attended noise monitoring and extrapolated noise levels indicate that Haerses Road quarry operations are compliant with shoulder and daytime noise criteria under the meteorological conditions at the time of monitoring in December 2023 and June 2024.

5.2.5 Noise Trend

Dixon Sand has a noise agreement in place with receiver R2, R12 and properties belonging to PF Formations along Hitchcock Road and therefore, noise criteria do not apply at these locations.

New noise criteria were established during DA Modification 3. Therefore, this marks the starting point for a new long-term trend for quarry noise. Attended noise monitoring results and extrapolated noise levels from the December 2023 and June 2024 monitoring are displayed in Charts 13 to 17, inclusive. All attended noise monitoring results and extrapolated noise levels are compliant for both shoulder and daytime period at all receivers.

Additional noise results, to be obtained from future noise monitoring, will be required to establish new noise trends for quarry operations.

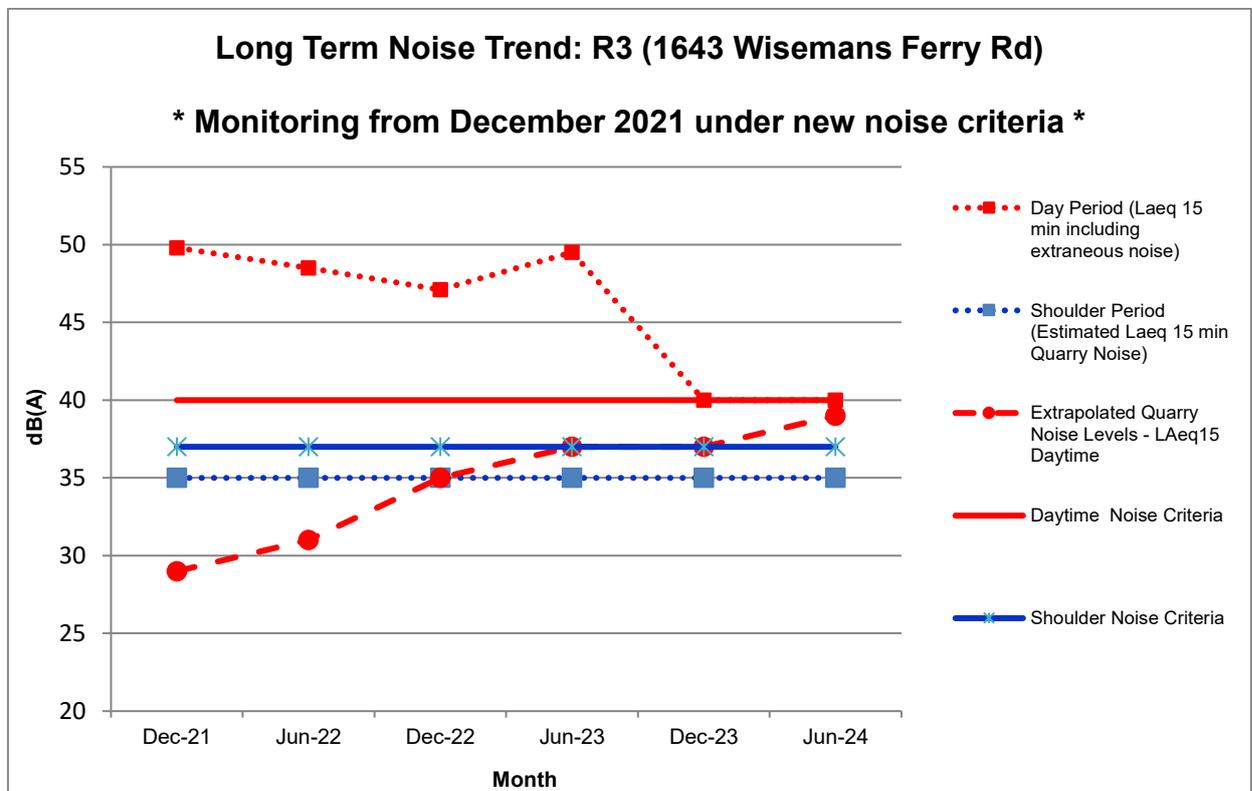


Chart 13: Noise Monitoring Results – R3

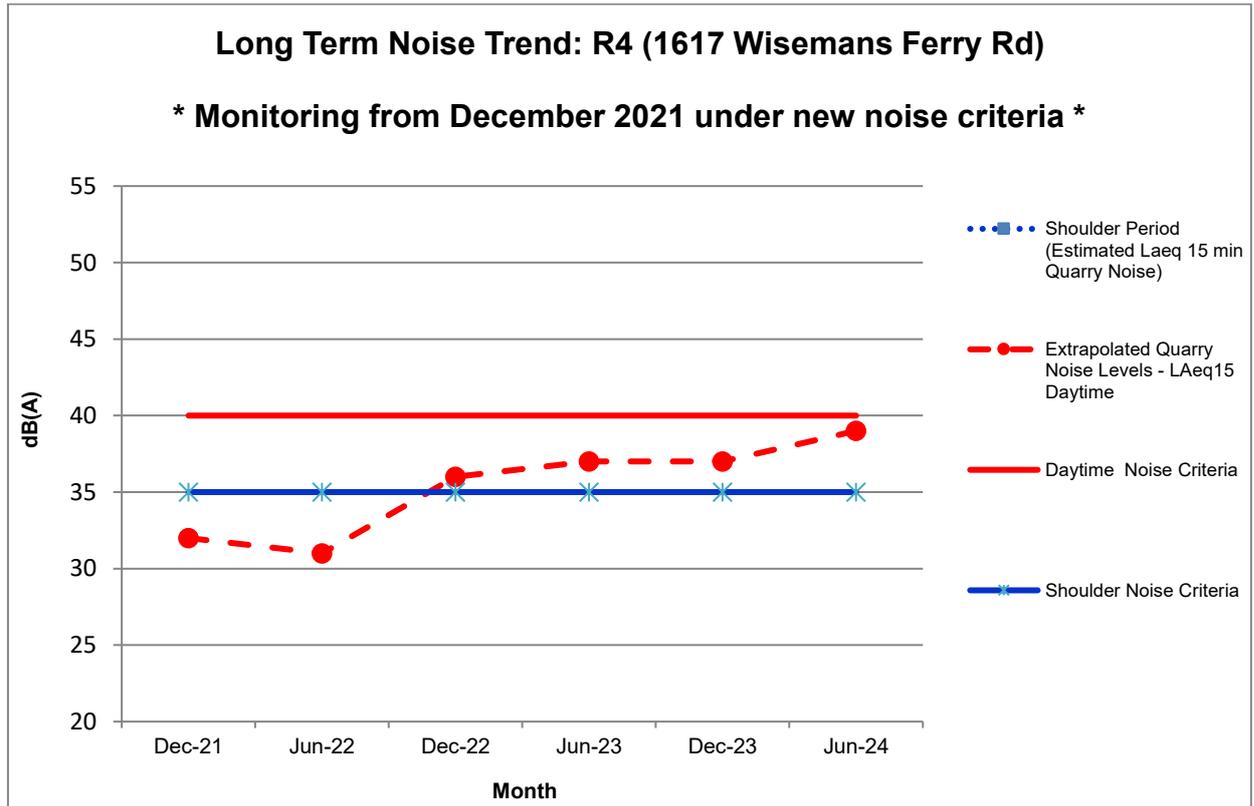


Chart 14: Noise Monitoring Results – R4

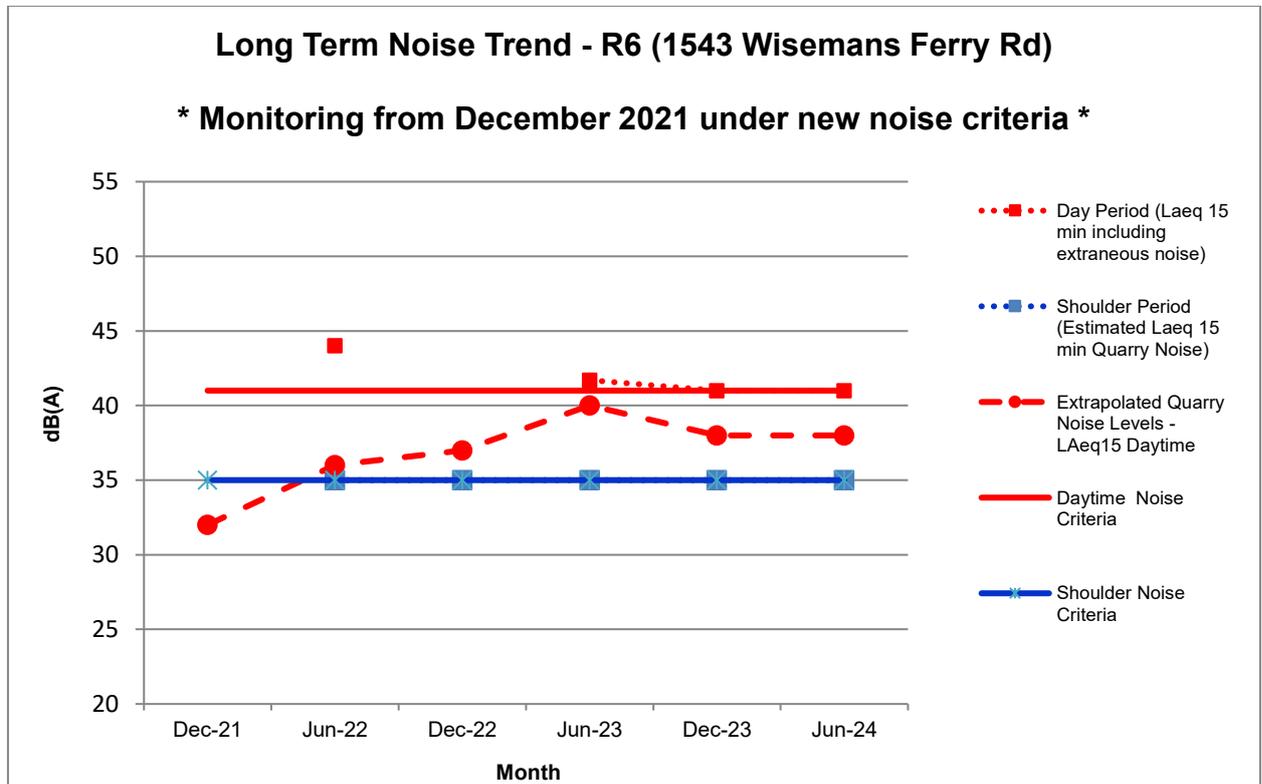


Chart 15: Noise Monitoring Results – R6

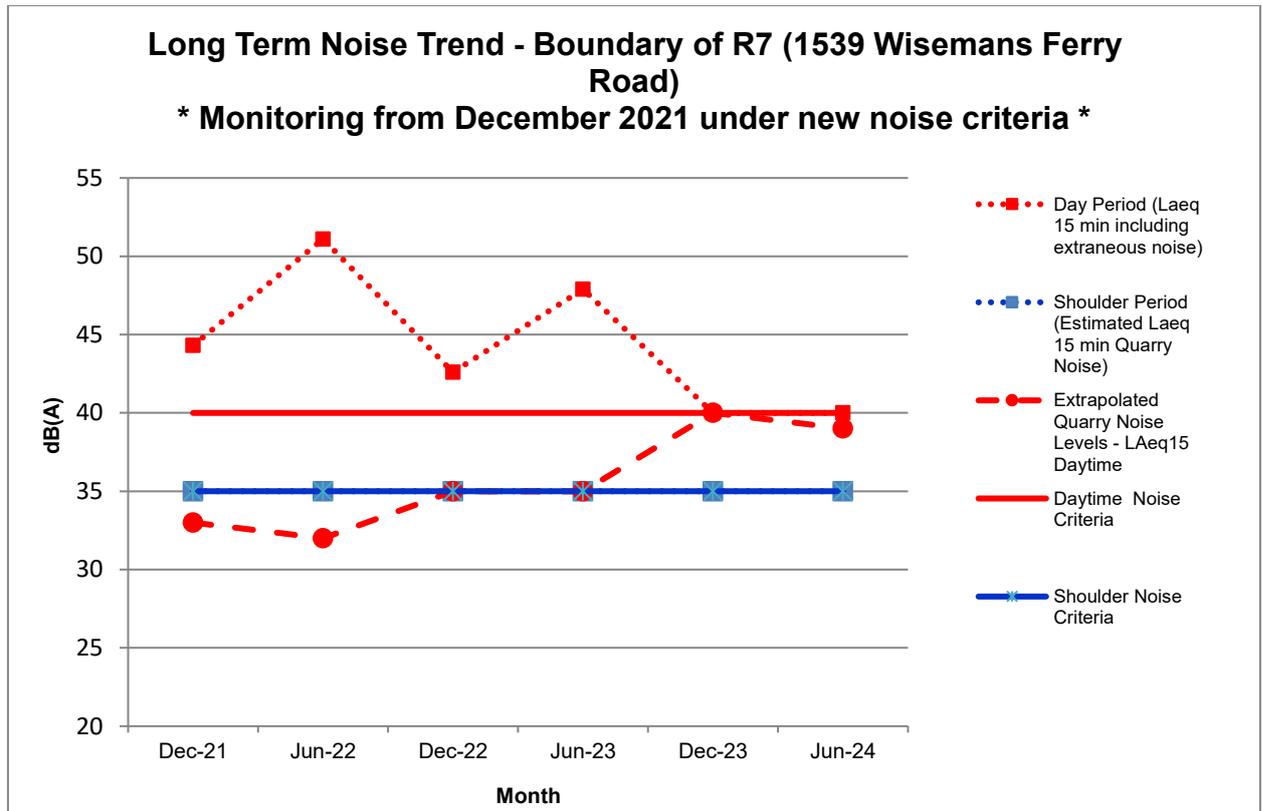


Chart 16: Noise Monitoring Results – R7

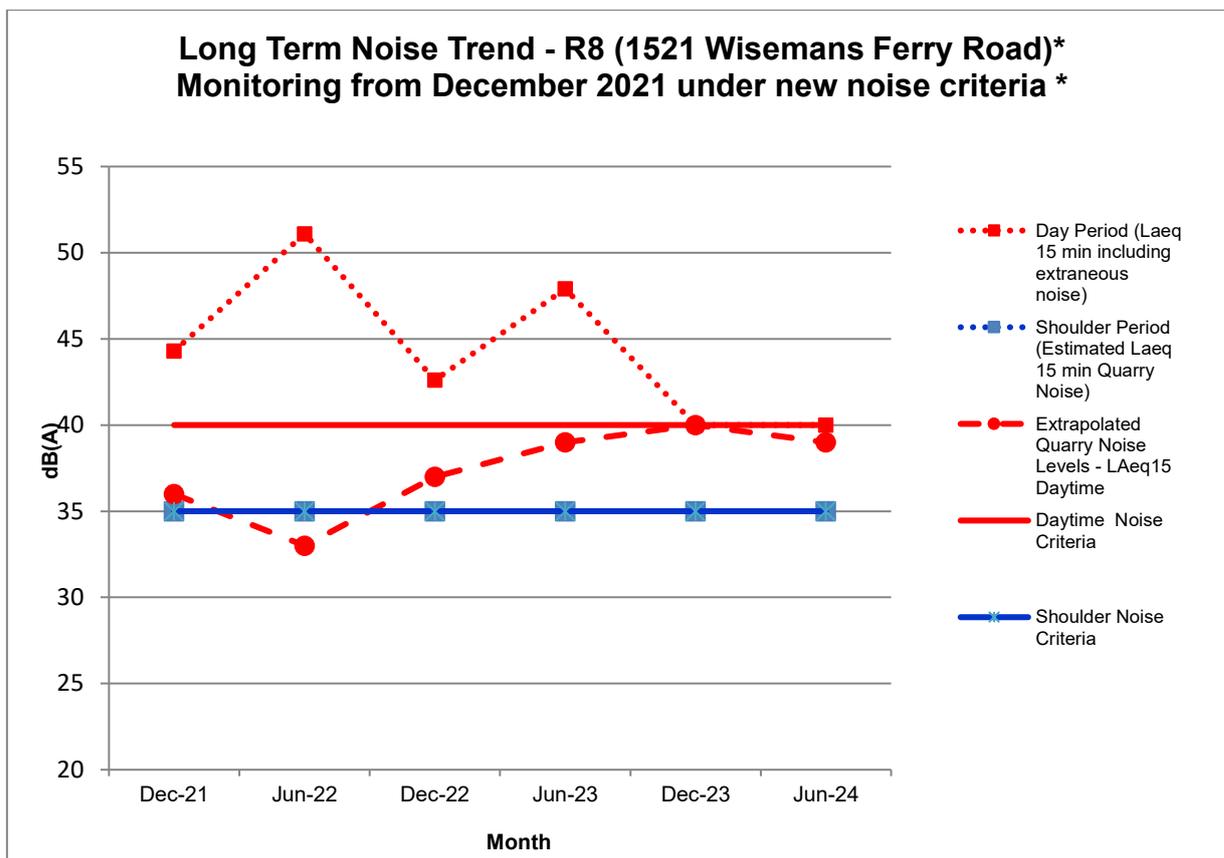


Chart 17: Noise Monitoring Results – R8

5.2.6 Discrepancies between Predicted and Actual Noise Impacts

The EIS (ERM, 2005) prepared for the original development consent DA 165-7-2005 contains predictions for noise impacts during quarry operations in the following extraction Stages:

- Stage 1,
- Stage 4 (scenario a),
- Stage 4 (scenario b), and
- Stage 5.

The EA (Umwelt, 2016) prepared for development consent DA 165-7-2005 (Modification 1) contains predictions for noise impacts for quarry activities in the newly approved extraction cells:

- early extraction in Cells 4,
- early extraction in Cells 5,
- clearing, pre-stripping and early extraction for Cell 1,
- clearing, pre-stripping and early extraction for Cell 3, and
- bund construction in Cell 4.

The Modification report MR3 (Umwelt, 2019) prepared for DA Modification 3 included a new Noise Impact Assessment which considered the potential noise emissions of the Quarry against the Project Noise Trigger Levels established in accordance with the Noise Policy for Industry (EPA 2017) which considered noise emissions over the remaining life of the Quarry including the proposed Modification under this DA Modification.

During this monitoring period, the main source of noise from quarry operations on Lot 216 were mobile sand screening and processing and loading of haulage trucks for transfer to Old Northern Road quarry (front end loaders, mobile screener and haulage trucks), extraction operation in the Modification 1 area and construction preparation works for the Sandstone Cutting Shed in Stage 3. There is a slight upward trend in the measured noise levels at receivers R3, R4, R7 and R8 since the last reporting period due to quarry operations moving in the northward directions closer to the receivers. Nevertheless, extrapolated daytime noise levels for receivers R3, R4, R6, R7, R8 and other receivers from noise monitoring in December 2023 and June 2024 are below the daytime noise criteria and compliant. Shoulder period noise criteria remained in compliant during this reporting period. The complying noise levels are as predicted and in line with the NIA in the Modification Report (Umwelt, 2019) where noise modelling results are based on worst-case meteorological conditions and conservatively modelled scenarios demonstrating that noise emission from quarry operations can be managed to maintain compliance with the Project Noise Trigger Levels throughout the life of the quarry. Until quarry operations progress to Stage 4 of the Tertiary Sand Extraction Area (original extraction area), no change to the existing management and monitoring measures implemented by the Quarry are required.

Ongoing noise monitoring results will enable a better understanding of the actual noise impacts associated with quarry operations in the new extraction cells of Modification 1 as the quarry moves into different extraction cells.

5.2.7 Changes to Environmental Procedures

No changes to environmental procedures in relation to noise management is required.

Undertake noise monitoring in accordance with the Noise Management Plans and continue with the 6-monthly monitoring frequency.

Noise bund walls are to be constructed and maintained as per the strategies outlined in the Haerses Road Acoustic Bund Construction Noise Management Plan.

5.3 Traffic and Transport

5.3.1 Ongoing Management Measures

Vehicle Movements

Vehicle movements are recorded in the truck register. Records have been sent to Council and Section 94 Contribution payments made.

There were no exceedances of permitted vehicle movements during the reporting period.

Monthly Inspections

Observations of road conditions, maintenance requirements and the effectiveness of the Wisemans Ferry Road intersection upgrade are inclusive in the monthly site inspection checklists. An example of the monthly site inspection checklist is attached in Appendix E.

Community Liaison

Liaison between Dixon Sand and the representative of Maroota Public School is conducted on a regular basis during the Community Consultative Committee meetings which are held bi-annually. Details of the CCC meetings and community engagement and contributions are discussed further in Section 8.

5.3.2 Traffic Related Complaints

Dixon Sand received no traffic related complaint for Haerses Road Quarry during this reporting period.

A copy of the summary of complaint register is contained in Appendix L.

5.3.3 Compliance

Assessment of compliance with the relevant conditions is summarised in Table 17.

Table 17: Road and Traffic Compliance.

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 8 of Schedule 2	Truck movements at the site (i.e. either arrival or dispatch), including truck movements between the site and the Old Northern Road Quarry, must not exceed: (a) 180 per day; and (b) 20 between 6.00 am and 7.00 am.	Yes	Refer to Truck Record
Condition 10 of Schedule 2	The Applicant must: (a) maintain accurate records of all VENM and ENM received at the site (including the date, time and quantity received); and (b) include a copy of this data in the Annual Review.	Yes	No VENM/ENM importation during this reporting period. Refer to Section 5.4.2
Condition 15 of Schedule 2	The Applicant must pay Council a monthly financial contribution toward the maintenance of local roads used for haulage of quarry products. The contribution must be determined in accordance with <i>The Hills Shire Council Contributions Plan No. 6 Extractive Industries</i> , or any subsequent relevant contributions plan adopted by Council.	Yes	Refer to Appendix J for an example of s.94 monthly contribution for sales from Haerses Road Quarry. Note these contributions are not inclusive of products sold at Old Northern Road Quarry.
Condition 1 of Schedule 3	The Applicant must comply with the operating hours set out in Table 1.	Yes	Refer to truck record

Activity	Permissible Hours
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday
	At no time on Sundays or public holidays
Truck arrival, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday
	At no time on Sundays or public holidays
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 to 5.00 pm Monday to Friday
	At no time on Saturdays, Sundays or public holidays
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 2 of Schedule 3	<p>The following activities may be carried out outside the hours specified in condition 1 above:</p> <p>(a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and</p> <p>(b) emergency work to avoid the loss of lives, property or to prevent environmental harm.</p>	Yes	Condition not triggered
Condition 20 of Schedule 3	<p>Prior to carrying out any development, the Applicant must upgrade Haerses Road to meet the requirements for 'internal haul roads', under Baulkham Hills Development Control Plan No. 16 – Extractive Industries, to the satisfaction of Council.</p>	Yes	Completed
Condition 21 of Schedule 3	<p>The Applicant must:</p> <p>(a) maintain safe access to the site for the public and emergency services for the duration of the development; and</p> <p>(b) reinstate the extracted length of Haerses Road to the satisfaction of Council.</p> <p><i>Notes:</i></p> <ul style="list-style-type: none"> • <i>The Applicant must ensure that the final alignment and design of Haerses Road is approved by Council prior to the commencement of the development.</i> • <i>The Applicant must bear the full costs associated with the design, survey and construction of the road works, including the relocation of utilities, if required.</i> • <i>All works are to be in accordance with Council's Design Guidelines and Work Specifications for Subdivisions and Developments.</i> • <i>Following the reconstruction of Haerses Road, the Applicant must rehabilitate any temporary access roads that were established on site.</i> 	Yes	<p>Ongoing</p> <p>Condition not yet triggered</p> <p>Completed</p> <p>Completed</p> <p>Completed</p> <p>Condition not yet triggered</p>
Condition 22 of Schedule 3	<p>Prior to carrying out any development, the Applicant must:</p> <p>(a) provide for appropriate sight distances at the intersection of Haerses Road and Wisemans Ferry Road, by clearing and/or lopping vegetation along the eastern approach of Wisemans Ferry Road; and</p> <p>(b) provide warning signage ("Truck Turning") on the eastern and western approaches of Wisemans Ferry Road, to the satisfaction of TfNSW.</p>	Yes	Completed

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
<p>Condition 23 of Schedule 3</p>	<p>Within 12 months of the commencement of the development, the Applicant must construct a Type 'AUR' treatment at the intersection of Haerses Road and Wisemans Ferry Road to the satisfaction of TfNSW. Until the intersection works have been completed to the satisfaction of TfNSW, the Applicant must limit the number of trucks entering the site to 15 truck movements per day.</p> <p>Notes:</p> <ul style="list-style-type: none"> • <i>Prior to the Construction Certificate being released the Applicant must:</i> <ul style="list-style-type: none"> - <i>enter into a Memorandum of Understanding with the TfNSW that the Type 'AUR' intersection treatment shall be fully constructed and handed over to the TfNSW within 12 months of the commencement of the development;</i> <i>and</i> - <i>issue a bank guarantee in favour of the TfNSW for the total cost of the intersection works (the cost to be determined following the approval of detailed design plans by the TfNSW).</i> • <i>The Applicant shall ensure that the intersection works comply with the TfNSW Road Design Guide.</i> • <i>The Applicant shall bear the full costs associated with the design, survey and construction of the works, including the relocation of utilities, if required.</i> 	<p>Yes</p>	<p>Completed</p>
<p>Condition 24 of Schedule 3</p>	<p>Prior to transporting any quarry products derived from quarrying operations within the Mod 1 extraction area, the Applicant must construct a channelised right-turn 'CHR' treatment at the intersection of Haerses Road and Wisemans Ferry Road to the satisfaction of TfNSW. The Applicant must:</p> <p>(a) submit detailed design plans to TfNSW for approval prior to the issue of a construction certificate by Council or the commencement of road works; and</p> <p>(b) design and construct the intersection treatment in accordance with the <i>Austroads Guide to Road Design</i>.</p>	<p>Yes</p>	<p>Completed in May 2021</p>
<p>Condition 24A of Schedule 3</p>	<p>The Applicant must monitor trucks queuing within the right turn bay at the quarry intersection on Wisemans Ferry Road and, in the instance that there are trucks regularly queuing at the intersection, extend the length of the right turn bay to the satisfaction of TfNSW.</p>	<p>Yes</p>	<p>Monitoring of truck queuing at the intersection is undertaken during monthly site inspection. Refer to Appendix E.</p>
<p>Condition 25 of Schedule 3</p>	<p>Prior to commencement of the works referred to in condition 24 above, the Applicant must prepare and implement a Traffic Control Plan for the development to the satisfaction of the TfNSW.</p>	<p>Yes</p>	<p>Completed by Civil Contractor</p>
<p>Condition 26 of Schedule 3</p>	<p>The Applicant must keep accurate records of all laden truck movements to and from the site (including time of arrival and dispatch) and publish a summary of these records on its website every 6 months.</p>	<p>Yes</p>	<p>Refer to Traffic Management Plan and Truck Records</p>

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 27 of Schedule 3	<p>The Applicant must:</p> <ul style="list-style-type: none"> (a) ensure that all laden trucks have their loads covered when arriving at or leaving the site; (b) ensure that all laden trucks are cleaned of material that may fall from vehicles, before leaving the site; and (c) use its best endeavours to ensure that appropriate signage is displayed on all trucks used to transport product from the development so they can be easily identified by road users. 	Yes	Refer to Traffic Management Plan
Condition 28 of Schedule 3	<p>The Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must:</p> <ul style="list-style-type: none"> (a) be prepared in consultation with the TfNSW and Council; (b) be submitted to the Secretary for approval within 6 months of the determination of Modification 1, unless otherwise agreed by the Secretary; (c) describe the processes in place to control the arrival and dispatch of trucks; (d) include a Drivers' Code of Conduct that details the safe and quiet driving practices that must be used by drivers travelling to and from the site, particularly in the vicinity of Maroota Public School; (e) describe the measures to be put in place to ensure compliance with the Drivers' Code of Conduct; (f) include specific measures to minimise the impact of heavy vehicles, including restrictions on routes and times (particularly in relation to peak hours, holiday periods and times immediately before and after school hours, i.e. 8.30 am – 9.00 am and 3.00 pm – 3.30 pm); and (g) propose measures to minimise the transmission of dust and tracking of material onto the surface of the public road from vehicles leaving the quarry. <p>The Applicant must implement the approved Traffic Management Plan as approved by the Secretary.</p>	Yes	Refer to Traffic Management Plan

5.3.4 Analysis

The production and truck movement data outlined above is evidence that Dixon Sand has operated in compliance with the consent conditions during the 2023 – 2024 reporting period.

The quarry did not receive any traffic related complaint was received by Haerses Road Quarry during this reporting period.

5.3.5 Findings

The findings show that mitigation measures proposed in the EIS and Management Plans are being implemented adequately. The permitted truck movements and hours of operations have been adhered to.

5.3.6 Changes to Environmental Procedures

No changes to the environmental procedures are proposed or deemed necessary for road and traffic management.

5.4 Waste Management

5.4.1 Waste Generation

During this reporting period, refuelling of plant and machinery at Haerses Road quarry was carried out using a fuel truck. Maintenance and servicing of Haerses Road quarry plant and machinery were undertaken in the dedicated workshop located at the Old Northern Road Quarry. Chemicals, hazardous materials, hydrocarbon wastes and diesel fuel are stored in appropriate bunded and/or designated areas. Spill response kits and fire extinguishers are located at vantage locations on site.

Glass, paper, cardboard and plastic (general solid waste – non-putrescible) were recycled via Council's fortnightly scheduled bin collection service. Food waste and other general solid waste (putrescible) were disposed of and collected via Council's weekly scheduled bin collection. Other bulky solid waste associated with the operations were disposed of in skip bins and transported offsite by a licensed waste transporter.

Printer ink cartridges are dropped off at the post office or Officeworks. Coffee pods were returned to the manufacturer to composting and package recycling.

The amount of waste transported off site from Haerses Road for disposal, recycled and processed during the monitoring period is contained in Table 18.

Table 18: Haerses Road – Total Waste Generated, July 2023 to June 2024.

Waste Type	Disposal / Recycling / Processing	Amount of Waste Generated
Putrescible	The Hills Shire Council Waste Contractor weekly pickup	Approx. 12.5 m ³
Recyclables	The Hills Shire Council Waste Contractor fortnightly pickup (1 x 240L Yellow bin)	Approx. 6.2 m ³
General Waste – Non-putrescible	Skip bins provided by a licensed Waste Contractor	80 m ³
Printer Cartridges	Drop of at Post Office or Officeworks	< 0.1 m ³
Coffee Pods	Returned to supplier for composting and package recycling	< 0.1 m ³
Sewerage	Onsite Sewerage treatment	As per manufacturer's specification.

The waste tracking registers are contained in Appendix M.

5.4.2 VENM and ENM Importation

Condition 9 of Schedule 2 of DA165-7-2005 permits the importation of up to 250,000 tonnes of Excavated Natural Material (ENM) and Virgin Excavated Natural Material (VENM) per calendar year to Haerses Road quarry. Importation of VENM commenced in June 2019 with the following quantity of ENM and VENM imported:

- A total of *nil* tonnes of VENM/ENM was imported to Haerses Road Quarry during the 2023 calendar year,
- A total of *nil* tonnes of VENM/ENM was imported to Haerses Road Quarry from January 2024 to June 2024,
- A total of *nil* tonnes of VENM/ENM was imported to Haerses Road Quarry during the 2023 - 2024 financial year (Annual Review reporting period).

A copy of the ENM / VENM Material Transport Register is contained in Appendix M. The ***VENM / ENM Material Transport Register*** records:

- Transport Company name
- Truck Registration number
- Date of transport
- Material tip time
- Testing Certificate demonstrating compliance with the Waste Classification
- Quantity of material received
- Total annual quantity

5.4.3 Changes to Environmental Procedures

No changes to the waste management procedure are proposed.

Continue efforts to minimise waste generation and maximise recycling and reuse of materials are to be undertaken such as labelling of bins for waste segregation, waste reduction posters and toolbox talks to raise awareness.

6. Water Management

6.1 Monitoring and Compliance Limits

DA165-7-2005 Modification 1 requires 13 additional monitoring wells to be installed (in clusters) in the 100m buffer zone to the Maroota Tertiary Sand Groundwater Source (MTSGS) in the expanded extraction area. These new monitoring bores have been installed in May 2018 and are an addition to the nine existing bores. Groundwater monitoring for bores in the buffer zone commenced in July 2018.

6.1.1 Groundwater Levels and Criteria / Trigger Levels

Out of the fourteen boreholes originally installed at Haerses Road quarry, six of the original boreholes are currently active and being monitored. Boreholes H1, H4, H5, H8, H10, H11 and H13 have been decommissioned due to their locations being obsolete or in the active quarry operational areas. Monitoring ceased at borehole H3 due the bore running dry. In 2011 two additional boreholes BH4 and BH5 were added to Haerses Road quarry water monitoring program. Additional 13 boreholes (Cluster bores located in the MTSGS 100m buffer) were required to be installed by DA165-7-2005 Modification 1. Cluster bores in the MTSGS buffer zone were installed in May 2018 with groundwater levels (utilising continuous data loggers) and quality monitoring program commencing in July 2018 with continuous data loggers installed. A number of cluster bores were decommissioned, and one additional borehole installed following consultation with DCCEEW - Water. Active groundwater bores at the Haerses Road quarry are listed in Table 19. The adopted 20th and 80th percentile water levels as site specific trigger values in the Soil and Water Management Plan are listed in Table 20.

Table 19: Groundwater monitoring bores for Haerses Road quarry site.

Monitoring Bore	Location Reference	Aim of Monitoring
H2	Stage 4, adjacent to the dam	MTSGS
H6	Stage 5, northern boundary	MTSGS
H7	Stage 5, southern boundary	MTSGS
H9	Stage 3, behind tomato vines	MTSGS
H12	Stage 3, adjacent to the shed	MTSGS
H14	Fire trail, south of quarry boundary	MTSGS
BH4	South-west of quarry, outside Stage 2.	SCBGS
BH5	Stage 2, western boundary	SCBGS
BH01A	100m MTSGS Buffer – Site 1	Perched groundwater in weathered Hawkesbury sandstone
BH01B	100m MTSGS Buffer – Site 1	Perched groundwater in unweathered Hawkesbury sandstone
BH01C	100m MTSGS Buffer – Site 1	SCBGS
BH02A	100m MTSGS Buffer – Site 2	Perched groundwater in weathered Hawkesbury sandstone
BH02B	100m MTSGS Buffer – Site 2	Perched groundwater in unweathered Hawkesbury sandstone
BH02C	100m MTSGS Buffer – Site 2	SCBGS

Monitoring Bore	Location Reference	Aim of Monitoring
BH05B	Lot 216, adjacent to BH5	Perched groundwater in unweathered Hawkesbury sandstone
BH06A	100m MTSGS Buffer – Site 4	Perched groundwater in weathered Hawkesbury sandstone
BH06B	100m MTSGS Buffer – Site 4	Perched groundwater in unweathered Hawkesbury sandstone
BH06C	100m MTSGS Buffer – Site 4	SCBGS
BH07	South-western corner of Extraction Cell 1A in Modification 1 area	SCBGS

Table 20: Baseline Groundwater Level Statistics and Trigger Values.

Monitoring Bore	Minimum	20 th Percentile	50 th Percentile	80 th Percentile	Maximum
H2	178.1	179.4	180.0	180.9	182.4
H6	179.4	181.2	181.4	182.4	184.7
H7	178.2	180.2	180.4	180.5	182.6
H9	182.6	184.9	185.0	185.3	186.9
H12	178.2	181.0	181.1	181.2	184.0
H14	171.9	174.7	174.9	175.1	177.2
BH4	139.3	140.5	140.6	140.7	141.2
BH5	121.4	123.2	123.2	123.3	123.4

6.1.2 Groundwater Quality and Criteria / Trigger Levels

Groundwater quality analyses for H-series bores, BH4 and BH5 were undertaken 6-monthly in December 2023 and June 2024, in accordance with the Soil and Water Management Plan. Groundwater quality monitoring for the were undertaken on a monthly basis. Groundwater samples were obtained and analysed by a NATA qualified laboratory for analysis of electrical conductivity and total suspended solids. pH measurements were undertaken in the field due to short sample holding time. The baseline groundwater quality statistics and trigger values for H-series, BH4 and BH5 are listed in Table 21 below.

Table 21: Baseline Groundwater Quality Statistics and Trigger Values

Monitoring Bore	pH			Electrical Conductivity (µS/c)		
	20th Percentile	50th Percentile	80th Percentile	20th Percentile	50th Percentile	80th Percentile
H2	4.3	4.4	4.6	56	69	108
H6	4.2	4.3	4.4	161	182	205
H7	4.2	4.3	4.4	114	189	298
H9	4.4	4.6	4.7	116	127	145
H12	4.5	4.6	4.8	133	182	210
H14	4.3	4.6	4.7	94	117	193
BH4	4.4	4.7	4.9	89	97	114
BH5	5.1	5.6	6.1	126	137	158

6.1.3 Surface Water Monitoring and Discharge Criteria

The EPL 12513 does not require any surface water monitoring and no surface water discharge is permitted at Haerses Road quarry. The Soil and Water Management Plan stipulates the requirement to monitor surface water quality at the Little Cattai Creek – “SW1” (located east of Stage 2 east extraction cell) and a tributary of Stone Chimney Creek – “SW2” (located west of the extraction Cell 1A) to achieve surface water quality baseline data downstream of quarry operations. Monitoring at these locations were to commence in September 2018 however, due to prolonged drought conditions and the fact that these monitoring points are located in ephemeral tributaries, water samples can only be obtained when there has been sufficient rainfall to generate flows in the tributaries. Up until the 2020 – 2021 reporting, only four sampling events for SW1 and SW2 were carried out. Since then, 3 additional sampling events were carried out during this 2021 – 2022 reporting period. No sampling had been taking during this 2022 – 2023 reporting period due to unsuitable sampling condition. The surface water quality statistics presented in Table 22 were derived from these seven sampling events and consequently, these trigger values represent the interim baseline values which will be subjected to on-going review once additional surface water quality results have been obtained.

Surface water quality monitoring for quarry basins commenced during the previous reporting period and the preliminary data is presented in this Annual Review. Continued monitoring will enable an establishment of trend in water quality in these quarry basins. A copy of the surface water quality results for quarry basins are contained in Appendix C.

Table 22: Baseline surface water quality statistics and trigger values

Parameter	Minimum		20 th Percentile		50 th Percentile		80 th Percentile		Maximum	
	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2	SW1	SW2
pH	5.5	5.1	6.0	5.2	6.5	5.8	6.6	5.9	6.7	6.1
TSS (mg/L)	5.0	5.0	7.8	13.2	12.0	16.0	58.8	41.6	90.0	84.0
Turbidity (NTU)	82.1	9.0	97.0	25.7	193.0	54.4	357.4	95.9	475.0	160.0

6.2 Extraction Limits

Extraction limits for Haerses Road quarry are defined by DA165-7-2005 and listed in Table 23 below.

Table 23: Haerses Road Quarry Extraction limits

DA165-7-2005 Conditions	Extraction limit
Condition 19 of Schedule 2	The Applicant must not undertake any extraction within 2 metres of the highest recorded wet weather groundwater level of both the MTSGS and the SCBGS.
Condition 20 of Schedule 2	<p>Within 6 months of the determination of Modification 1, the Applicant must:</p> <ul style="list-style-type: none"> (a) establish the highest recorded wet weather groundwater levels for the site based on all available local and site-specific groundwater monitoring data; and (b) engage a suitably qualified and experienced person to prepare a Maximum Extraction Depth Map (contour map or similar) for the development to ensure compliance with condition 19 above and submit this map to the Secretary for approval. <p>Within 14 days of the approval of the Maximum Extraction Depth Map, the Applicant must submit a copy of the approved map and the supporting groundwater monitoring data to DPE Water.</p>
Condition 21 of Schedule 2	The Applicant must comply with the extraction depths specified in the approved Maximum Extraction Depth Map, to the satisfaction of the Secretary.
Condition 22 of Schedule 2	<p>The Applicant must review and update the Maximum Extraction Depth Map:</p> <ul style="list-style-type: none"> (a) annually, for the duration of the baseline groundwater monitoring program (see condition 17 of Schedule 3); and (b) within 3 months of the completion of each Independent Environmental Audit (see condition 13 of Schedule 5), to the satisfaction of the Secretary.

6.3 Results

Groundwater Levels

Chart 18 depicts the long term recorded groundwater levels which commenced in June 2003 for H-series, BH4 and BH5. Charts 19 to 34 (inclusive) illustrate the groundwater levels for all active bores during this reporting period.

Groundwater Quality

Chart 35 depicts the long term recorded groundwater pH which commenced in June 2003. Charts 36 to 46 (inclusive) illustrate the groundwater pH across all bores during this reporting period.

Chart 47 depicts the long term recorded groundwater electrical conductivity commencing June 2003. Charts 48 to 57 (inclusive) illustrate the groundwater electrical conductivity across all bores during this reporting period.

Groundwater quality results for BH07 will be presented in the next reporting period.

Surface Water Quality

Table 24 contains the laboratory analyses results for water samples obtained at SW1 and SW2 to date. Water quality results for quarry related water basins are displayed in Charts 58 to 61 (inclusive).

Haerses Road Long Term Groundwater Levels 2006 - June 2024 H-Series, BH4 and BH5

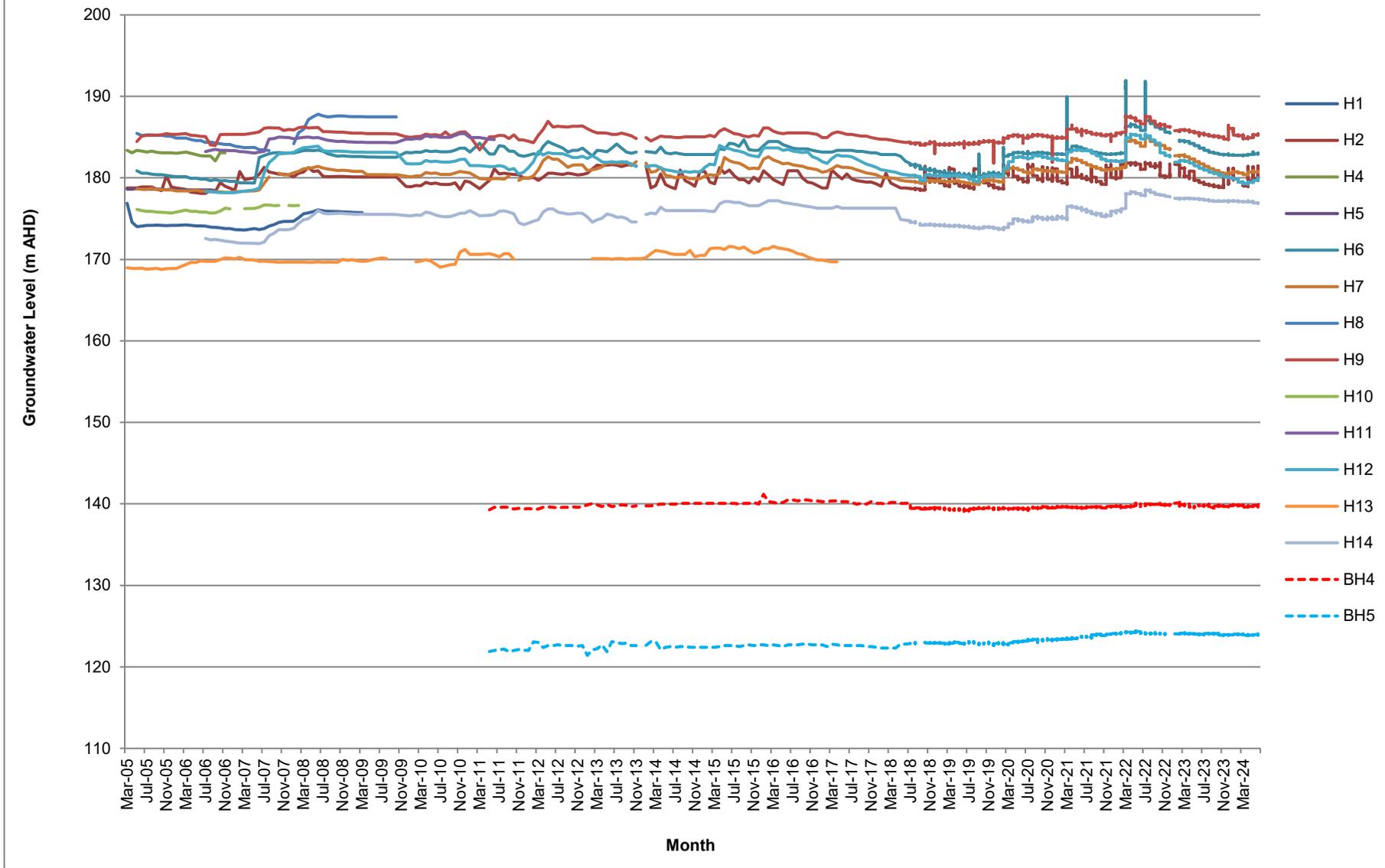


Chart 18: Haerses Road Long Term Groundwater Levels for H-Series, BH4 and BH5.

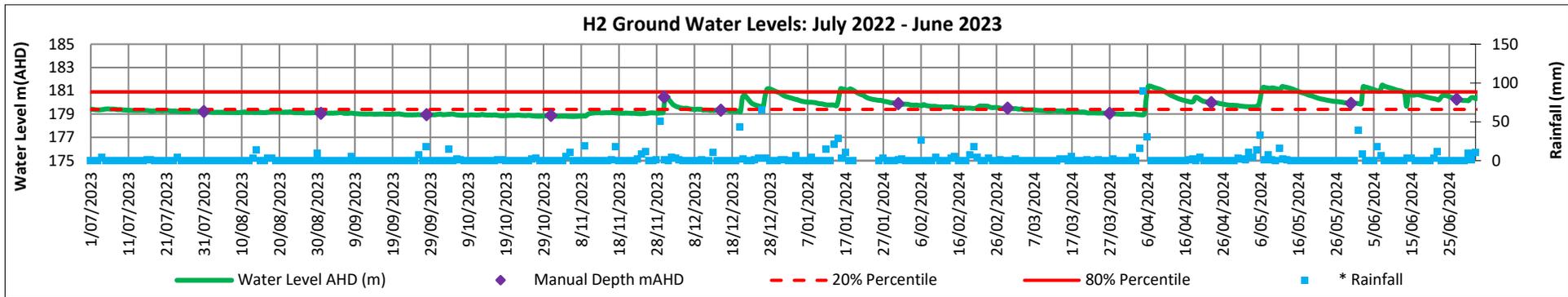


Chart 19: H2 Groundwater Levels for July 2023 – June 2024.

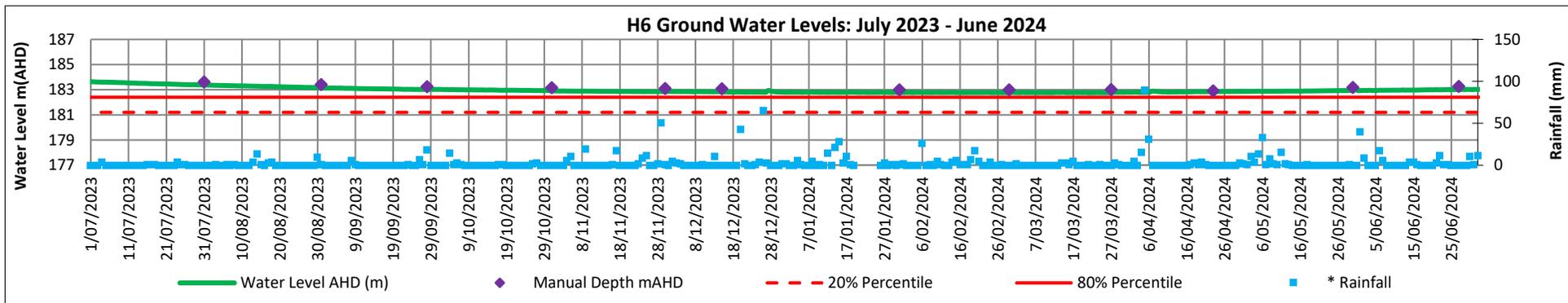


Chart 20: H6 Groundwater Levels for July 2023 – June 2024.

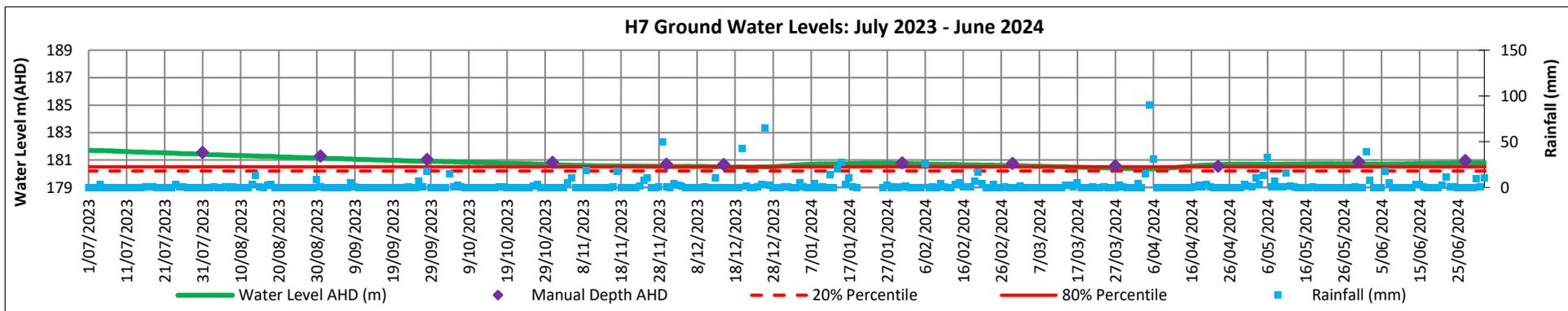


Chart 21: H7 Groundwater Levels for July 2023 – June 2024.

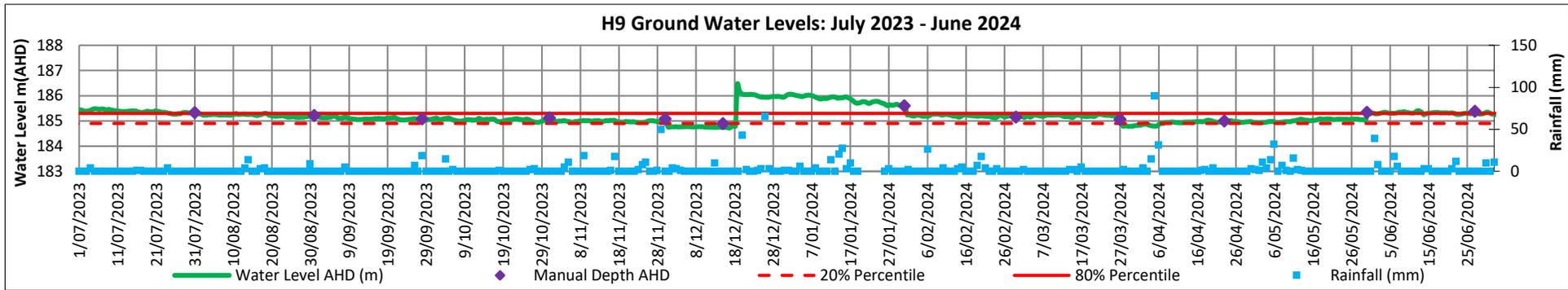


Chart 22: H9 Groundwater Levels for July 2023 – June 2024.

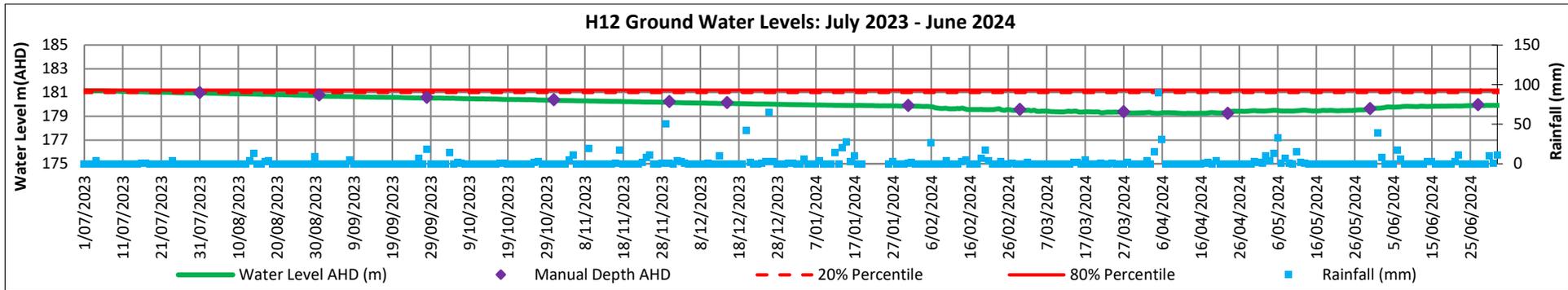


Chart 23: H12 Groundwater Levels for July 2023 – June 2024.

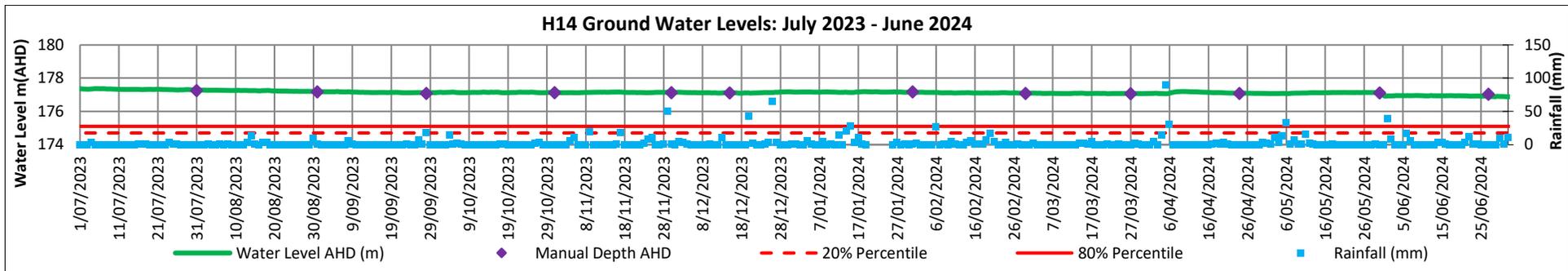


Chart 24: H14 Groundwater Levels for July 2023 – June 2024.

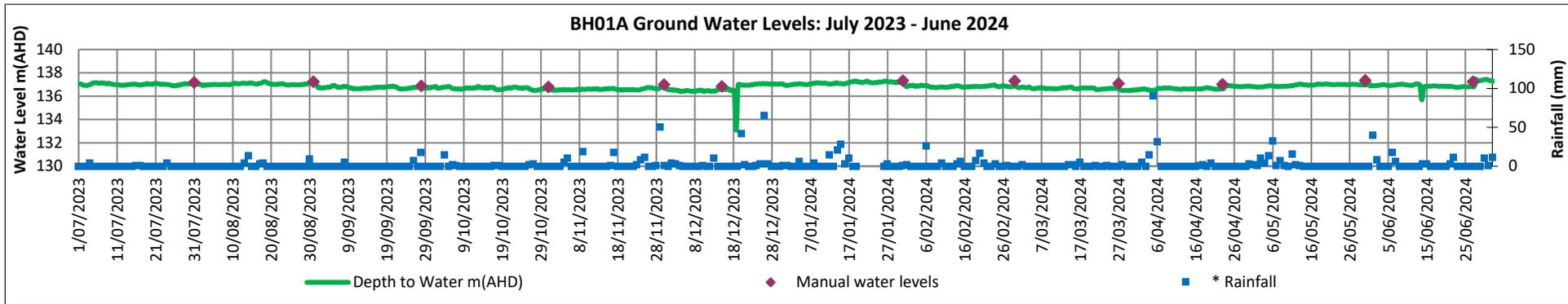


Chart 25: BH01A Groundwater Levels for July 2023 – June 2024.

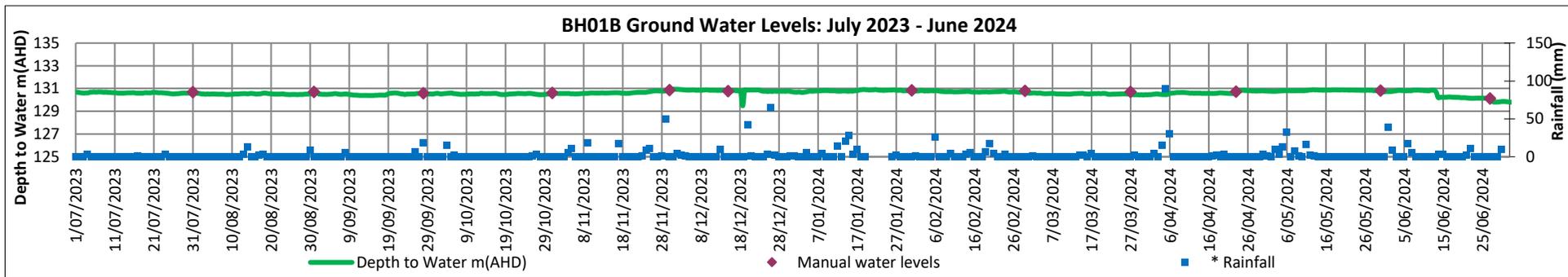


Chart 26: BH01B Groundwater Levels for July 2023 – June 2024.

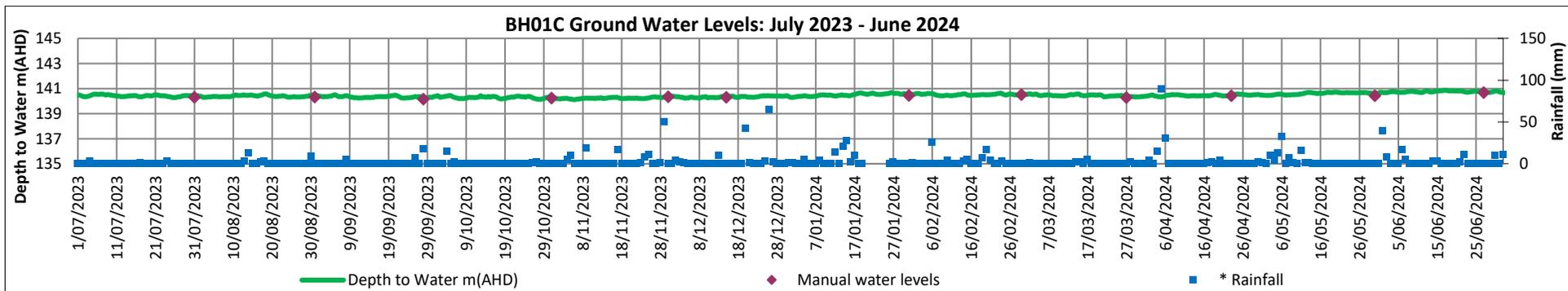


Chart 27: BH01C Groundwater Levels for July 2023 – June 2024.

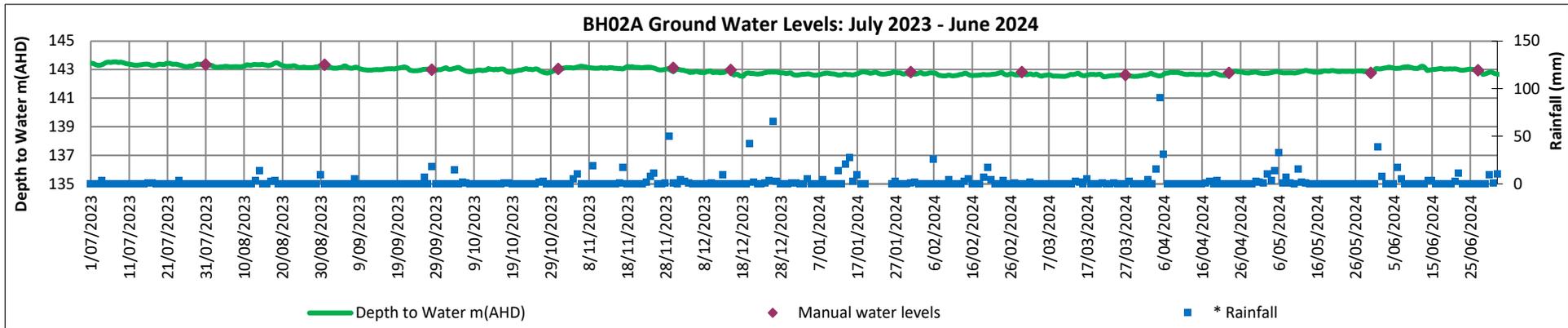


Chart 28: BH02A Groundwater Levels for July 2023 – June 2024.

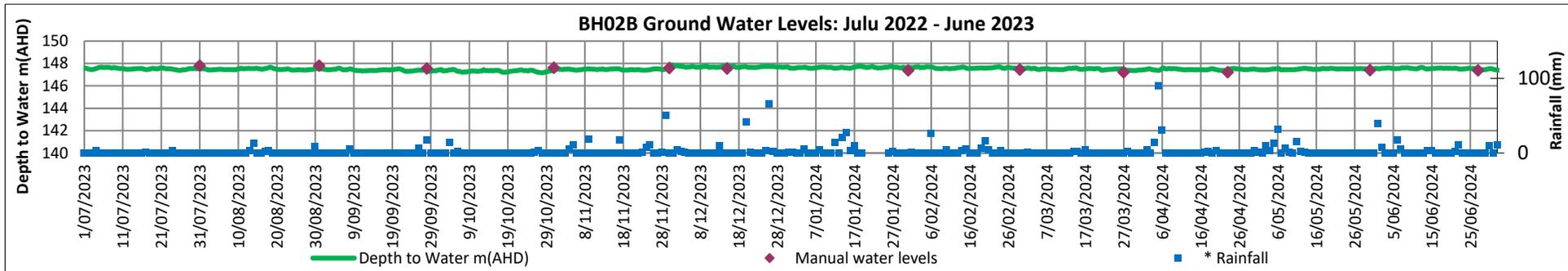


Chart 29: BH02B Groundwater Levels for July 2023 – June 2024.

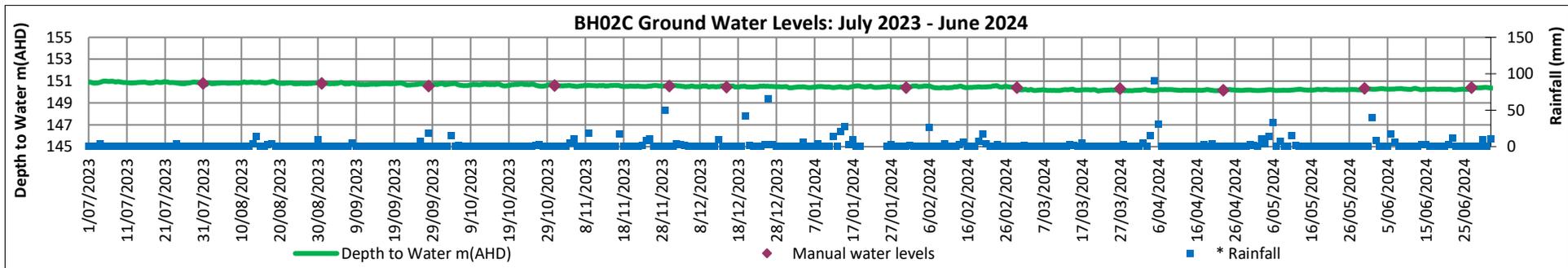


Chart 30: BH02C Groundwater Levels for July 2023 – June 2024.

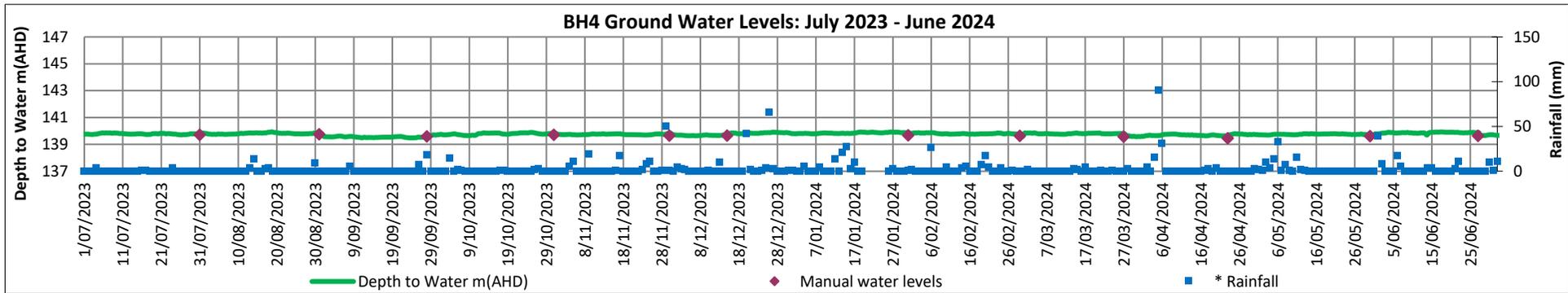


Chart 31: BH4 Groundwater Levels for July 2023 – June 2024.

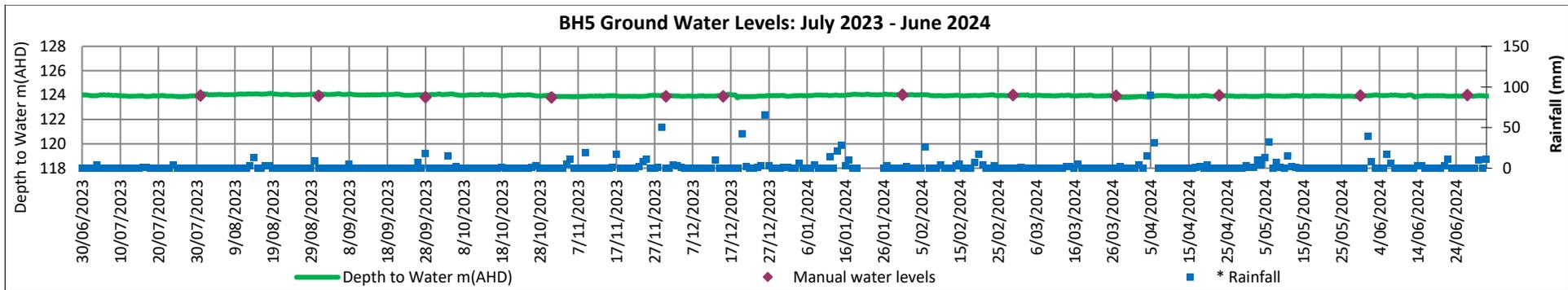


Chart 32: BH05 Groundwater Levels for July 2023 – June 2024.

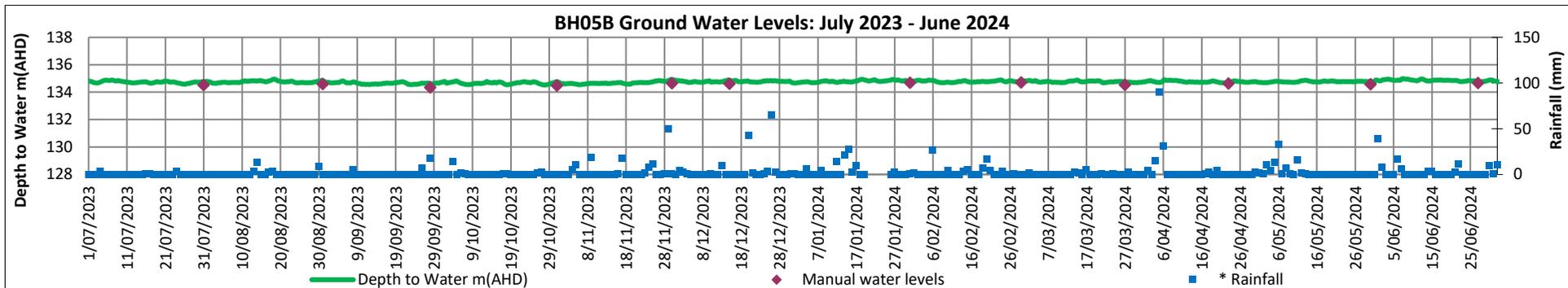


Chart 33: BH05B Groundwater Levels for July 2023 – June 2024.

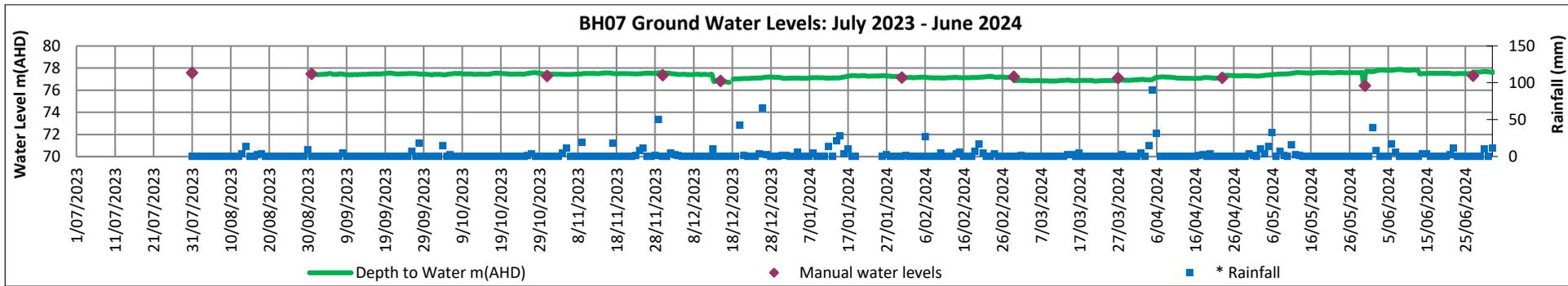


Chart 34: BH07 Groundwater Levels for July 2023 – June 2024.

**Haerses Road Groundwater Quality - pH
Nov 2010 - Jun 2024**

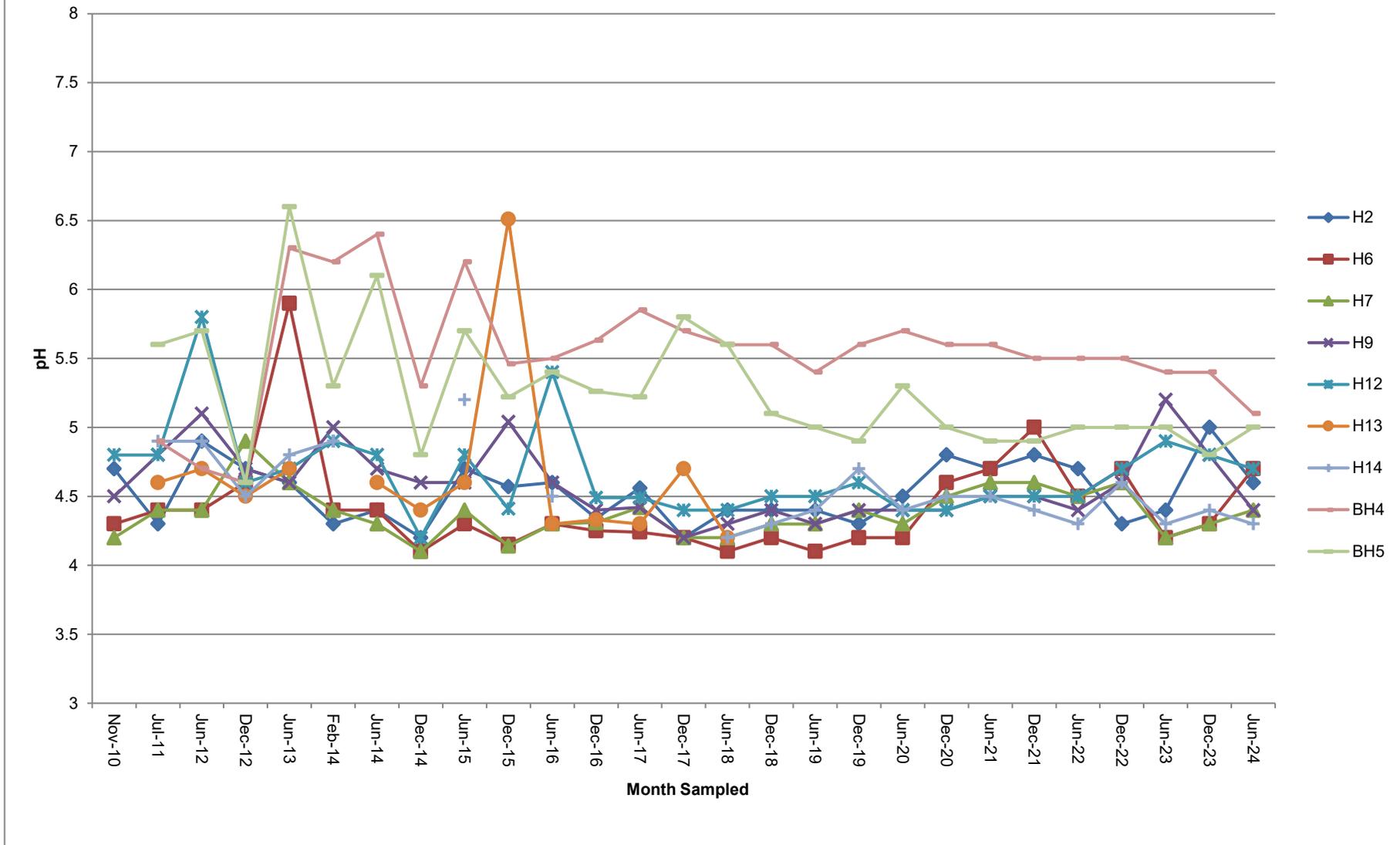


Chart 35: Haerses Road Long Term pH – H series, BH4 and BH5

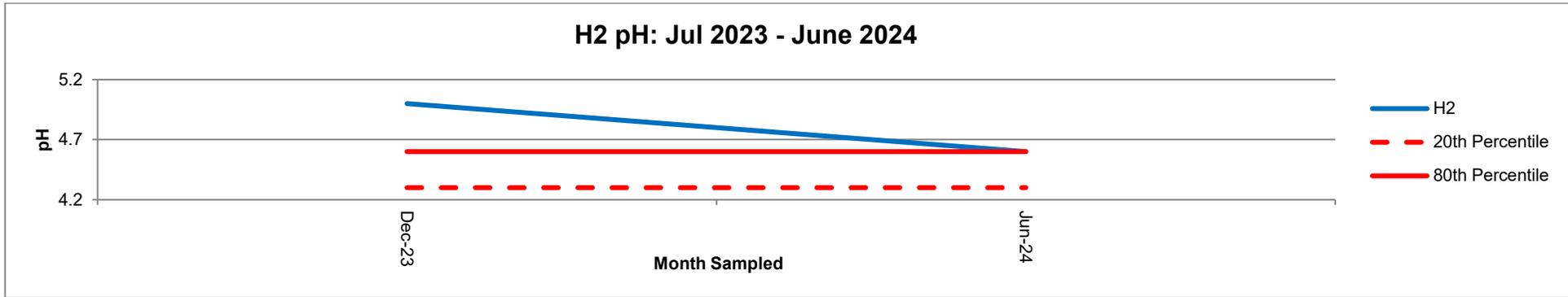


Chart 36: H2 pH Results July 2023 – June 2024.

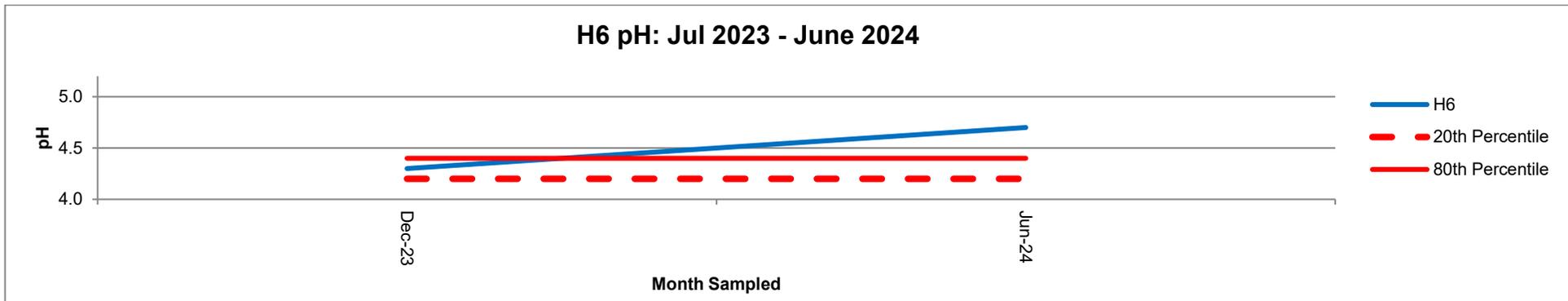


Chart 37: H6 pH Results July 2023 – June 2024.

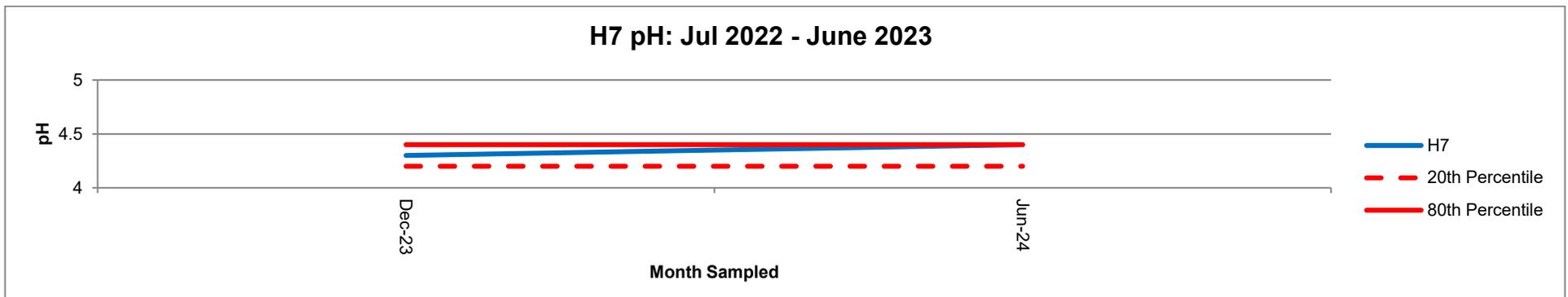


Chart 38: H7 pH Results July 2023 – June 2024.

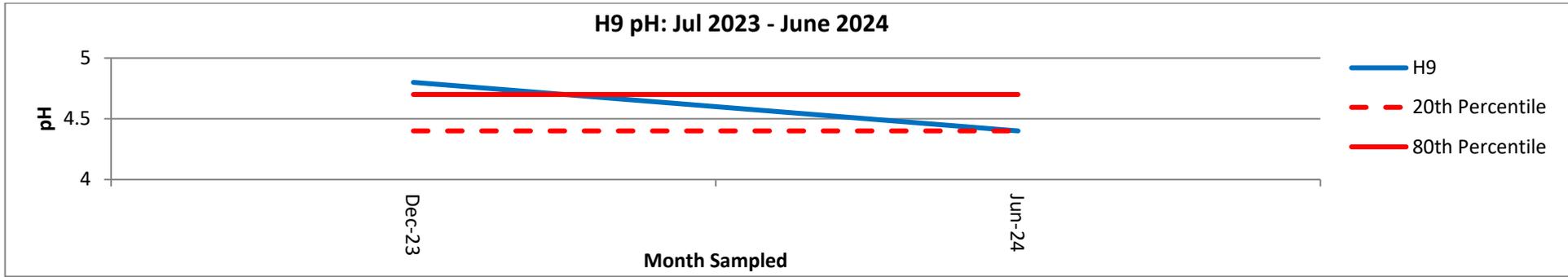


Chart 39: H9 pH Results July 2023 – June 2024.

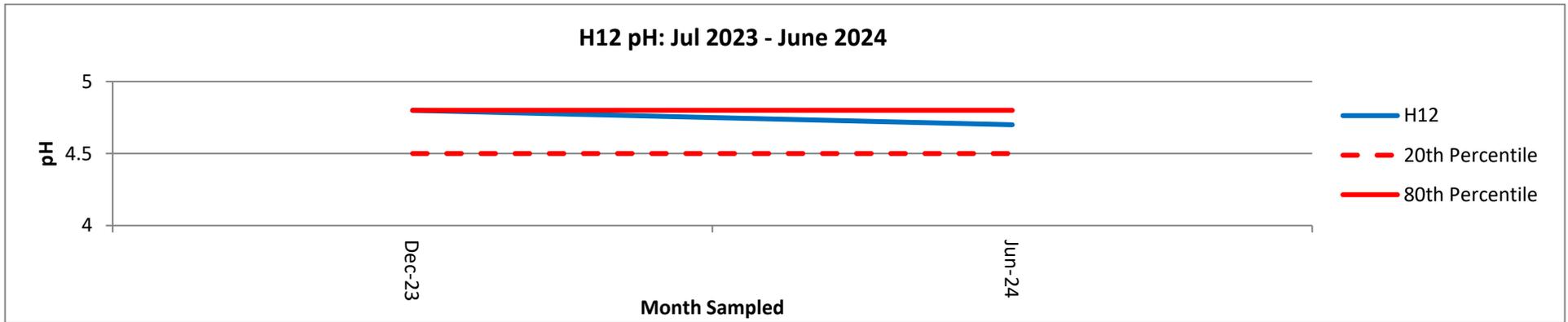


Chart 40: H12 pH Results July 2023 – June 2024.

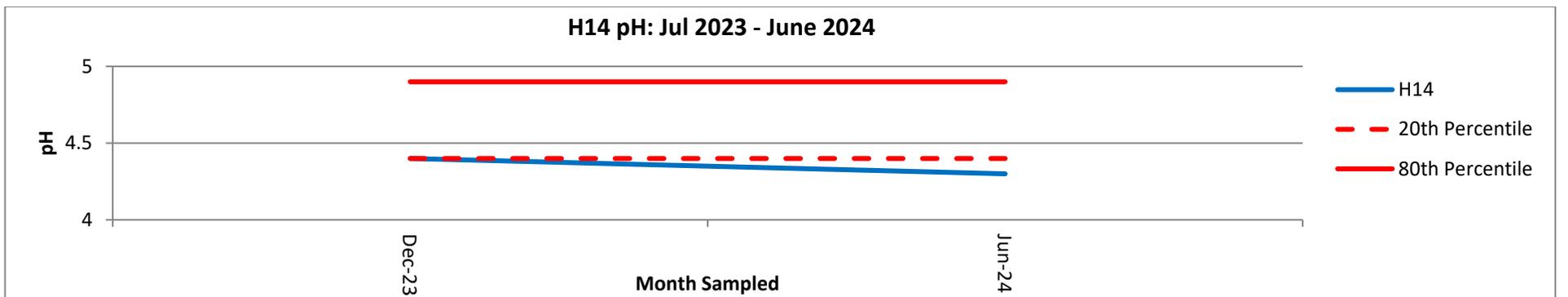


Chart 41: H14 pH Results July 2023 – June 2024.

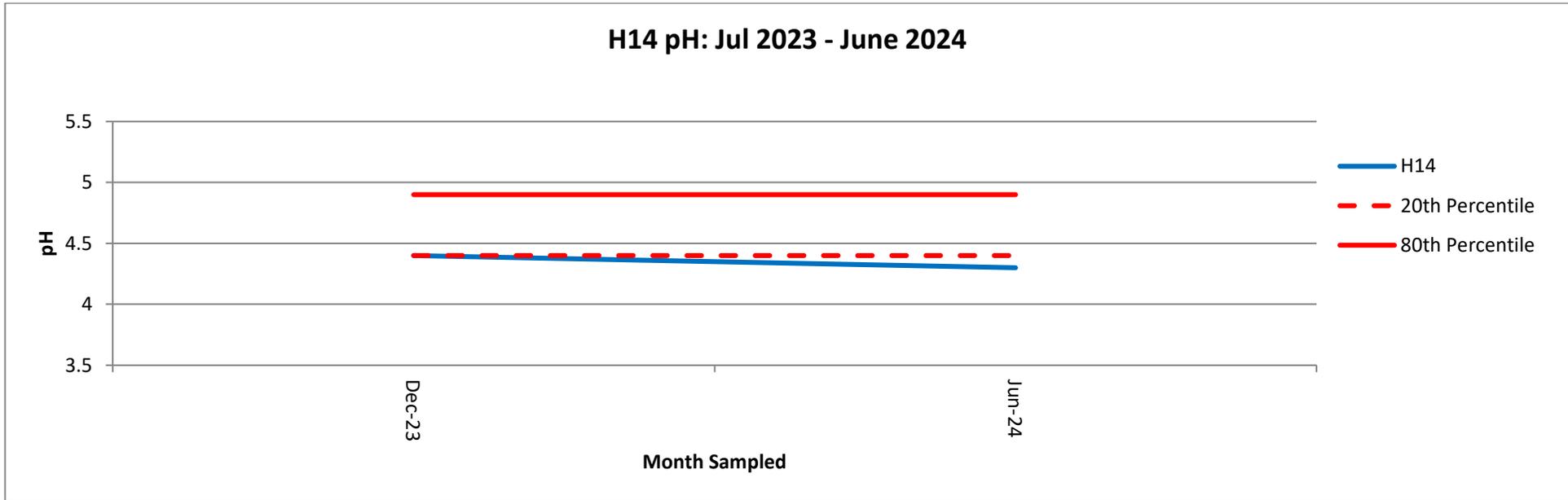


Chart 42: H14 pH Results July 2023 – June 2024.

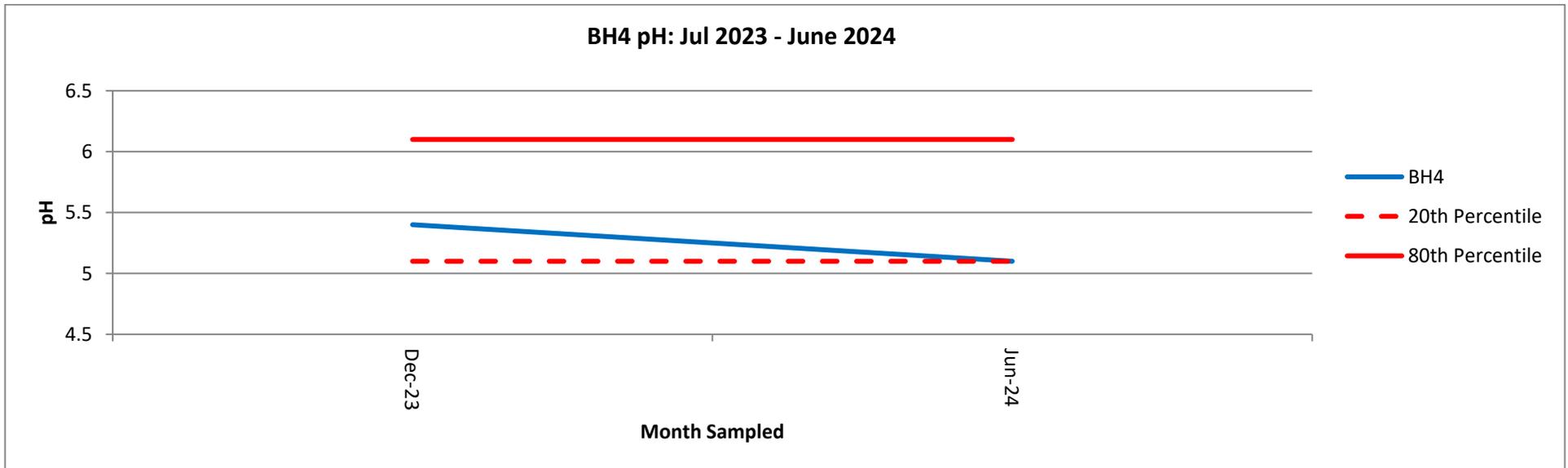


Chart 43: BH4 pH Results July 2023 – June 2024.

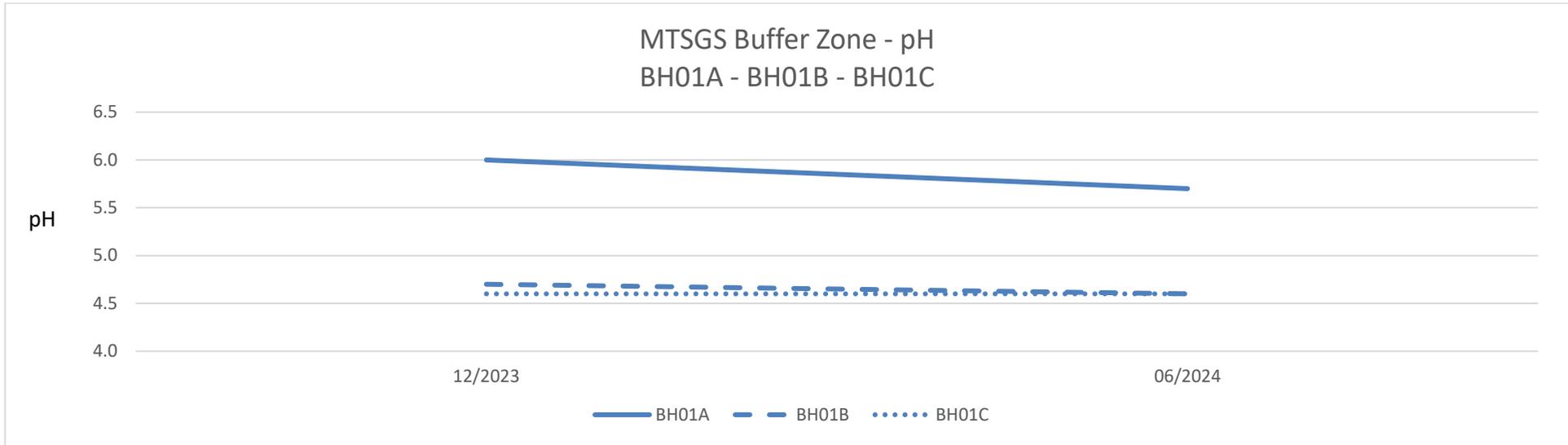


Chart 44: BH01A, BH01B and BH01C pH Results July 2023 – June 2024.

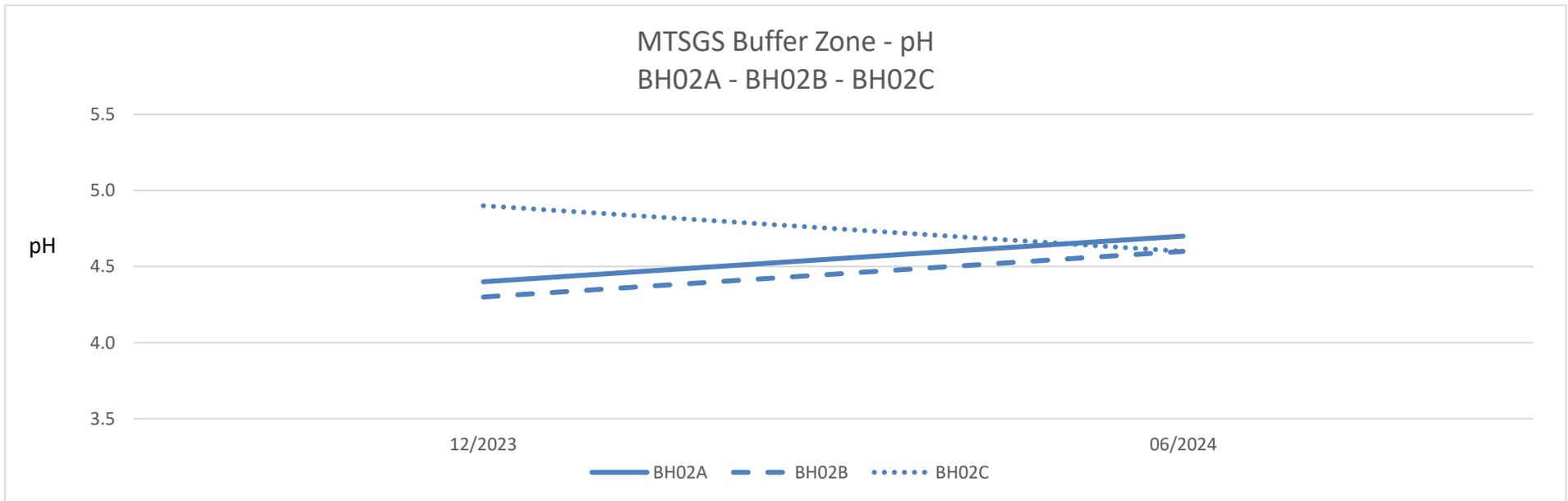


Chart 45: BH02A, BH02B and BH02C pH Results July 2023 – June 2024.

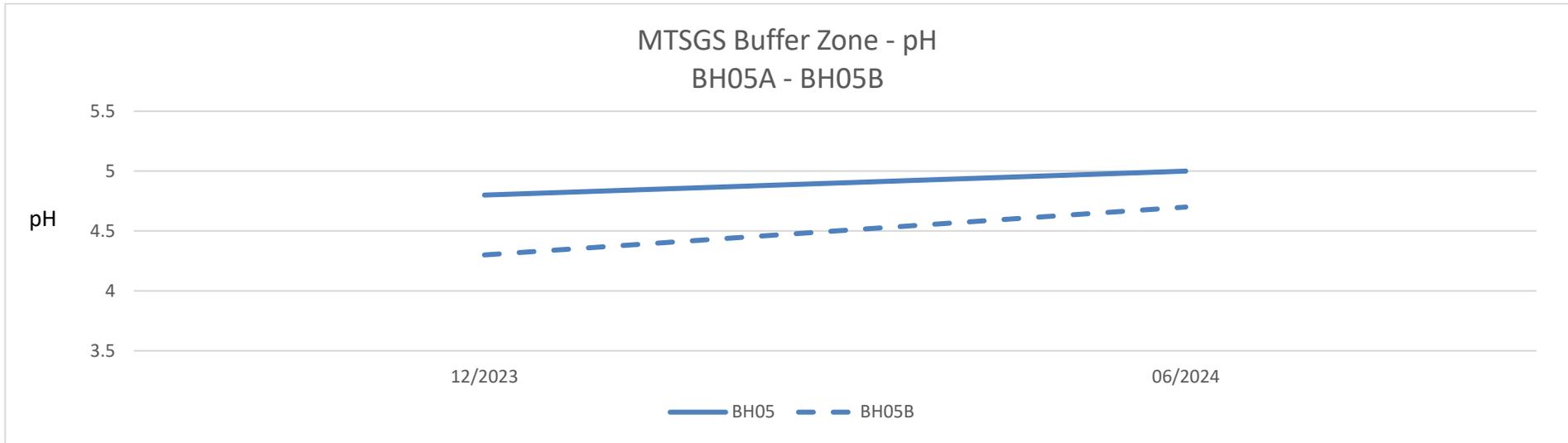


Chart 46: BH5 and BH05B pH Results July 2023 – June 2024.

Haerses Road Groundwater Quality - Electrical Conductivity Jul 2011 - Jun 2024

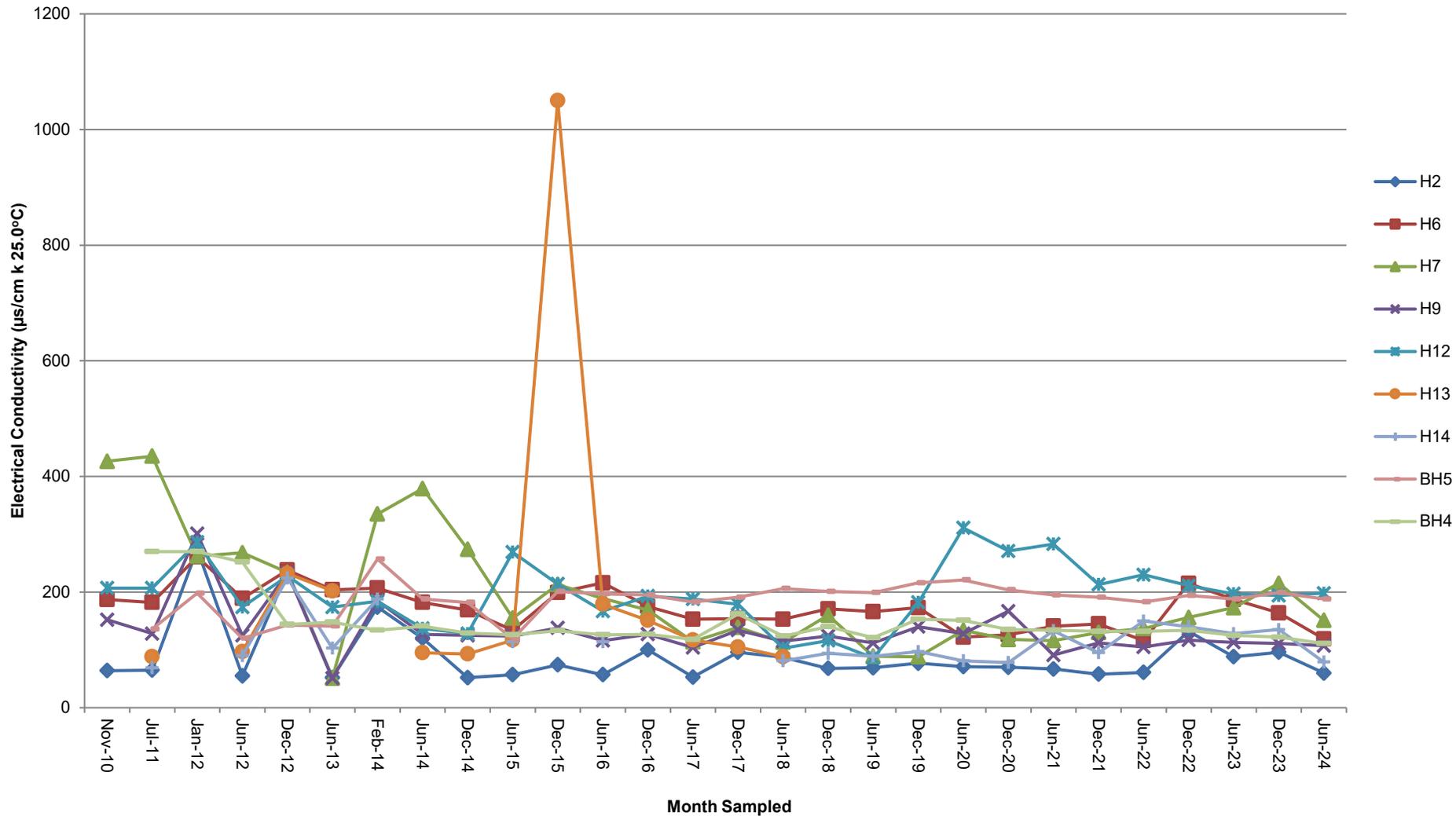


Chart 47: Haerses Road Long Term Electrical Conductivity – H series, BH4 and BH5

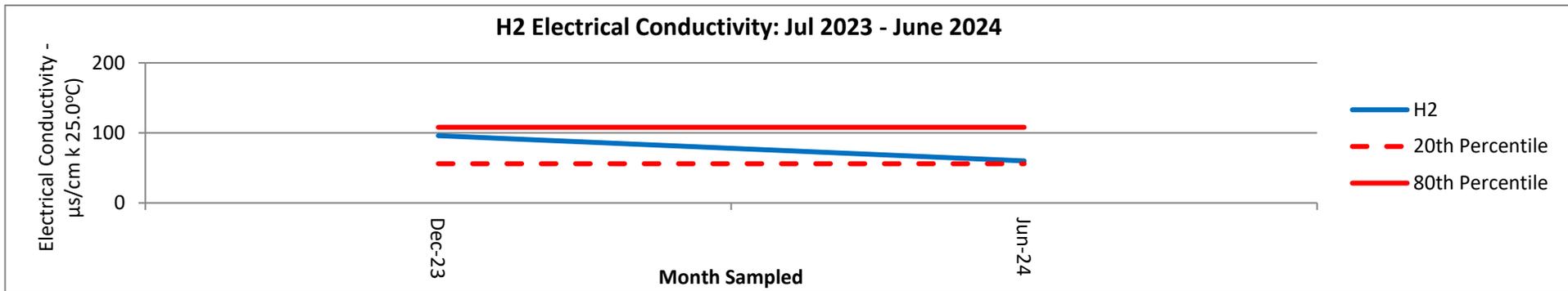


Chart 48: H2 Electrical Conductivity Results July 2023 – June 2024.

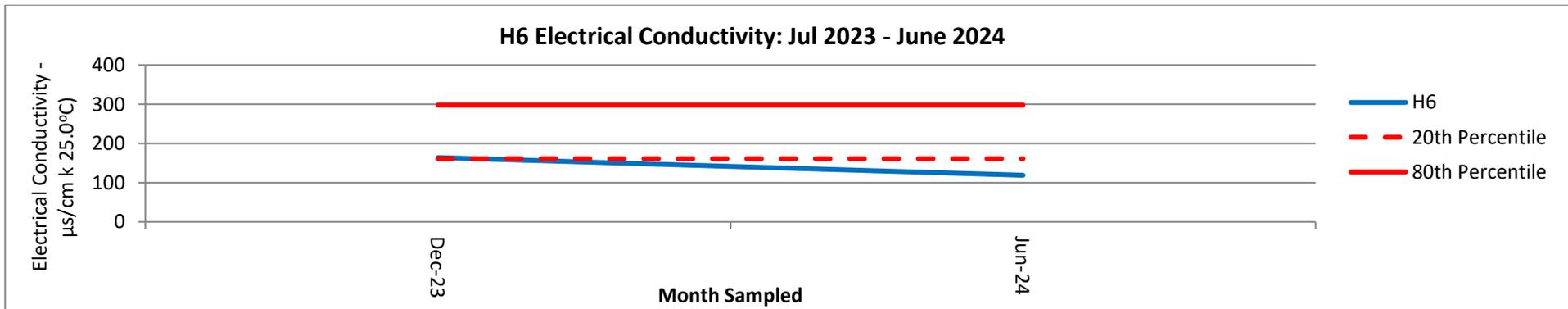


Chart 49: H6 Electrical Conductivity Results July 2023 – June 2024.

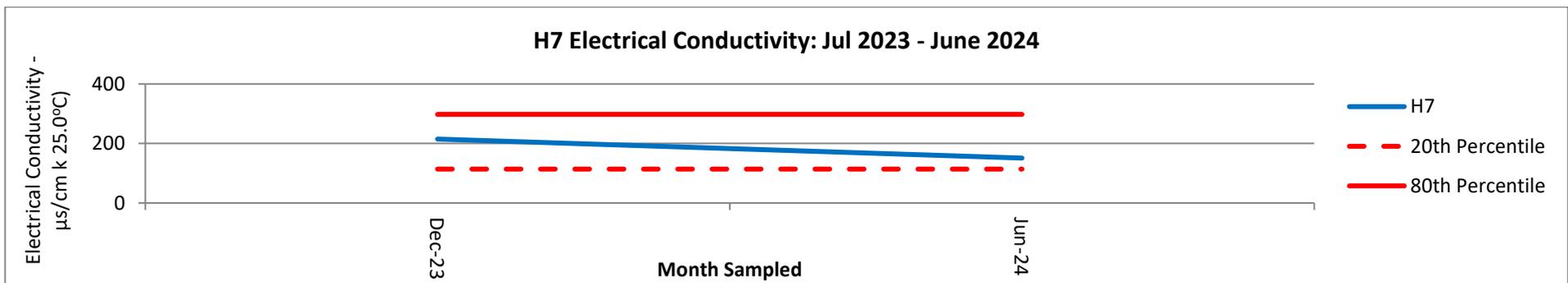


Chart 50: H7 Electrical Conductivity Results July 2023 – June 2024.

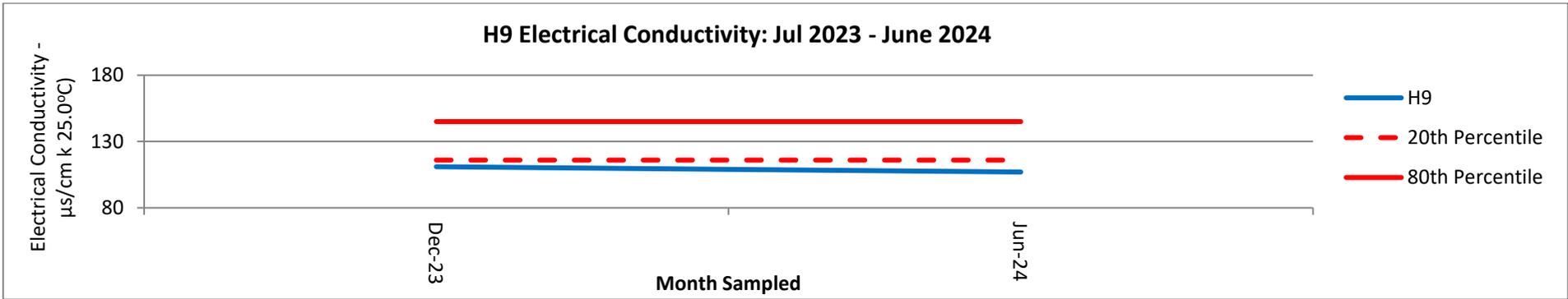


Chart 51: H9 Electrical Conductivity Results July 2023 – June 2024.

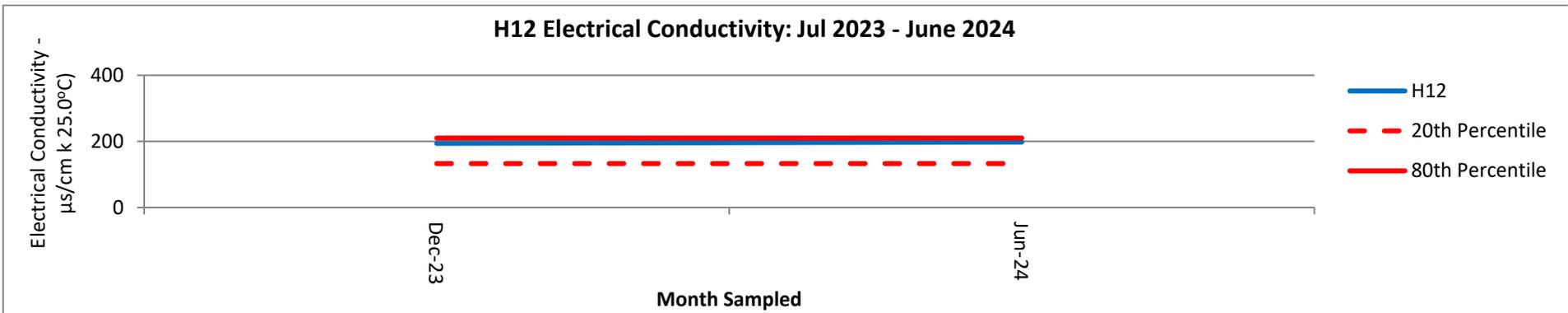


Chart 52: H12 Electrical Conductivity Results July 2023 – June 2024.

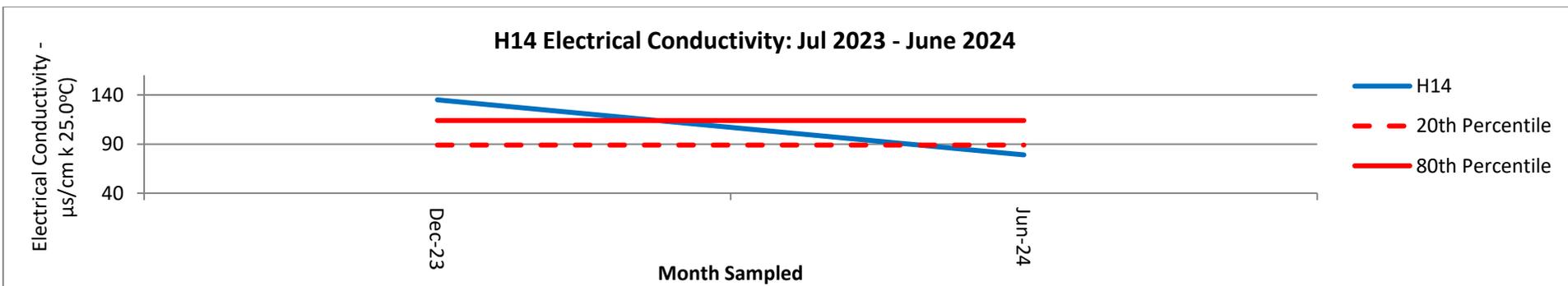


Chart 53: H14 Electrical Conductivity Results July 2023 – June 2024.

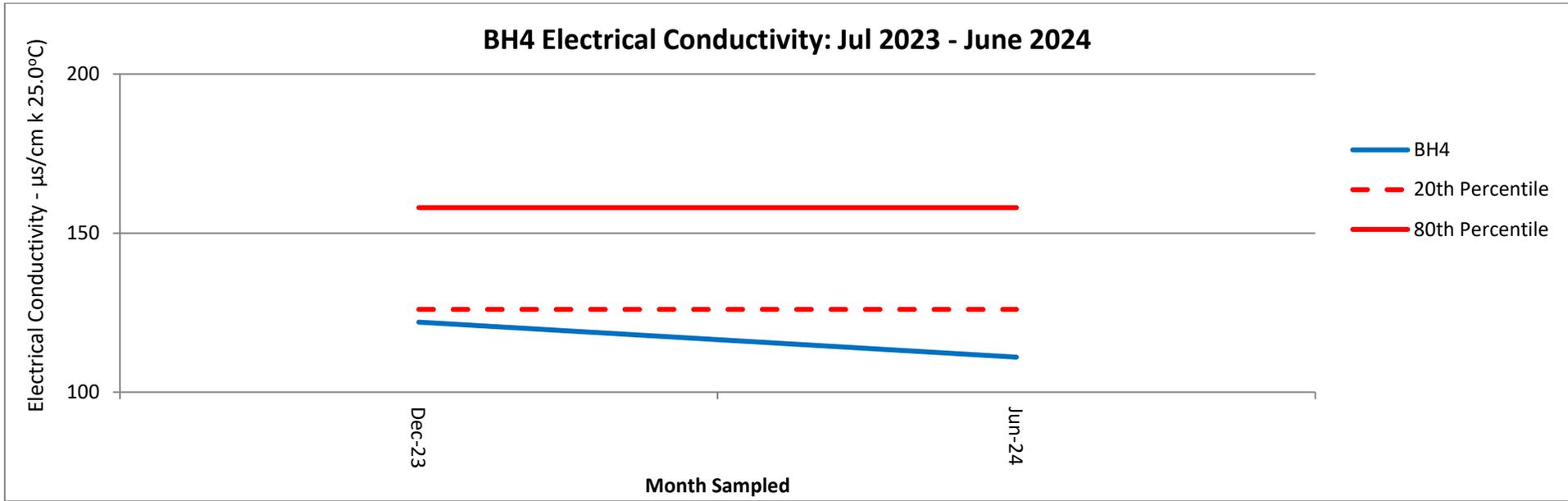


Chart 54: BH4 Electrical Conductivity Results July 2023 – June 2024.

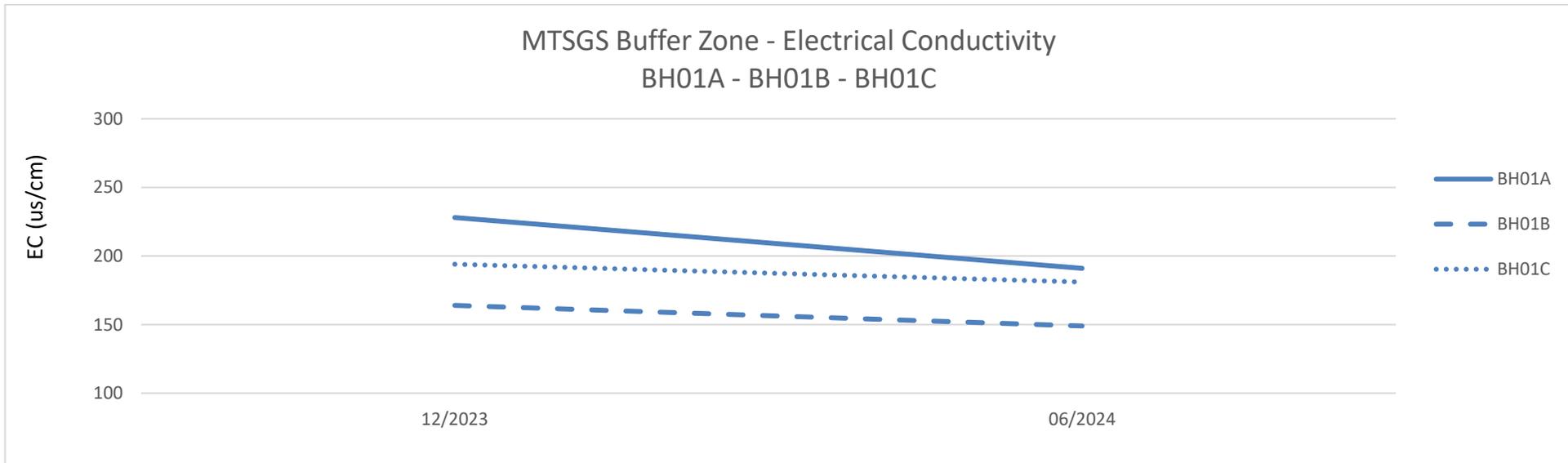


Chart 55: BH01A, BH01B and BH01C Electrical Conductivity Results July 2023 – June 2024

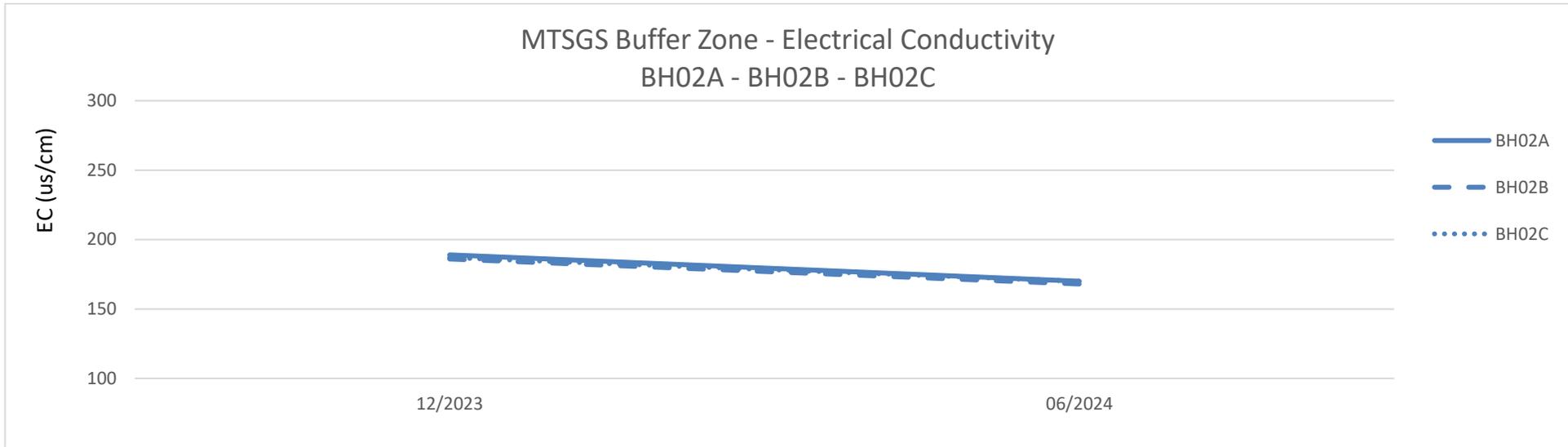


Chart 56: BH02A, BH02B and BH02C Electrical Conductivity Results July 2023 – June 2024.

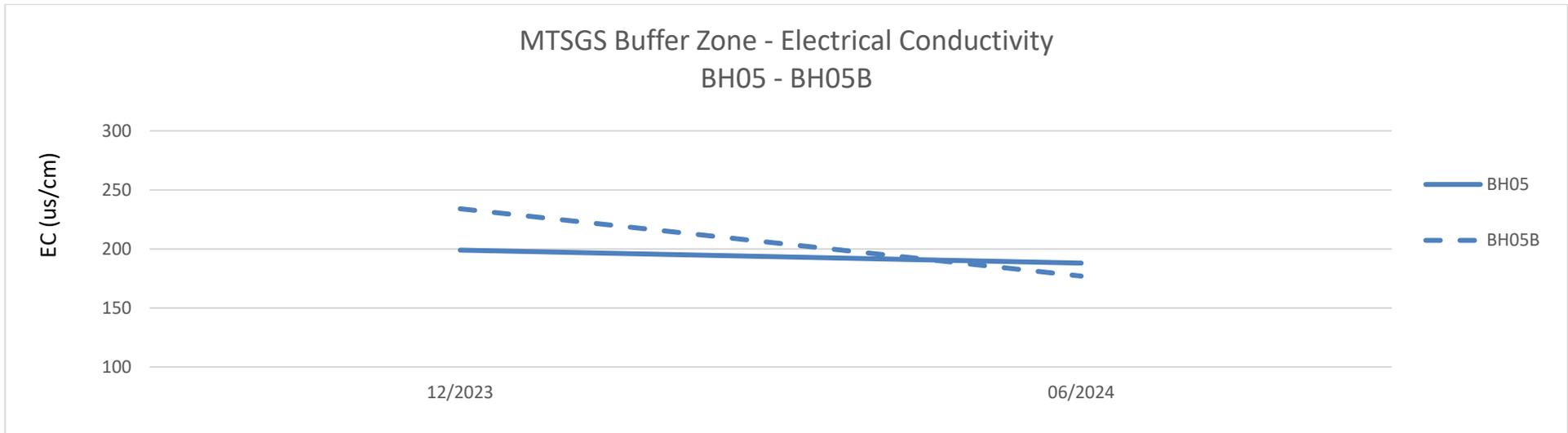


Chart 57: BH5 and BH05B Electrical Conductivity Results July 2023 – June 2024.

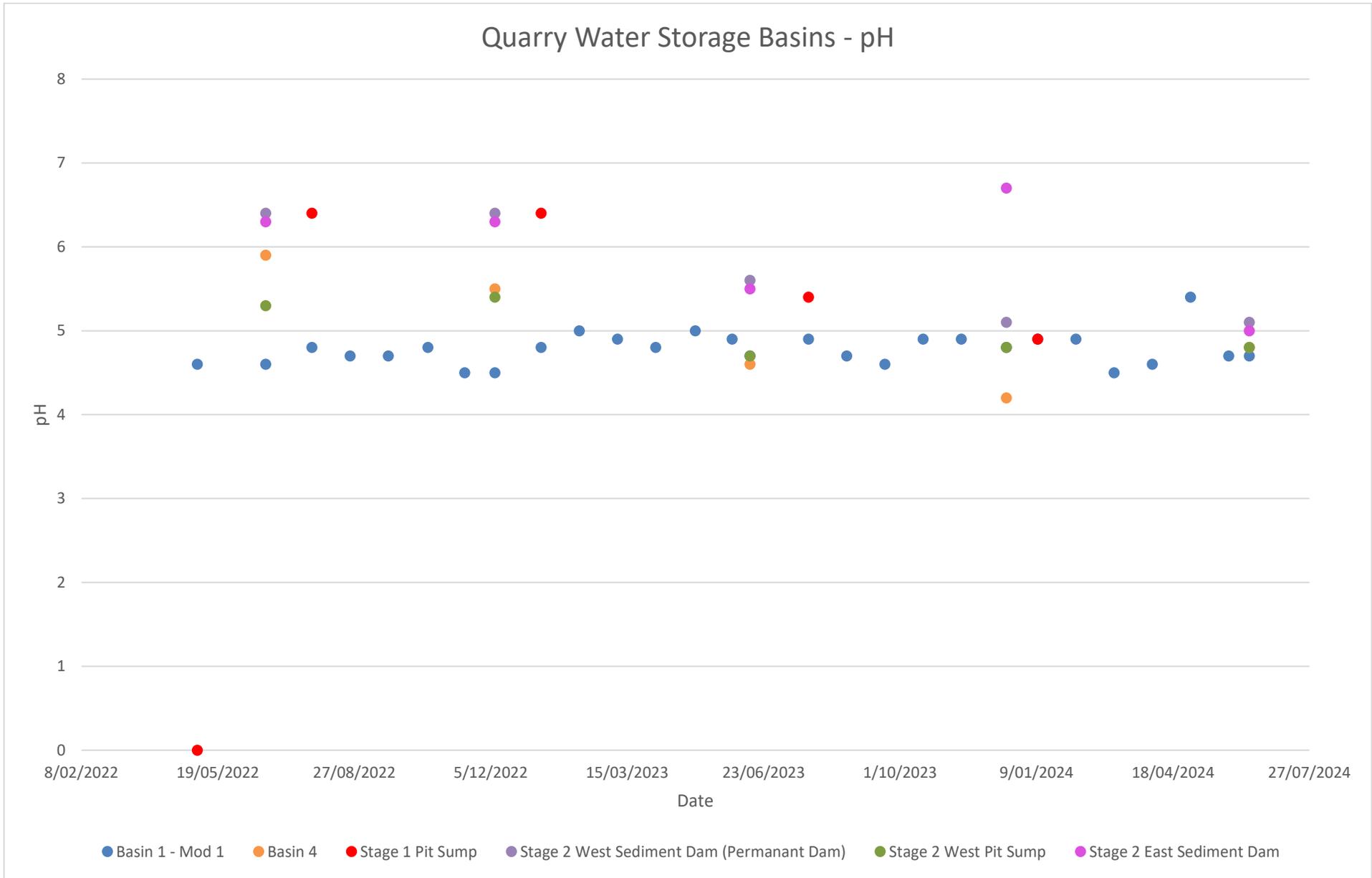


Chart 58: Quarry water storage basins - pH.

Quarry Water Storage Basins - Electrical Conductivity

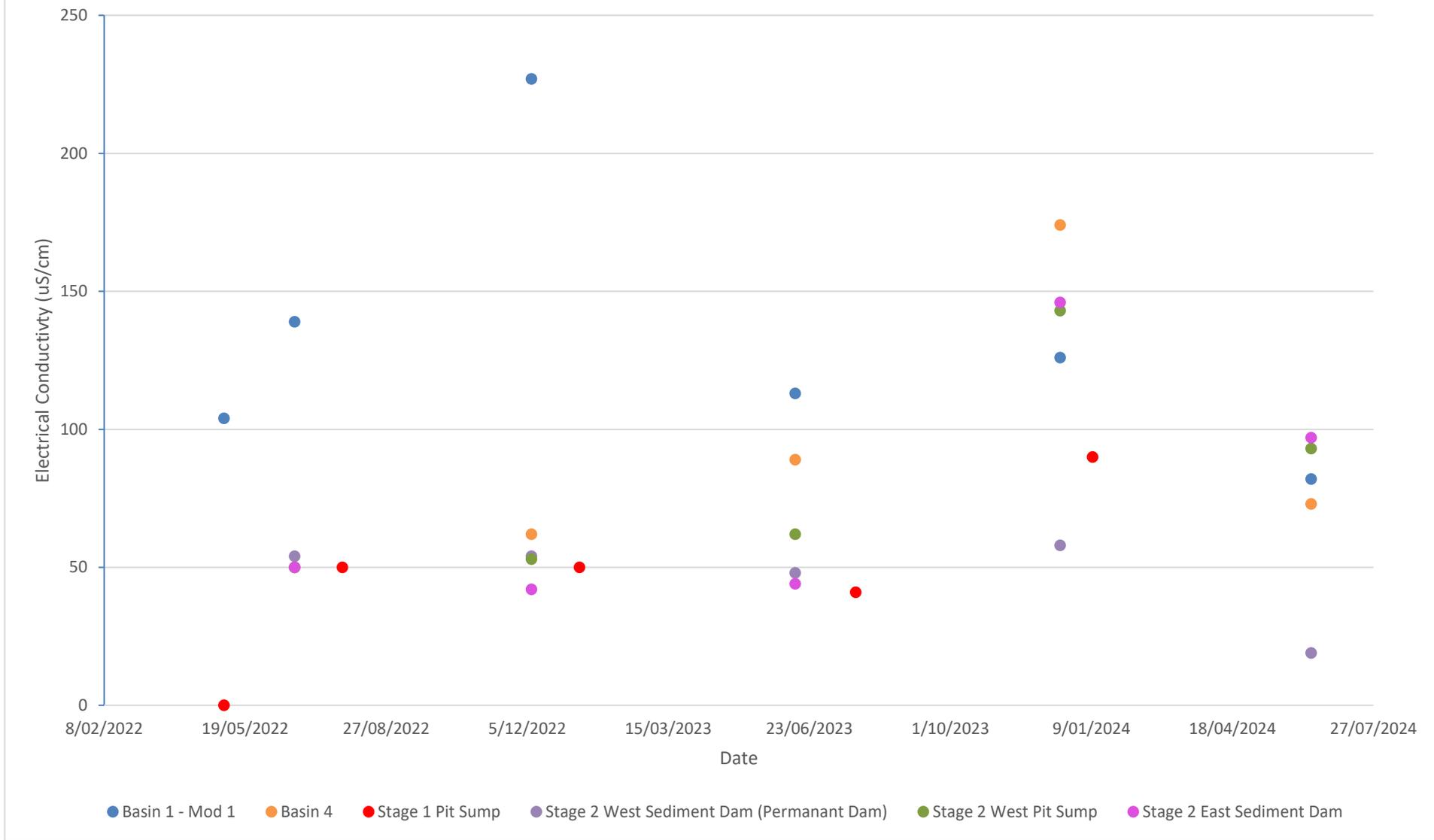


Chart 59: Quarry water storage basins – Electrical Conductivity

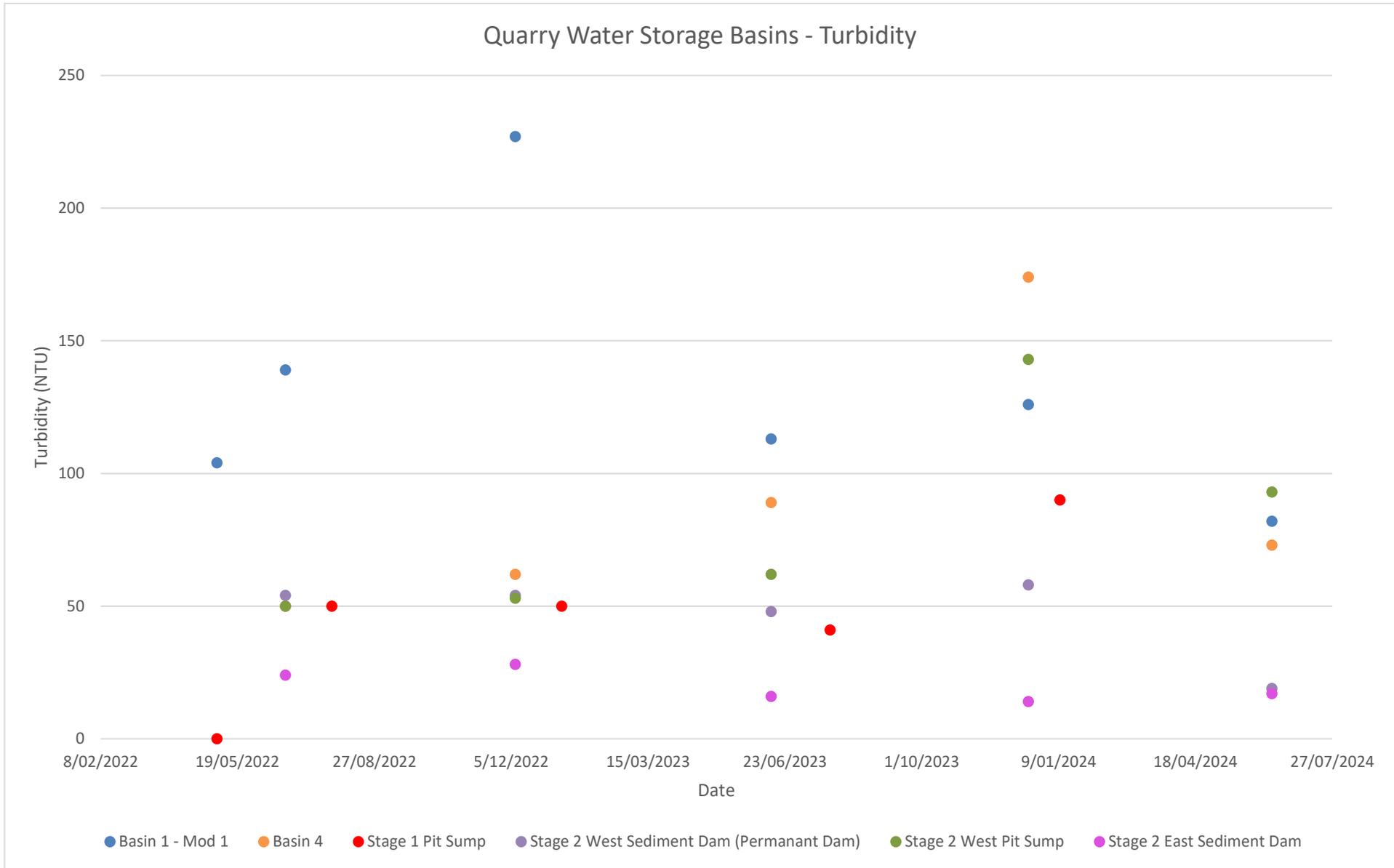


Chart 60: Quarry water storage basins – Turbidity

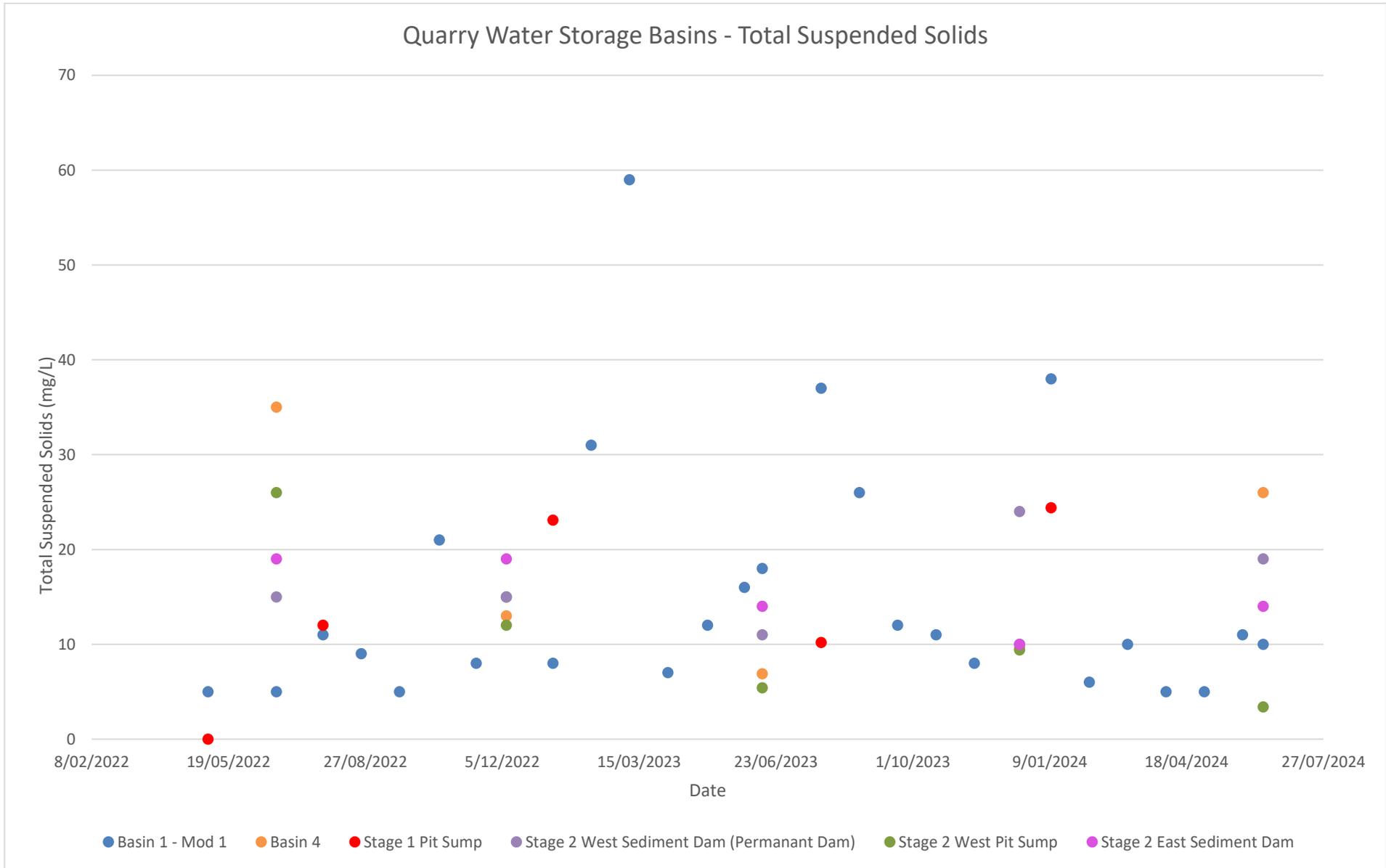


Chart 61: Quarry water storage basins – Total Suspended Solids

Table 24: SW1 and SW2 laboratory results

Sample Date	pH		Total Suspended Solids (mg/L)		Turbidity (NTU)	
	SW1	SW2	SW1	SW2	SW1	SW2
10/02/2020	6.70	5.88	12	14	82.1	25.3
10/08/2020	6.58	5.79	n/a	44	279	105
26/10/2020	6.33	5.84	5	16	107	54.4
05/01/2021	n/a	5.68	n/a	5	n/a	9
10/11/2021	n/a	5.06	n/a	84	n/a	160
26/11/2021	n/a	6.12	n/a	32	n/a	59.3
25/02/2022	5.49	5.06	90	13	475	27.1

Note: n/a denotes to parameter not being analysed due to invalid sample from insufficient water sample or lack of water for sampling.

6.4 Analyses

Groundwater Levels

During the 2023 - 2024 reporting period, groundwater levels for H-series boreholes indicated a strong relationship between water levels, existing ground moisture content and rainfall events. This is evident since the commencement of the groundwater monitoring program in 2005 shown on Chart 18. Fluctuations of water levels in the H-series boreholes directly correlate to the recharge from surface infiltration and percolation after rain events. This is clearly demonstrated in the months of July 2022 where a sharp rise in water levels were a result of aquifer recharge after significant rainfall events (refer to Charts 19 to 24 inclusive). In comparison, lower water levels were observed over the 2017 – 2018, 2018 – 2019 and 2019 - 2020 reporting periods due to extended drought conditions with less than average annual rainfall being evident. Since the 2020 – 2021 reporting period, rise in groundwater levels have been recorded with the La Nina climatic condition and the return of average rainfall.

Minor water level fluctuations have been recorded during this reporting period for Boreholes BH4 and BH5 which monitor the SBCGS however, there has been a relatively stable trend since the commission of these boreholes in 2011.

Twelve boreholes have been drilled and monitoring wells installed in the 100 metre MTSGS buffer zone. One additional monitoring well was installed next to the existing BH5. Groundwater monitoring of these thirteen bores have commenced since July 2018. Six boreholes in MTSGS buffer zone have been decommissioned and one new borehole installed. The minor reduction in groundwater levels were due to monthly sampling of water using the low flow pump out methodology for laboratory analysis (refer to Charts 25 to 30 inclusive, 33 to 34 inclusive). Condition 17 of Schedule 3 of DA 165-7-2005 requires that prior to commencing quarry operations within the MTSGS buffer zone, Dixon Sand is to complete a baseline groundwater monitoring program which includes monthly monitoring of groundwater levels and quality within the MTSGS buffer zone for a period of no less than 2 years. The 2-year baseline period was met at the end of July 2020. The assessment of the 2-year groundwater levels for the bores installed in the 100 metre MTSGS buffer zone is discussed further in Section 6.8.

Groundwater Quality

pH and electrical conductivity (EC) results for H-series, BH4 and BH5 have remained relatively stable from 2010 to the current reporting period, showing minimal fluctuations with occasional occurrences of anomalies due to human-induced environmental change such as application of fertiliser (from cropping) directly adjacent to the monitoring bore (refer to Charts 35 and 57). Elevated pH and EC results in H13 during 2015 were a result of influence from direct application of fertiliser in the immediate area surrounding the monitoring well. Water quality parameters obtained from H13 during this reporting period have returned to levels similar those previously recorded. Borehole H13 have since been decommissioned due to its location being the designated area for the processing plant and material stockpiles on Lot 216. Borehole H14 was unblocked in May 2018 and groundwater depth and quality sampling have resumed.

The assessment of the 2-year groundwater quality for the bores installed in the 100 metre MTSGS buffer zone will be further discussed in Section 6.8.

Surface Water

Due to these nominated monitoring points being ephemeral tributaries, water samples were only able to be collected when there has been sufficient rainfall to generate flows in the tributaries and when it is safe to undertake sampling. Despite some wet weather during this monitoring period, surface water sampling at SW1 and SW2 was not always possible due to heavy rainfall affecting safe site access or insufficient flow for sampling. Table 24 presents the pH, total suspended solids and turbidity of water samples obtained from SW1 and SW2 since the commencement of surface water monitoring. Additional data is still required to enable baseline surface water quality to be established.

Basin Water Quality

Surface water monitoring for quarry related water storage basins commenced during this reporting period. Charts 58 – 61 inclusive show pH, electrical conductivity, turbidity and total suspended solids results for five quarry related water storage bodies. However, additional data is still required in order to allow for interpretation and identification of any trend.

6.5 Review of Maximum Extraction Depth Map

A review of the Maximum Extraction Depth Map (MEDM) was undertaken by WSP Golder within 3 months of the Independent Environmental Audit in accordance with Condition 22(b) of Schedule 2 of DA 165-7-2005 and was submitted on 15 April 2023. The revised MEDM (April 2023) was approved by DPHI on 8 December 2023.

Condition 22(a) of Schedule 2 of DA 165-7-2005 requires Dixon Sand to review and update the MEDM annually, for the duration of the baseline groundwater monitoring program within the MTSGS buffer zone which commenced in July 2018. Additional review of the MEDM was undertaken on 29 June 2024 by Dixon Sand as part of the Annual Review. No changes to the current MEDM (April 2023) are warranted. Additional monitoring data for BH07 will aid in the next review and revision of the MEDM to increase accuracy in the groundwater modelling across the site.

The next review of the MEDM will be undertaken within 3 months of the IEA which is scheduled for late 2025.

6.6 Water Access License Usage

The Annual Returns for Water Access Licences (WALs) 25941 and 25956 for the 2023 – 2024 reporting period were submitted to WaterNSW in July 2024. The total water usage and usage purposes for each WAL are listed in Table 25 below.

Table 25: Water usage for Water Access Licences during the Financial Year 2023 - 2024

Water Access License Number	Annual Water Usage (Megalitres)	Usage Purpose
WAL 25941	3.1	Crop irrigation by onsite farmers
WAL 25956	5.6	Plant irrigation by onsite plant nursery

6.7 Water Balance Monitoring

The following water balance related monitoring in Table 26 applied to the quarry during the monitoring period.

Table 26: Quarry Water Balance monitoring in accordance with Soil and Water Management Plan.

Monitoring Item	Response
Water inventories on site will be monitored by continuous level monitoring instrumentation	Groundwater levels are monitored using continuous data loggers.
The number of Water Cart fills per month	Water Cart records kept
Monthly water transfer volumes between water storages (based on rated pump capacity and run time)	No water transfers between water storages during this reporting period.
Monthly clean water import volumes;	No clean water imports for quarry operations during this reporting period. A total of 8.7 megalitres of water (combined WALs) was utilised in accordance with the WAL conditions by onsite farmers and nursery for crop and plant irrigation.
Monthly processing plant water consumption (if constructed) (either metered or based on rated pump capacity and run time).	Wet processing plant not yet commissioned at the quarry.
Surface water related complaints	No surface water related complaints received during this reporting period.

Monitoring Item	Response
Assessment of the overall effectiveness of the Water Management System	Overall, the Water Management System at Haerses Road quarry has shown to be effective during this reporting period.

Future water balance monitoring data will be entered into a tracking spreadsheet to allow Dixon Sand to assess the adequacy of water inventories for ongoing production.

6.8 Groundwater Monitoring Program for Bores located in the 100m MTSGS Buffer

Condition 17 of Schedule 3 of DA 165-7-2005 requires Dixon Sand to complete a baseline groundwater monitoring program which includes monthly monitoring of groundwater levels and quality within the Maroota Tertiary Sands Groundwater Source (MTSGS) buffer zone for a period no less than 2 years prior to commencing quarrying operations within the MTSGS buffer zone. This is to be undertaken in consultation with DPE – Water (now Department of Climate Change, Energy, the Environment and Water – Water Division) and to the satisfaction of the Secretary.

Dixon Sand has completed the abovementioned groundwater monitoring program in July 2020 and engaged Mr Peter Dundon from Dundon Consulting Pty Ltd to carry out a review and presentation of baseline groundwater levels and quality data. Consultation with DPE Water was undertaken through a series of meetings during the consultation process for DA 165-7-2005 Modification 1 which resulted in the required scope of works outlined in Conditions 16 and 17.

The review by Mr Dundon concluded that there is a clear distinction between the Maroota Sands groundwater and perched groundwater within the Hawkesbury Sandstone. It was therefore unlikely that any excavation of Hawkesbury Sandstone within the buffer zone around the Maroota Sands approved area will cause any disturbance to the groundwater remaining in the Maroota Sands after sand extraction had been completed down to the approved depth. There was no evidence to suggest that extraction could not safely proceed within the temporary 100m buffer zone along the eastern margin of the Hawkesbury Sandstone resource.

Dixon Sand submitted the abovementioned report containing the reviewed baseline data of monitoring bores within the MTSGS buffer zone to DPE Water (now DCCEEW – Water). On 4 September 2020. On 24 May 2021 Dixon Sand received the confirmation of satisfaction from NRAR.

Dixon Sand received the DPHI's endorsement on 11 June 2021 acknowledging that the Baseline Groundwater Monitoring Program meets the relevant conditions of consent and that the pre-extraction requirements relating to the MTSGS buffer zone and Buffer Groundwater Monitoring Program have been met and extraction can therefore occur (subject to other relevant consent conditions being met).

Subsequently a number of cluster boreholes have been removed due to their location being in extraction area. These include BH03A – BH03B – BH03C cluster and BH06A – BH06B – BH06C cluster. After the recent review of the 6-

monthly grounder water data for the 100m buffer to the MTSGS, Dixon Sand received a recommendation from DCCEEW - Water to replace the decommissioned monitoring boreholes BH06A, BH06B and BH06C with a new monitoring borehole targeting the SBCGS. Dixon Sand engaged WSP Golder to undertake an assessment of the most appropriate location and design specification for the new bore. It was proposed that the new monitoring bore be installed in the south-western corner of Extraction Cell 1A in the Modification 1 extraction area. This proposal was excepted by DWWECC - Water on 24 May 2023. BH07 was commissioned in August 2023.

6.9 Changes to Environmental Procedures

Current groundwater management measures are considered adequate.

7. Ecological Monitoring and Rehabilitation

7.1 Vegetation Clearing

No vegetation clearing was undertaken during this reporting period.

All previous vegetation clearing were undertaken in accordance with the pre-clearing survey and multi-stage habitat tree clearing protocols. Appropriate briefing and induction were provided to the relevant staff prior to undertaking vegetation clearing.

7.2 Bush Regeneration and Weed Management

Rehabilitation and weed management at Haerses Road quarry were undertaken on a monthly basis by a bush regeneration contractor, Bush-It Pty Ltd.

Approximately 287.5 hours were spent on bush regeneration works at Haerses Road Quarry, equating to approximately 53% of the time spent between Old Northern Road Quarry and Haerses Road Quarry.

Bush regeneration and weed management were carried at the following locations:

- Area A - original translocation and planting offset area located east of Stage 2 west (Lot 177 DP 752039),
- Area B - western perimeter edge of Haerses Road Biobanking Site under the BCT agreement,
- Area C - Old dam area in Stage 3 (south-western), and
- Area D - 30m vegetation buffer from Wisemans Ferry Road.

No bush regeneration work has been carried out at the Porters Road Biobank Site under the BCT agreement due to the current passive management status during the reporting period.

Bush regeneration works involved mechanical and chemical methodologies.

Figures 6 and 7 illustrate the areas where bush regeneration works have been completed during this reporting period.

The Annual Rehabilitation Report provided by the contractor for the 2023 – 2024 reporting period is attached as Appendix G.

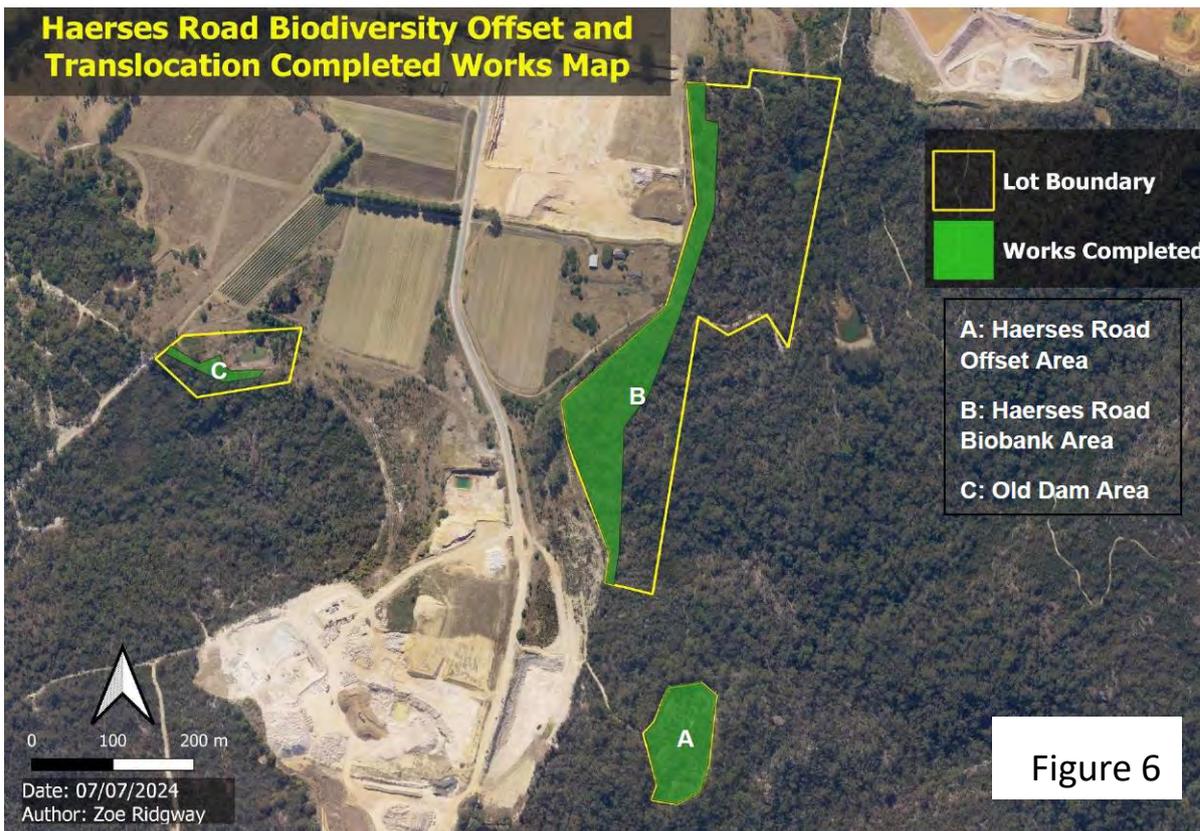


Figure 6: Bush regeneration and weed management works within the Biobank area, offset area and old dam in Stage 3 (source: BushIT 2024).

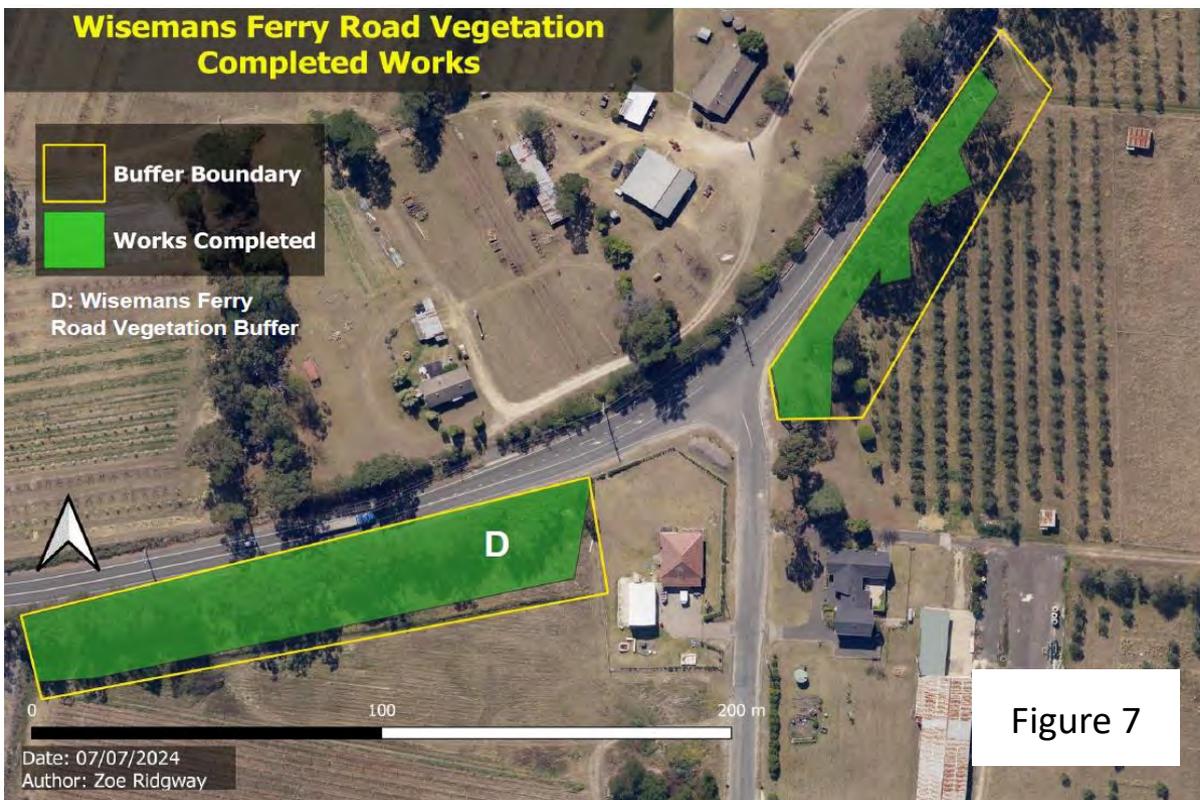


Figure 7: Bush regeneration and weed management works within the 30m buffer to Wisemans Ferry Road (source: BushIT 2024).

7.2.1 2009 Translocation Site and Original Offset (Area A)

Rehabilitation works in the translocation and original offset areas began in 2009. During this reporting period, a combination of spraying and maintenance works were undertaken in the areas shown in Figure 6 which focused on controlling infestations of whiskey grass, African love grass and couch. The growth of *Kunzea ambigua* and other canopy trees were managed in order to assist regeneration at groundcover stratum.

7.2.2 Haerses Road Biobank Site (Area B) and Porters Road Biobank Site

During the reporting period, the status of Haerses Road and Porters Road Biobank Sites management are under 'passive' management. However, as the western perimeter of Haerses Road biobank site borders exotic grassland containing several different invasive perennial grass and exotic annual species, weed management through spraying, secondary and maintenance works have occurred in the area highlighted in Figure 6.

No bush regeneration work was carried out at Porters Road biobank site. A seed collection day was organised at the site with seeds being gathered from Proteaceae and Eucalyptus species and propagated in a local native nursery for future planting.

More information on the BSA sites is provided in Section 7.4.

7.2.3 Old Dam in Stage 3 (Area C)

This area is located in close proximity to the western Haerses Road Biobank site and therefore, weed management at this location has been included as one of the primary management areas during this reporting period. The area around the old farm dam located in Stage 3 has been subjected to historical neighbouring agricultural activities in the immediate area which resulted in encroachment of weed infestation particularly *Lantana camara* with other weeds such as *Ageratina adenophora*, *Solanum mauritianum* and *Andropogon virginicus* being present. Primary and secondary work to treat these weeds have been undertaken.

7.2.4 Wisemans Ferry Road 30 Metre Buffer (Area D)

The Haerses Road and Wisemans Ferry Road intersection upgrade works have severely impacted access for maintenance of this area during the previous 3 reporting periods. Further assisted revegetation and rework to this area was undertaken during this reporting period. Supplementary planting, direct seeding, weed spraying and maintenance works were carried out.

In uncapped areas, a number of targeted weeds were treated with regular water of planted vegetation and removal of guards for mature enough plants. Seed dispersal was conducted in this area using onsite seeds collected from the Old Dam (Area C).

In the capped areas, regular scans of Weeds of National Significance (WoNS) species were undertaken. During the previous reporting period, this area was stripped back with the aid of quarry machinery, weed species removed and the area capped with crushed sandstone. Planting of approximately 240 native trees, shrubs and ground cover species was undertaken in this area during the last reporting period, followed by routine weed monitoring and treatment of exotic grasses such as Kikuyu and couch, and blackberry throughout the previous and this reporting period. An additional 50 plants were planted in the capped area during this reporting period.

Overall, the status of the revegetation and screen planting have improved since the impact from the 2020 intersection upgrade works.

7.3 Ecological Monitoring

Dixon Sand engaged South East Environmental to undertake the annual biodiversity and rehabilitation monitoring and reporting for Haerses Road Quarry. Progress assessments were made against the commitments in the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan (BRMP).

The Biodiversity and Rehabilitation Management Report (South East Environmental, 2024) aimed to:

- Identify native flora and fauna species, populations and ecological communities known to or likely to occur within the Haerses Road site,
- describe the native vegetation and habitats within the Haerses Road site,
- describe the current condition of the threatened flora and its habitat found within the Haerses Road site,
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the Haerses Road site with reference to the Commonwealth *EPBC Act* 1999 and the NSW *BC Act* 2016,
- recommend appropriate biodiversity and environmental management measures that should be implemented to reach criteria for monitoring success set by the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 (2020), and
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

Figure 8 shows the buffer zones at Haerses Road Quarry.

Figure 9 shows the location of Haerses Road quarry, in relation to the biobank sites.

Figure 10 displays the areas delegated as the Haerses Road Biobank site (BSA 414).

Figure 11 displays the areas delegated as the Porters Road Biobank site (BSA 415).

Annual vegetation survey and baseline monitoring were undertaken for this reporting period.

Rehabilitation work at Haerses Road quarry is in the early stages and will increase with both intensity and measurable criteria within the next reporting period.

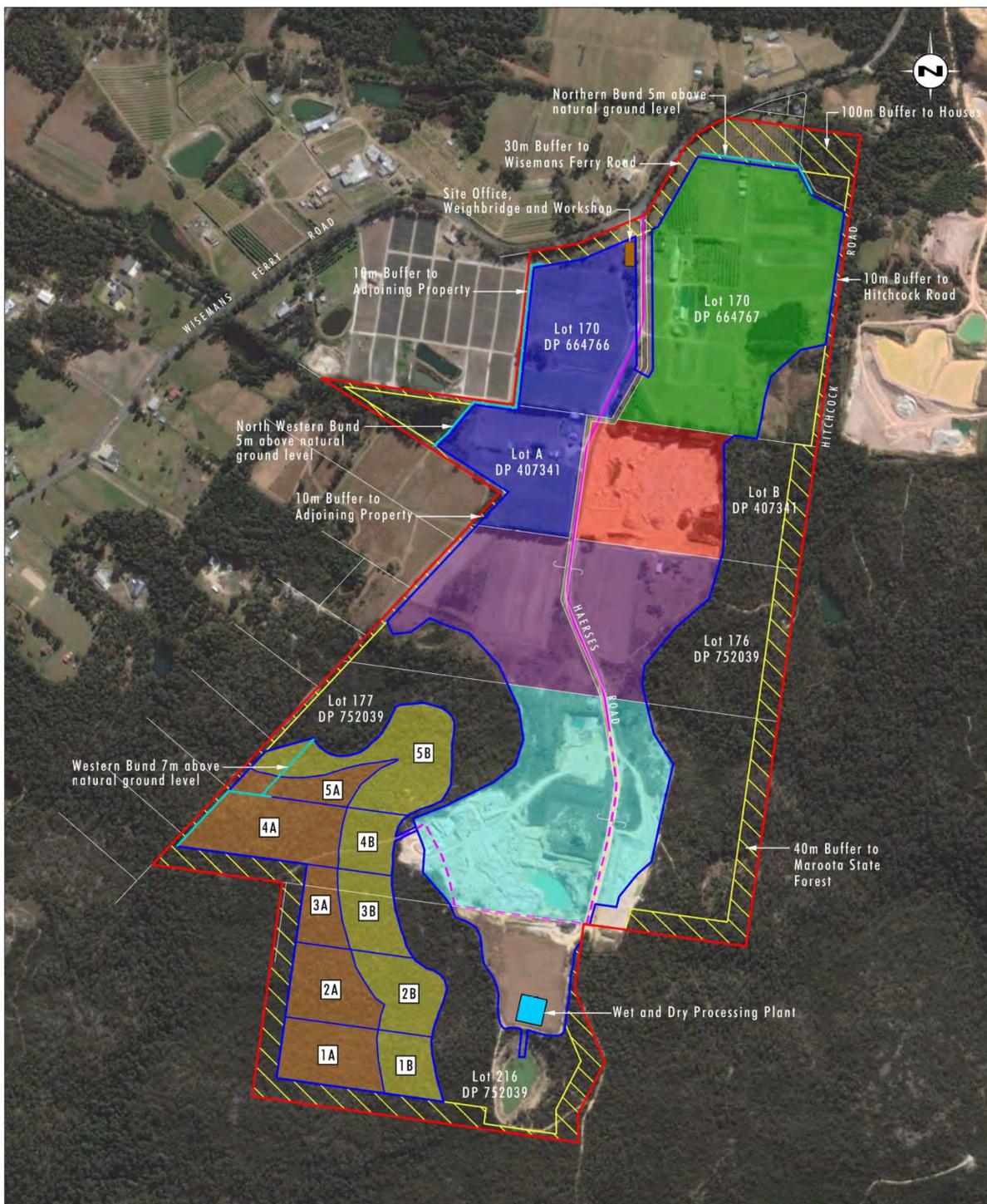


Image Source: Google Earth (Sep 2017)
 Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

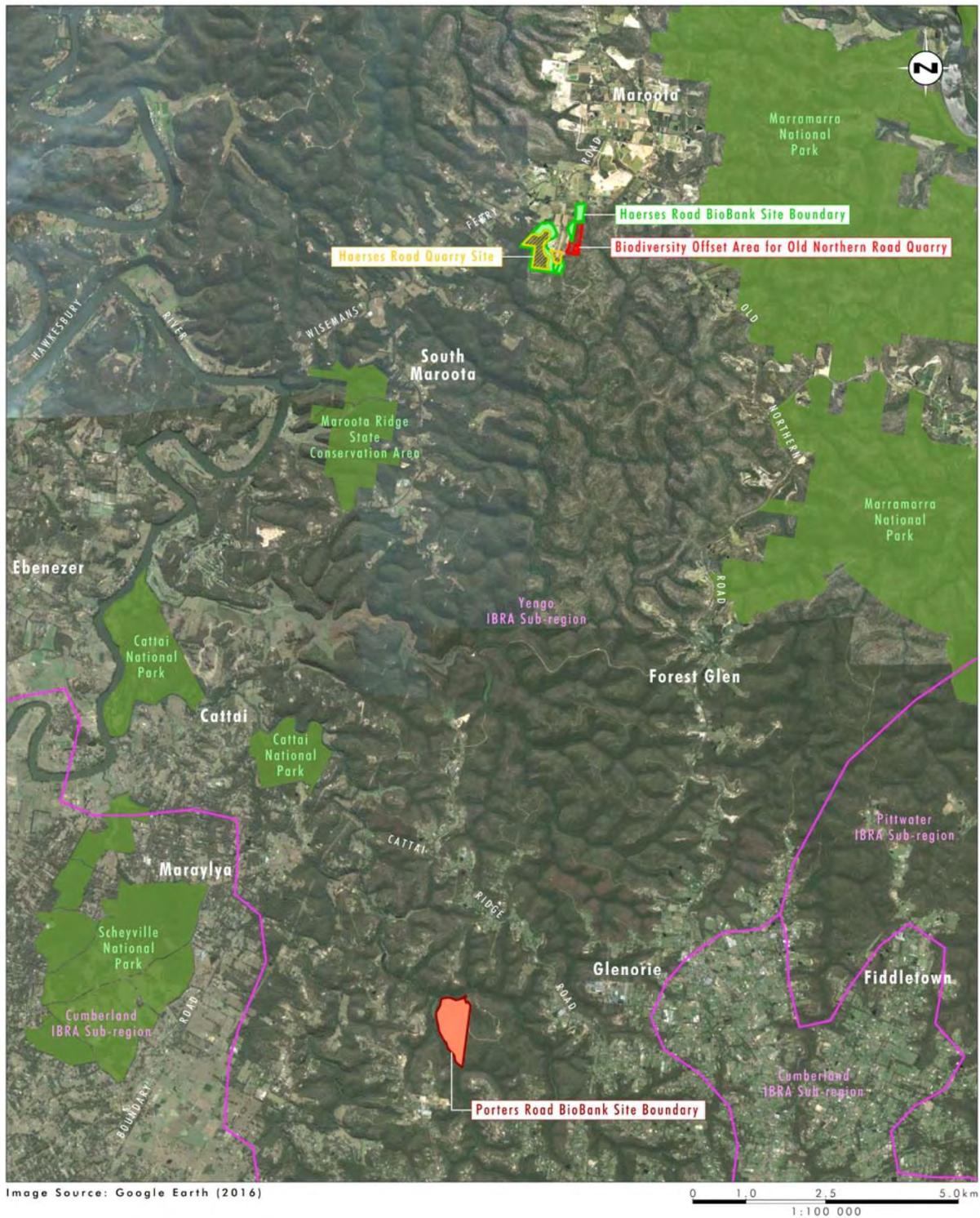
0 100 250 500m
 1:10 000

Legend

- Haerses Road Quarry Site
- Approved Extraction Area
- Extraction Area Stage 1
- Extraction Area Stage 2
- Extraction Area Stage 3
- Extraction Area Stage 4
- Extraction Area Stage 5
- Extraction Area A
- Extraction Area B
- Extraction Cell Number
- Site Office, Weighbridge and Workshop
- Wet Processing Plant
- Indicative Unsealed Ha
- Sealed Haul Road
- Acoustic Bund
- Buffer Zone

Figure 8
Buffer Zones,
Haerses Road Quarry

File Name (A4): R06/4272_042.dgn
 20180608 10.10



Legend

- Haerses Road Quarry Site
- Biodiversity Offset Area for Old Northern Road Quarry
- Haerses Road BioBank Site Boundary
- Porters Road BioBank Site Boundary
- National Park and Conservation Area
- IBRA Sub-region

File Name (A4): R06/4272_005.dgn
20180525 10.58

Figure 9
Haerses Road and Porters Road
BioBank Sites and HR BOA

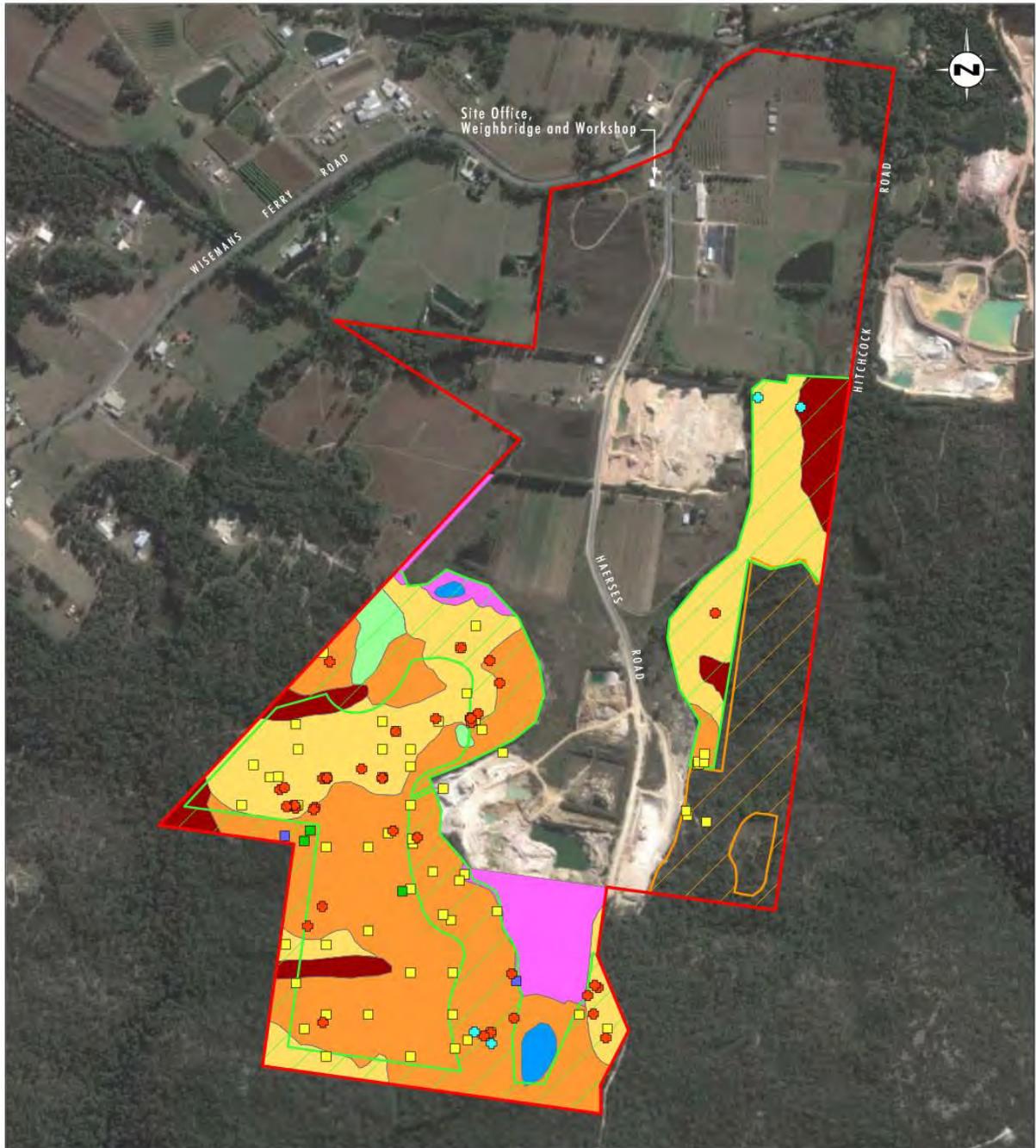


Image Source: Google Earth - DigitalGlobe (May 2016)
 Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

0 100 250 500m
 1:10 000

Legend

- Haerses Road Quarry Site
- Biodiversity Offset Area for Old Northern Road Quarry
- Haerses Road BioBank Site Boundary
- Cleared
- Dam
- Zone 1: PCT 978 - HN560 – Needlebush – Banksia Wet Heath on Sandstone Plateaux of the Sydney Basin Bioregion – Moderate to Good Condition
- Zone 2: PCT 1083 - HN566 – Red Bloodwood – Scribbly Gum Heathy Woodland on Sandstone Plateaux of the Sydney Basin Bioregion – Moderate to Good Condition
- Zone 3: PCT 1134 - HN582 – Scribbly Gum – Hairpin Banksia – Dwarf Apple Heathy Woodland on Hinterland Sandstone Plateaux of the Central Coast, Sydney Basin Bioregion – Moderate to Good Condition
- Zone 4: PCT 1181 - HN586 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint Heathy Open Forest on Slopes of Dry Sandstone Gullies of Western and Southern Sydney, Sydney Basin Bioregion – Moderate to Good Condition
- Dural Land Snail
- Eastern pygmy-possum
- *Darwinia biflora*
- *Grevillea parviflora subsp supplicans*
- *Tetratheca glandulosa*

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Figure 10
Haerses Road BioBank Site
and HRBOA

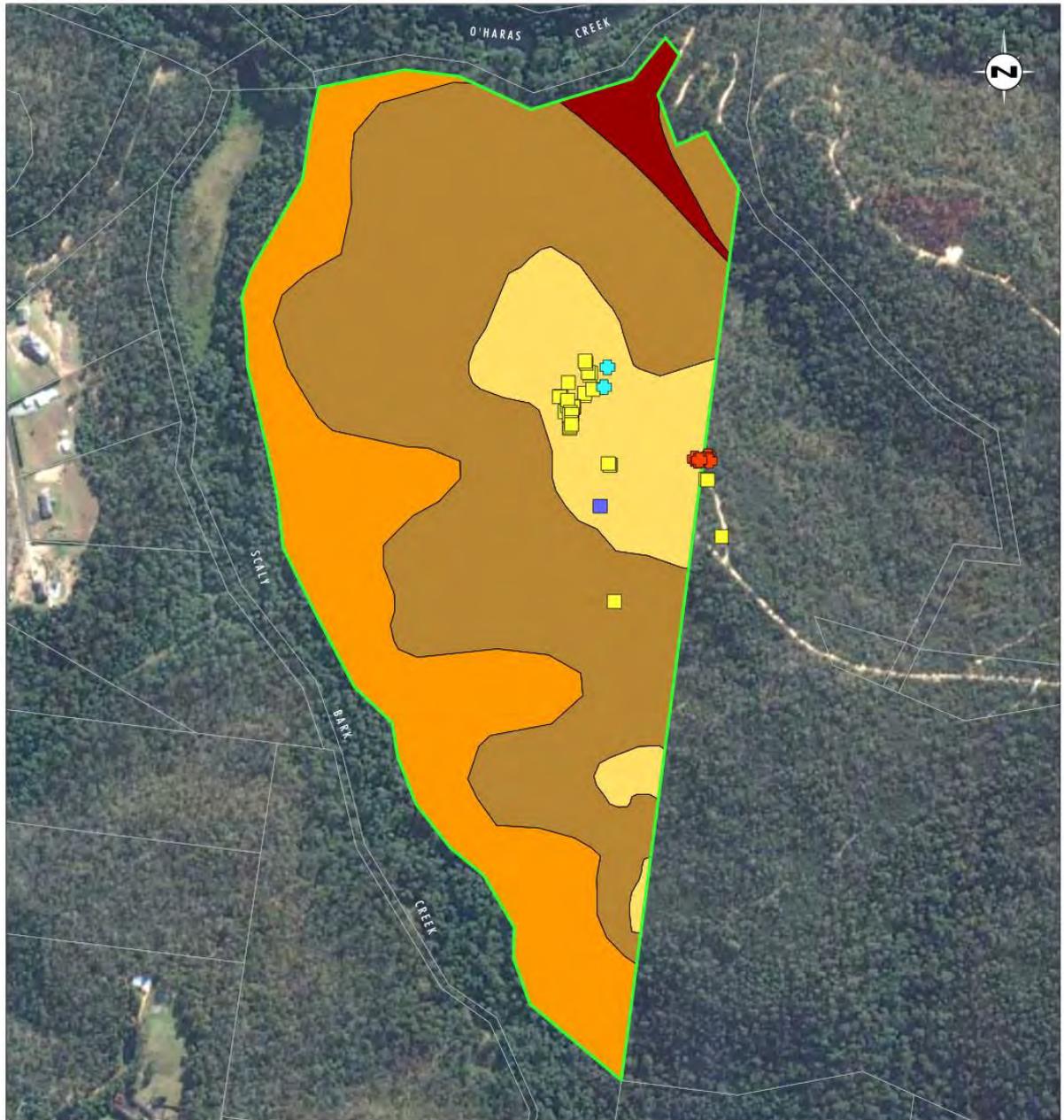


Image Source: Google Earth (2015)
 Data Source: LPI (2011), Umwelt (2017), South East Environmental (2016, 2017)
 Note: Site within Baulkham Hills Local Government Area and Yengo IBRA Subregion Boundary

0 100 200 400m
 1:7 500

Legend

- Porters Road BioBank Site Boundary
- Zone 1: PCT 1083 - HN566 - Red Bloodwood - scribbly gum heathy woodland on sandstone plateaux of the Sydney Basin - Moderate to Good Condition
- Zone 2: PCT 1134 - HN582 - Scribbly Gum - Hairpin Banksia - Dwarf Apple heathy woodland on hinterland sandstone plateaux of the Central Coast, Sydney Basin Bioregion - Moderate to Good Condition
- Zone 3: PCT 1181 - HN586 - Smooth-barked Apple - Red Bloodwood - Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion - Moderate to Good Condition
- Zone 4: PCT 1237 - HN596 - Sydney Blue Gum - Blackbutt - Smooth-barked Apple moist shrubby open forest on shale ridges of the Hornsby Plateau, Sydney Basin Bioregion - Moderate to Good Condition
- Dural Land Snail
- Eastern pygmy-possum
- *Darwinia biflora*
- *Tetrathecha glandulosa*

File Name (A4): R06/4272_006.dgn
 20180525 11.08

Figure 11
Porters Road BioBank Site

7.3.1 Stage 1 Extraction Cell

Approximately 5.68 hectares of Stage 1 has been disturbed for sand extraction. The remaining area to the east comprised of remnant native vegetation. Extraction has concluded for the eastern section (approximately 3 hectares) which is in the process of rehabilitation to agricultural land (refer to Plate 2). During this reporting period, rehabilitation work has begun in the eastern portion of Stage 1, with overburden clay material from Stages 2 and 3 being utilised to raise the ground levels to final landform levels. Rehabilitation work is expected to continue during the next reporting period with the aim of rehabilitation the land to Agricultural Class 4.



Plate 1 – Commencement of final landform shaping in Stage 1 Extraction area (South East Environmental 2024).



Plate 2 - Rehabilitation area in Stage 1, Google Imagery dated June 2024 (South East Environmental, 2024).

7.3.2 Stage 2 Extraction Cell

Stage 2 extraction cell is still an active quarry extraction area. Rehabilitation has commenced in Stage 2 west where sandstone extraction took place and concluded. The farm dam constructed in this area which will form a permanent water infrastructure for the property, in accordance with the Soil and Water Management Plan (refer to Plate 3).

Soil containing native vegetation seed bank from the extraction cells A and B was spread over the area between the dam and native vegetation on the western boundary. The natural regeneration process has commenced with a good diversity ground cover species emerging. In addition, the threatened *Darwinia biflora* and *Tetratheca glandulosa* have emerged with *Darwinia biflora* being prolific across the area (refer to Plate 4). Emergence of *Acacia bynoeana* has also been observed in the area immediately surrounding the dam, as previously observed in the last reporting period.



Plate 3 – Farm dam located in Stage 2 west (South East Environmental, 2024).



Plate 4 – Stage 2 west rehabilitation area west of the farm dam (South East Environmental, 2024).

7.3.3 Extraction Cells A and B

Vegetation clearing and extraction have commenced in extraction Cell 1A in December 2019 following the completion of the pre-commencement conditions. During this reporting period, extraction was undertaken in Cells 1A, 1B, 2A, 2B, 3A and 3B.

No rehabilitation has been undertaken in Cells A and B of the Modification 1 area.

7.3.3.1 Baseline Monitoring for Extraction Cells A and B

Baseline vegetation data was obtained during the previous reporting period in areas within the future extraction cells, as outlined in the Biodiversity and Rehabilitation Management Plan (BRMP v5, 2020). The Haerses Road Biodiversity and Rehabilitation management Plan outlines the annual monitoring of the extraction cells prior to disturbance for the purpose of providing baseline data for rehabilitation of the site post extraction.

A baseline monitoring site was not able to be established in Extraction Cells 1A and 1B due to commencement of extraction and current areas being subjected to disturbance. The monitoring locations within cell 2 and 3 have been disturbed in preparation for material extraction and therefore monitoring at these sites has concluded. Baseline monitoring in Cell 2A was undertaken in July 2023. The remaining two monitoring locations within cells 4 and 5 were surveyed in July 2024 to collect further data which will contribute to the final rehabilitation of the quarry.

Information collected from these baseline monitoring sites was carried out in accordance with DPE Biodiversity Assessment Method, as approved via the *Biodiversity Conservation Act 2016* and the *Biodiversity Conservation Regulation 2017*. Photo monitoring points have been nominated within these baseline monitoring sites for ongoing monitoring and comparison purpose each year. The survey sites were selected for ongoing survey monitoring with the aim of representing the two dominant vegetation communities within the Haerses Road BRMP (v5, 2020).

Ground survey indicated that the PCT 978 previously identified within extraction Cell 5b could not be located. A larger secondary PCT 978 occurs within the Biodiversity Offset Area which is outside of the survey area required for this annual report. A small area of PCT 1181 was located within Extraction Cell 2A. However, this area of PCT 1181 is not large enough to be encompassed by the vegetation survey undertaken, therefore, part of this PCT is within quadrat 3 where transition between PCT 1181, PCT 1083 and PCT 1134 occurs.

Within the three vegetation survey quadrats the following information was collected:

- Composition – native plant species richness by growth form,
- Structure – foliage cover of native and exotic species by growth form, and
- Function – number of large trees, tree stem size class, canopy species regeneration, length of fallen logs, percentage of leaf litter, number of trees with hollows and high threat exotic cover

Full details of the survey results can be found in the *Annual Biodiversity & Rehabilitation Management Report (South East Environmental, 2024)* contained in Appendix H.

7.3.4 Wisemans Ferry Road 30 Metre Buffer

Supplementary buffer planting commenced in 2016 utilising native species such as *Banksia*, *Melaleuca*, *Hakea* and *Acacia* to provide visual screening for motorists on Wisemans Ferry Road. Intersection upgrade works at the Haerses Road and Wisemans Ferry Road during early 2020 have caused disturbance to the planted vegetation in the buffer areas. The resulting disturbance from the road works was unavoidable. Works associated with the intersection upgrade was completed and finalised in May 2021.

Assisted planting was undertaken during the previous 2022 – 2023 reporting period on the western section of the Buffer area, utilising soil and mulch containing native seed bank. Currently a diverse Eucalyptus, Acacia, Leptospermum and native grass and forb species have emerged (refer to Plate 5). This rework area will be monitored to ensure its intent as a vegetation screening from Wisemans Ferry Road.

The eastern portion of the Buffer area has not shown any signs of natural regeneration due to the density of exotic pasture species dominating the area. Assisted rehabilitation planting has been carried out and additional future planting may be required in order to fulfil the gaps and densify the vegetation buffer (refer to Plate 6).

Exotic species occur in the 30-metre buffer with Weeds of National Significance (WoNS) and High Threat Weeds (HTW) present. Weed management and control has commenced during this previous reporting period and will continue into the future, with priority given to management of WoNS and HTW.



Plate 5 – Western side of 30m buffer to Wisemans Ferry Road (South East Environmental, 2024).



Plate 6 – Eastern side of 30m buffer to Wisemans Ferry Road (South East Environmental, 2024).

7.3.5 Buffer to Deerubbin Local Aboriginal Land Council Property

The translocation and original offset sites from 2006 are located to the west of the Deerubbin LALC property (formerly Maroota State Forest). A 40-metre buffer runs along the eastern and southern boundaries between the quarry and the Deerubbin LALC property. Rehabilitation of this area started in 2015 with continued regular regeneration works in this area, there has been no further disturbance to any areas of the buffer.

7.4 Management of Biodiversity Stewardship Sites

Two Biodiversity Stewardship Agreements (BSA) were finalised for DA 165-7-2005. The two sites are located at Haerses Road and Porters Road. The BSA stipulates a requirement that management actions are to be implemented when the Agreement commences, and management actions that are to be undertaken when the Total Fund Deposit is met, and Dixon Sand received the first annual management payment. During the reporting period, Dixon Sand has not fulfilled the payment of 80% of the Total Fund Deposit and therefore Passive Management of the biobank sites were undertaken.

The annual inspection for Year 5 of the Haerses Road and Porters Road biobank sites were undertaken on 28 February 2024 for the purpose of annual reporting of passive management actions. The reports were submitted to the BSA Coordination Team on 12 March 2024.

Inspections were carried out against a number of management actions with the following outcome at both stewardship sites:

- **weed control** – N/A until active management,
- **grazing management** – no stock kept or located on both properties, no unauthorised grazing of stock,
- **fire management** – no fire within the BSA sites during previous 12-month period,
- **native vegetation management** – no disturbance, burning or use of fertilisers, pesticides or herbicides within the BSA sites,
- **threatened species habitat management and enhancement** – no disturbance to any threatened species habitat within 12 months. The Haerses Road Biobank site is fenced sign posted as environmental protection area to deter unauthorised persons from entering and disturbing significant habitat areas. The Porters Road biobank site can only be accessed via 2 locked gates to which only the property owner and RFS have keys for.
- **management of human disturbance** – no removal of dead timber or rocks from the sites. No storage or disposal of rubbish within the sites. Maintenance of tracks at Haerses Road site has occurred particularly following extreme rainfall events which cause damage to the track pavement. Work was carried out with care and no disturbance to native vegetation alongside these tracks. Fence regularly checked to ensure their visibility. Tracks at Porters Road site are 4-wheel drive access only and maintenance is not expected to be required unless emergency services require access.
- **Monitoring** – N/A until active management. Photo points established.

Photographic point monitoring forms part of the assessment with three photo locations being assessed for each biobank site.

Previously during the Year 1 inspection, it was noted that both biobank sites experienced ongoing drought condition in 2019 which resulted in loss of some shrubs and ground cover vegetation. During the Year 2 inspection, a return to average rainfall conditions throughout 2020 has assisted in increase in grass diversity, emergence of ground cover forbs and ferns, and vegetation growth. During Year 3 inspection, increased shrub density has been noted in 2 out of 3 photographic point locations at Haerses Road site due to above average rainfall. A good increase in groundcover diversity was observed and shrub growth with increasing density and diversity were noted at Porters Road site. Low density of weed was detected growing on the margin of the Porters Road site. During the Year 4 inspection, no change was observed at any of the photo monitoring points at Porters Road site whilst a slight increase in grass cover diversity and shrub density were observed at 2 monitoring points at Haerses Road site. The latest Year 5 Passive Management inspection at the specified photo monitoring points identified an increased in ground cover density across most sites due to ideal climatic conditions for plant growth. An increased in shrub growth and density was observed at half of the photo monitoring points. One photo monitoring point identified an encroachment of the woody weed *Lantana camara* which will become a prioritised weed management area during the next reporting period.

The full annual passive management reports for Year 5 (2023 - 2024) of passive management for both biobanking sites are contained in Appendix I.

7.5 Change in Environmental Procedures

The following recommendations for bush regeneration, rehabilitation work and monitoring have been made:

Stage 1 Extraction Area

- Undertake further screening of stockpiled rehabilitation material to remove unsuitable larger rocks and boulders
- Final landform for active rehabilitation areas
- Layering stockpile material to create suitable agricultural terrain
- First agricultural planting event if final landform levels have been achieved

Stage 2 Extraction Area

- Continue monitoring the native vegetation growth to the west of the water storage dam in Stage 2 west

Wisemans Ferry Road 30 metre Buffer Area

- Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place

Buffer to Deerubbin LALC Property (formerly Maroota State Forest)

- Continued bush regeneration maintenance in the previously disturbed area
- Baseline monitoring locations established

Extraction Cells A and B

- Continued monitoring of vegetation quadrats for establishment of baseline data.

Haerses Road and Porters Road Biobank Sites

- Monitoring and management of the Haerses Road and Porters Road biobank BSA sites to be undertaken in accordance with the Biobanking Agreement and BSA reporting.

Weed Management

- Continue with weed management as per the recommendations contained in the Bush Regenerator and Ecologist's reports.

8. Community and Social Impacts

8.1 Compliance

Dixon Sand is required to adhere to the following community related consent conditions:

Table 27: Community related consent conditions

Development Consent Condition	Requirement	Compliance
Condition 8 of Schedule 5	<p>The Applicant must establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. The CCC must be established by 30 June 2018 and operated in general accordance with the Department’s Community Consultative Committee Guidelines, November 2016 (or later version).</p> <p>Notes:</p> <ul style="list-style-type: none"> • The CCC is an advisory committee. The Department and other relevant agencies are responsible for ensuring that the Applicant complies with this consent. • In accordance with the guidelines, the Committee should comprise an independent chair and appropriate representation from the Applicant, Council and the local community. • The CCC established and operated prior to the approval of Modification 1 must continue to be operated in accordance with the procedures required by the consent prior to the approval of Modification 1 until such time as the CCC required by this condition is established. • The Applicant may, with the approval of the Secretary, combine the function of this CCC with the functions of other CCCs in the area. 	The current CCC members were re-appointed by the DPHI on 1 st March 2018 (note joint CCC for the Old Northern Road and Haerses Road quarries).
Condition 1(e) of Schedule 5	<p>describe the procedures to be implemented to:</p> <ul style="list-style-type: none"> • keep the local community and relevant agencies informed about the operation and environmental performance of the development; • receive, record, handle and respond to complaints; • resolve any disputes that may arise during the course of the development; • respond to any non-compliance; • respond to emergencies; and 	Refer to the Environmental Management Systems and Management Plans

8.2 Complaints and Follow-up Actions

No complaints were received for Haerses Road quarry during the 2023 - 2024 reporting period.

Table 28: Complaints received during the reporting period.

Complaint 1	
Date complaint received	Not Applicable – no complaint received during this reporting period.
Issue	
Recommended Action(s)	
Outcome	
Close out Date	

The summary of complaint register is contained in Appendix L.

8.2.1 Long Term Complaints Trend

Long term complaints monitoring data commencing 2006 – 2007 is depicted in Chart 66 below. It must be noted that complaints were recorded for the Haerses Road and Old Northern Road quarries combined from the 2006 – 2007 to 2017 – 2018 monitoring periods, with complaints recorded separately for individual quarries from thereon.

A total of sixteen complaints have been received by Dixon sand since the 2006 – 2007 monitoring period to date.

The number of complaints were nil and one during the 2006 - 2007 and 2007 – 2008 monitoring periods respectively, with the one complaint being associated with a haulage truck driving in a dangerous manner.

During the 2008 – 2009 monitoring period, the number of complaints increased to six, with the majority associated with trucks driving in a dangerous manner or exceeding the school zone speed limit. One complaint was made in relation to the quarry generating excessive noise where the source of noise was identified to have been caused by a different operation.

From 2009 – 2010 to 2016 – 2017 monitoring periods, the number of complaints were minimal and fluctuated between nil and two. These complaints were associated with haulage trucks driving in a dangerous manner or exceeding the speed limit.

The 2016 – 2017 monitoring period recorded an increase in number of complaints to eight complaints which were associated with haulage trucks driving in a dangerous manner, excessive noise generation, operation outside of approved hours and excessive dust generation.

From this point, a downward trend in number of complaints can be observed. The number of complaints received reduced to two complaints during the 2018 – 2019 monitoring period which were associated with haulage trucks exceeding the speed limit. No complaints were received during this 2019 – 2020 monitoring period. One complaint was received during this 2020 – 2021 reporting period associated with a haulage truck driving in a dangerous manner. There were no complaints during the 2021 – 2022 reporting period. One traffic complaint was received for the previous 2022 – 2023 reporting period.

Dixon Sand received no complaint during this reporting period.

The majority of the complaints were made by residents of Maroota, residents of neighbouring suburbs or local road users. One complaint was made by Dixon Sand Quarry Manager. Timing of events leading to complaints were mainly during quarry operation hours with the exception of complaints associated with operations outside of consented hours. The locations of haulage trucks driving in a dangerous manner, exceeding the speed limit, or excessively using engine brakes occurred mainly on Old Northern Road and Wisemans Ferry Road in the local areas. All complaints have been closed out.

Dixon Sand executed the steps to identify the validity of the complaints received and implemented appropriate actions outlined in the complaints procedure and Maroota Local Traffic Management Policy (inter-pit policy). Throughout the years, a number of complaints were identified to have been associated with other operations in or out of the area.

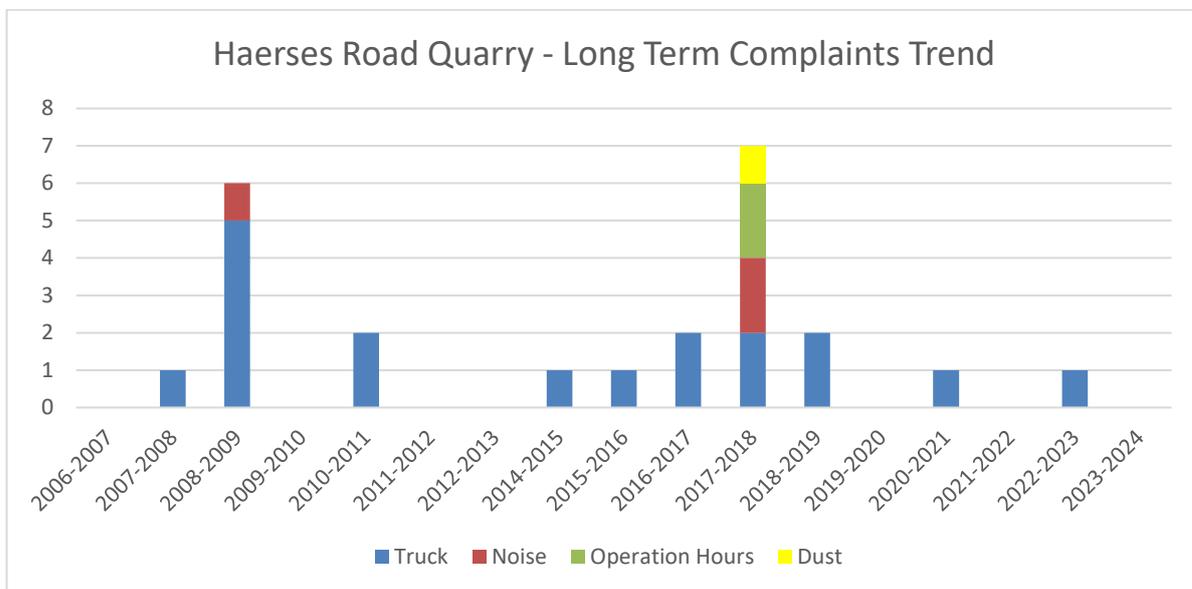


Chart 62: Long term complaints monitoring data.

8.3 Community Consultative Committee, Meetings and Guidelines

Two CCC meetings were held during the 2023 - 2024 reporting period, in accordance with the consent conditions and CCC Guidelines (2023). The ordinary bi-annual CCC meetings were held on 8th November 2023 and 28th May 2024.

The minutes from the ordinary CCC meeting are contained in Appendix K.

8.4 Community and Stakeholder Liaison

In addition to contacting Community Representatives of the CCC, the local community is provided with an opportunity to comment on Dixon Sand’s environmental performance through direct contact with quarry staff or through the contact portal via the company’s website.

Stakeholder Liaison and Correspondences

Dixon Sand staff made contact with local community members on a number of occasions. These include:

- Notifying the Maroota Public School regarding noise monitoring undertaken in December 2023 and June 2024 and other matters relating to ground maintenance on school ground or in proximity to the school,
- Liaising with the neighbouring property owner to the Old Northern Road quarry regarding general maintenance, and
- Bi-annual CCC meetings in November 2023 and May 2024

Local Initiatives

Dixon Sand regularly makes monetary and resource contributions to a number of community initiatives and charities such as:

- monetary donation and participation in the Maroota Public School's Annual Maroota Muster Festival,
- monetary donation to Cattai Public School,
- monetary donation to Royal Flying Doctor Service,
- monetary donation to Last Post @ Wisemans Ferry for Anzac Day
- monetary donation to Castlereagh Christian Conference Centre
- monetary sponsorship of Nepean Area Disabilities Organisation
- monetary sponsorship of Sporting Individuals
- publication of environmental monitoring data, and provision of all current consents and site management plans for public viewing on the Dixon Sand website.

8.5 Ecologically Sustainable Development

Ecologically Sustainable Development (ESD) can be defined as “using, conserving and enhancing the community’s resources so that the ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased” (Commonwealth of Australia, 1992).

The four principles of ESD are listed in Schedule 2 of the *Environmental Planning and Assessment Regulation 2021* as follows:

- the precautionary principle;
- inter-generational equity;
- conservation of biological diversity and ecological integrity; and
- Improved valuation, pricing and incentive mechanisms.

Dixon Sand’s Old Northern Road Quarry continue to manage all potential threats to the quality of the environment, determined with a reasonable degree of certainty through the use of scientific investigation and analysis of the individual and cumulative environmental impacts of the proposal.

Long-term environmental fluctuations have been, and will continue to be, monitored for the duration of extraction such as groundwater levels and quality, noise, air quality and threatened flora and fauna.

Threatened flora and fauna present on site are monitored annually to ensure they are not impacted by quarry activities. Similarly, noise and air quality monitoring will continue throughout the life of the developments. Mitigation measures are in place to minimise the potential adverse impacts likely to affect social and intergenerational equity. These measures relate to erosion and sediment control, surface and groundwater management, air quality control,

and noise and waste management. Continual community relation strategies will ensure the community is well informed and has an effective means of voicing concerns and receiving feedback.

Dixon Sand aims to protect the biological diversity and ecological integrity of the sites through:

- progressive rehabilitation of the extracted areas using agricultural and native species;
- monitoring and maintenance of buffer areas to ecologically sensitive sites;
- establishment of native vegetation offset areas, biodiversity offset area and native rehabilitation areas to maximise native fauna habitats and enhance vegetation corridor for flora and fauna migration, and
- providing a final landform that integrates elements of the local area.

The value placed on environmental resources by Dixon Sand is represented as costs associated with the implementation of monitoring and mitigation measures throughout the life of the development consents.

8.6 Changes to Social Monitoring Procedures

No changes are proposed for the social management procedures.

9. Bushfire Management

9.1 Compliance

DA165-7-2005 requires Dixon Sand to ensure the quarry is suitably equipped to respond to any fires on site. Dixon Sand is to assist the Rural Fire Service and emergency services to the extent practicable if there is a fire in the vicinity of the site.

A Bushfire Management Plan has been prepared for Haerses Road quarry.

10. Competency, Training and Awareness

The quarry management team is to ensure all personnel, including contractors, are provided with appropriate environmental training and awareness to ensure they understand their environmental awareness, responsibilities and how to mitigate the impacts. Training is undertaken using the following avenues:

- Compulsory site environmental induction for employees and contractors,
- Truck driver induction training,
- Pollution incident response management plan (PIRMP) and mock scenario training,
- Multi staged pre-clearing procedures and fauna handling and rescue procedures training,
- Job Safety and Environmental Analysis,
- Environmental hazard identification workshop,
- Regular toolbox talks, and
- Bushfire Management and Emergency evacuation training.

11. Incidents and Non-Compliances

11.1 Environmental Incidents and Non-Compliances

Details of the incidents and non-compliances are listed in Table 29 below.

Table 29: Environmental Non-compliances and Incidents

Event No.	Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
1	Submission of 2023 - 2024 Annual Review after March 2024	Condition 12 of Schedule 5 of DA 165-7-2005	<p>Dixon Sand is required to submit the Annual Review for the Quarry by the end of March each year. The submission of this Annual Review at the end of September is technically non-compliant with the deadline required by the consent condition. However, Dixon Sand requested approval from the DPE for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPHI on 9 February 2018 to submit the Annual Review by the end of September each year.</p> <p>DPHI determined no breach of consent condition.</p>
2	7 February 2024 - 6 March 2024	Condition 9 of Schedule 3 of DA 165-7-2005	<p>DPHI Notification and Reporting: DA-165-7-2005-PA-67</p> <p>During this monitoring period, the monthly dust deposition result at D10 was 19.6 g/m²/month and the rolling annual average dust deposition was 5.5 g/m²/month which exceeded the annual criteria of 4.0 g/m²/month.</p> <p>Elevated dust attributed to adjacent farming activities and regular maintenance (slashing) of the grass in the paddock of which the dust gauge is located in.</p> <p>Dust gauge D10 is located on land owned by the Quarry (Stage 4 extraction) and not on private residence.</p> <p>No consent breached. No further action required by DPHI. Incident closed out.</p>
3	6 March 2024 - 3 April 2024	Condition 9 of Schedule 3 of DA 165-7-2005	<p>DPHI Notification and Reporting: DA-165-7-2005-PA-68</p> <p>During this monitoring period, the monthly dust deposition result at D10 was 10.5 g/m²/month and the rolling annual average dust deposition was 6.2 g/m²/month which exceeded the annual criteria of 4.0 g/m²/month.</p> <p>Elevated dust attributed to adjacent farming activities and regular maintenance (slashing) of the grass in the paddock of which the dust gauge is located in.</p>

Event No.	Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
			<p>Dust gauge D10 is located on land owned by the Quarry and not on private residence.</p> <p>No consent breached. No further action required by DPHI. Incident closed out.</p>
4	3 April 2024 - 1 May 2024	Condition 9 of Schedule 3 of DA 165-7-2005	<p>DPHI Notification and Reporting: DA-165-7-2005-PA-69</p> <p>During this monitoring period, the monthly dust deposition result at D10 was not obtainable due to the dust gauge stand being struck by a plant. Therefore, the rolling annual average dust deposition remains at 6.2 g/m²/month which exceeded the annual criteria of 4.0 g/m²/month.</p> <p>Elevated dust attributed to adjacent farming activities and regular maintenance (slashing) of the grass in the paddock of which the dust gauge is located in.</p> <p>Dust gauge D10 is located on land owned by the Quarry and not on private residence.</p> <p>No consent breached. No further action required by DPHI. Incident closed out.</p>
5	1 May 2024 - 29 May 2024	Condition 9 of Schedule 3 of DA 165-7-2005	<p>DPHI Notification and Reporting: DA-165-7-2005-PA-70</p> <p>During this monitoring period, the monthly dust deposition result at D10 was 15.4 g/m²/month and the rolling annual average dust deposition was 7.3 g/m²/month which exceeded the annual criteria of 4.0 g/m²/month.</p> <p>Elevated dust attributed to adjacent farming activities and regular maintenance (slashing) of the grass in the paddock of which the dust gauge is located in.</p> <p>Dust gauge D10 is located on land owned by the Quarry and not on private residence.</p> <p>No consent breached. No further action required by DPHI. Incident closed out.</p>
6	29 May 2024 - 26 June 2024	Condition 9 of Schedule 3 of DA 165-7-2005	<p>DPHI Notification and Reporting: DA-165-7-2005-PA-71</p> <p>During this monitoring period, the monthly dust deposition result at D10 was 5.2 g/m²/month and the rolling annual average dust deposition was 7.4 g/m²/month which exceeded the annual criteria of 4.0 g/m²/month.</p> <p>Elevated dust attributed to adjacent farming activities and regular maintenance (slashing) of the grass in the paddock of which the dust gauge is located in.</p>

Event No.	Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
			<p>Dust gauge D10 is located on land owned by the Quarry and not on private residence.</p> <p>No consent breached. No further action required by DPHI. Incident closed out.</p>

No archaeological artefacts or sites have been uncovered during this reporting period.

11.2 Notices issued by Resources Regulator

Dixon Sand received one Notice of Concern, six Improvement Notices and Prohibition Notice under the *Work Health and Safety Act 2011* from DPIRD (Resources Regulator) during this reporting period. The identified issues have been rectified and closed out.

Table 30: Notices issued by Resources Regulator

Date Issued	Notice Reference	Identified Issues	Status
9/01/2024	NTCE0013446 - Section 195 Prohibition Notice	Excavator door open while cutting sandstone and dust hygiene report	Closed out
10/01/2024	NTCE0013449 - Section 191 Improvement Notice	Worker not wearing PPE	Closed out
12/01/2024	NTCE0013450 - Section 191 Improvement Notice	HV and LV interaction, speed signs in operational areas	Closed out
12/01/2024	NTCE0013451 - Section 191 Improvement Notice	Guarding and lock out procedures	Closed out
12/01/2024	NTCE0013454 - Section 23 Notice of Concern	Dust Hygiene testing not completed since 2018 due to COVID, consultation process	Closed out
10/01/2024	NTCE0013447 - Section 191 Improvement Notice	Redevelopment of Safety Management System	Closed out
11/01/2024	NTCE0013455 - Section 191 Improvement Notice	Gap between walkway and stairs	Closed out
13/05/2024	NTCE0014140 - Section 191 Improvement Notice	Risk assessment for Psychosocial hazards	Closed out

12. Independent Environmental Audit

12.1 Independent Environmental Audit Requirements

Condition 14 of Schedule 5 of DA 165-7-2005 requires:

Within 12 weeks of commencing this audit, or as otherwise agreed by the Secretary, the Applicant must submit a copy of the audit report to the Secretary and any other NSW agency that requests it, together with its response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. The Applicant must implement these recommendations, to the satisfaction of the Secretary.

The appointment of R.W. Corkery and Co Pty Ltd (RWC) to carry out the Independent Environmental Audit (IEA) for Haerses Road quarry was approved by the Department of Planning and Environment (DPE) on 8th September 2022.

The IEA commenced on 18 October 2022 which covers the 3-year audit period between 23 October 2019 and 18 October 2022. The *Independent Environmental Audit: Haerses Road Report* (RW Corkery & Co, December 2022, Document No. 1021/02) was issued to Dixon Sand on 15th December 2022.

The *Response and Action Plan for the Independent Environmental Audit 2022, Haerses Road Quarry* document was prepared to provide Dixon Sand's response and proposed actions toward the IEA findings, recommendations for non-compliances and suggested improvements as identified in *the Independent Environmental Audit: Haerses Road Report* (RW Corkery & Co, December 2022, Document No. 1022/02).

The IEA report and Response and Action Plan report were submitted to the DPE on 16th January 2023. The CCC members were provided a link to the reports published on Dixon Sand's website.

All proposed actions associated with the Non-compliances from the IEA 2022 have been implemented and closed out.

The next IEA is scheduled to be undertaken late 2025.

13. Proposed Actions to be completed in the next Reporting Period

13.1 Air Quality Monitoring Program

- Undertake consultation with the EPA regarding the review (and revision if required) of the current air quality monitoring locations. The Air Quality Management Plan will be updated accordingly.

13.2 Vegetation Clearing

- Continue to implement the pre-clearing survey and multistage habitat tree felling procedures prior to any vegetation felling.

13.3 Rehabilitation and Bush Regeneration

Stage 1 Extraction Area

- Undertake further screening of stockpiled rehabilitation material to remove unsuitable larger rocks and boulders
- Final landform for active rehabilitation areas
- Layering stockpile material to create suitable agricultural terrain
- First agricultural planting event if final landform levels have been achieved

Stage 2 Extraction Area

- Continue to monitor the native vegetation growth to the west of the water storage dam in Stage 2 west

Wisemans Ferry Road 30 metre Buffer Area

- Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place

Buffer to Deerubbin LALC Property (formerly Maroota State Forest)

- Continued bush regeneration maintenance in the previously disturbed area
- Baseline monitoring locations established

Extraction Cells A and B

- Continued monitoring of vegetation quadrats for establishment of baseline data.

Haerses Road and Porters Road Biobank Sites

- Monitoring and management of the Haerses Road and Porters Road biobank BSA sites to be undertaken in accordance with the Biobanking Agreement and BSA reporting.

Weed Management

- Continue with weed management as per the recommendations contained in the Bush Regenerator and Ecologist's reports.

14. Audits and Improvement Notice

There are no outstanding proposed actions for the Independent Environmental Audit and Resources Regulator issued Notices.

15. Conclusion

A number of recommendations and changes in environmental procedures have been proposed throughout this Annual Review of 2023 - 2024 reporting period.

In general, Dixon Sand has maintained acceptable environmental performance outcomes throughout the reporting period. The company has committed to ongoing endeavours to minimise environmental impacts and potential exceedances related to quarry operations.

Appendix A – Dust Deposition Reports

Sampling Report Number: 14909

Date Issued: 4/08/2023

Revision No: 00

Sampling Conditions: Fine, 9°- 19°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14909/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	26/07/2023 11:23	AS3580.10.1	CuSO4
14909/2	D10 Hearses Rd		T.Walker	26/07/2023 11:51	AS3580.10.1	CuSO4
14909/3	D06 School		T.Walker	26/07/2023 09:58	AS3580.10.1	CuSO4
14909/4	D05 Bund		T.Walker	26/07/2023 10:12	AS3580.10.1	CuSO4
14909/5	D04 Rehab		T.Walker	26/07/2023 10:54	AS3580.10.1	CuSO4
14909/6	D07 Mullock		T.Walker	26/07/2023 11:08	AS3580.10.1	CuSO4
14909/7	D01(A) Front Gate		T.Walker	26/07/2023 10:22	AS3580.10.1	CuSO4
14909/8	D11 Goldstien		T.Walker	26/07/2023 10:36	AS3580.10.1	CuSO4
14909/9	D12 Ram		T.Walker	26/07/2023 11:36	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14909/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
14909/2	D10 Hearses Rd	312538	6294576	Major bird droppings, algae
14909/3	D06 School	313518	6296537	Minor insects
14909/4	D05 Bund	313160	6296838	Minor vegetation
14909/5	D04 Rehab	312385	6296932	
14909/6	D07 Mullock	312579	6296676	
14909/7	D01(A) Front Gate	313290	6297176	Minor dust, visible dust in funnel. Crop farming/tilling in adjacent paddock
14909/8	D11 Goldstien	312034	6294213	
14909/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 4/08/2023.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 14985

Date Issued: 31/08/2023

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following Dust Deposition sample(s) were received on 23/08/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	26/07/2023 11:23	23/08/2023 11:22	14985/1	Dust	
D10 Hearses Rd	26/07/2023 11:51	23/08/2023 11:52	14985/2	Dust	
D06 School	26/07/2023 09:58	23/08/2023 10:12	14985/3	Dust	
D05 Bund	26/07/2023 10:12	23/08/2023 10:24	14985/4	Dust	
D04 Rehab	26/07/2023 10:54	23/08/2023 10:56	14985/5	Dust	
D07 Mullock	26/07/2023 11:08	23/08/2023 11:10	14985/6	Dust	
D01(A) Front Gate	26/07/2023 10:22	23/08/2023 10:37	14985/7	Dust	
D11 Goldstien	26/07/2023 10:36	23/08/2023 12:46	14985/8	Dust	
D12 Ram	26/07/2023 11:36	23/08/2023 11:36	14985/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra
Technical Officer

Authorised by:



Anthony Crane
Laboratory Manager

Results have been approved and report finalised on 31/08/2023.

Test Report Number: 14985

Date Issued: 31/08/2023

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	14985/1 23/08/2023 D08&9 Hitchcock Rd Olive Grove	14985/2 23/08/2023 D10 Hearses Rd	14985/3 23/08/2023 D06 School	14985/4 23/08/2023 D05 Bund	14985/5 23/08/2023 D04 Rehab
Date Tested	--	--	25/08/2023	25/08/2023	25/08/2023	25/08/2023	25/08/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	3.2	0.7	1.2	0.5
Ash	AS 3580.10.1	g/m2/mth	0.6	1.7	0.2	0.8	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	1.5	0.5	0.4	0.4
Calculated Rain	AS 3580.10.1	mm	30	28	28	28	27

Deposited Matter	Method	Lab ID Sample Date Sample ID	14985/6 23/08/2023 D07 Mullock	14985/7 23/08/2023 D01(A) Front Gate	14985/8 23/08/2023 D11 Goldstien	14985/9 23/08/2023 D12 Ram
Date Tested	--	--	25/08/2023	25/08/2023	25/08/2023	25/08/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	3.6	0.5	0.2
Ash	AS 3580.10.1	g/m2/mth	0.2	3.1	0.1	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.5	0.4	<0.1
Calculated Rain	AS 3580.10.1	mm	28	29	28	30



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14985

Date Issued: 31/08/2023

Revision No: 00

Sampling Conditions: Fine, 16°- 20°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14985/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	23/08/2023 11:22	AS3580.10.1	CuSO4
14985/2	D10 Hearses Rd		T.Walker	23/08/2023 11:52	AS3580.10.1	CuSO4
14985/3	D06 School		T.Walker	23/08/2023 10:12	AS3580.10.1	CuSO4
14985/4	D05 Bund		T.Walker	23/08/2023 10:24	AS3580.10.1	CuSO4
14985/5	D04 Rehab		T.Walker	23/08/2023 10:56	AS3580.10.1	CuSO4
14985/6	D07 Mullock		T.Walker	23/08/2023 11:10	AS3580.10.1	CuSO4
14985/7	D01(A) Front Gate		T.Walker	23/08/2023 10:37	AS3580.10.1	CuSO4
14985/8	D11 Goldstien		T.Walker	23/08/2023 12:46	AS3580.10.1	CuSO4
14985/9	D12 Ram		T.Walker	23/08/2023 11:36	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14985/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
14985/2	D10 Hearses Rd	312538	6294576	Insects
14985/3	D06 School	313518	6296537	Minor vegetation
14985/4	D05 Bund	313160	6296838	
14985/5	D04 Rehab	312385	6296932	
14985/6	D07 Mullock	312579	6296676	
14985/7	D01(A) Front Gate	313290	6297176	Dust, minor insects - bare loose earth in adjacent crop paddocks
14985/8	D11 Goldstien	312034	6294213	Minor vegetation
14985/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 31/08/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15102

Date Issued: 28/09/2023

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following Dust Deposition sample(s) were received on 20/09/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	23/08/2023 11:22	20/09/2023 12:06	15102/1	Dust	
D10 Hearses Rd	23/08/2023 11:52	20/09/2023 12:38	15102/2	Dust	
D06 School	23/08/2023 10:12	20/09/2023 10:58	15102/3	Dust	
D05 Bund	23/08/2023 10:24	20/09/2023 11:12	15102/4	Dust	
D04 Rehab	23/08/2023 10:56	20/09/2023 11:38	15102/5	Dust	
D07 Mullock	23/08/2023 11:10	20/09/2023 11:52	15102/6	Dust	
D01(A) Front Gate	23/08/2023 10:37	20/09/2023 11:21	15102/7	Dust	
D11 Goldstien	23/08/2023 12:46	20/09/2023 13:28	15102/8	Dust	
D12 Ram	23/08/2023 11:36	20/09/2023 12:26	15102/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager

Authorised by:

Results have been approved and report finalised on 28/09/2023.



Test Report Number: 15102

Date Issued: 28/09/2023

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15102/1 20/09/2023 D08&9 Hitchcock Rd Olive Grove	15102/2 20/09/2023 D10 Hearses Rd	15102/3 20/09/2023 D06 School	15102/4 20/09/2023 D05 Bund	15102/5 20/09/2023 D04 Rehab
Date Tested	--	--	26/09/2023	26/09/2023	26/09/2023	26/09/2023	26/09/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	8.5	0.3	0.6	0.2
Ash	AS 3580.10.1	g/m2/mth	0.6	3.4	0.3	0.6	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	5.1	<0.1	<0.1	<0.1
Calculated Rain	AS 3580.10.1	mm	21	21	18	16	18

Deposited Matter	Method	Lab ID Sample Date Sample ID	15102/6 20/09/2023 D07 Mullock	15102/7 20/09/2023 D01(A) Front Gate	15102/8 20/09/2023 D11 Goldstien	15102/9 20/09/2023 D12 Ram
Date Tested	--	--	26/09/2023	26/09/2023	26/09/2023	26/09/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	2.4	0.4	0.6
Ash	AS 3580.10.1	g/m2/mth	0.3	2.4	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	<0.1	0.2	0.4
Calculated Rain	AS 3580.10.1	mm	18	18	20	22

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15102

Date Issued: 28/09/2023

Revision No: 00

Sampling Conditions: Fine, 31°- 34°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15102/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	20/09/2023 12:06	AS3580.10.1	CuSO4
15102/2	D10 Hearses Rd		T.Walker	20/09/2023 12:38	AS3580.10.1	CuSO4
15102/3	D06 School		T.Walker	20/09/2023 10:58	AS3580.10.1	CuSO4
15102/4	D05 Bund		T.Walker	20/09/2023 11:12	AS3580.10.1	CuSO4
15102/5	D04 Rehab		T.Walker	20/09/2023 11:38	AS3580.10.1	CuSO4
15102/6	D07 Mullock		T.Walker	20/09/2023 11:52	AS3580.10.1	CuSO4
15102/7	D01(A) Front Gate		T.Walker	20/09/2023 11:21	AS3580.10.1	CuSO4
15102/8	D11 Goldstien		T.Walker	20/09/2023 13:28	AS3580.10.1	CuSO4
15102/9	D12 Ram		T.Walker	20/09/2023 12:26	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15102/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Insects
15102/2	D10 Hearses Rd	312538	6294576	Major vegetation/seeds
15102/3	D06 School	313518	6296537	Minor insects
15102/4	D05 Bund	313160	6296838	Minor insects
15102/5	D04 Rehab	312385	6296932	
15102/6	D07 Mullock	312579	6296676	Minor vegetation
15102/7	D01(A) Front Gate	313290	6297176	Minor dust - Bare earth/sandy crop paddocks adjacent
15102/8	D11 Goldstien	312034	6294213	Minor vegetation
15102/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 28/09/2023.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 15245

Date Issued: 26/10/2023

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 18/10/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	20/09/2023 12:06	18/10/2023 11:49	15245/1	Dust	
D10 Hearses Rd	20/09/2023 12:38	18/10/2023 12:13	15245/2	Dust	
D06 School	20/09/2023 10:58	18/10/2023 10:45	15245/3	Dust	
D05 Bund	20/09/2023 11:12	18/10/2023 11:00	15245/4	Dust	
D04 Rehab	20/09/2023 11:38	18/10/2023 11:25	15245/5	Dust	
D07 Mullock	20/09/2023 11:52	18/10/2023 11:37	15245/6	Dust	
D01(A) Front Gate	20/09/2023 11:21	18/10/2023 11:11	15245/7	Dust	
D11 Goldstien	20/09/2023 13:28	18/10/2023 12:23	15245/8	Dust	
D12 Ram	20/09/2023 12:26	18/10/2023 12:02	15245/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager

Authorised by:

Results have been approved and report finalised on 26/10/2023.

Test Report Number: 15245

Date Issued: 26/10/2023

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15245/1 18/10/2023 D08&9 Hitchcock Rd Olive Grove	15245/2 18/10/2023 D10 Hearses Rd	15245/3 18/10/2023 D06 School	15245/4 18/10/2023 D05 Bund	15245/5 18/10/2023 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	24/10/2023	24/10/2023	24/10/2023	24/10/2023	24/10/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.1	0.6	1.0	3.2	0.7
Ash	AS 3580.10.1	g/m2/mth	0.6	0.4	0.6	2.6	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	0.2	0.4	0.6	0.3
Calculated Rain	AS 3580.10.1	mm	44	43	50	52	53

Deposited Matter	Method	Lab ID Sample Date Sample ID	15245/6 18/10/2023 D07 Mullock	15245/7 18/10/2023 D01(A) Front Gate	15245/8 18/10/2023 D11 Goldstien	15245/9 18/10/2023 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	24/10/2023	24/10/2023	24/10/2023	24/10/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	2.2	0.7	0.5
Ash	AS 3580.10.1	g/m2/mth	0.4	1.9	0.4	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.3	0.3	0.2
Calculated Rain	AS 3580.10.1	mm	52	51	46	46



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15245

Date Issued: 26/10/2023

Revision No: 00

Sampling Conditions: Cloudy, light rain, 16 - 20 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15245/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	18/10/2023 11:49	AS3580.10.1	CuSO4
15245/2	D10 Hearses Rd		D.Walker	18/10/2023 12:13	AS3580.10.1	CuSO4
15245/3	D06 School		D.Walker	18/10/2023 10:45	AS3580.10.1	CuSO4
15245/4	D05 Bund		D.Walker	18/10/2023 11:00	AS3580.10.1	CuSO4
15245/5	D04 Rehab		D.Walker	18/10/2023 11:25	AS3580.10.1	CuSO4
15245/6	D07 Mullock		D.Walker	18/10/2023 11:37	AS3580.10.1	CuSO4
15245/7	D01(A) Front Gate		D.Walker	18/10/2023 11:11	AS3580.10.1	CuSO4
15245/8	D11 Goldstien		D.Walker	18/10/2023 12:23	AS3580.10.1	CuSO4
15245/9	D12 Ram		D.Walker	18/10/2023 12:02	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15245/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects
15245/2	D10 Hearses Rd	312538	6294576	Minor insects
15245/3	D06 School	313518	6296537	Insects
15245/4	D05 Bund	313160	6296838	Minor insects
15245/5	D04 Rehab	312385	6296932	
15245/6	D07 Mullock	312579	6296676	Minor sand, minor vegetation
15245/7	D01(A) Front Gate	313290	6297176	Minor sand
15245/8	D11 Goldstien	312034	6294213	
15245/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 26/10/2023.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 15325

Date Issued: 24/11/2023

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 15/11/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	18/10/2023 11:49	15/11/2023 11:53	15325/1	Dust	
D10 Hearses Rd	18/10/2023 12:13	15/11/2023 12:24	15325/2	Dust	
D06 School	18/10/2023 10:45	15/11/2023 10:42	15325/3	Dust	
D05 Bund	18/10/2023 11:00	15/11/2023 10:54	15325/4	Dust	
D04 Rehab	18/10/2023 11:25	15/11/2023 11:23	15325/5	Dust	
D07 Mullock	18/10/2023 11:37	15/11/2023 11:37	15325/6	Dust	
D01(A) Front Gate	18/10/2023 11:11	15/11/2023 11:06	15325/7	Dust	
D11 Goldstien	18/10/2023 12:23	15/11/2023 13:26	15325/8	Dust	
D12 Ram	18/10/2023 12:02	15/11/2023 12:09	15325/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager

Authorised by:

Results have been approved and report finalised on 24/11/2023.



Test Report Number: 15325

Date Issued: 24/11/2023

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15325/1 15/11/2023 D08&9 Hitchcock Rd Olive Grove	15325/2 15/11/2023 D10 Hearses Rd	15325/3 15/11/2023 D06 School	15325/4 15/11/2023 D05 Bund	15325/5 15/11/2023 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	23/11/2023	23/11/2023	23/11/2023	23/11/2023	23/11/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.3	2.4	1.4	4.5	0.5
Ash	AS 3580.10.1	g/m2/mth	0.6	2.1	0.7	3.9	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.7	0.3	0.7	0.6	0.2
Calculated Rain	AS 3580.10.1	mm	61	67	52	49	48

Deposited Matter	Method	Lab ID Sample Date Sample ID	15325/6 15/11/2023 D07 Mullock	15325/7 15/11/2023 D01(A) Front Gate	15325/8 15/11/2023 D11 Goldstien	15325/9 15/11/2023 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	23/11/2023	23/11/2023	23/11/2023	23/11/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.3	2.1	0.5	0.9
Ash	AS 3580.10.1	g/m2/mth	1.1	1.7	0.3	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.4	0.2	0.4
Calculated Rain	AS 3580.10.1	mm	51	51	73	84



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15325

Date Issued: 24/11/2023

Revision No: 00

Sampling Conditions: Cloudy, 25°- 29°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15325/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	15/11/2023 11:53	AS3580.10.1	CuSO4
15325/2	D10 Hearses Rd		T & D.Walker	15/11/2023 12:24	AS3580.10.1	CuSO4
15325/3	D06 School		T & D.Walker	15/11/2023 10:42	AS3580.10.1	CuSO4
15325/4	D05 Bund		T & D.Walker	15/11/2023 10:54	AS3580.10.1	CuSO4
15325/5	D04 Rehab		T & D.Walker	15/11/2023 11:23	AS3580.10.1	CuSO4
15325/6	D07 Mullock		T & D.Walker	15/11/2023 11:37	AS3580.10.1	CuSO4
15325/7	D01(A) Front Gate		T & D.Walker	15/11/2023 11:06	AS3580.10.1	CuSO4
15325/8	D11 Goldstien		T & D.Walker	15/11/2023 13:26	AS3580.10.1	CuSO4
15325/9	D12 Ram		T & D.Walker	15/11/2023 12:09	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15325/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor vegetation
15325/2	D10 Hearses Rd	312538	6294576	Minor sand, minor vegetation
15325/3	D06 School	313518	6296537	Insects
15325/4	D05 Bund	313160	6296838	Minor sand
15325/5	D04 Rehab	312385	6296932	
15325/6	D07 Mullock	312579	6296676	
15325/7	D01(A) Front Gate	313290	6297176	
15325/8	D11 Goldstien	312034	6294213	Minor vegetation
15325/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 24/11/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15467

Date Issued: 19/12/2023

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 13/12/2023

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	15/11/2023 11:53	13/12/2023 12:10	15467/1	Dust	
D10 Hearses Rd	15/11/2023 12:24	13/12/2023 12:41	15467/2	Dust	
D06 School	15/11/2023 10:42	13/12/2023 10:56	15467/3	Dust	
D05 Bund	15/11/2023 10:54	13/12/2023 11:13	15467/4	Dust	
D04 Rehab	15/11/2023 11:23	13/12/2023 11:40	15467/5	Dust	
D07 Mullock	15/11/2023 11:37	13/12/2023 11:55	15467/6	Dust	
D01(A) Front Gate	15/11/2023 11:06	13/12/2023 11:28	15467/7	Dust	
D11 Goldstien	15/11/2023 13:26	13/12/2023 14:08	15467/8	Dust	
D12 Ram	15/11/2023 12:09	13/12/2023 12:25	15467/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager



Liane Peyra
Technical Officer

Authorised by:

Results have been approved and report finalised on 19/12/2023.

Test Report Number: 15467

Date Issued: 19/12/2023

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15467/1 13/12/2023 D08&9 Hitchcock Rd Olive Grove	15467/2 13/12/2023 D10 Hearses Rd	15467/3 13/12/2023 D06 School	15467/4 13/12/2023 D05 Bund	15467/5 13/12/2023 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	15/12/2023	15/12/2023	15/12/2023	15/12/2023	15/12/2023
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.4	2.4	3.6	11.4	1.1
Ash	AS 3580.10.1	g/m2/mth	0.9	1.6	1.3	9.3	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	0.8	2.3	2.1	0.6
Calculated Rain	AS 3580.10.1	mm	96	90	105	119	85

Deposited Matter	Method	Lab ID Sample Date Sample ID	15467/6 13/12/2023 D07 Mullock	15467/7 13/12/2023 D01(A) Front Gate	15467/8 13/12/2023 D11 Goldstien	15467/9 13/12/2023 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	15/12/2023	15/12/2023	15/12/2023	15/12/2023
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.1	1.7	1.9	1.0
Ash	AS 3580.10.1	g/m2/mth	0.7	1.2	0.6	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.5	1.3	0.7
Calculated Rain	AS 3580.10.1	mm	94	100	80	79



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15467

Date Issued: 19/12/2023

Revision No: 00

Sampling Conditions: Cloudy, 26°- 34°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15467/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	13/12/2023 12:10	AS3580.10.1	CuSO4
15467/2	D10 Hearses Rd		D.Walker	13/12/2023 12:41	AS3580.10.1	CuSO4
15467/3	D06 School		D.Walker	13/12/2023 10:56	AS3580.10.1	CuSO4
15467/4	D05 Bund		D.Walker	13/12/2023 11:13	AS3580.10.1	CuSO4
15467/5	D04 Rehab		D.Walker	13/12/2023 11:40	AS3580.10.1	CuSO4
15467/6	D07 Mullock		D.Walker	13/12/2023 11:55	AS3580.10.1	CuSO4
15467/7	D01(A) Front Gate		D.Walker	13/12/2023 11:28	AS3580.10.1	CuSO4
15467/8	D11 Goldstien		D.Walker	13/12/2023 14:08	AS3580.10.1	CuSO4
15467/9	D12 Ram		D.Walker	13/12/2023 12:25	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15467/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor vegetation, minor insects
15467/2	D10 Hearses Rd	312538	6294576	Minor sand - earthworks at adjacent crop paddock
15467/3	D06 School	313518	6296537	Insects, minor bird droppings
15467/4	D05 Bund	313160	6296838	Dust, minor insects. Land clearing - loose exposed earth
15467/5	D04 Rehab	312385	6296932	Minor vegetation, minor insects
15467/6	D07 Mullock	312579	6296676	Minor insects
15467/7	D01(A) Front Gate	313290	6297176	Minor sand
15467/8	D11 Goldstien	312034	6294213	Minor insects, minor vegetation
15467/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 19/12/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15566

Date Issued: 18/01/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 10/01/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	13/12/2023 12:10	10/01/2024 12:08	15566/1	Dust	
D10 Hearses Rd	13/12/2023 12:41	10/01/2024 12:34	15566/2	Dust	
D06 School	13/12/2023 10:56	10/01/2024 10:45	15566/3	Dust	
D05 Bund	13/12/2023 11:13	10/01/2024 10:59	15566/4	Dust	
D04 Rehab	13/12/2023 11:40	10/01/2024 11:27	15566/5	Dust	
D07 Mullock	13/12/2023 11:55	10/01/2024 11:47	15566/6	Dust	
D01(A) Front Gate	13/12/2023 11:28	10/01/2024 11:11	15566/7	Dust	
D11 Goldstien	13/12/2023 14:08	10/01/2024 12:52	15566/8	Dust	
D12 Ram	13/12/2023 12:25	10/01/2024 12:15	15566/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager

Authorised by:

Results have been approved and report finalised on 18/01/2024.

Test Report Number: 15566

Date Issued: 18/01/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15566/1 10/01/2024 D08&9 Hitchcock Rd Olive Grove	15566/2 10/01/2024 D10 Hearses Rd	15566/3 10/01/2024 D06 School	15566/4 10/01/2024 D05 Bund	15566/5 10/01/2024 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	16/01/2024	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.4	1.3	3.5	23.1	1.5
Ash	AS 3580.10.1	g/m2/mth	0.8	0.8	1.7	22.0	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	0.6	0.5	1.8	1.1	0.8
Calculated Rain	AS 3580.10.1	mm	187	180	148	165	115

Deposited Matter	Method	Lab ID Sample Date Sample ID	15566/6 10/01/2024 D07 Mullock	15566/7 10/01/2024 D01(A) Front Gate	15566/8 10/01/2024 D11 Goldstien	15566/9 10/01/2024 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	16/01/2024	16/01/2024	16/01/2024	16/01/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.2	13.7	1.8	0.8
Ash	AS 3580.10.1	g/m2/mth	0.7	11.5	0.8	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	2.2	1.0	0.5
Calculated Rain	AS 3580.10.1	mm	96	116	84	175



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15566

Date Issued: 18/01/2024

Revision No: 00

Sampling Conditions: Cloudy, 26 - 28 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15566/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	10/01/2024 12:08	AS3580.10.1	CuSO4
15566/2	D10 Hearses Rd		D.Walker	10/01/2024 12:34	AS3580.10.1	CuSO4
15566/3	D06 School		D.Walker	10/01/2024 10:45	AS3580.10.1	CuSO4
15566/4	D05 Bund		D.Walker	10/01/2024 10:59	AS3580.10.1	CuSO4
15566/5	D04 Rehab		D.Walker	10/01/2024 11:27	AS3580.10.1	CuSO4
15566/6	D07 Mullock		D.Walker	10/01/2024 11:47	AS3580.10.1	CuSO4
15566/7	D01(A) Front Gate		D.Walker	10/01/2024 11:11	AS3580.10.1	CuSO4
15566/8	D11 Goldstien		D.Walker	10/01/2024 12:52	AS3580.10.1	CuSO4
15566/9	D12 Ram		D.Walker	10/01/2024 12:15	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15566/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
15566/2	D10 Hearses Rd	312538	6294576	Minor insects
15566/3	D06 School	313518	6296537	Minor insects, vegetation
15566/4	D05 Bund	313160	6296838	Sand, minor insects
15566/5	D04 Rehab	312385	6296932	Minor vegetation, minor insects, glass in bottle. Funnel broken / replaced
15566/6	D07 Mullock	312579	6296676	Glass in bottle. Funnel broken / replaced
15566/7	D01(A) Front Gate	313290	6297176	Full, minor sand, minor vegetation
15566/8	D11 Goldstien	312034	6294213	Glass in bottle. Funnel cracked / chipped
15566/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 18/01/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15691

Date Issued: 15/02/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 7/02/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	10/01/2024 12:08	7/02/2024 11:44	15691/1	Dust	
D10 Hearses Rd	10/01/2024 12:34	7/02/2024 12:21	15691/2	Dust	
D06 School	10/01/2024 10:45	7/02/2024 10:41	15691/3	Dust	
D05 Bund	10/01/2024 10:59	7/02/2024 10:52	15691/4	Dust	
D04 Rehab	10/01/2024 11:27	7/02/2024 11:19	15691/5	Dust	
D07 Mullock	10/01/2024 11:47	7/02/2024 11:33	15691/6	Dust	
D01(A) Front Gate	10/01/2024 11:11	7/02/2024 11:02	15691/7	Dust	
D11 Goldstien	10/01/2024 12:52	7/02/2024 13:22	15691/8	Dust	
D12 Ram	10/01/2024 12:15	7/02/2024 12:04	15691/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 15/02/2024.

Test Report Number: 15691

Date Issued: 15/02/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15691/1 7/02/2024 D08&9 Hitchcock Rd Olive Grove	15691/2 7/02/2024 D10 Hearses Rd	15691/3 7/02/2024 D06 School	15691/4 7/02/2024 D05 Bund	15691/5 7/02/2024 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	13/02/2024	13/02/2024	13/02/2024	13/02/2024	13/02/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.7	12.8	1.1	5.2	1.6
Ash	AS 3580.10.1	g/m2/mth	0.4	7.0	0.7	4.2	1.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	5.8	0.4	1.0	0.5
Calculated Rain	AS 3580.10.1	mm	117	110	115	122	114

Deposited Matter	Method	Lab ID Sample Date Sample ID	15691/6 7/02/2024 D07 Mullock	15691/7 7/02/2024 D01(A) Front Gate	15691/8 7/02/2024 D11 Goldstien	15691/9 7/02/2024 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	13/02/2024	13/02/2024	13/02/2024	13/02/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	2.1	2.7	1.0	0.6
Ash	AS 3580.10.1	g/m2/mth	1.2	2.3	0.5	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.9	0.4	0.5	0.4
Calculated Rain	AS 3580.10.1	mm	124	114	122	111



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15691

Date Issued: 15/02/2024

Revision No: 00

Sampling Conditions: Cloudy, 20°- 23°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15691/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	7/02/2024 11:44	AS3580.10.1	CuSO4
15691/2	D10 Hearses Rd		T & D.Walker	7/02/2024 12:21	AS3580.10.1	CuSO4
15691/3	D06 School		T & D.Walker	7/02/2024 10:41	AS3580.10.1	CuSO4
15691/4	D05 Bund		T & D.Walker	7/02/2024 10:52	AS3580.10.1	CuSO4
15691/5	D04 Rehab		T & D.Walker	7/02/2024 11:19	AS3580.10.1	CuSO4
15691/6	D07 Mullock		T & D.Walker	7/02/2024 11:33	AS3580.10.1	CuSO4
15691/7	D01(A) Front Gate		T & D.Walker	7/02/2024 11:02	AS3580.10.1	CuSO4
15691/8	D11 Goldstien		T & D.Walker	7/02/2024 13:22	AS3580.10.1	CuSO4
15691/9	D12 Ram		T & D.Walker	7/02/2024 12:04	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15691/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects
15691/2	D10 Hearses Rd	312538	6294576	Sand, vegetation, algae. Recent paddock slashing & landscaping works.
15691/3	D06 School	313518	6296537	Minor insects
15691/4	D05 Bund	313160	6296838	Minor insects
15691/5	D04 Rehab	312385	6296932	
15691/6	D07 Mullock	312579	6296676	
15691/7	D01(A) Front Gate	313290	6297176	Minor sand, minor insects. - Visible dust from truck movements on entry/exit road. Active farming in adjacent paddock.
15691/8	D11 Goldstien	312034	6294213	Replaced cracked funnel
15691/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 15/02/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15754

Date Issued: 14/03/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 6/03/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	07/02/2024 11:44	6/03/2024 11:47	15754/1	Dust	
D10 Hearses Rd	07/02/2024 12:21	6/03/2024 12:10	15754/2	Dust	
D06 School	07/02/2024 10:41	6/03/2024 10:45	15754/3	Dust	
D05 Bund	07/02/2024 10:52	6/03/2024 10:57	15754/4	Dust	
D04 Rehab	07/02/2024 11:19	6/03/2024 11:21	15754/5	Dust	
D07 Mullock	07/02/2024 11:33	6/03/2024 11:35	15754/6	Dust	
D01(A) Front Gate	07/02/2024 11:02	6/03/2024 11:09	15754/7	Dust	
D11 Goldstien	07/02/2024 13:22	6/03/2024 13:10	15754/8	Dust	
D12 Ram	07/02/2024 12:04	6/03/2024 12:01	15754/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra
Technical Officer



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 14/03/2024.

Test Report Number: 15754

Date Issued: 14/03/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15754/1 6/03/2024 D08&9 Hitchcock Rd Olive Grove	15754/2 6/03/2024 D10 Hearses Rd	15754/3 6/03/2024 D06 School	15754/4 6/03/2024 D05 Bund	15754/5 6/03/2024 D04 Rehab
		Units					
<i>Date Tested</i>	AS 3580.10.1	--	12/03/2024	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	19.6	2.9	3.6	0.3
Ash	AS 3580.10.1	g/m2/mth	0.4	18.3	2.0	3.7	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	1.3	0.9	<0.1	<0.1
Calculated Rain	AS 3580.10.1	mm	57	57	55	60	50

Deposited Matter	Method	Lab ID Sample Date Sample ID	15754/6 6/03/2024 D07 Mullock	15754/7 6/03/2024 D01(A) Front Gate	15754/8 6/03/2024 D11 Goldstien	15754/9 6/03/2024 D12 Ram
		Units				
<i>Date Tested</i>	AS 3580.10.1	--	12/03/2024	12/03/2024	12/03/2024	12/03/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	2.2	1.2	0.9
Ash	AS 3580.10.1	g/m2/mth	0.4	2.4	1.0	0.6
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	<0.1	0.2	0.3
Calculated Rain	AS 3580.10.1	mm	52	54	46	56



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15754

Date Issued: 14/03/2024

Revision No: 00

Sampling Conditions: Fine, 26°- 31°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15754/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	6/03/2024 11:47	AS3580.10.1	CuSO4
15754/2	D10 Hearses Rd		T & D.Walker	6/03/2024 12:10	AS3580.10.1	CuSO4
15754/3	D06 School		T & D.Walker	6/03/2024 10:45	AS3580.10.1	CuSO4
15754/4	D05 Bund		T & D.Walker	6/03/2024 10:57	AS3580.10.1	CuSO4
15754/5	D04 Rehab		T & D.Walker	6/03/2024 11:21	AS3580.10.1	CuSO4
15754/6	D07 Mullock		T & D.Walker	6/03/2024 11:35	AS3580.10.1	CuSO4
15754/7	D01(A) Front Gate		T & D.Walker	6/03/2024 11:09	AS3580.10.1	CuSO4
15754/8	D11 Goldstien		T & D.Walker	6/03/2024 13:10	AS3580.10.1	CuSO4
15754/9	D12 Ram		T & D.Walker	6/03/2024 12:01	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15754/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
15754/2	D10 Hearses Rd	312538	6294576	Major sand, bird droppings, minor vegetation. - Paddock slashed recently
15754/3	D06 School	313518	6296537	Minor sand, insects, minor vegetation
15754/4	D05 Bund	313160	6296838	Minor sand
15754/5	D04 Rehab	312385	6296932	Minor vegetation
15754/6	D07 Mullock	312579	6296676	
15754/7	D01(A) Front Gate	313290	6297176	Minor sand
15754/8	D11 Goldstien	312034	6294213	
15754/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 14/03/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 15917

Date Issued: 11/04/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following 9 Dust Deposition sample(s) were received on 3/04/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	06/03/2024 11:47	3/04/2024 14:03	15917/1	Dust	
D10 Hearses Rd	06/03/2024 12:10	3/04/2024 14:30	15917/2	Dust	
D06 School	06/03/2024 10:45	3/04/2024 12:58	15917/3	Dust	
D05 Bund	06/03/2024 10:57	3/04/2024 13:14	15917/4	Dust	
D04 Rehab	06/03/2024 11:21	3/04/2024 13:37	15917/5	Dust	
D07 Mullock	06/03/2024 11:35	3/04/2024 13:51	15917/6	Dust	
D01(A) Front Gate	06/03/2024 11:09	3/04/2024 13:25	15917/7	Dust	
D11 Goldstien	06/03/2024 13:10	3/04/2024 14:54	15917/8	Dust	
D12 Ram	06/03/2024 12:01	3/04/2024 14:16	15917/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager

Authorised by:

Results have been approved and report finalised on 11/04/2024.



Test Report Number: 15917

Date Issued: 11/04/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	15917/1 3/04/2024 D08&9 Hitchcock Rd Olive Grove	15917/2 3/04/2024 D10 Hearses Rd	15917/3 3/04/2024 D06 School	15917/4 3/04/2024 D05 Bund	15917/5 3/04/2024 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	08/04/2024	08/04/2024	08/04/2024	08/04/2024	08/04/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	10.5	4.9	3.1	0.9
Ash	AS 3580.10.1	g/m2/mth	0.6	9.7	1.2	2.6	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.8	3.7	0.5	0.4
Calculated Rain	AS 3580.10.1	mm	24	22	23	23	20

Deposited Matter	Method	Lab ID Sample Date Sample ID	15917/6 3/04/2024 D07 Mullock	15917/7 3/04/2024 D01(A) Front Gate	15917/8 3/04/2024 D11 Goldstien	15917/9 3/04/2024 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	08/04/2024	08/04/2024	08/04/2024	08/04/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.6	2.0	1.1	0.7
Ash	AS 3580.10.1	g/m2/mth	0.3	1.4	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.6	0.9	0.5
Calculated Rain	AS 3580.10.1	mm	20	22	20	23



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15917

Date Issued: 11/04/2024

Revision No: 00

Sampling Conditions: Cloudy, 24 - 26 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15917/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	3/04/2024 14:03	AS3580.10.1	CuSO4
15917/2	D10 Hearses Rd		T & D.Walker	3/04/2024 14:30	AS3580.10.1	CuSO4
15917/3	D06 School		T & D.Walker	3/04/2024 12:58	AS3580.10.1	CuSO4
15917/4	D05 Bund		T & D.Walker	3/04/2024 13:14	AS3580.10.1	CuSO4
15917/5	D04 Rehab		T & D.Walker	3/04/2024 13:37	AS3580.10.1	CuSO4
15917/6	D07 Mullock		T & D.Walker	3/04/2024 13:51	AS3580.10.1	CuSO4
15917/7	D01(A) Front Gate		T & D.Walker	3/04/2024 13:25	AS3580.10.1	CuSO4
15917/8	D11 Goldstien		T & D.Walker	3/04/2024 14:54	AS3580.10.1	CuSO4
15917/9	D12 Ram		T & D.Walker	3/04/2024 14:16	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15917/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
15917/2	D10 Hearses Rd	312538	6294576	Sand. Paddock slashed
15917/3	D06 School	313518	6296537	Vegetation
15917/4	D05 Bund	313160	6296838	Minor sand, minor insects
15917/5	D04 Rehab	312385	6296932	Minor vegetation
15917/6	D07 Mullock	312579	6296676	
15917/7	D01(A) Front Gate	313290	6297176	Minor insects
15917/8	D11 Goldstien	312034	6294213	Minor vegetation
15917/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 11/04/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 16042

Date Issued: 9/05/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following Dust Deposition sample(s) were received on 1/05/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	03/04/2024 14:03	1/05/2024 11:37	16042/1	Dust	
D10 Hearses Rd	03/04/2024 14:30	1/05/2024 12:04	16042/2	Dust	No Sample
D06 School	03/04/2024 12:58	1/05/2024 10:36	16042/3	Dust	
D05 Bund	03/04/2024 13:14	1/05/2024 10:51	16042/4	Dust	
D04 Rehab	03/04/2024 13:37	1/05/2024 11:14	16042/5	Dust	
D07 Mullock	03/04/2024 13:51	1/05/2024 11:26	16042/6	Dust	
D01(A) Front Gate	03/04/2024 13:25	1/05/2024 11:01	16042/7	Dust	
D11 Goldstien	03/04/2024 14:54	1/05/2024 13:12	16042/8	Dust	
D12 Ram	03/04/2024 14:16	1/05/2024 11:49	16042/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra
Technical Officer

Authorised by:



Anthony Crane
Laboratory Manager

Results have been approved and report finalised on 9/05/2024.

Test Report Number: 16042

Date Issued: 9/05/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	16042/1 1/05/2024 D08&9 Hitchcock Rd Olive Grove	16042/3 1/05/2024 D06 School	16042/4 1/05/2024 D05 Bund	16042/5 1/05/2024 D04 Rehab	16042/6 1/05/2024 D07 Mullock
		Units					
<i>Date Tested</i>	AS 3580.10.1	--	07/05/2024	07/05/2024	07/05/2024	07/05/2024	07/05/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.9	3.5	1.4	0.6	0.9
Ash	AS 3580.10.1	g/m2/mth	0.9	1.9	1.2	0.2	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	1.0	1.6	0.2	0.4	0.5
Calculated Rain	AS 3580.10.1	mm	176	172	188	163	174

Deposited Matter	Method	Lab ID Sample Date Sample ID	16042/7 1/05/2024 D01(A) Front Gate	16042/8 1/05/2024 D11 Goldstien	16042/9 1/05/2024 D12 Ram
		Units			
<i>Date Tested</i>	AS 3580.10.1	--	07/05/2024	07/05/2024	07/05/2024
Number of Days	AS 3580.10.1	days	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.6	0.9	0.7
Ash	AS 3580.10.1	g/m2/mth	1.2	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.7	0.5
Calculated Rain	AS 3580.10.1	mm	116	184	183



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16042

Date Issued: 9/05/2024

Revision No: 00

Sampling Conditions: Cloudy, 17°- 19 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16042/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	1/05/2024 11:37	AS3580.10.1	CuSO4
16042/2	D10 Hearses Rd		T & D.Walker	1/05/2024 12:04	AS3580.10.1	CuSO4
16042/3	D06 School		T & D.Walker	1/05/2024 10:36	AS3580.10.1	CuSO4
16042/4	D05 Bund		T & D.Walker	1/05/2024 10:51	AS3580.10.1	CuSO4
16042/5	D04 Rehab		T & D.Walker	1/05/2024 11:14	AS3580.10.1	CuSO4
16042/6	D07 Mullock		T & D.Walker	1/05/2024 11:26	AS3580.10.1	CuSO4
16042/7	D01(A) Front Gate		T & D.Walker	1/05/2024 11:01	AS3580.10.1	CuSO4
16042/8	D11 Goldstien		T & D.Walker	1/05/2024 13:12	AS3580.10.1	CuSO4
16042/9	D12 Ram		T & D.Walker	1/05/2024 11:49	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16042/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor algae
16042/2	D10 Hearses Rd	312538	6294576	No sample, funnel & bottle smashed by slasher. Bottle & Funnel replaced by Vgt.
16042/3	D06 School	313518	6296537	Sand, insects
16042/4	D05 Bund	313160	6296838	Minor sand
16042/5	D04 Rehab	312385	6296932	
16042/6	D07 Mullock	312579	6296676	
16042/7	D01(A) Front Gate	313290	6297176	
16042/8	D11 Goldstien	312034	6294213	
16042/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 9/05/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 16212

Date Issued: 5/06/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following Dust Deposition sample(s) were received on 29/05/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	01/05/2024 11:37	29/05/2024 12:29	16212/1	Dust	
D10 Hearses Rd	01/05/2024 12:04	29/05/2024 13:17	16212/2	Dust	
D06 School	01/05/2024 10:36	29/05/2024 10:48	16212/3	Dust	
D05 Bund	01/05/2024 10:51	29/05/2024 11:19	16212/4	Dust	
D04 Rehab	01/05/2024 11:14	29/05/2024 11:47	16212/5	Dust	
D07 Mullock	01/05/2024 11:26	29/05/2024 12:03	16212/6	Dust	
D01(A) Front Gate	01/05/2024 11:01	29/05/2024 11:29	16212/7	Dust	
D11 Goldstien	01/05/2024 13:12	29/05/2024 14:33	16212/8	Dust	
D12 Ram	01/05/2024 11:49	29/05/2024 12:49	16212/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra
Technical Officer

Authorised by:

Technical Officer

Results have been approved and report finalised on 5/06/2024.

Test Report Number: 16212

Date Issued: 5/06/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	16212/1 29/05/2024 D08&9 Hitchcock Rd Olive Grove	16212/2 29/05/2024 D10 Hearses Rd	16212/3 29/05/2024 D06 School	16212/4 29/05/2024 D05 Bund	16212/5 29/05/2024 D04 Rehab
<i>Date Tested</i>	AS 3580.10.1	--	31/05/2024	31/05/2024	31/05/2024	31/05/2024	31/05/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	15.4	3.3	7.2	0.1
Ash	AS 3580.10.1	g/m2/mth	0.5	9.4	0.9	7.0	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	6.0	2.4	0.2	<0.1
Calculated Rain	AS 3580.10.1	mm	93	88	104	107	106

Deposited Matter	Method	Lab ID Sample Date Sample ID	16212/6 29/05/2024 D07 Mullock	16212/7 29/05/2024 D01(A) Front Gate	16212/8 29/05/2024 D11 Goldstien	16212/9 29/05/2024 D12 Ram
<i>Date Tested</i>	AS 3580.10.1	--	31/05/2024	31/05/2024	31/05/2024	31/05/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	1.0	0.2	0.7
Ash	AS 3580.10.1	g/m2/mth	0.3	0.9	0.1	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.1	0.1	0.3
Calculated Rain	AS 3580.10.1	mm	103	102	94	102



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16212

Date Issued: 5/06/2024

Revision No: 00

Sampling Conditions: Fine, 17°- 22 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16212/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	29/05/2024 12:29	AS3580.10.1	CuSO4
16212/2	D10 Hearses Rd		T.Walker	29/05/2024 13:17	AS3580.10.1	CuSO4
16212/3	D06 School		T.Walker	29/05/2024 10:48	AS3580.10.1	CuSO4
16212/4	D05 Bund		T.Walker	29/05/2024 11:19	AS3580.10.1	CuSO4
16212/5	D04 Rehab		T.Walker	29/05/2024 11:47	AS3580.10.1	CuSO4
16212/6	D07 Mullock		T.Walker	29/05/2024 12:03	AS3580.10.1	CuSO4
16212/7	D01(A) Front Gate		T.Walker	29/05/2024 11:29	AS3580.10.1	CuSO4
16212/8	D11 Goldstien		T.Walker	29/05/2024 14:33	AS3580.10.1	CuSO4
16212/9	D12 Ram		T.Walker	29/05/2024 12:49	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16212/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
16212/2	D10 Hearses Rd	312538	6294576	Major bird droppings, insects. Bird droppings in funnel.
16212/3	D06 School	313518	6296537	Vegetation
16212/4	D05 Bund	313160	6296838	Minor dust (loam), minor insects. Active farm paddock ploughing adjacent dust gauge whilst on site. Funnel neck broken.
16212/5	D04 Rehab	312385	6296932	
16212/6	D07 Mullock	312579	6296676	
16212/7	D01(A) Front Gate	313290	6297176	Minor insects
16212/8	D11 Goldstien	312034	6294213	
16212/9	D12 Ram	311750	6294159	Minor insects, bird droppings in funnel

Sampling procedures have been approved and report finalised on 5/06/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 16361

Date Issued: 5/07/2024

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following Dust Deposition sample(s) were received on 26/06/2024

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	29/05/2024 12:29	26/06/2024 11:39	16361/1	Dust	
D10 Hearses Rd	29/05/2024 13:17	26/06/2024 12:54	16361/2	Dust	
D06 School	29/05/2024 10:48	26/06/2024 10:26	16361/3	Dust	
D05 Bund	29/05/2024 11:19	26/06/2024 10:43	16361/4	Dust	
D04 Rehab	29/05/2024 11:47	26/06/2024 11:12	16361/5	Dust	
D07 Mullock	29/05/2024 12:03	26/06/2024 11:26	16361/6	Dust	
D01(A) Front Gate	29/05/2024 11:29	26/06/2024 10:57	16361/7	Dust	
D11 Goldstien	29/05/2024 14:33	26/06/2024 12:23	16361/8	Dust	
D12 Ram	29/05/2024 12:49	26/06/2024 12:01	16361/9	Dust	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra
Technical Officer

Authorised by:



Anthony Crane
Laboratory Manager

Results have been approved and report finalised on 5/07/2024.

Test Report Number: 16361

Date Issued: 5/07/2024

Revision No: 00

Results

Deposited Matter	Method	Lab ID Sample Date Sample ID	16361/1 26/06/2024 D08&9 Hitchcock Rd Olive Grove	16361/2 26/06/2024 D10 Hearses Rd	16361/3 26/06/2024 D06 School	16361/4 26/06/2024 D05 Bund	16361/5 26/06/2024 D04 Rehab
		Units					
<i>Date Tested</i>	AS 3580.10.1	--	2/07/2024	2/07/2024	2/07/2024	2/07/2024	2/07/2024
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	5.2	0.5	5.8	<0.1
Ash	AS 3580.10.1	g/m2/mth	0.4	4.4	0.3	4.7	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.8	0.2	1.1	<0.1
Calculated Rain	AS 3580.10.1	mm	93	92	95	83	97

Deposited Matter	Method	Lab ID Sample Date Sample ID	16361/6 26/06/2024 D07 Mullock	16361/7 26/06/2024 D01(A) Front Gate	16361/8 26/06/2024 D11 Goldstien	16361/9 26/06/2024 D12 Ram
		Units				
<i>Date Tested</i>	AS 3580.10.1	--	2/07/2024	2/07/2024	2/07/2024	2/07/2024
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.2	2.2	0.7	<0.1
Ash	AS 3580.10.1	g/m2/mth	0.2	2.0	0.2	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.2	0.5	<0.1
Calculated Rain	AS 3580.10.1	mm	96	94	97	102



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16361

Date Issued: 5/07/2024

Revision No: 00

Sampling Conditions: Fine, 14 °- 19 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16361/1	D08&9 Hitchcock Rd Olive Grove		T & D.Walker	26/06/2024 11:39	AS3580.10.1	CuSO4
16361/2	D10 Hearses Rd		T & D.Walker	26/06/2024 12:54	AS3580.10.1	CuSO4
16361/3	D06 School		T & D.Walker	26/06/2024 10:26	AS3580.10.1	CuSO4
16361/4	D05 Bund		T & D.Walker	26/06/2024 10:43	AS3580.10.1	CuSO4
16361/5	D04 Rehab		T & D.Walker	26/06/2024 11:12	AS3580.10.1	CuSO4
16361/6	D07 Mullock		T & D.Walker	26/06/2024 11:26	AS3580.10.1	CuSO4
16361/7	D01(A) Front Gate		T & D.Walker	26/06/2024 10:57	AS3580.10.1	CuSO4
16361/8	D11 Goldstien		T & D.Walker	26/06/2024 12:23	AS3580.10.1	CuSO4
16361/9	D12 Ram		T & D.Walker	26/06/2024 12:01	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16361/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
16361/2	D10 Hearses Rd	312538	6294576	Minor sand, bird droppings, insects, algae
16361/3	D06 School	313518	6296537	
16361/4	D05 Bund	313160	6296838	Minor sand, bird droppings, algae. Funnel neck broken in bottle again - Funnel replaced.
16361/5	D04 Rehab	312385	6296932	
16361/6	D07 Mullock	312579	6296676	
16361/7	D01(A) Front Gate	313290	6297176	Minor sand
16361/8	D11 Goldstien	312034	6294213	Minor bird droppings
16361/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 5/07/2024.

Where method is "unknown" sampling procedures are not endorsed



Appendix B – PM10, TSP and Weather Station Reports



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

JULY 2023

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 22 August 2023

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for July 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for July 2023.

Approximately 100% of valid TEOM data was available for July 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for July 2023.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in June 2023 with the next calibration due to be completed in September 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for July 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/07/2023	6.0	6.0	15.0	15.0
2/07/2023	10.5	8.3	26.3	20.6
3/07/2023	14.0	10.2	35.0	25.4
4/07/2023	8.8	9.8	22.0	24.6
5/07/2023	5.5	9.0	13.8	22.4
6/07/2023	7.0	8.6	17.5	21.6
7/07/2023	5.4	8.2	13.5	20.4
8/07/2023	9.1	8.3	22.8	20.7
9/07/2023	8.0	8.3	20.0	20.6
10/07/2023	7.2	8.2	18.0	20.4
11/07/2023	11.2	8.4	28.0	21.1
12/07/2023	13.4	8.8	33.5	22.1
13/07/2023	13.2	9.2	33.0	22.9
14/07/2023	20.7	10.0	51.8	25.0
15/07/2023	11.6	10.1	29.0	25.3
16/07/2023	13.3	10.3	33.3	25.8
17/07/2023	10.2	10.3	25.5	25.8
18/07/2023	9.2	10.2	23.0	25.6
19/07/2023	12.0	10.3	30.0	25.8
20/07/2023	9.7	10.3	24.3	25.8
21/07/2023	11.9	10.4	29.8	25.9
22/07/2023	11.1	10.4	27.8	26.0
23/07/2023	12.7	10.5	31.8	26.3
24/07/2023	13.2	10.6	33.0	26.6
25/07/2023	10.3	10.6	25.8	26.5
26/07/2023	9.8	10.6	24.5	26.4
27/07/2023	16.4	10.8	41.0	27.0
28/07/2023	10.3	10.8	25.8	26.9
29/07/2023	9.5	10.7	23.8	26.8
30/07/2023	8.3	10.7	20.8	26.6
31/07/2023	8.7	10.6	21.8	26.5

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 µg/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

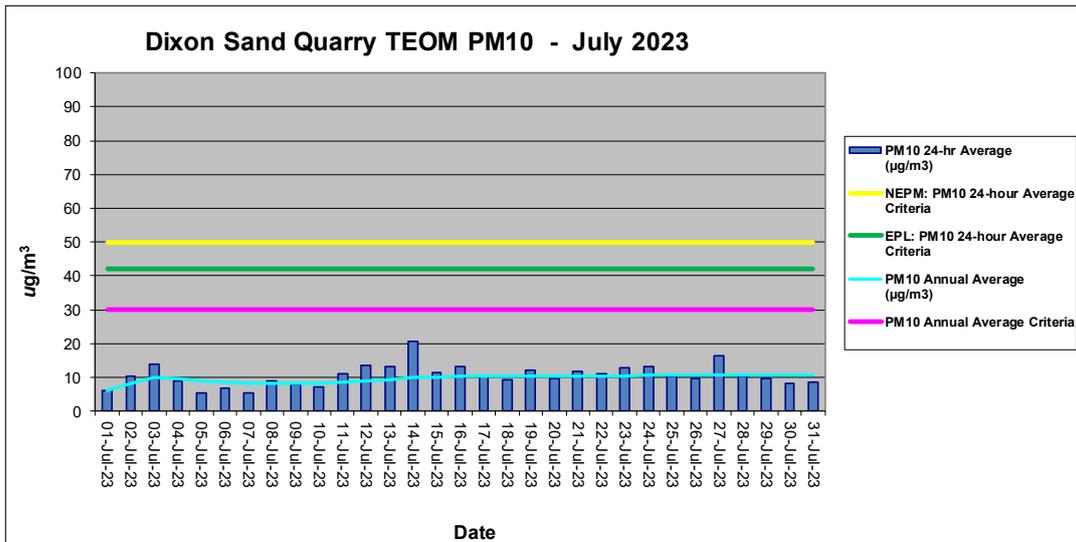


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2023 and is next due in September 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for July 2023.

Table 3: Meteorological Data Summary for July 2023

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/07/2023	6.8	10.9	16.5	0.0	0.2	3.8	13.2	45.4	63.2	77.7	998.1	1001.0	1006.6
2/07/2023	6.3	10.4	16.0	0.0	0.0	3.0	9.9	50.7	73.0	94.5	1006.5	1009.5	1011.9
3/07/2023	6.5	11.4	15.3	0.0	0.0	1.8	8.7	69.4	84.4	99.9	1004.4	1008.6	1011.5
4/07/2023	10.6	12.0	13.0	3.6	0.0	1.7	8.5	86.2	98.2	99.9	992.8	998.2	1004.5
5/07/2023	11.8	14.6	19.3	0.0	0.4	3.8	13.1	65.7	84.3	100.0	991.1	992.6	994.1
6/07/2023	8.8	11.6	14.7	0.0	0.3	4.5	17.6	43.3	67.8	89.4	990.6	992.5	994.9
7/07/2023	9.2	11.7	16.2	0.0	0.0	4.9	19.6	41.2	60.1	77.6	989.1	992.1	995.9
8/07/2023	8.5	12.6	17.2	0.0	0.5	6.6	20.9	32.1	49.8	67.0	991.3	993.9	995.9
9/07/2023	9.9	12.7	16.3	0.0	0.1	5.2	20.8	42.5	54.1	69.7	993.3	997.5	1000.3
10/07/2023	8.4	12.1	18.7	0.0	0.0	2.9	9.4	42.0	63.0	78.1	999.7	1001.6	1003.5
11/07/2023	4.9	11.0	17.8	0.0	0.0	2.7	8.4	36.3	61.4	88.7	1003.0	1005.2	1007.8
12/07/2023	6.7	12.1	18.0	0.0	0.0	3.2	13.3	47.9	68.9	91.0	1007.0	1008.4	1010.8
13/07/2023	7.5	13.7	20.6	0.0	0.6	4.0	14.6	30.7	59.4	89.9	1004.3	1006.5	1008.2
14/07/2023	11.3	15.5	21.0	0.0	0.5	5.6	23.5	34.8	49.0	60.8	1001.2	1003.4	1005.5
15/07/2023	12.9	16.7	21.4	0.0	0.9	5.7	21.8	31.8	47.7	63.4	999.3	1001.3	1002.8
16/07/2023	10.6	13.3	15.6	0.6	0.1	2.0	8.7	46.0	81.6	100.0	1002.6	1006.9	1009.8
17/07/2023	10.8	12.7	16.7	0.8	0.0	1.9	7.2	80.1	96.3	99.9	1006.2	1008.6	1010.9
18/07/2023	9.8	13.8	20.3	0.2	0.2	3.0	8.9	32.6	73.3	100.0	999.0	1002.2	1006.2
19/07/2023	6.8	10.4	15.0	0.0	0.1	3.3	11.1	27.6	54.5	78.4	1000.3	1002.2	1003.9
20/07/2023	3.7	10.6	17.9	0.0	0.1	4.3	17.6	24.2	52.8	88.4	994.4	998.3	1002.6
21/07/2023	8.7	11.7	16.5	0.0	0.0	3.3	13.8	32.9	55.4	78.3	994.8	997.2	1001.0
22/07/2023	4.8	9.7	15.3	0.0	0.2	2.6	13.6	41.1	67.1	88.9	1000.2	1001.3	1002.9
23/07/2023	4.7	9.7	16.5	0.0	0.1	3.1	11.6	51.6	81.4	100.0	1000.3	1002.8	1006.3
24/07/2023	8.6	11.3	16.0	3.6	0.0	3.3	10.9	67.2	90.8	100.0	1005.9	1008.6	1012.1
25/07/2023	6.5	11.3	17.3	0.2	0.0	2.4	12.1	49.2	85.4	100.0	1012.0	1014.6	1016.5
26/07/2023	8.2	12.9	19.0	0.2	0.0	3.2	17.2	44.9	76.4	100.0	1010.7	1013.4	1016.2
27/07/2023	8.2	13.3	19.4	0.0	0.0	3.0	12.3	45.2	69.3	100.0	1004.7	1008.6	1011.9
28/07/2023	11.9	16.2	21.7	0.0	0.4	4.8	16.2	37.1	51.3	66.2	999.3	1002.0	1004.7
29/07/2023	14.0	17.6	22.6	0.0	0.2	3.4	11.3	41.7	55.6	64.9	999.8	1001.6	1003.7
30/07/2023	12.5	17.3	22.5	0.0	0.4	4.7	17.2	39.9	59.2	76.5	997.4	999.8	1001.6
31/07/2023	11.9	15.8	21.2	0.0	0.1	3.0	9.9	31.8	51.1	71.6	1000.1	1002.0	1004.2
Monthly	3.7	12.8	22.6	9.2	0.0	3.6	23.5	24.2	67.3	100.0	989.1	1002.7	1016.5

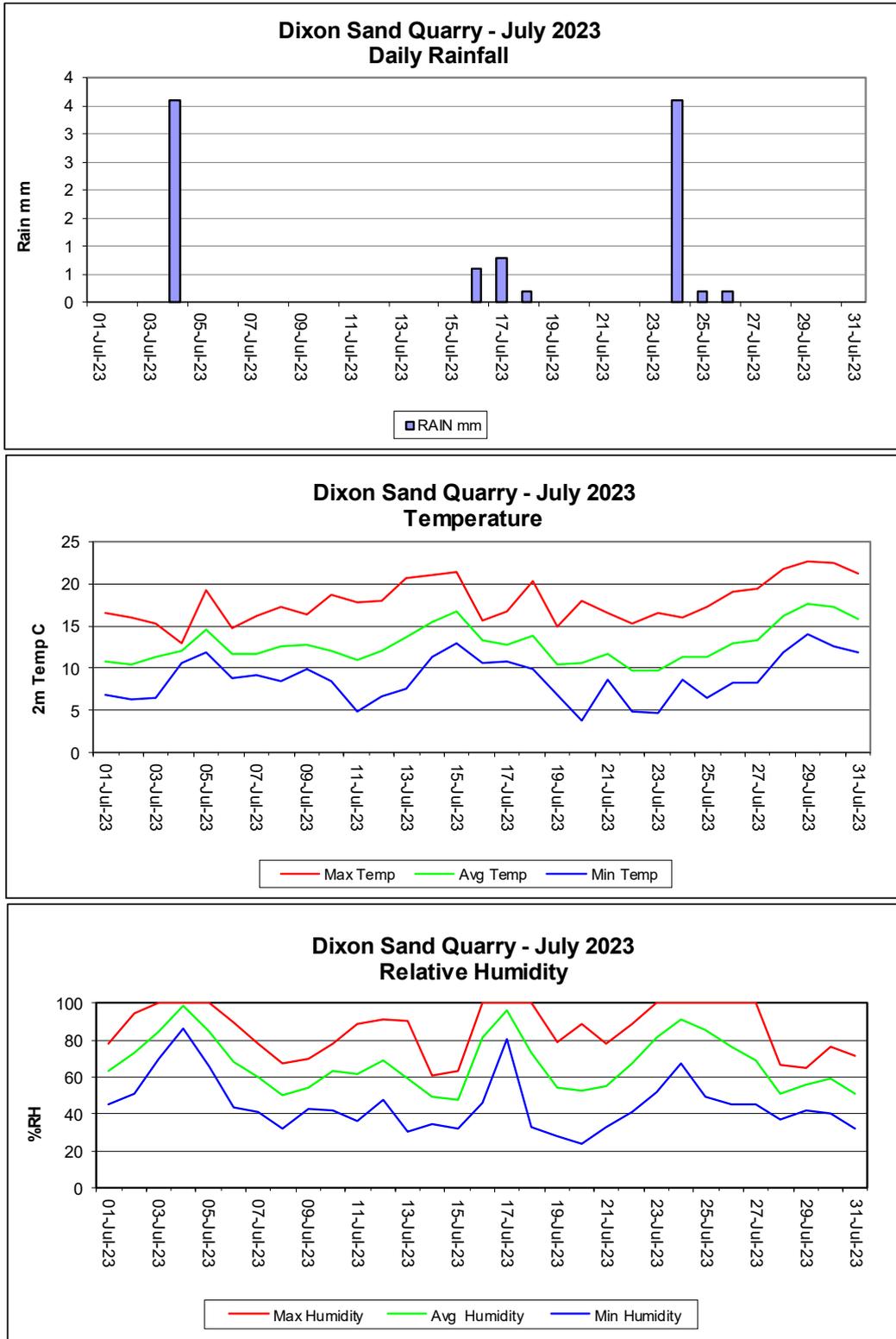


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

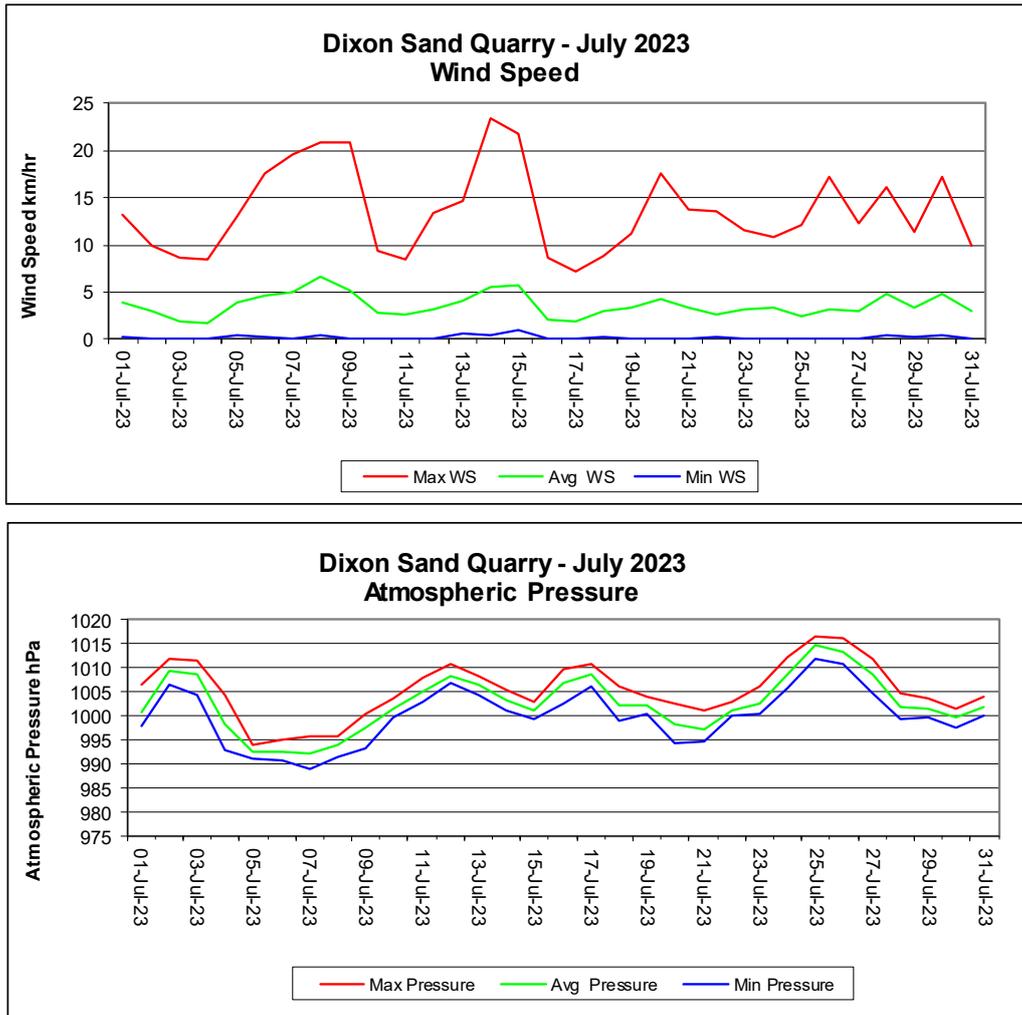


Figure 3: Wind Speed and Atmospheric Pressure Charts

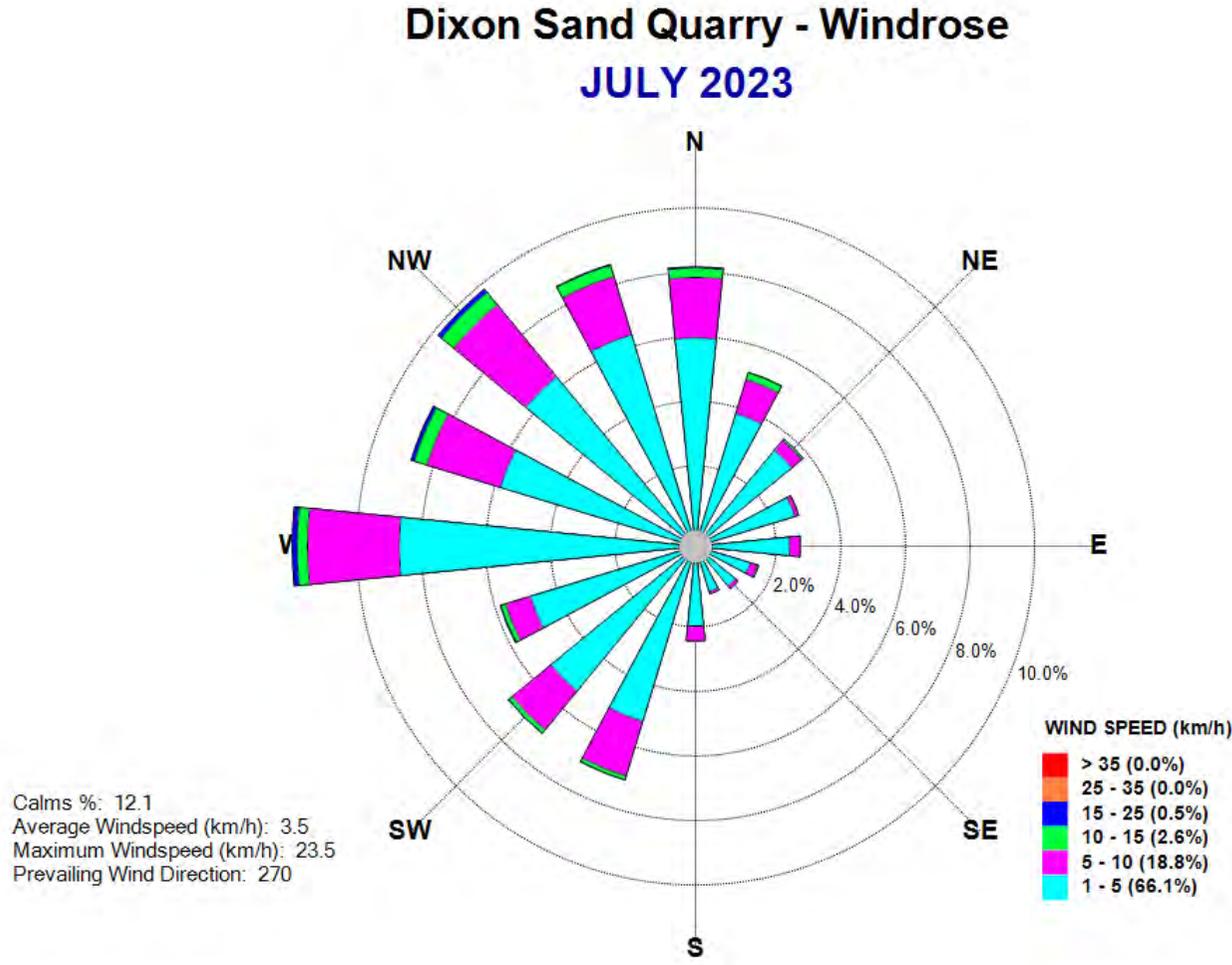


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

AUGUST 2023

Amendment 1

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 22 September 2023

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for August 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for August 2023.

Approximately 99% of valid TEOM data was available for August 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 99% of valid TEOM data was available for August 2023.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in June 2023 with the next calibration due to be completed in September 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for August 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/08/2023	13.3	10.7	33.3	26.7
2/08/2023	20.1	11.0	50.3	27.4
3/08/2023	14.8	11.1	37.0	27.7
4/08/2023	18.8	11.3	47.0	28.2
5/08/2023	17.0	11.5	42.5	28.6
6/08/2023	12.7	11.5	31.8	28.7
7/08/2023	11.1	11.5	27.8	28.7
8/08/2023	11.3	11.5	28.3	28.7
9/08/2023	14.0	11.5	35.0	28.8
10/08/2023	15.4	11.6	38.5	29.1
11/08/2023	9.8	11.6	24.5	29.0
12/08/2023	16.6	11.7	41.5	29.3
13/08/2023	12.6	11.7	31.5	29.3
14/08/2023	7.7	11.6	19.3	29.1
15/08/2023	9.0	11.6	22.5	28.9
16/08/2023	7.9	11.5	19.8	28.7
17/08/2023	8.7	11.4	21.8	28.6
18/08/2023	5.9	11.3	14.8	28.3
19/08/2023	7.7	11.3	19.3	28.1
20/08/2023	5.0	11.1	12.5	27.8
21/08/2023	12.8	11.2	32.0	27.9
22/08/2023	9.9	11.1	24.8	27.8
23/08/2023	10.0	11.1	25.0	27.8
24/08/2023	18.6	11.3	46.5	28.1
25/08/2023	39.1	11.8	97.8	29.4
26/08/2023	13.7	11.8	34.3	29.5
27/08/2023	10.3	11.8	25.8	29.4
28/08/2023	11.0	11.7	27.5	29.4
29/08/2023	18.7	11.9	46.8	29.7
30/08/2023	17.2	11.9	43.0	29.9
31/08/2023	10.0	11.9	25.0	29.8

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 µg/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

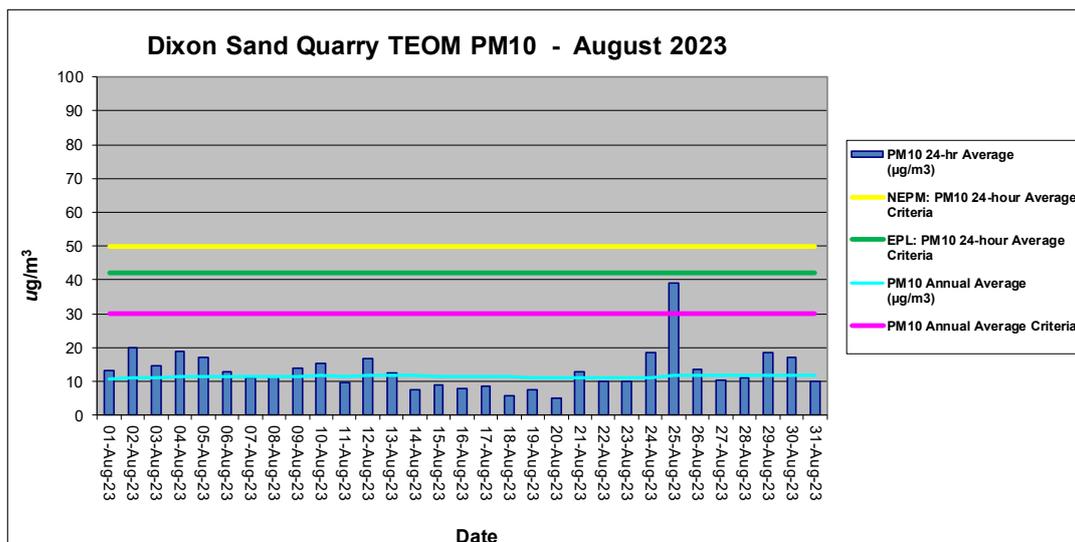


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2023 and is next due in September 2023. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for August 2023.

Table 3: Meteorological Data Summary for August 2023

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/08/2023	8.2	13.4	19.9	0.0	0.1	3.1	12.8	30.5	55.9	78.2	1003.6	1006.7	1011.8
2/08/2023	9.0	12.5	16.8	0.0	0.2	2.4	11.0	70.4	84.7	100.0	1011.8	1014.2	1016.0
3/08/2023	9.7	14.5	20.6	0.2	0.0	3.7	15.0	46.0	78.4	100.0	1011.3	1013.3	1015.6
4/08/2023	10.6	16.5	22.6	0.0	0.5	4.5	13.2	32.1	54.6	81.9	1008.6	1011.0	1013.6
5/08/2023	11.9	14.8	16.9	0.0	0.3	3.5	12.3	45.7	63.0	100.0	1008.3	1009.5	1011.0
6/08/2023	10.6	11.9	14.1	0.2	0.0	3.0	8.9	78.1	95.1	100.0	1010.6	1011.6	1013.1
7/08/2023	8.9	11.7	15.0	0.0	0.2	2.8	9.4	69.2	85.9	100.0	1009.3	1010.5	1011.6
8/08/2023	9.3	12.6	17.8	0.2	0.2	2.8	13.3	46.9	85.3	99.9	1009.4	1010.7	1012.5
9/08/2023	8.6	13.4	18.9	0.0	0.0	3.3	14.6	41.0	72.7	100.0	1004.7	1008.7	1011.9
10/08/2023	10.2	15.4	22.0	0.0	0.4	5.6	18.2	26.8	45.0	79.1	996.7	1000.9	1004.8
11/08/2023	7.5	12.7	18.2	0.0	0.2	3.0	9.1	31.6	50.7	67.2	999.6	1001.3	1003.6
12/08/2023	7.7	14.1	21.3	0.0	0.2	3.4	12.9	27.6	49.1	69.2	995.4	998.0	999.6
13/08/2023	10.9	13.1	15.6	3.4	0.1	2.8	11.3	49.1	74.0	100.0	997.4	998.6	1000.5
14/08/2023	9.7	11.4	14.9	13.4	0.2	3.2	11.8	84.1	98.8	100.0	994.5	996.6	999.1
15/08/2023	6.9	10.6	15.7	0.2	0.0	3.3	15.1	62.2	89.4	100.0	997.5	1000.3	1003.4
16/08/2023	6.7	11.0	16.1	0.0	0.1	3.3	13.7	52.9	85.8	100.0	997.5	1000.7	1003.6
17/08/2023	7.4	12.7	20.0	2.6	0.0	3.1	10.3	29.5	73.3	100.0	987.8	992.3	997.4
18/08/2023	8.0	12.0	15.9	3.4	0.4	5.9	24.0	34.4	69.7	100.0	982.7	986.0	991.8
19/08/2023	6.5	11.3	17.3	0.0	0.2	3.8	14.9	35.1	55.3	71.5	991.9	996.2	999.7
20/08/2023	9.4	14.1	20.3	0.0	0.2	3.5	13.3	34.5	60.0	78.7	999.7	1002.0	1003.8
21/08/2023	8.7	14.1	20.4	0.0	0.2	3.2	17.1	35.7	63.9	84.4	1000.2	1002.2	1004.1
22/08/2023	10.7	17.1	23.7	0.0	0.2	4.0	16.6	26.8	52.6	82.2	996.7	998.5	1001.4
23/08/2023	9.0	13.4	18.2	0.0	0.0	4.0	13.3	43.6	75.4	100.0	997.8	1003.1	1008.1
24/08/2023	8.9	12.9	18.1	0.0	0.2	3.1	11.2	53.2	77.2	100.0	1006.6	1007.9	1009.8
25/08/2023	8.4	13.7	21.2	0.0	0.0	3.3	12.4	25.2	67.2	96.7	1004.4	1006.2	1007.4
26/08/2023	9.2	13.3	19.5	0.0	0.0	2.8	17.0	42.6	85.0	100.0	1006.3	1007.8	1009.5
27/08/2023	10.1	14.3	21.1	0.0	0.0	3.2	15.6	41.3	81.9	100.0	1005.2	1007.2	1008.9
28/08/2023	8.8	14.3	19.9	0.0	0.0	3.6	19.0	43.0	80.2	100.0	1001.9	1004.8	1006.9
29/08/2023	10.0	15.5	22.6	0.0	0.2	4.2	14.9	31.2	74.8	100.0	996.0	999.2	1003.5
30/08/2023	11.1	16.0	24.7	9.0	0.3	4.9	19.6	27.1	67.1	100.0	990.6	994.2	996.4
31/08/2023	9.6	13.5	19.7	0.2	0.1	3.3	13.9	49.3	89.3	100.0	993.6	995.5	997.7
Monthly	6.5	13.5	24.7	32.8	0.0	3.5	24.0	25.2	72.3	100.0	982.7	1003.1	1016.0

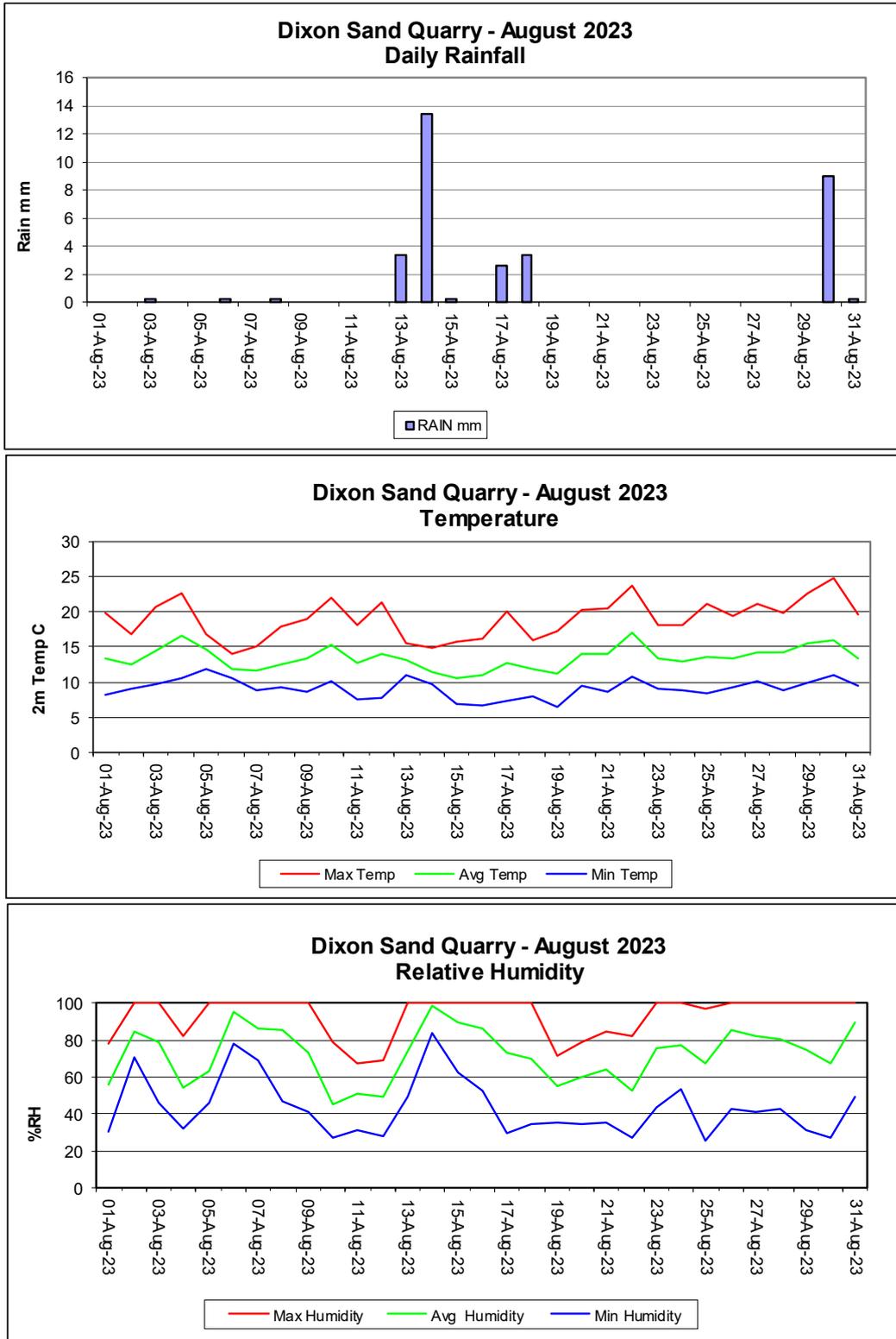


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

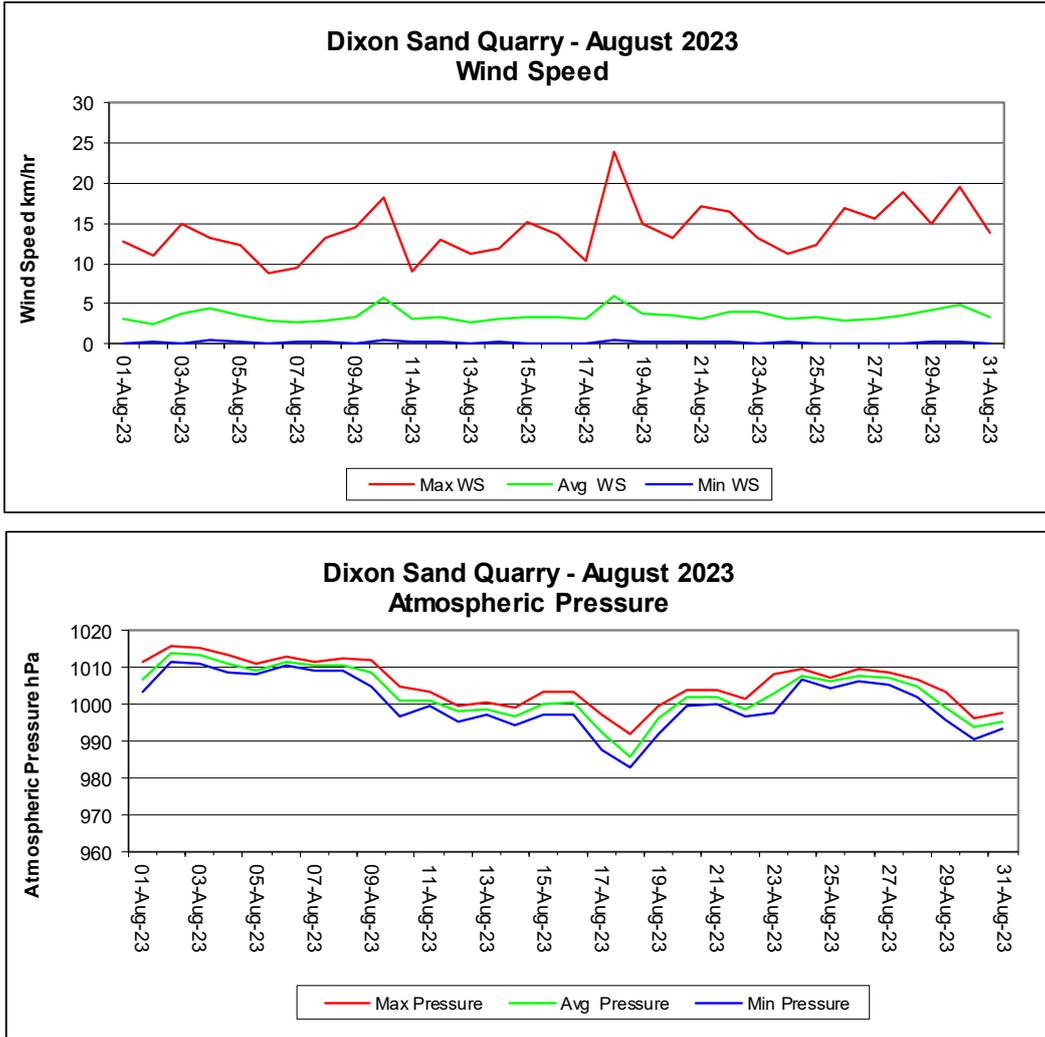


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose AUGUST 2023

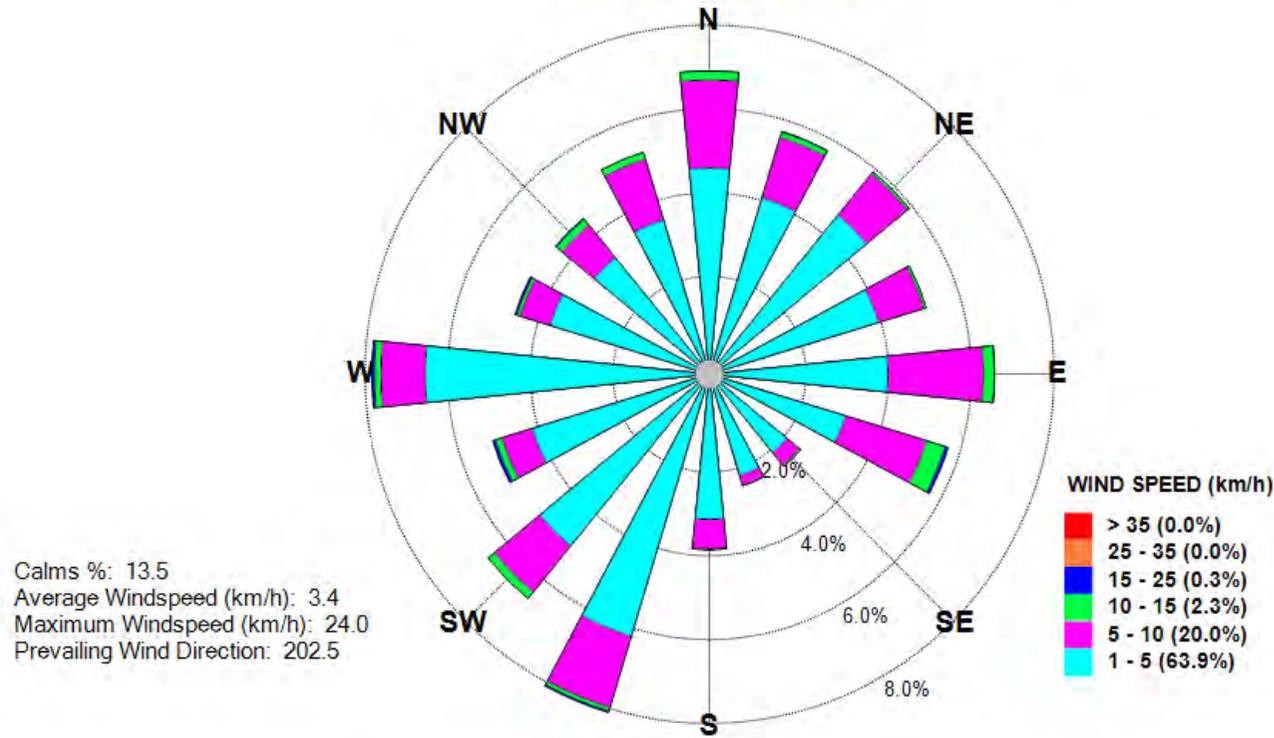


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

SEPTEMBER 2023

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 19 October 2023

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for September 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for September 2023.

Approximately 100% of valid TEOM data was available for September 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 99% of valid TEOM data was available for September 2023.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted 25 September 2023 with the next calibration due to be completed in December 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for September 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/09/2023	11.0	11.9	27.5	29.8
2/09/2023	10.5	11.9	26.3	29.7
3/09/2023	9.9	11.9	24.8	29.6
4/09/2023	15.5	11.9	38.8	29.8
5/09/2023	12.4	11.9	31.0	29.8
6/09/2023	15.9	12.0	39.8	29.9
7/09/2023	23.9	12.1	59.8	30.4
8/09/2023	7.3	12.1	18.3	30.2
9/09/2023	9.5	12.0	23.8	30.1
10/09/2023	10.7	12.0	26.8	30.1
11/09/2023	21.2	12.1	53.0	30.4
12/09/2023	31.3	12.4	78.3	31.0
13/09/2023	19.0	12.5	47.5	31.2
14/09/2023	23.0	12.6	57.5	31.6
15/09/2023	23.4	12.8	58.5	31.9
16/09/2023	14.4	12.8	36.0	32.0
17/09/2023	10.8	12.8	27.0	31.9
18/09/2023	19.5	12.9	48.8	32.1
19/09/2023	26.0	13.0	65.0	32.5
20/09/2023	32.7	13.3	81.8	33.1
21/09/2023	22.5	13.4	56.3	33.4
22/09/2023	11.2	13.3	28.0	33.3
23/09/2023	12.6	13.3	31.5	33.3
24/09/2023	8.2	13.3	20.5	33.2
25/09/2023	11.4	13.2	28.5	33.1
26/09/2023	22.8	13.4	57.0	33.4
27/09/2023	17.0	13.4	42.5	33.5
28/09/2023	11.8	13.4	29.5	33.5
29/09/2023	13.5	13.4	33.8	33.5
30/09/2023	16.1	13.4	40.3	33.5

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 µg/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

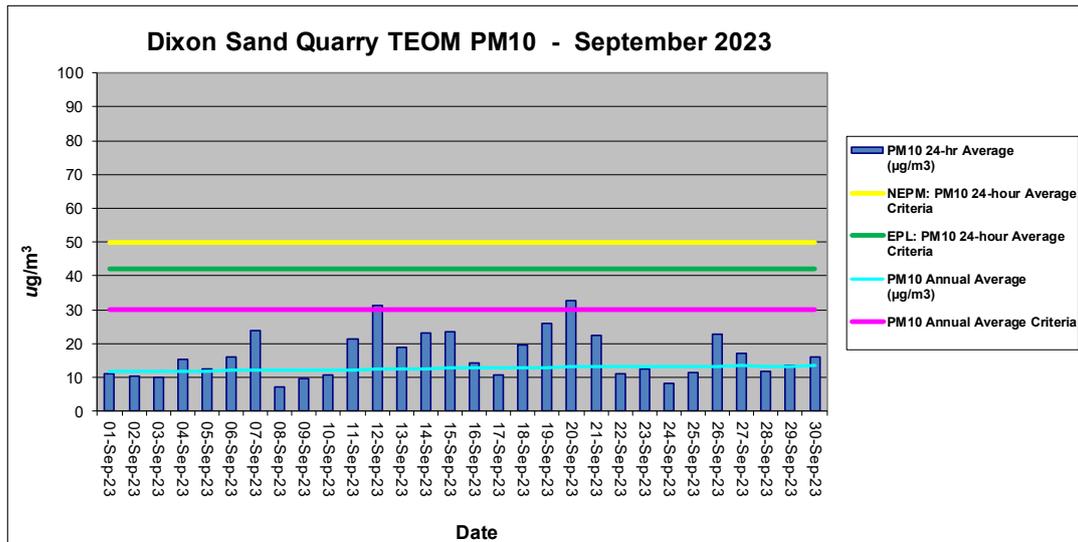


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted on 25 September 2023 and is next due in March 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for September 2023.

Table 3: Meteorological Data Summary for September 2023

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/09/2023	8.2	12.2	18.0	0.0	0.1	3.6	13.4	34.9	73.6	100.0	996.8	999.5	1002.9
2/09/2023	6.9	11.6	18.2	0.0	0.1	3.6	12.8	38.0	74.1	99.3	999.8	1002.0	1003.9
3/09/2023	9.6	13.3	19.6	0.0	0.0	3.3	21.1	39.7	78.8	100.0	997.6	1000.4	1002.5
4/09/2023	9.4	14.8	21.1	0.0	0.0	3.7	18.1	53.1	84.4	100.0	989.0	994.2	999.3
5/09/2023	11.8	17.0	23.0	0.0	0.2	4.6	14.5	13.3	49.8	100.0	986.6	992.6	999.7
6/09/2023	10.2	15.2	22.5	0.0	0.2	4.8	22.2	17.1	47.5	80.7	998.9	1000.8	1003.2
7/09/2023	8.6	18.6	27.9	0.0	0.0	5.9	22.7	26.2	57.2	98.0	993.5	997.2	1001.1
8/09/2023	9.0	14.2	20.7	5.2	0.6	6.3	23.9	24.7	67.4	100.0	992.7	997.2	1003.1
9/09/2023	6.6	11.2	18.0	0.2	0.0	4.0	16.5	22.3	50.5	74.1	1002.4	1004.8	1008.0
10/09/2023	5.1	10.9	17.4	0.0	0.1	3.2	14.6	23.5	55.7	88.0	1007.1	1008.7	1010.4
11/09/2023	6.6	12.0	19.2	0.0	0.1	3.0	12.6	36.5	71.5	94.6	1008.8	1010.4	1012.1
12/09/2023	8.7	13.5	20.3	0.0	0.0	3.3	12.6	32.1	74.8	96.9	1007.0	1009.0	1011.1
13/09/2023	9.7	15.3	22.8	0.0	0.0	3.9	16.8	25.8	67.4	97.3	1005.2	1007.2	1008.9
14/09/2023	10.1	17.2	25.3	0.0	0.1	3.1	12.7	18.9	54.2	92.9	1005.4	1007.1	1009.1
15/09/2023	13.2	20.9	29.4	0.0	0.3	4.6	13.9	13.7	35.6	61.2	1001.1	1004.0	1006.4
16/09/2023	17.3	24.3	32.1	0.0	0.5	5.1	18.8	13.9	27.1	41.7	998.5	1001.2	1003.5
17/09/2023	19.3	24.5	31.3	0.0	0.7	4.3	17.5	11.8	22.7	36.5	999.5	1001.4	1003.5
18/09/2023	15.5	25.3	33.6	0.0	0.5	4.0	16.0	11.5	22.9	40.2	996.9	999.8	1002.6
19/09/2023	20.2	26.0	32.0	0.0	0.3	6.9	21.3	14.5	22.2	30.8	992.6	995.6	998.9
20/09/2023	20.6	26.3	32.5	0.0	0.4	8.0	26.7	12.8	21.6	33.9	987.4	990.5	993.1
21/09/2023	11.5	16.4	22.8	0.0	0.0	5.3	30.6	15.5	68.9	100.0	990.8	997.4	1006.2
22/09/2023	9.4	12.7	17.1	0.0	0.0	4.6	17.7	47.6	73.6	99.9	1006.0	1008.1	1010.0
23/09/2023	7.5	12.7	17.7	0.2	0.0	3.6	16.1	48.6	72.7	99.0	1006.7	1008.7	1010.6
24/09/2023	10.0	13.9	19.4	0.0	0.0	3.9	22.0	44.0	71.1	94.5	1004.3	1006.7	1009.3
25/09/2023	10.4	17.5	26.7	0.0	0.1	4.0	13.6	26.3	58.5	91.3	998.7	1001.9	1004.7
26/09/2023	13.0	16.8	23.1	6.8	0.1	4.4	22.5	49.6	72.6	99.9	998.4	1000.3	1002.9
27/09/2023	12.5	16.8	23.2	0.2	0.2	4.0	24.3	59.0	88.4	100.0	997.8	1000.2	1004.6
28/09/2023	13.7	15.7	19.2	18.0	0.0	3.2	9.3	78.3	95.6	100.0	1003.6	1006.2	1009.1
29/09/2023	12.8	19.3	29.1	0.0	0.3	4.8	17.5	20.8	70.4	100.0	1000.5	1003.6	1006.2
30/09/2023	13.0	20.8	29.9	0.0	0.2	4.1	18.7	26.0	67.3	100.0	995.9	1000.1	1004.7
Monthly	5.1	16.9	33.6	30.6	0.0	4.4	30.6	11.5	59.9	100.0	986.6	1001.9	1012.1

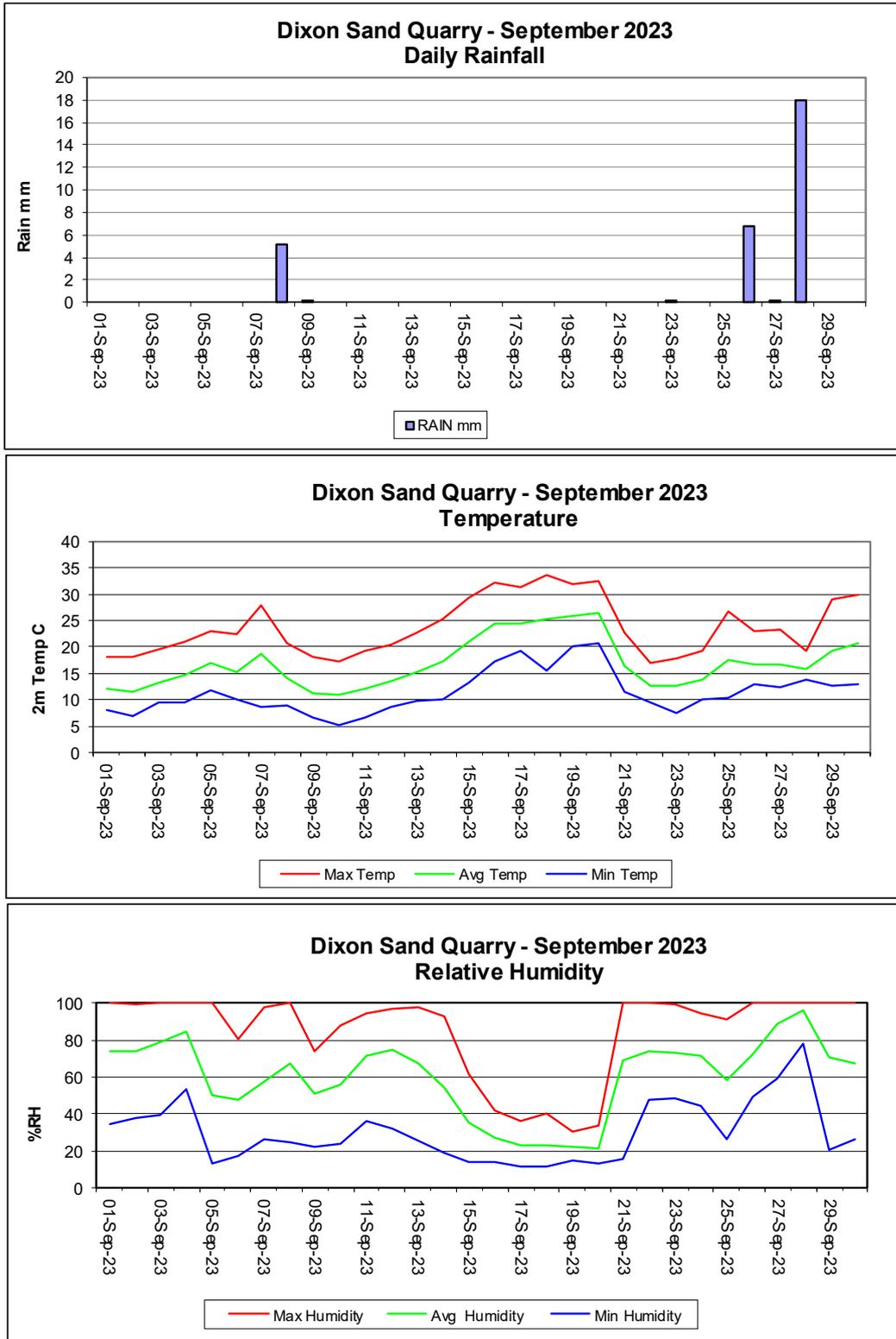


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

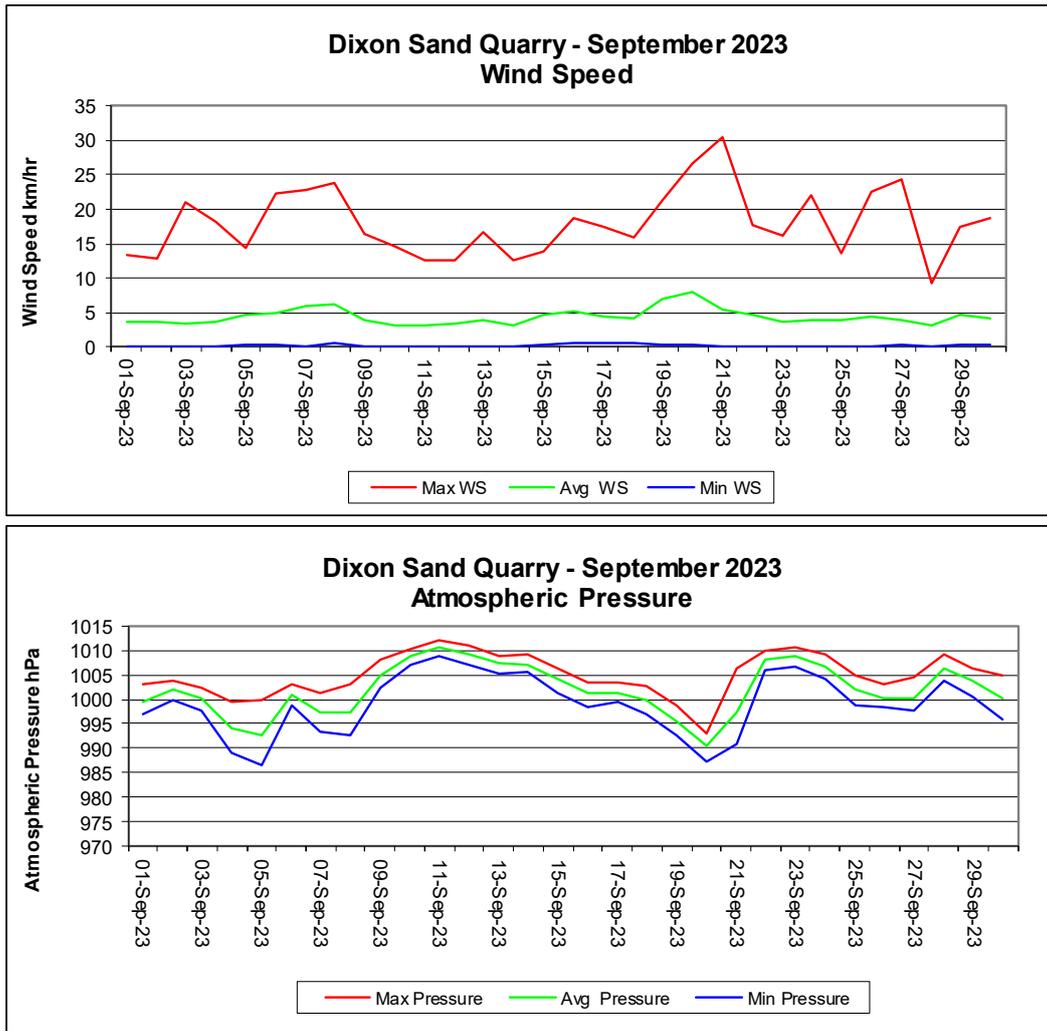


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose SEPTEMBER 2023

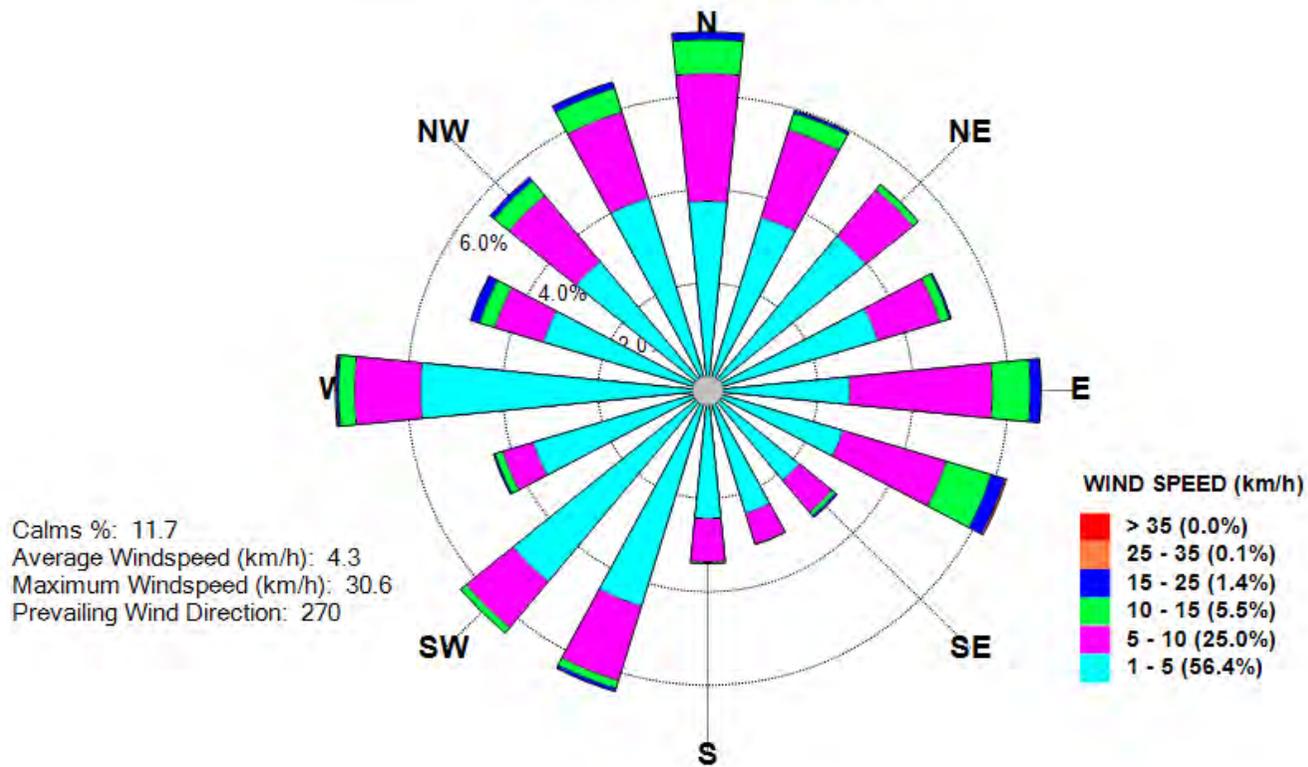


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



CBased Environmental Pty Limited

ABN 62 611 924 264

Weather Station Physical Screening Field Check

Client Dixon Sands Site Name: TEOM/VET

Date: 25/9/2023 Time: 11:00 - 12:00

	Yes (Pass)	No (Fail)	Comments
Grass / Vegetation Impacts			
Compound Grass height <10cm	/		
No objects within impact area (10 x height of object)		/	Trees/buildings nearby
Ground Anchor / Guy Wires / Mast Condition			
Bottom guy wires tight (correct tension = 35-50mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		fixed mast
Top Guy wires tensioned (correct tension = 60-75mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		fixed mast
Mast Vertical and in good condition	/		
Ground anchors/star pickets tight in ground	NA		fixed mast
Guy Wires insignificant corrosion	/		
Ground anchors/D shackles/ winders insignificant corrosion	↓		↓
Bolts/hinge points in mast are secure	↓		↓
Cables / Connectors / Logger Cabinet / Solar Panel			
Cables attached to mast/guy wires via ties are secure	/		loose wires due to design
Insignificant corrosion to plugs/connectors	/		
No water ingress in logger/battery cabinet	/		
Wiring/plugs in cabinet OK, Logger OK	/		
Battery terminals and condition OK	NA		Battery Volts = N/A 240V system
Battery volts (charging >13V, not charging >12V)	NA		
Solar panel undamaged and clean	NA		
Sensor shields clean	OK		↓
Sensor Check			
Wind direction aligned True North/ Magnetic North (strike out N/A)	/		Compass Bearing: 350 degrees
Rain gauge cleaned, working OK (1 tip check) or 100ml Cal	/		100ml check completed
Rain gauge level OK	/		
Anemometer/wind vane moving freely (analogue sensors)	NA		will attract
Other sensors visually checked and OK	/		
Last months data checked and OK / Logging data OK	/		

Checked By: Name COLIN DAVIE Signed Colin

CBased Environmental Pty Limited
 Unit 3, 2 Enterprise Crescent
 SINGLETON NSW 2330
 P: (02) 6571 3334



CBased Environmental Pty Limited
 ABN 62 611 924 264

Weather Station Field Check

Site: Dixon Sands
 Date/Time: 25/09/2023 11:00-12:00

Measured Against Reference Sensors

Parameter	Units	Site	Reference	Difference	Pass/Fail	Reference Description
Temperature 10m	°C	22.3	22.6	-0.3	Pass	Ref Thermometer
Humidity	%RH	34.6	36	-1.5	Pass	Ref RH sensor
Rainfall	mm	3.2	3.2	0.0	Pass	Glass Pipette
Wind Speed	km/hr	3.0	3.0	0.0	Pass	Ref Anemometer
Wind Direction	Degrees	267	270	-3.0	Pass	Sighting compass

Reference Instruments Specifications: *Calibration expires: 10/02/2024

Sensor	Serial Number	Specifications	Accuracy
*Temperature	230210N04	-40 to 65°C	+/- 0.3°C
*Barometer	BF230207001	20 to 30" Hg	+/- 1.1hPa
*Humidity	230210N04	10 to 90%RH	+/- 2%RH
*Anemometer	230210N06	0 to 64km/hr	+/- 3.6km/hr or 5%
**Rainfall	Standard number of tips	3.2mm	+/- 0.2mm
Compass	Sighting Compass	0 to 360 degrees	+/- 5 Deg

** 100mL used.

Reference sensors were certified by Davis Instruments USA using a reference traceable to National Institute of Standards and Technology (NIST) and were "in calibration" when used.

Comments:

The weatherstation was in conformance with the reference instruments at the monitored levels. Wind direction is referenced to true north. The calibration check of the raingauge involved adding water to the raingauge. Rain total of 3.2mm should be deleted from site records on the 25/9/2023.

NA=Not Available

The meteorological station meets the requirements of the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.

The weather station has Passed the field check. Next annual field check due:

Mar-24

Checked by: Colin Davies

25/09/2023

CBased Environmental Pty Limited
 Unit 3, 2 Enterprise Crescent
 SINGLETON NSW 2330
 P: 65 713 334



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB



TEOM Client/Site: Dixan Sandi / TEOM1

Date: 25/9/23

1. TEOM Data Screen SERIAL No: 25570 Firmware: N/A AB model

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OK ✓	Green - Normal	✓	
Date/time	TEOM: 25/9/23 11:05 Actual: 25/9/23 11:07	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	8.9	Positive values	✓	
Filter loading PM10	71	<80 %	✓	
Frequency PM-10	0.036	200-300 Hz	✓	
Noise PM-10	253.2748	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	NA OK	<0.50 atm	✓	
Warnings	NIL	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/**(NO)** (circle)

Technician Name : COLIN DAVEY Signed [Signature]



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	22.3	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	—	—
Ambient Pressure	0.985	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	—	—
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.01	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	2.90	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.68	12.95 – 14.39 lpm	✓	
Total Flow rate	16.48	15.67 – 17.67 lpm	✓	

Comments:

Fadj man = 1.060
 Fadj avx = 1.000 ✓ OK

Results: (Tick box)

- There were NO equipment faults found. No action required – (file report)**
- There were faults found (Fails) – Were these fixed on site: YES/NO (circle)**
Any Fails that cannot be repaired on site must be reported to CBased:
Office: 65713334 or email cbased@bigpond.com
Date faults notified to CBased: _____

Comments/Action Required:



Calibration/Maintenance

- 1. 1405A: Were Filters replaced YES/NO
- 2. PM10 Inlet head cleaned YES/NO
- 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	16	255.63560	255.63561	255.63562	255.63562

✓ good.

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
Pass/Fail – if Fail – install new filter and redo stability test.

- 4. Instrument clock verified (Refer Section 1) YES/NO.
If Time changed – clock reset OK YES/NO or NA (not changed)
Comments:

- 5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.
Comments if changed:

- 6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: 5 low cool

Tetralcal Flow/Temp/Pressure Calibrator Serial No: 1009 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

- 1. Flow Verification – Conducted YES/NO

PM10 Flow verified Flow l/min 2.95 Error % 1.7 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.45 Error % 1.6 (allowed error <6%) PASS/FAIL

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

- 2. Leak Check – Conducted YES/NO

PM10 actual 0.14 < Limit 0.15

Bypass actual 0.50 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments: slight leak null transducer but OK ✓



Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO

Reference Temperature: _____ C TEOM Temperature _____ C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: _____ atm TEOM Pressure _____ atm
if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

**Note: Tetralcal measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetralcal result by 1013.25 to change units to atm.
For mmHg divide tetralcal result by 760 to change units to atm.**

NA

2. Flow Calibration – Conducted YES/NO

PM10

Set point 2.4 Actual: _____
Set point 3.6 Actual: _____
Set point 3.0 Actual: _____ After calibration Final: _____ l/min

BYPASS

Set point 10.9 Actual: _____
Set point 16.4 Actual: _____
Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (K0) Verification – Conducted YES/NO

Actual measured K0 = _____ TEOM stated K0 _____ Error %: _____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % = _____ PASS/FAIL. Comments:
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____ Finish date/time: _____
Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³
Noise was less than 5ug/m³ YES/NO

5. Maintenance

Air Inlet system cleaned YES/NO
Pump Reconditioned YES/NO
Check Waterproofing YES/NO
Comments:





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

OCTOBER 2023

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 28 November 2023

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for October 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for October 2023.

Approximately 100% of valid TEOM data was available for October 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for October 2023.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in September 2023 with the next calibration due to be completed in December 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for October 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/10/2023	20.0	13.5	50.0	33.7
2/10/2023	33.6	13.7	84.0	34.2
3/10/2023	27.1	13.8	67.8	34.6
4/10/2023	17.5	13.9	43.8	34.7
5/10/2023	6.2	13.8	15.5	34.5
6/10/2023	11.7	13.8	29.3	34.4
7/10/2023	11.2	13.7	28.0	34.4
8/10/2023	8.0	13.7	20.0	34.2
9/10/2023	11.3	13.7	28.3	34.2
10/10/2023	19.5	13.7	48.8	34.3
11/10/2023	17.2	13.8	43.0	34.4
12/10/2023	27.7	13.9	69.3	34.7
13/10/2023	8.3	13.8	20.8	34.6
14/10/2023	8.1	13.8	20.3	34.5
15/10/2023	9.7	13.7	24.3	34.4
16/10/2023	19.7	13.8	49.3	34.5
17/10/2023	13.2	13.8	33.0	34.5
18/10/2023	8.6	13.8	21.5	34.4
19/10/2023	15.5	13.8	38.8	34.4
20/10/2023	22.7	13.8	56.8	34.6
21/10/2023	21.4	13.9	53.5	34.8
22/10/2023	14.6	13.9	36.5	34.8
23/10/2023	14.4	13.9	36.0	34.8
24/10/2023	21.2	14.0	53.0	35.0
25/10/2023	31.9	14.1	79.8	35.3
26/10/2023	17.6	14.2	44.0	35.4
27/10/2023	10.5	14.1	26.3	35.3
28/10/2023	8.2	14.1	20.5	35.2
29/10/2023	9.9	14.1	24.8	35.1
30/10/2023	19.1	14.1	47.8	35.2
31/10/2023	23.1	14.2	57.8	35.4

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

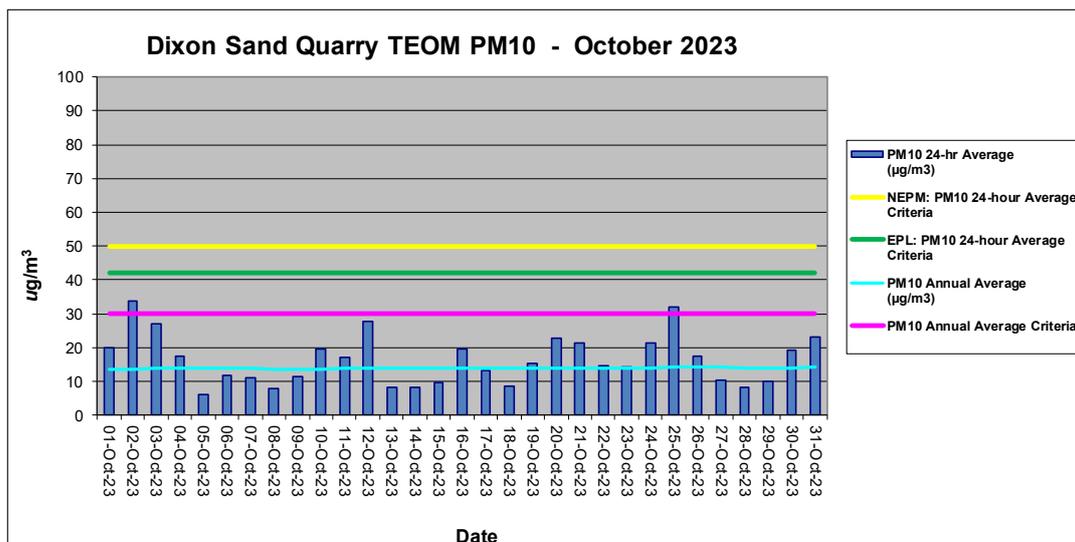


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2023 and is next due in March 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for October 2023.

Table 3: Meteorological Data Summary for October 2023

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/10/2023	17.9	26.2	33.8	0.0	0.4	7.0	29.7	12.2	34.1	77.1	989.7	993.4	998.5
2/10/2023	13.8	18.1	23.3	0.0	0.4	4.8	25.3	52.2	75.1	100.0	998.5	1001.0	1004.2
3/10/2023	15.4	25.4	33.6	0.0	1.2	7.4	35.4	14.2	45.4	100.0	992.4	995.8	1000.6
4/10/2023	11.0	21.2	26.1	14.6	0.8	8.6	28.0	16.9	52.9	100.0	984.5	990.8	993.6
5/10/2023	11.2	14.8	19.6	0.2	0.2	7.2	29.5	19.0	46.0	98.0	989.1	995.8	1002.5
6/10/2023	9.9	13.8	20.7	2.0	0.3	3.7	19.9	35.5	61.9	99.9	1001.7	1004.9	1009.7
7/10/2023	9.8	12.8	17.6	0.4	0.1	4.3	18.4	46.6	79.0	100.0	1009.0	1010.3	1012.0
8/10/2023	9.2	13.8	20.8	0.0	0.1	3.7	23.3	37.5	75.4	100.0	1007.2	1009.9	1012.9
9/10/2023	10.6	17.3	26.1	0.0	0.4	3.9	19.8	19.7	55.6	87.2	1000.2	1004.4	1008.3
10/10/2023	11.2	16.3	22.1	0.0	0.2	5.8	20.9	52.2	80.0	99.9	1000.5	1002.7	1005.3
11/10/2023	13.7	18.4	26.0	0.0	0.1	3.3	17.7	26.5	77.0	100.0	1000.2	1003.1	1005.3
12/10/2023	14.3	22.4	32.0	0.0	0.5	6.3	30.7	16.2	54.0	100.0	987.5	995.3	1002.4
13/10/2023	10.6	16.9	24.7	0.0	0.1	4.4	16.4	20.6	40.7	59.4	994.1	997.0	999.8
14/10/2023	12.7	19.2	26.8	0.0	0.1	3.9	22.0	23.1	43.5	61.6	993.2	996.6	999.6
15/10/2023	12.8	19.3	28.3	0.0	0.2	4.5	13.9	16.5	45.2	66.9	991.8	995.9	999.0
16/10/2023	10.1	16.6	24.2	0.0	0.2	5.5	37.9	22.5	54.9	82.8	989.5	993.7	1001.4
17/10/2023	9.2	12.3	17.2	0.4	0.5	6.1	22.2	49.8	70.7	100.0	1001.4	1006.4	1010.6
18/10/2023	10.5	13.9	20.1	0.6	0.2	4.4	16.8	45.9	82.5	99.9	1007.1	1008.9	1010.7
19/10/2023	11.1	15.6	21.3	0.0	0.0	3.6	18.0	44.2	73.3	94.3	999.7	1003.8	1008.2
20/10/2023	12.0	18.7	27.3	0.0	0.1	4.4	27.3	30.8	72.8	100.0	994.7	998.2	1001.7
21/10/2023	13.1	19.3	27.6	0.0	0.0	5.3	30.8	47.7	84.7	100.0	990.1	994.6	998.0
22/10/2023	15.2	22.0	30.7	0.0	0.4	4.0	16.7	9.7	54.1	100.0	987.6	989.9	993.5
23/10/2023	13.8	19.6	27.8	0.0	0.2	4.3	23.6	16.3	40.1	71.2	990.4	993.1	996.0
24/10/2023	11.2	21.5	33.9	0.0	0.0	3.9	21.3	11.4	54.3	97.6	988.5	992.6	995.9
25/10/2023	15.5	21.4	26.2	0.0	0.2	6.0	21.8	15.0	47.9	78.7	987.6	992.0	999.1
26/10/2023	10.6	12.8	15.4	1.4	1.1	5.5	13.1	57.0	77.0	98.6	998.6	1002.3	1007.5
27/10/2023	8.8	12.1	17.4	2.8	0.8	5.7	16.2	47.8	86.2	100.0	1006.8	1009.3	1011.7
28/10/2023	8.5	13.5	19.2	0.0	0.1	4.3	20.2	41.3	75.0	99.9	1004.4	1007.6	1011.2
29/10/2023	10.4	18.0	27.2	0.0	0.6	4.8	18.9	18.7	57.5	91.2	995.1	999.3	1004.9
30/10/2023	14.7	24.1	32.7	0.0	0.3	6.1	20.5	13.9	35.2	77.8	987.1	991.8	996.4
31/10/2023	14.0	22.7	28.8	0.0	0.2	5.1	22.7	6.1	34.2	72.8	987.8	992.3	1000.3
Monthly	8.5	18.1	33.9	22.4	0.0	5.1	37.9	6.1	60.2	100.0	984.5	999.1	1012.9

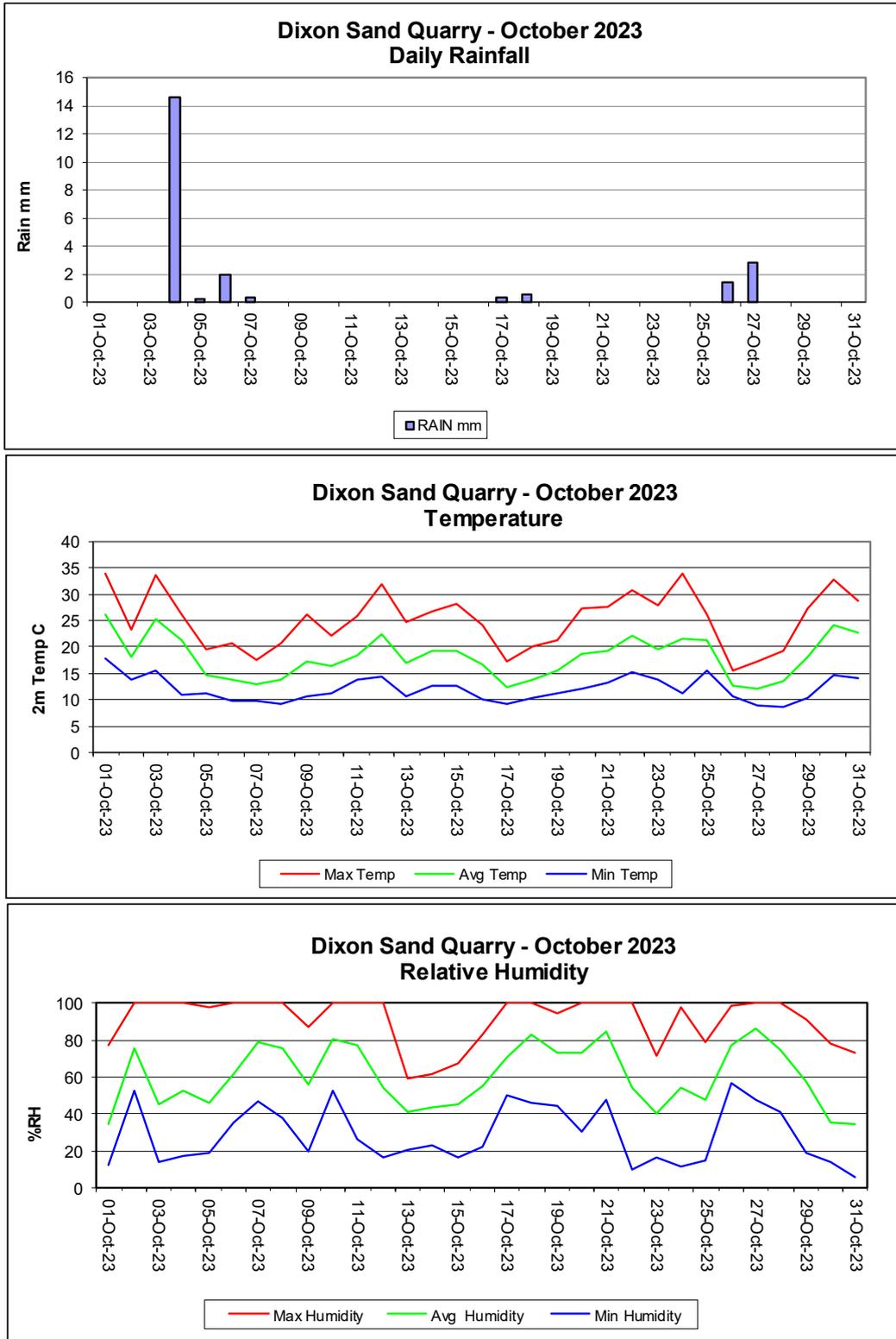


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

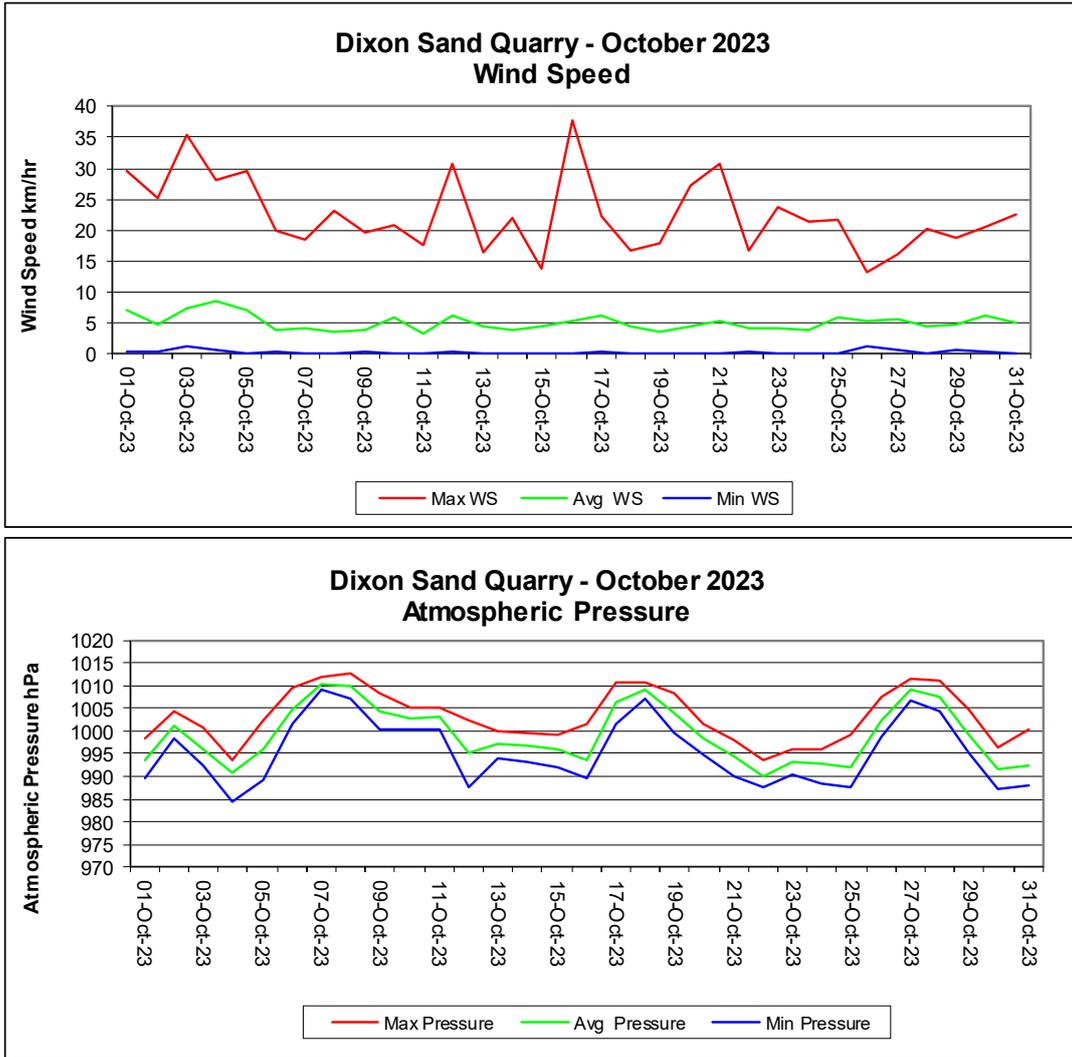


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose OCTOBER 2023

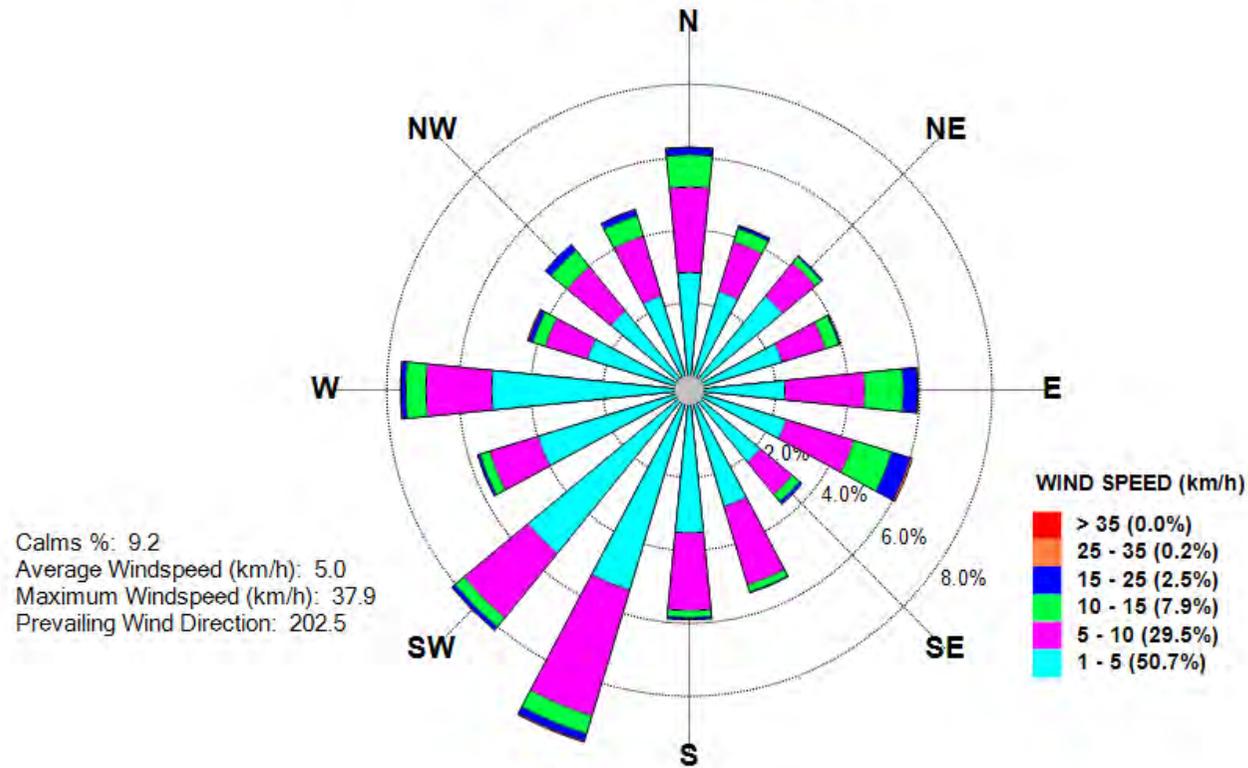


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

NOVEMBER 2023

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 21 December 2023

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for November 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for November 2023.

Approximately 100% of valid TEOM data was available for November 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for November 2023.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in September 2023 with the next calibration due to be completed in December 2023. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for November 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/11/2023	23.3	14.2	58.3	35.6
2/11/2023	19.8	14.3	49.5	35.7
3/11/2023	16.3	14.3	40.8	35.8
4/11/2023	10.5	14.3	26.3	35.7
5/11/2023	8.4	14.2	21.0	35.6
6/11/2023	10.5	14.2	26.3	35.5
7/11/2023	12.2	14.2	30.5	35.5
8/11/2023	15.0	14.2	37.5	35.5
9/11/2023	12.3	14.2	30.8	35.4
10/11/2023	10.6	14.1	26.5	35.4
11/11/2023	13.5	14.1	33.8	35.4
12/11/2023	30.5	14.3	76.2	35.7
13/11/2023	21.7	14.3	54.3	35.8
14/11/2023	22.7	14.4	56.8	35.9
15/11/2023	20.8	14.4	52.0	36.1
16/11/2023	16.0	14.4	40.0	36.1
17/11/2023	11.7	14.4	29.3	36.0
18/11/2023	11.5	14.4	28.7	36.0
19/11/2023	14.4	14.4	36.0	36.0
20/11/2023	17.6	14.4	44.0	36.0
21/11/2023	11.5	14.4	28.8	36.0
22/11/2023	13.6	14.4	34.0	36.0
23/11/2023	12.7	14.4	31.8	36.0
24/11/2023	7.8	14.3	19.5	35.8
25/11/2023	8.0	14.3	20.0	35.7
26/11/2023	9.4	14.3	23.5	35.7
27/11/2023	17.8	14.3	44.5	35.7
28/11/2023	14.4	14.3	36.0	35.7
29/11/2023	14.2	14.3	35.4	35.7
30/11/2023	7.4	14.2	18.5	35.6

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

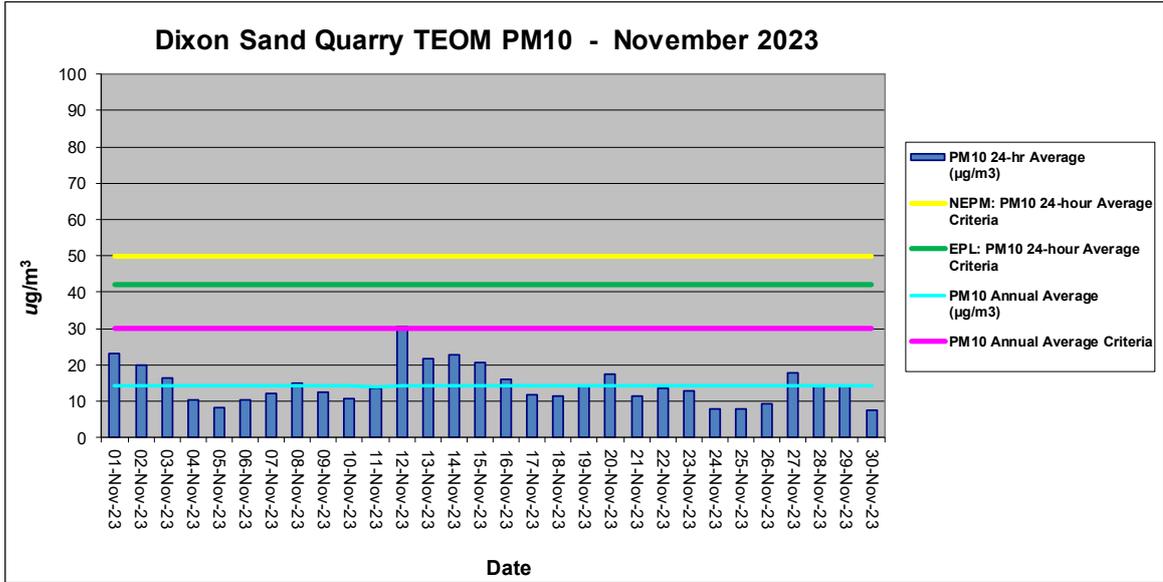


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2023 and is next due in March 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for November 2023.

Table 3: Meteorological Data Summary for November 2023

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/11/2023	11.4	16.1	21.3	0.0	0.0	4.7	26.1	39.0	66.2	89.9	998.6	1000.3	1002.9
2/11/2023	11.7	16.7	22.3	0.0	0.0	4.2	19.9	41.4	66.8	85.6	998.0	1000.7	1002.8
3/11/2023	13.6	17.9	24.2	0.0	0.1	4.4	23.4	45.7	73.8	94.5	995.6	998.8	1000.8
4/11/2023	14.8	16.6	19.9	5.2	0.1	2.3	8.8	71.5	94.4	100.0	998.3	1001.1	1003.8
5/11/2023	13.8	15.1	16.9	10.6	0.0	4.6	19.3	74.4	92.6	100.0	1003.0	1005.7	1008.1
6/11/2023	11.9	15.8	20.6	0.0	0.0	3.5	15.6	47.5	76.7	100.0	1002.5	1005.0	1007.6
7/11/2023	13.2	18.1	24.8	0.0	0.1	4.1	21.0	40.0	72.1	92.3	997.7	1001.1	1004.1
8/11/2023	12.7	19.6	27.4	0.0	0.0	4.1	18.9	30.5	71.8	100.0	995.1	998.2	1000.6
9/11/2023	14.4	18.8	27.8	18.8	0.2	4.3	20.8	35.7	83.3	99.9	992.9	996.1	997.9
10/11/2023	13.8	18.6	25.8	0.0	0.1	5.4	27.5	50.2	86.6	100.0	995.6	997.2	999.5
11/11/2023	14.6	22.9	33.2	0.0	0.0	5.5	22.0	24.3	71.4	99.9	993.5	997.0	999.9
12/11/2023	16.5	21.8	29.4	0.0	0.2	5.3	21.2	50.2	82.3	100.0	991.4	994.9	997.5
13/11/2023	16.3	18.3	21.6	0.0	0.4	5.3	20.4	58.7	82.8	100.0	996.0	997.6	999.4
14/11/2023	14.6	20.0	28.8	0.0	0.2	4.7	27.6	35.3	78.0	100.0	991.1	994.2	997.5
15/11/2023	17.0	20.6	27.3	0.0	0.0	3.7	17.0	47.7	83.6	100.0	989.5	992.0	994.6
16/11/2023	17.6	21.0	29.5	0.6	0.2	4.1	20.4	31.3	80.1	100.0	986.9	990.3	992.5
17/11/2023	13.6	16.4	21.7	17.4	0.0	4.4	20.2	42.2	81.4	100.0	991.5	997.1	1002.0
18/11/2023	13.1	17.8	23.9	0.0	0.0	4.2	22.9	43.3	73.1	100.0	998.3	1000.5	1002.1
19/11/2023	13.6	20.2	28.9	0.0	0.2	5.5	21.3	25.8	68.5	95.6	995.9	999.4	1001.6
20/11/2023	16.3	20.3	25.5	0.0	0.1	3.6	18.0	43.6	77.6	100.0	997.3	999.0	1001.3
21/11/2023	16.0	19.7	26.2	0.0	0.2	4.5	15.6	48.4	88.3	100.0	995.7	998.9	1000.6
22/11/2023	16.3	19.7	24.5	0.0	0.1	3.9	23.9	62.9	86.3	100.0	998.8	1000.9	1003.0
23/11/2023	16.1	18.8	23.6	1.6	0.5	4.1	13.3	71.5	96.2	100.0	1000.9	1002.5	1004.0
24/11/2023	16.7	18.7	21.8	8.0	0.3	3.7	13.3	89.1	98.7	100.0	998.4	1000.3	1002.5
25/11/2023	17.1	18.5	20.1	11.0	0.1	3.2	13.1	99.9	99.9	100.0	991.2	994.6	998.7
26/11/2023	18.2	23.3	30.6	0.0	0.4	4.5	13.2	30.5	70.8	100.0	988.8	990.6	992.3
27/11/2023	16.9	21.1	25.9	0.0	0.1	5.8	30.1	56.2	83.7	100.0	990.0	992.6	995.9
28/11/2023	18.1	19.2	20.7	1.0	0.0	5.3	17.1	96.9	99.9	100.0	991.0	994.1	996.3
29/11/2023	15.7	20.1	28.1	50.0	0.1	4.1	18.4	54.1	92.6	100.0	980.6	985.4	990.9
30/11/2023	16.2	21.3	27.1	0.4	0.2	3.3	14.7	43.4	70.3	100.0	981.3	983.1	985.2
Monthly	11.4	19.1	33.2	124.6	0.0	4.3	30.1	24.3	81.6	100.0	980.6	997.0	1008.1

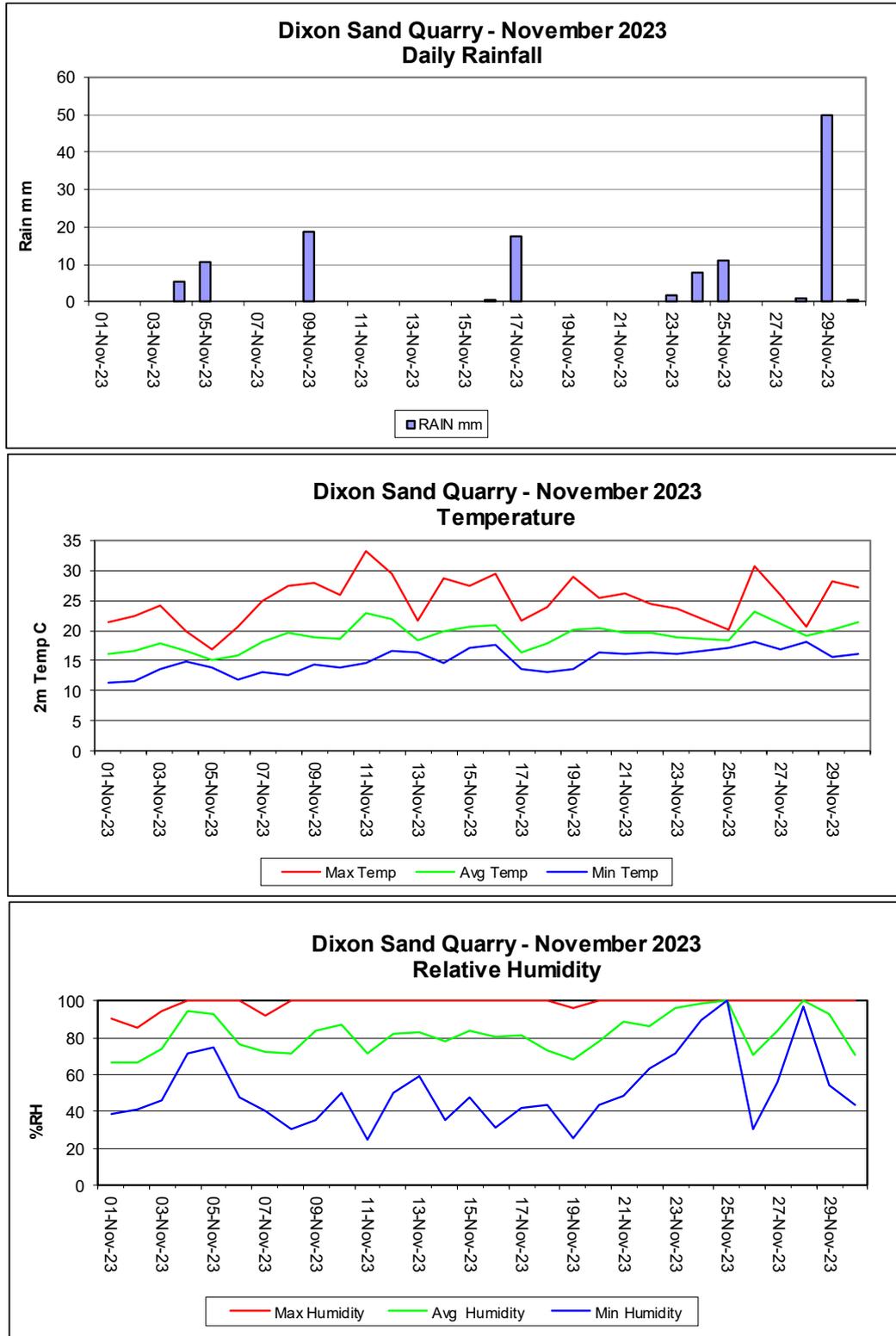


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

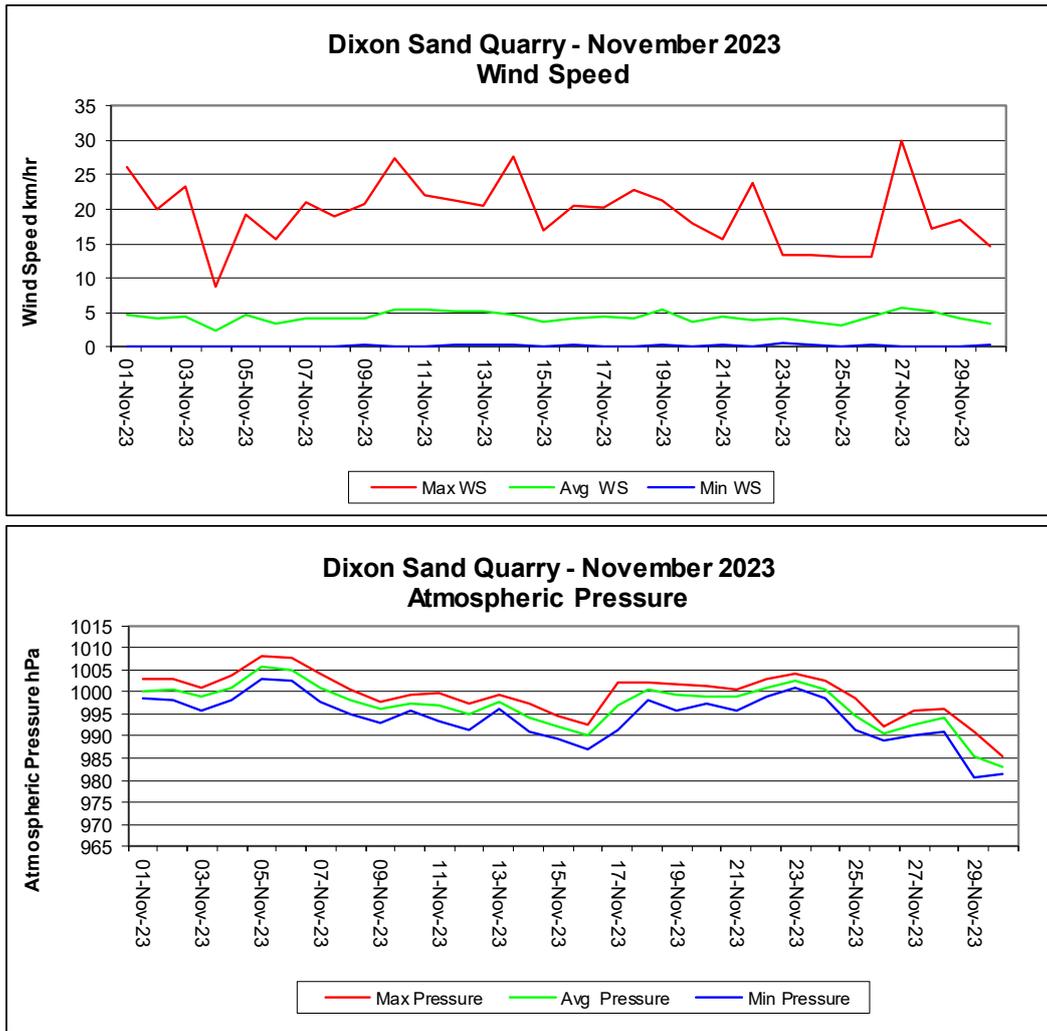


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose NOVEMBER 2023

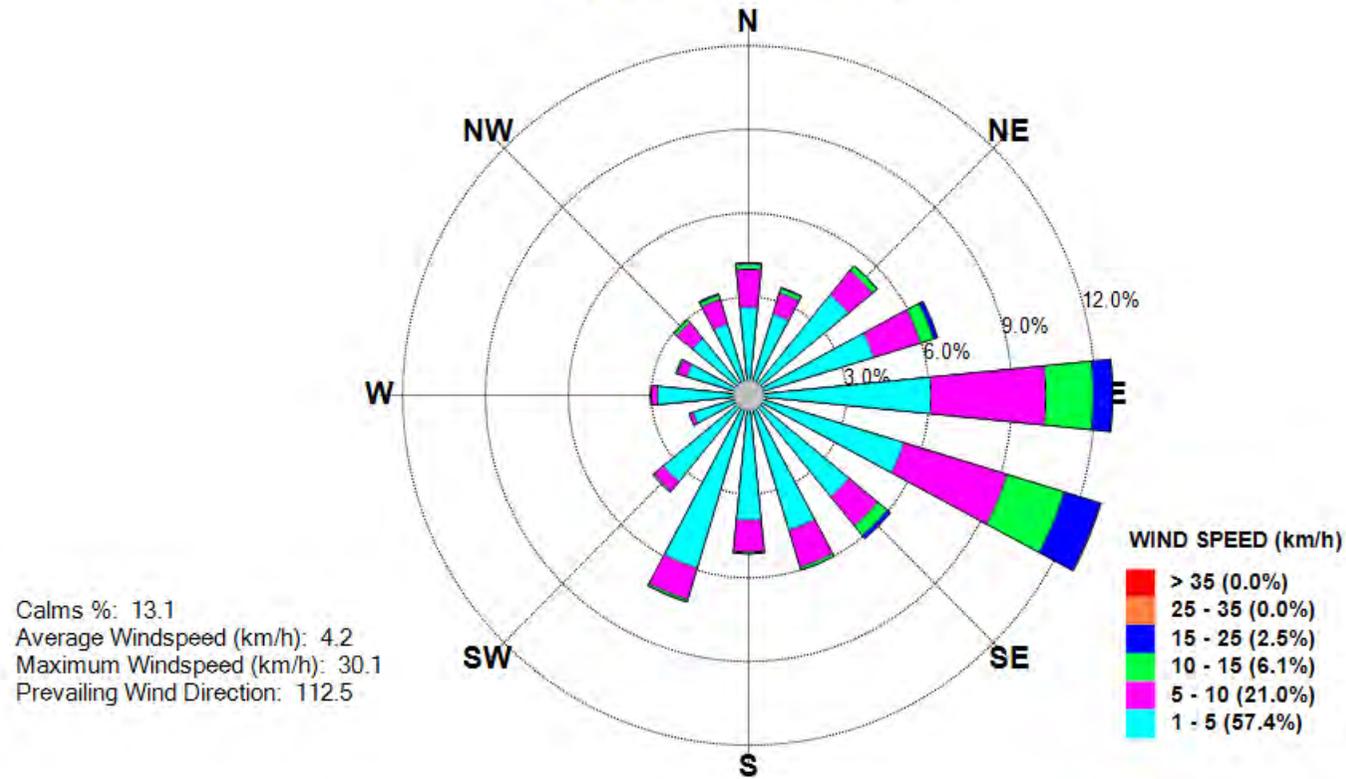


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

DECEMBER 2023

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 24 January 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for December 2023 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for December 2023.

Approximately 100% of valid TEOM data was available for December 2023.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for December 2023.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted on 9 January 2024 for December 2023. The next calibration is due to be completed in March 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for December 2023 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/12/2023	13.8	14.2	34.5	35.6
2/12/2023	10.0	14.2	25.0	35.5
3/12/2023	8.4	14.2	21.0	35.4
4/12/2023	8.8	14.1	22.0	35.3
5/12/2023	17.2	14.2	43.0	35.4
6/12/2023	24.5	14.2	61.3	35.6
7/12/2023	25.5	14.3	63.8	35.7
8/12/2023	21.0	14.3	52.5	35.8
9/12/2023	26.8	14.4	67.0	36.0
10/12/2023	11.8	14.4	29.5	36.0
11/12/2023	24.0	14.5	60.0	36.1
12/12/2023	14.9	14.5	37.3	36.1
13/12/2023	20.7	14.5	51.8	36.2
14/12/2023	17.4	14.5	43.5	36.3
15/12/2023	21.9	14.6	54.8	36.4
16/12/2023	19.7	14.6	49.3	36.5
17/12/2023	20.3	14.6	50.8	36.5
18/12/2023	28.1	14.7	70.3	36.7
19/12/2023	41.0	14.9	102.5	37.1
20/12/2023	6.6	14.8	16.5	37.0
21/12/2023	14.2	14.8	35.5	37.0
22/12/2023	19.3	14.8	48.3	37.1
23/12/2023	12.0	14.8	30.0	37.0
24/12/2023	12.7	14.8	31.8	37.0
25/12/2023	11.0	14.8	27.5	36.9
26/12/2023	16.7	14.8	41.8	37.0
27/12/2023	11.5	14.8	28.8	36.9
28/12/2023	10.7	14.7	26.8	36.9
29/12/2023	10.8	14.7	27.1	36.8
30/12/2023	10.4	14.7	26.0	36.8
31/12/2023	16.7	14.7	41.8	36.8

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 µg/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

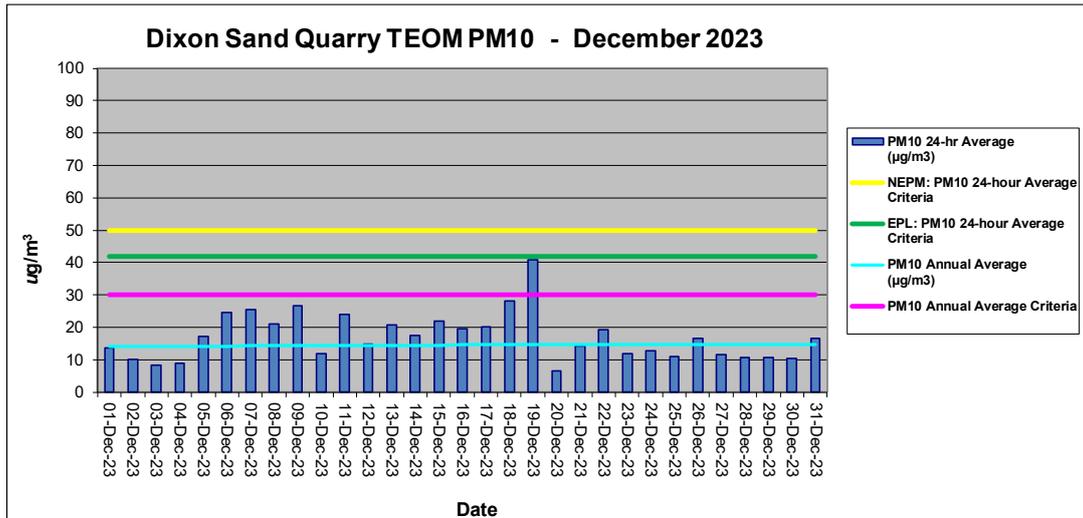


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2023 and is next due in March 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for December 2023.

Table 3: Meteorological Data Summary for December 2023

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/12/2023	16.8	21.6	29.8	0.0	0.1	4.3	21.9	32.9	74.2	100.0	983.9	985.9	988.9
2/12/2023	17.3	20.2	25.8	4.2	0.0	2.8	20.9	57.7	90.5	100.0	987.5	989.0	992.4
3/12/2023	14.7	19.7	29.1	2.6	0.0	3.8	23.8	29.0	79.5	100.0	991.3	993.8	998.9
4/12/2023	15.4	18.7	24.5	1.2	0.1	3.7	26.1	54.3	84.1	99.9	996.2	998.5	1000.4
5/12/2023	15.2	25.1	35.9	0.0	0.3	5.5	16.1	20.1	59.7	99.9	992.3	995.9	999.0
6/12/2023	17.6	24.0	28.8	0.0	0.2	6.4	24.5	31.7	58.9	100.0	992.6	996.9	1000.3
7/12/2023	16.5	21.7	31.6	0.0	0.0	4.4	22.9	41.3	82.8	100.0	996.2	998.5	1001.4
8/12/2023	19.2	27.7	36.8	0.0	0.5	5.6	25.9	26.2	58.4	100.0	992.0	996.1	1000.2
9/12/2023	22.6	30.9	40.5	0.0	0.2	5.5	16.7	20.1	47.7	94.3	989.7	992.5	999.3
10/12/2023	18.9	21.3	27.6	0.4	0.3	5.3	19.6	68.3	94.9	100.0	995.8	998.3	1000.0
11/12/2023	18.5	23.5	32.0	0.0	0.1	3.4	18.1	50.2	84.6	100.0	995.5	997.3	1000.6
12/12/2023	19.2	22.9	27.6	0.0	0.1	5.1	24.9	52.9	80.8	100.0	996.0	999.0	1001.0
13/12/2023	18.5	23.6	31.3	10.0	0.1	4.3	24.0	47.6	81.8	100.0	988.8	994.1	998.7
14/12/2023	20.7	28.5	37.1	0.0	0.0	5.0	27.2	17.0	55.1	100.0	983.0	987.0	991.4
15/12/2023	19.1	22.1	26.1	0.0	0.0	5.0	31.9	59.3	77.5	95.5	987.0	989.5	991.8
16/12/2023	17.3	25.1	34.2	0.0	0.1	4.5	17.6	11.3	57.2	100.0	984.6	987.1	992.5
17/12/2023	18.3	21.4	25.3	0.0	0.2	6.2	29.7	60.1	80.5	94.5	992.6	994.4	997.5
18/12/2023	18.2	22.6	29.9	0.0	0.1	4.2	23.4	61.0	91.3	100.0	990.2	993.9	996.9
19/12/2023	20.7	25.0	31.0	0.0	0.0	4.6	15.7	38.9	78.0	100.0	988.0	991.2	994.3
20/12/2023	14.6	17.0	20.6	42.4	0.0	4.4	17.3	99.9	99.9	100.0	992.4	994.7	997.0
21/12/2023	14.6	17.3	20.8	1.6	0.7	5.1	17.1	61.5	88.4	100.0	994.8	996.6	998.7
22/12/2023	15.5	18.9	23.8	0.0	0.0	4.2	25.4	43.9	68.1	84.6	994.2	996.4	998.4
23/12/2023	14.9	19.4	25.7	0.0	0.0	4.1	25.7	45.4	77.8	97.9	988.2	992.3	995.9
24/12/2023	16.8	19.3	23.1	0.6	0.1	2.8	15.1	73.2	94.5	100.0	985.0	987.8	990.0
25/12/2023	16.9	20.4	26.2	3.2	0.0	4.4	28.5	58.8	89.3	100.0	984.1	986.8	988.8
26/12/2023	15.5	20.9	28.1	65.4	0.1	3.7	34.7	57.4	90.5	100.0	984.4	987.6	989.3
27/12/2023	17.1	20.5	25.3	2.6	0.0	2.5	9.6	56.2	81.9	100.0	987.8	989.6	991.9
28/12/2023	18.3	23.2	32.0	0.0	0.2	4.1	18.7	27.7	65.7	97.4	988.8	990.9	993.6
29/12/2023	18.6	22.5	26.5	0.0	0.0	2.9	11.3	45.3	76.2	100.0	990.4	992.0	993.5
30/12/2023	18.9	21.9	28.4	0.0	0.0	6.4	29.2	39.1	63.6	93.7	988.6	991.1	996.7
31/12/2023	15.6	17.6	19.8	1.0	0.3	3.3	14.1	71.2	89.1	100.0	996.7	1000.8	1003.6
Monthly	14.6	22.1	40.5	135.2	0.0	4.4	34.7	11.3	77.5	100.0	983.0	993.1	1003.6

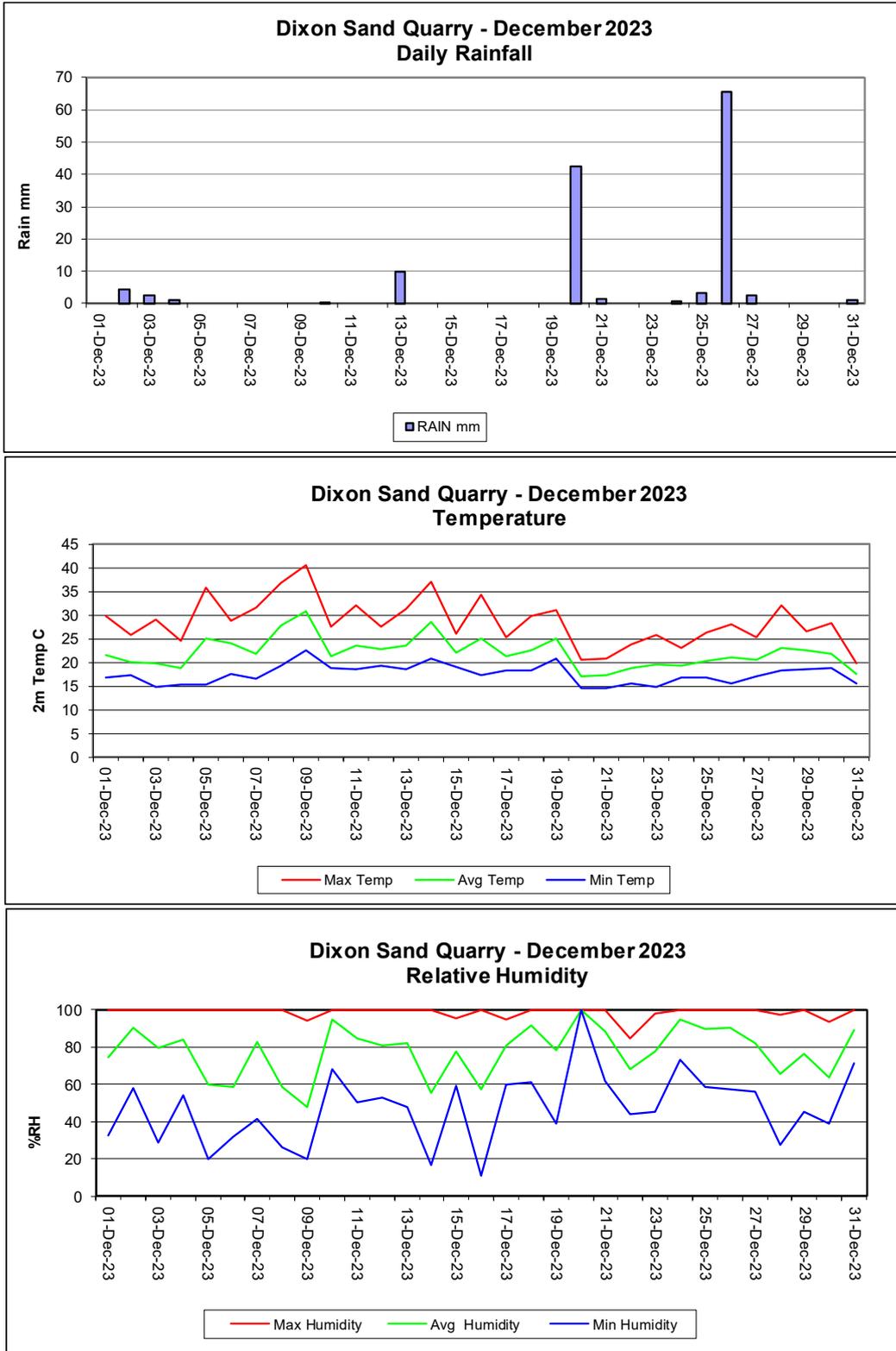


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

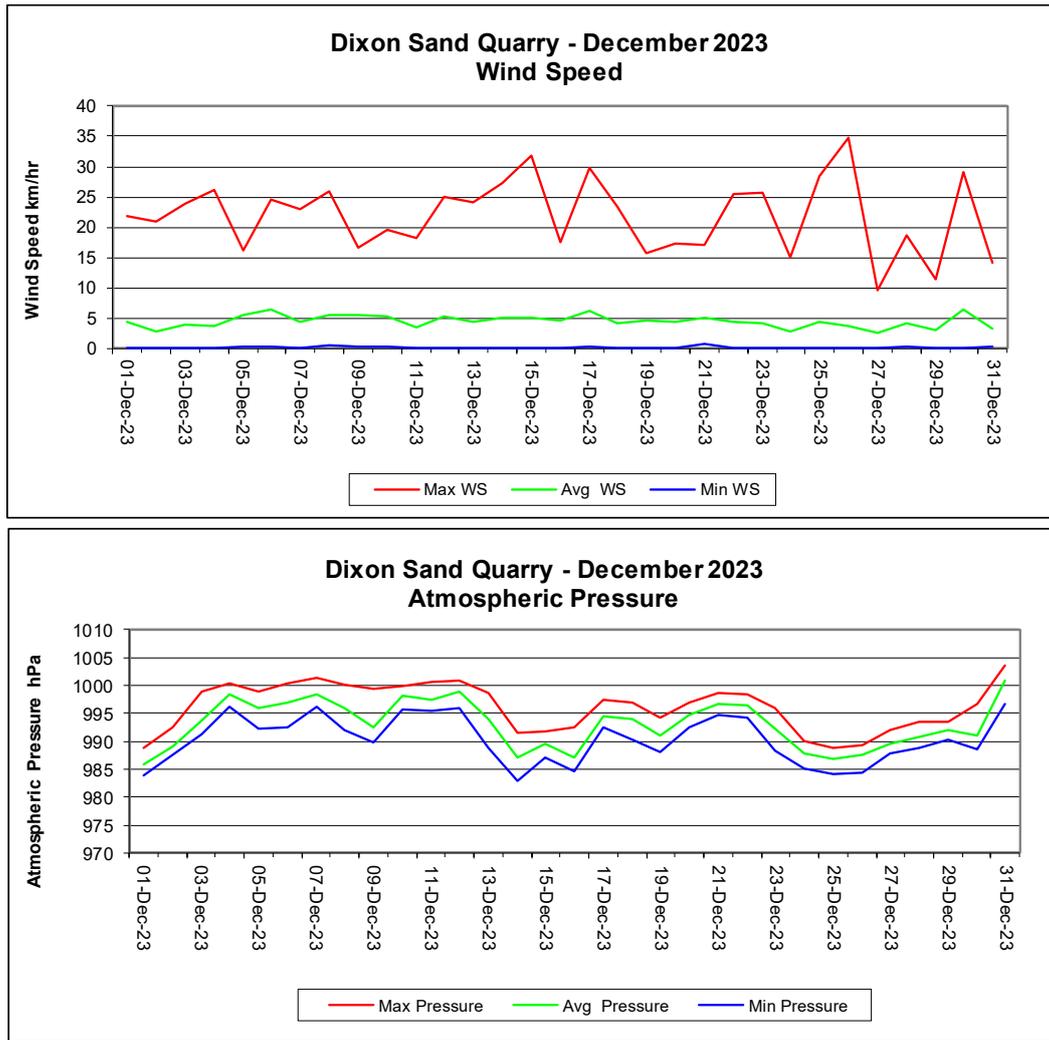


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose DECEMBER 2023

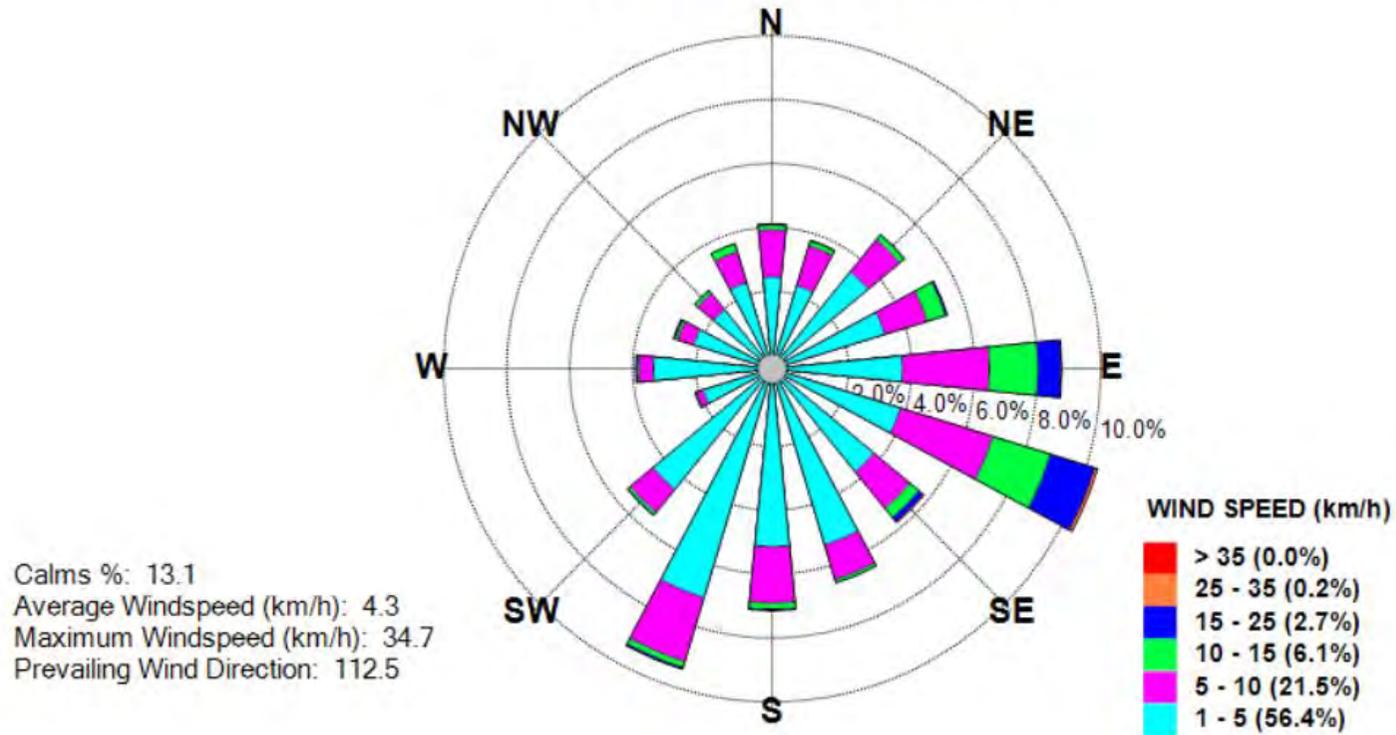


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB



TEOM Client/Site: Dixon Sands / TEOM 1

Date: 8+9/1/24

1. TEOM Data Screen SERIAL No: 25570 Firmware: NA/AB version.

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>Full OK 4</u>	Green - Normal	✓	
Date/time	TEOM: <u>8.1.24</u> <u>11.07</u> Actual: <u>8.1.24</u> <u>12.07</u>	Current Date/time correct within 5 minutes	✓ EST.	
PM-10 24hr av	<u>22.2</u>	Positive values	✓	
Filter loading PM10	<u>56</u>	<80 %	✓	
Frequency PM-10	<u>252.60937</u>	200-300 Hz	✓	
Noise PM-10	<u>0.049</u>	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>NA OK</u>	<0.50 atm	✓	
Warnings	<u>NIL</u>	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DAVIES Signed 8/1/24



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	22.8	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	✓
Ambient Pressure	1.000	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	✓	✓
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.67	12.95 – 14.39 lpm	✓	
Total Flow rate	16.67	15.67 – 17.67 lpm	✓	

Comments:

Results: (Tick box)

- There were NO equipment faults found. No action required – (file report)**
- There were faults found (Fails) – Were these fixed on site: YES/NO (circle)**
Any Fails that cannot be repaired on site must be reported to CBased:
Office: 65713334 or email cbased@bigpond.com
Date faults notified to CBased: _____

Comments/Action Required:



Calibration/Maintenance

- 1. 1405A: Were Filters replaced (YES/NO)
- 2. PM10 Inlet head cleaned (YES/NO)
- 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed (YES/NO)

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	17	255-68435	255-68438	255-68440	255-68441

✓ OK

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

- 4. Instrument clock verified (Refer Section 1) (YES/NO).
 If Time changed – clock reset OK YES/NO or (NA) (not changed)
 Comments:

- 5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. (YES/NO).
 Comments if changed:

- 6. TEOM Cleaned and Air Conditioner checked (YES/NO). Air Conditioner settings or operational status: OK

Tetralcal Flow/Temp/Pressure Calibrator Serial No: 1009 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

1. Flow Verification – Conducted (YES/NO)

PM10 Flow verified Flow l/min 3.05 Error % 1.7 (allowed error <6%) (PASS/FAIL)

Bypass Flow verified Flow l/min 13.84 Error % 1.2 (allowed error <6%) (PASS/FAIL)

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:** *Fadj recal → see over*

2. Leak Check – Conducted (YES/NO)

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.46 < Limit 0.60

Leak check (PASS/FAIL) – If fail then find leak and retest.

Comments: *Slight leak OK ✓*



Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO

Reference Temperature: 22.5 C TEOM Temperature 22.7 C
 if difference +/- 1 C recalibrate sensor. Sensor recalibrated (YES)/NO

Reference Pressure: 1.001 atm TEOM Pressure 1.000 atm
 if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated (YES)/NO

**Note: Tetral measures Atmospheric Pressure in mm Hg or mb or hPa
 For mb or hPa divide tetral result by 1013.25 to change units to atm.
 For mmHg divide tetral result by 760 to change units to atm.**

**2. Flow Calibration – Conducted (YES)/NO
 PM10**

Set point 2.4 Actual: _____
 Set point 3.6 Actual: _____
 Set point 3.0 Actual: _____ After calibration Final: _____ l/min

Hardware Cal	Pre	Post
Fadj main	1.055	1.050
Fadj aux	1.005	1.005

BYPASS

Set point 10.9 Actual: _____
 Set point 16.4 Actual: _____
 Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (K0) Verification – Conducted (YES)/NO

Actual measured KO = 13825 TEOM stated KO 13748 Error %: 0.56 .
 Allowed Error +/- 2.5%. (PASS)/FAIL
 If Error +/- 2.5% repeat. If confirmed consult manufacturer.
 Second Error % = _____ (PASS)/FAIL. Comments: _____
 If second test fails consult manufacturer.

4. Annual Noise check - Conducted (YES)/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:
 Start date/time: 8/1/24 22:35 Finish date/time: 9/2/24 11:20
 Standard deviation of all recorded data (min 30 min averages) = 1.4 ug/m³
 Noise was less than 5ug/m³ (YES)/NO

5. Maintenance

Air Inlet system cleaned (YES)/NO
 Pump Reconditioned (YES)/NO
 Check Waterproofing (YES)/NO OK
 Comments:





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

JANUARY 2024

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 20 February 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for January 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 81% of valid meteorological data was recorded for January 2024.

Approximately 96% of valid TEOM data was available for January 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or OEH (EPA) approved methods. The following Australian Standards were used:

- AS3580.9.8 - *“Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”*; and
- AS/NZS 3580.1.1 - *“Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”*.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 96% of valid TEOM data was available for January 2024, due to power outages and routine calibration and maintenance.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted on 9 January 2024 for December 2023. The next calibration is due to be completed in March 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for January 2024 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/01/2024	15.7	14.7	39.3	36.8
2/01/2024	15.5	14.7	38.8	36.8
3/01/2024	13.2	14.7	33.0	36.8
4/01/2024	14.8	14.7	37.0	36.8
5/01/2024	11.1	14.7	27.8	36.7
6/01/2024	12.8	14.7	32.0	36.7
7/01/2024	18.4	14.7	46.0	36.8
8/01/2024	No Data	14.7	No Data	36.8
9/01/2024	No Data	14.7	No Data	36.8
10/01/2024	16.3	14.7	40.8	36.8
11/01/2024	14.0	14.7	35.0	36.8
12/01/2024	13.4	14.7	33.5	36.8
13/01/2024	16.9	14.7	42.3	36.8
14/01/2024	12.8	14.7	32.0	36.8
15/01/2024	13.0	14.7	32.5	36.7
16/01/2024	17.8	14.7	44.5	36.8
17/01/2024	18.0	14.7	45.0	36.8
18/01/2024	10.2	14.7	25.5	36.8
19/01/2024	12.3	14.7	30.8	36.7
20/01/2024	18.2	14.7	45.5	36.8
21/01/2024	12.5	14.7	31.3	36.7
22/01/2024	30.9	14.8	77.3	36.9
23/01/2024	13.2	14.8	33.0	36.9
24/01/2024	16.7	14.8	41.8	37.0
25/01/2024	21.1	14.8	52.8	37.0
26/01/2024	19.9	14.8	49.7	37.1
27/01/2024	15.3	14.8	38.3	37.1
28/01/2024	16.5	14.8	41.3	37.1
29/01/2024	18.9	14.9	47.3	37.2
30/01/2024	21.7	14.9	54.3	37.2
31/01/2024	15.4	14.9	38.5	37.2

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

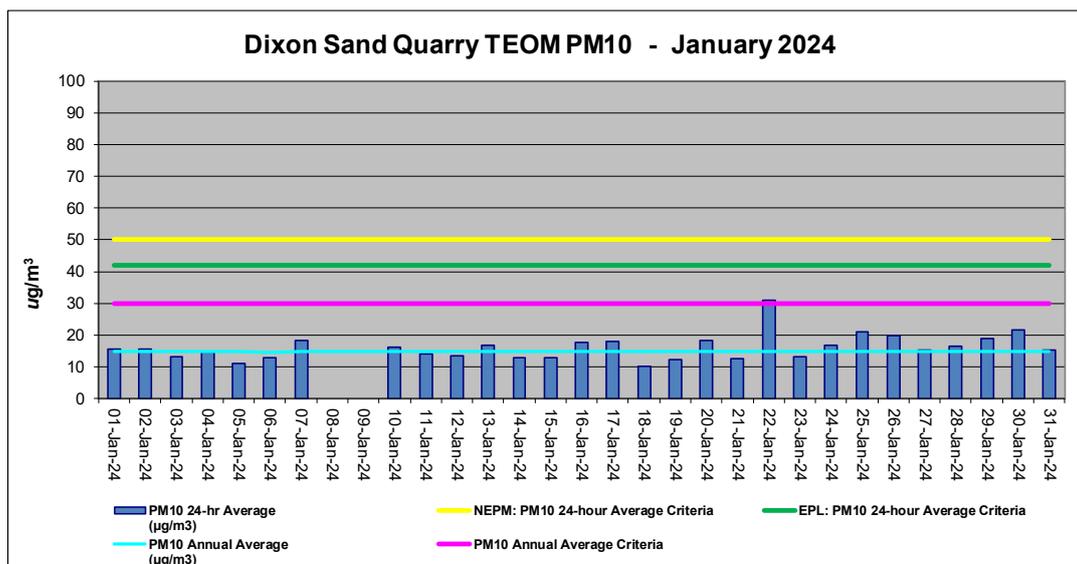


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2023 and is next due in March 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 81% of valid meteorological data was recorded for January 2024 due to an issue with the data logger communication.

Table 3: Meteorological Data Summary for January 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/01/2024	15.8	19.1	21.9	1.0	0.0	3.5	18.7	81.1	92.8	100.0	999.8	1002.2	1004.0
2/01/2024	18.5	22.5	27.7	0.0	0.3	4.9	19.3	60.5	82.7	100.0	996.4	999.1	1001.4
3/01/2024	18.8	23.1	29.8	0.0	0.2	4.1	19.1	42.1	78.5	99.9	994.7	997.0	999.4
4/01/2024	19.1	21.2	28.4	5.6	0.2	2.9	12.1	64.7	93.7	100.0	993.9	997.2	1001.0
5/01/2024	15.8	19.6	23.7	0.2	0.6	3.9	22.5	63.1	82.9	100.0	1000.0	1001.9	1004.2
6/01/2024	13.7	19.5	24.7	0.0	0.1	4.2	18.6	42.6	75.0	100.0	999.3	1001.5	1003.8
7/01/2024	16.0	22.1	27.6	0.0	0.0	4.3	19.5	52.5	74.3	95.5	994.2	997.6	1000.6
8/01/2024	19.4	21.5	24.4	4.2	0.3	4.8	19.3	69.8	86.8	100.0	990.0	992.3	995.0
9/01/2024	20.3	22.4	25.9	0.0	0.2	5.3	22.8	69.3	84.0	95.1	990.5	993.2	996.2
10/01/2024	19.3	23.0	29.9	0.2	0.0	4.0	18.4	60.1	87.3	100.0	992.7	995.1	996.5
11/01/2024	20.8	24.0	29.4	0.0	0.1	5.1	24.7	60.8	88.2	100.0	995.5	999.1	1002.2
12/01/2024	20.2	23.5	27.7	14.0	0.1	6.0	24.8	58.2	83.6	100.0	997.9	1000.4	1002.3
13/01/2024	19.3	24.1	31.6	0.0	0.0	4.0	19.2	39.8	79.1	99.1	992.8	996.3	999.2
14/01/2024	17.9	20.8	26.9	20.8	0.2	4.0	15.5	70.1	94.6	100.0	996.5	998.3	1000.0
15/01/2024	17.3	19.0	20.4	27.8	0.0	3.5	16.7	72.6	93.8	100.0	998.8	1001.0	1002.6
16/01/2024	17.0	19.8	24.0	2.8	0.2	2.9	12.1	75.2	92.9	100.0	993.8	997.2	1001.0
17/01/2024	19.5	22.4	27.9	10.0	0.1	3.0	11.7	66.8	92.1	100.0	985.4	989.1	993.6
18/01/2024	20.5	25.3	31.5	0.2	0.1	3.9	13.9	25.2	65.8	100.0	982.0	984.1	986.2
19/01/2024	17.6	21.7	29.5	0.0	0.1	4.4	25.4	25.7	52.8	86.8	985.7	988.5	993.6
20/01/2024													
21/01/2024													
22/01/2024													
23/01/2024													
24/01/2024													
25/01/2024													
26/01/2024	20.9	28.0	37.5	0.0	0.2	4.6	23.9	24.7	63.6	88.3	981.4	984.6	989.2
27/01/2024	18.4	20.0	22.9	2.6	0.0	3.1	19.1	73.4	92.2	100.0	985.0	987.9	989.3
28/01/2024	17.5	21.1	27.2	0.0	0.1	4.3	21.1	55.2	85.7	100.0	987.5	991.4	995.1
29/01/2024	18.6	24.1	32.4	0.2	0.0	4.5	24.5	51.0	83.0	100.0	988.3	992.0	995.0
30/01/2024	21.5	23.6	28.1	0.0	0.0	3.8	15.2	69.3	91.9	100.0	992.1	993.5	994.8
31/01/2024	20.3	22.6	27.6	0.4	0.0	2.7	13.2	69.6	91.4	100.0	991.5	993.6	995.7
Monthly	13.7	22.2	37.5	90.0	0.0	4.1	25.4	24.7	83.6	100.0	981.4	995.0	1004.2

20-25 January 2024 no valid data - datalogger communication issues

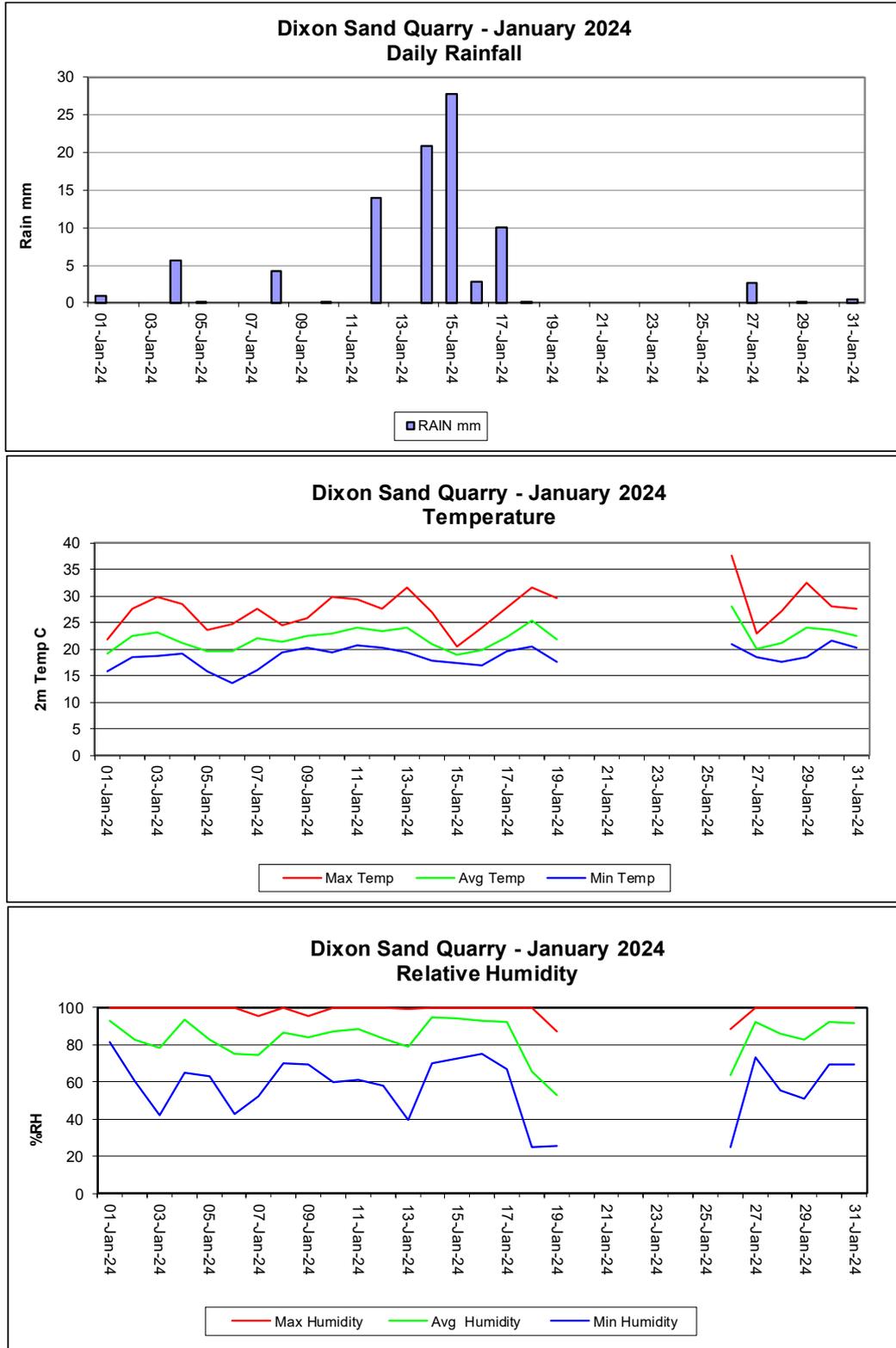


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

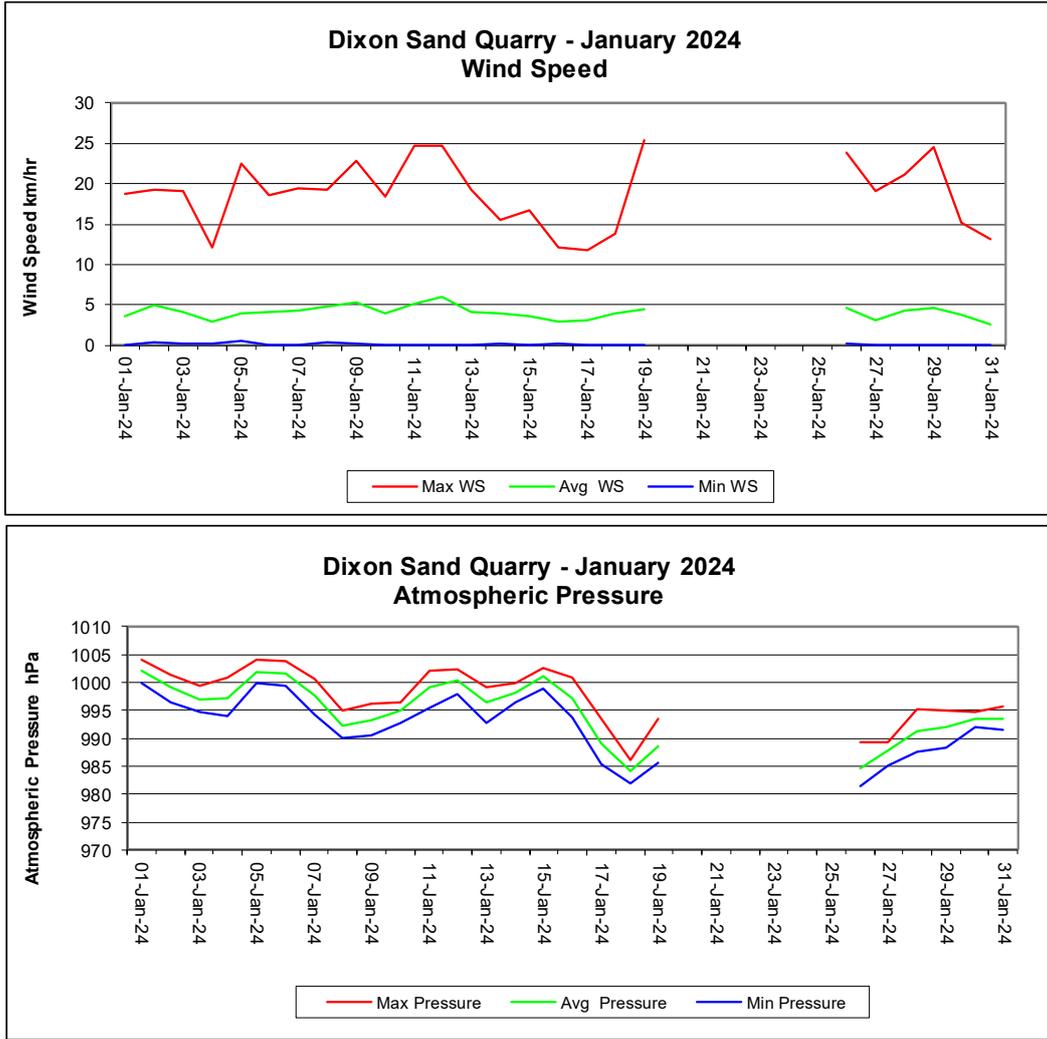


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JANUARY 1st-20th & 26th-31st 2024

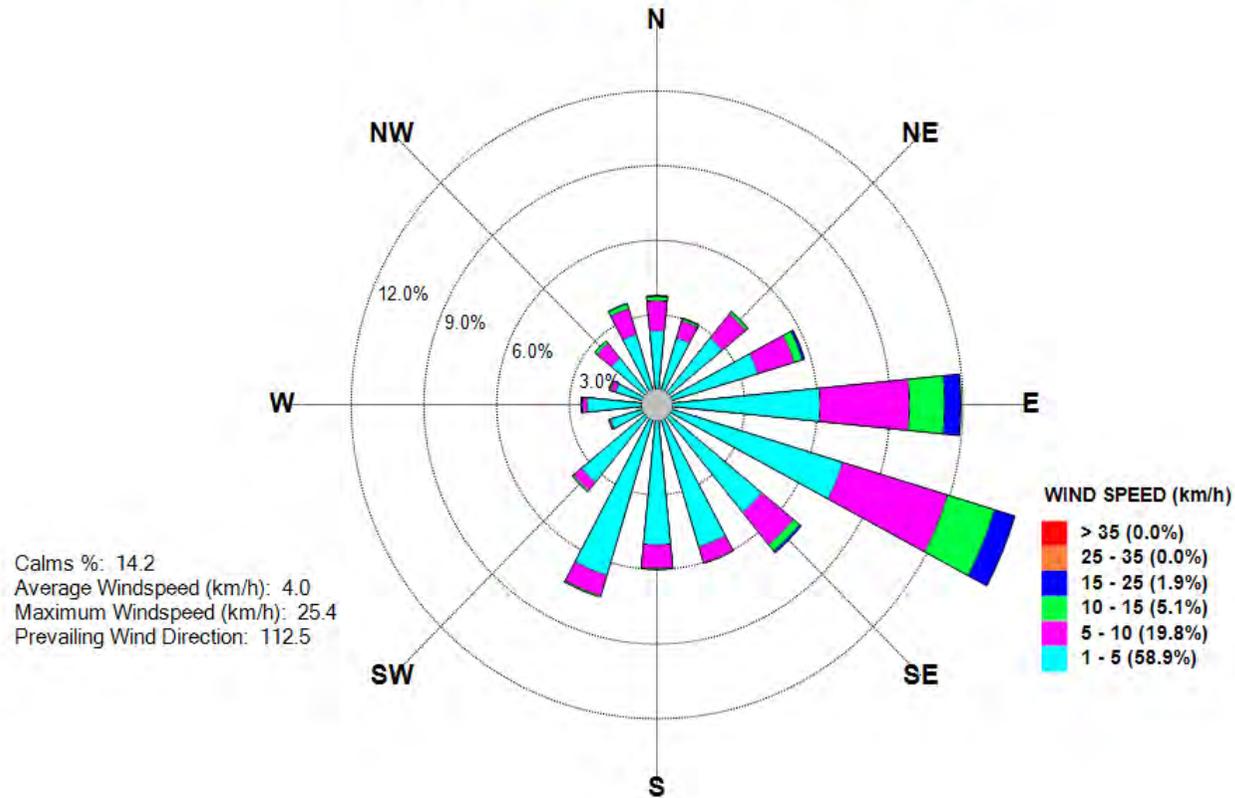


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB



TEOM Client/Site: Dixon Sands / TEOM 1

Date: 8+9/1/24

1. TEOM Data Screen SERIAL No: 25570 Firmware: NA/AB version.

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>Full OK 4</u>	Green - Normal	✓	
Date/time	TEOM: <u>8.1.24</u> <u>11.07</u> Actual: <u>8.1.24</u> <u>12.07</u>	Current Date/time correct within 5 minutes	✓ EST.	
PM-10 24hr av	<u>22.2</u>	Positive values	✓	
Filter loading PM10	<u>56</u>	<80 %	✓	
Frequency PM-10	<u>252.60937</u>	200-300 Hz	✓	
Noise PM-10	<u>0.049</u>	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>NA OK</u>	<0.50 atm	✓	
Warnings	<u>NIL</u>	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DAVIES Signed 8/1/24



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	22.8	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	✓
Ambient Pressure	1.000	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	✓	✓
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.67	12.95 – 14.39 lpm	✓	
Total Flow rate	16.67	15.67 – 17.67 lpm	✓	

Comments:

Results: (Tick box)

- There were NO equipment faults found. No action required – (file report)**
- There were faults found (Fails) – Were these fixed on site: YES/NO (circle)**
Any Fails that cannot be repaired on site must be reported to CBased:
Office: 65713334 or email cbased@bigpond.com
Date faults notified to CBased: _____

Comments/Action Required:



Calibration/Maintenance

- 1. 1405A: Were Filters replaced (YES/NO)
- 2. PM10 Inlet head cleaned (YES/NO)
- 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed (YES/NO)

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	17	255-68435	255-68438	255-68440	255-68441

✓ OK

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

- 4. Instrument clock verified (Refer Section 1) (YES/NO).
 If Time changed – clock reset OK YES/NO or (NA) (not changed)
 Comments:

- 5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. (YES/NO).
 Comments if changed:

- 6. TEOM Cleaned and Air Conditioner checked (YES/NO). Air Conditioner settings or operational status: OK

Tetralcal Flow/Temp/Pressure Calibrator Serial No: 1009 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

1. Flow Verification – Conducted (YES/NO)

PM10 Flow verified Flow l/min 3.05 Error % 1.7 (allowed error <6%) (PASS/FAIL)

Bypass Flow verified Flow l/min 13.84 Error % 1.2 (allowed error <6%) (PASS/FAIL)

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:** *Fadj recal → see over*

2. Leak Check – Conducted (YES/NO)

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.46 < Limit 0.60

Leak check (PASS/FAIL) – If fail then find leak and retest.

Comments: *Slight leak OK ✓*



Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO

Reference Temperature: 22.5 C TEOM Temperature 22.7 C
 if difference +/- 1 C recalibrate sensor. Sensor recalibrated (YES)/NO

Reference Pressure: 1.001 atm TEOM Pressure 1.000 atm
 if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated (YES)/NO

**Note: Tetral measures Atmospheric Pressure in mm Hg or mb or hPa
 For mb or hPa divide tetral result by 1013.25 to change units to atm.
 For mmHg divide tetral result by 760 to change units to atm.**

2. Flow Calibration – Conducted (YES)/NO
PM10

Set point 2.4 Actual: _____
 Set point 3.6 Actual: _____
 Set point 3.0 Actual: _____ After calibration Final: _____ l/min

Hardware Cal	Pre	Post
Fadj main	1.055	1.050
Fadj aux	1.005	1.005

BYPASS

Set point 10.9 Actual: _____
 Set point 16.4 Actual: _____
 Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (K0) Verification – Conducted (YES)/NO

Actual measured KO = 13825 TEOM stated KO 13748 Error %: 0.56 .
 Allowed Error +/- 2.5%. (PASS)/FAIL
 If Error +/- 2.5% repeat. If confirmed consult manufacturer.
 Second Error % = _____ (PASS)/FAIL. Comments: _____
 If second test fails consult manufacturer.

4. Annual Noise check - Conducted (YES)/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:
 Start date/time: 8/1/24 22:35 Finish date/time: 9/2/24 11:20
 Standard deviation of all recorded data (min 30 min averages) = 1.4 ug/m³
 Noise was less than 5ug/m³ (YES)/NO

5. Maintenance

Air Inlet system cleaned (YES)/NO
 Pump Reconditioned (YES)/NO
 Check Waterproofing (YES)/NO OK
 Comments:





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

FEBRUARY 2024

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 21 March 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for February 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for February 2024.

Approximately 100% of valid TEOM data was available for February 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”; and
- AS/NZS 3580.1.1 - “Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for February 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in January 2024 for December 2023. The next calibration is due to be completed in March 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for February 2024 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/02/2024	16.3	14.9	40.8	37.3
2/02/2024	20.2	14.9	50.5	37.3
3/02/2024	38.7	15.0	96.8	37.6
4/02/2024	31.1	15.1	77.8	37.8
5/02/2024	32.0	15.2	80.0	38.0
6/02/2024	12.6	15.2	31.5	38.0
7/02/2024	17.7	15.2	44.3	38.0
8/02/2024	13.9	15.2	34.8	38.0
9/02/2024	14.1	15.2	35.3	38.0
10/02/2024	13.0	15.2	32.5	37.9
11/02/2024	16.6	15.2	41.5	37.9
12/02/2024	18.0	15.2	45.0	38.0
13/02/2024	15.6	15.2	39.0	38.0
14/02/2024	20.6	15.2	51.5	38.0
15/02/2024	7.7	15.2	19.3	38.0
16/02/2024	14.4	15.2	36.0	37.9
17/02/2024	15.3	15.2	38.3	37.9
18/02/2024	16.3	15.2	40.8	38.0
19/02/2024	14.2	15.2	35.4	38.0
20/02/2024	10.4	15.2	26.0	37.9
21/02/2024	9.4	15.1	23.5	37.8
22/02/2024	13.3	15.1	33.3	37.8
23/02/2024	19.9	15.1	49.8	37.9
24/02/2024	14.0	15.1	35.0	37.9
25/02/2024	13.4	15.1	33.5	37.8
26/02/2024	20.3	15.2	50.8	37.9
27/02/2024	16.8	15.2	42.0	37.9
28/02/2024	18.9	15.2	47.3	37.9
29/02/2024	16.4	15.2	41.0	38.0

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

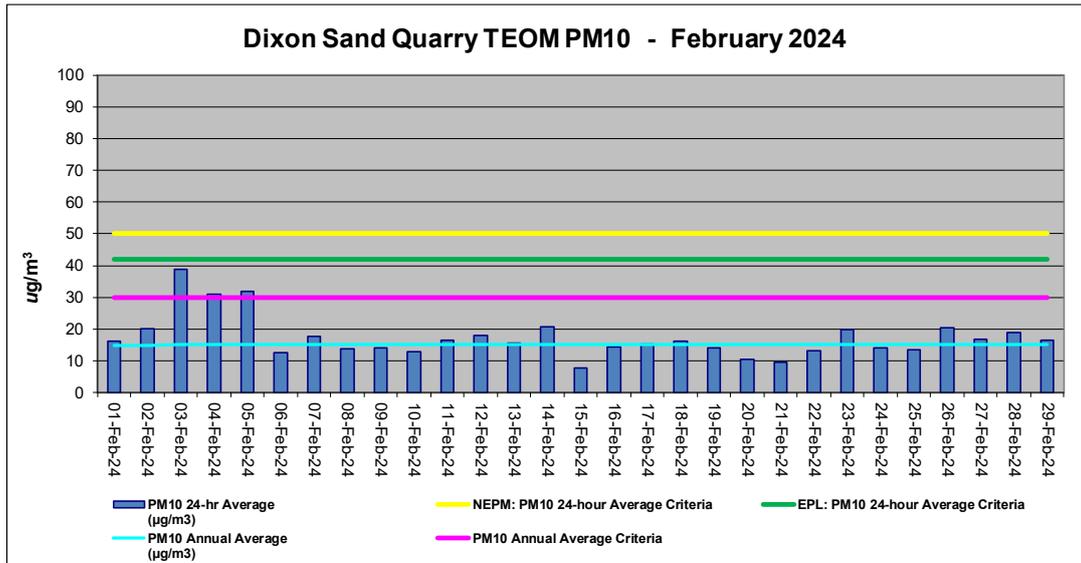


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in September 2023 and is next due in March 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for February 2024.

Table 3: Meteorological Data Summary for February 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/02/2024	18.2	22.2	30.0	1.6	0.3	4.2	17.2	53.7	87.4	100.0	988.2	992.3	995.5
2/02/2024	20.3	23.8	31.5	0.0	0.1	5.6	29.4	29.0	81.0	100.0	986.8	988.8	993.4
3/02/2024	18.2	22.1	26.8	0.0	0.1	5.1	19.6	58.9	75.2	90.5	990.8	993.2	995.1
4/02/2024	19.0	26.3	37.1	0.0	0.1	4.4	20.3	29.1	70.7	97.6	986.4	989.6	992.5
5/02/2024	24.2	28.3	33.6	0.0	0.2	3.5	14.1	48.1	72.1	97.1	986.7	988.7	990.8
6/02/2024	18.4	21.1	24.2	26.2	0.3	3.5	18.2	73.0	93.4	100.0	987.2	992.7	1000.0
7/02/2024	16.0	18.7	23.3	0.0	0.1	4.2	19.3	66.7	78.0	98.4	999.0	1001.5	1004.6
8/02/2024	16.2	19.0	23.5	0.2	0.2	3.2	19.8	56.0	76.7	96.3	1003.3	1004.6	1005.9
9/02/2024	14.8	19.4	24.6	0.0	0.4	3.6	11.1	59.4	77.8	92.0	1000.1	1002.3	1004.9
10/02/2024	17.3	19.4	24.2	4.2	0.5	3.9	18.1	48.2	86.1	100.0	1002.0	1004.3	1005.8
11/02/2024	15.2	19.4	22.6	0.2	0.0	3.2	11.7	67.1	84.3	100.0	1001.2	1003.4	1005.4
12/02/2024	18.5	23.2	30.4	0.0	0.0	4.4	18.9	44.8	76.6	94.5	996.5	1000.0	1002.6
13/02/2024	19.5	25.2	33.1	0.0	0.1	3.5	11.9	34.4	74.5	100.0	991.3	995.1	998.5
14/02/2024	18.0	23.3	31.7	3.0	0.2	3.9	16.4	45.8	78.0	100.0	989.7	993.8	1000.4
15/02/2024	16.2	17.6	19.1	5.4	0.0	3.2	9.5	99.9	99.9	99.9	999.5	1001.6	1003.5
16/02/2024	17.3	21.2	27.6	0.2	0.4	3.6	16.5	70.4	93.2	99.9	1000.1	1002.1	1003.4
17/02/2024	20.3	23.9	31.0	0.2	0.4	3.3	15.5	46.2	85.1	100.0	998.6	1001.0	1002.6
18/02/2024	18.5	23.0	29.8	0.2	0.0	2.4	11.4	53.5	88.9	100.0	997.0	999.1	1001.1
19/02/2024	17.6	19.7	24.9	6.8	0.1	2.2	15.0	77.3	95.7	100.0	996.8	999.1	1001.0
20/02/2024	17.9	19.1	21.8	17.0	0.1	2.9	11.8	83.0	96.0	100.0	997.6	999.0	1000.9
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22/02/2024	19.1	23.4	31.8	0.0	0.1	3.1	17.2	44.4	84.7	100.0	990.5	993.9	997.3
23/02/2024	22.4	27.4	36.4	0.0	0.4	5.3	19.0	28.9	66.6	92.4	985.9	989.3	993.3
24/02/2024	16.9	18.5	22.1	3.2	0.3	3.0	9.9	81.7	93.9	100.0	993.2	997.4	1001.5
25/02/2024	13.8	20.5	27.5	0.0	0.0	3.4	13.7	53.6	80.9	100.0	993.6	997.4	1001.0
26/02/2024	18.8	22.7	31.1	0.0	0.1	3.0	25.3	40.2	79.0	96.6	993.5	995.7	999.6
27/02/2024	18.0	19.9	21.9	0.4	0.1	2.6	10.7	77.9	92.1	100.0	998.3	999.5	1000.8
28/02/2024	19.6	23.0	29.2	0.0	0.0	3.8	16.1	64.4	89.4	100.0	996.0	998.6	1001.0
29/02/2024	21.5	28.9	39.5	0.0	0.3	4.8	17.2	27.9	65.2	99.8	992.2	994.6	997.6
Monthly	13.8	22.1	39.5	73.0	0.0	3.6	29.4	27.9	83.3	100.0	985.9	997.1	1005.9

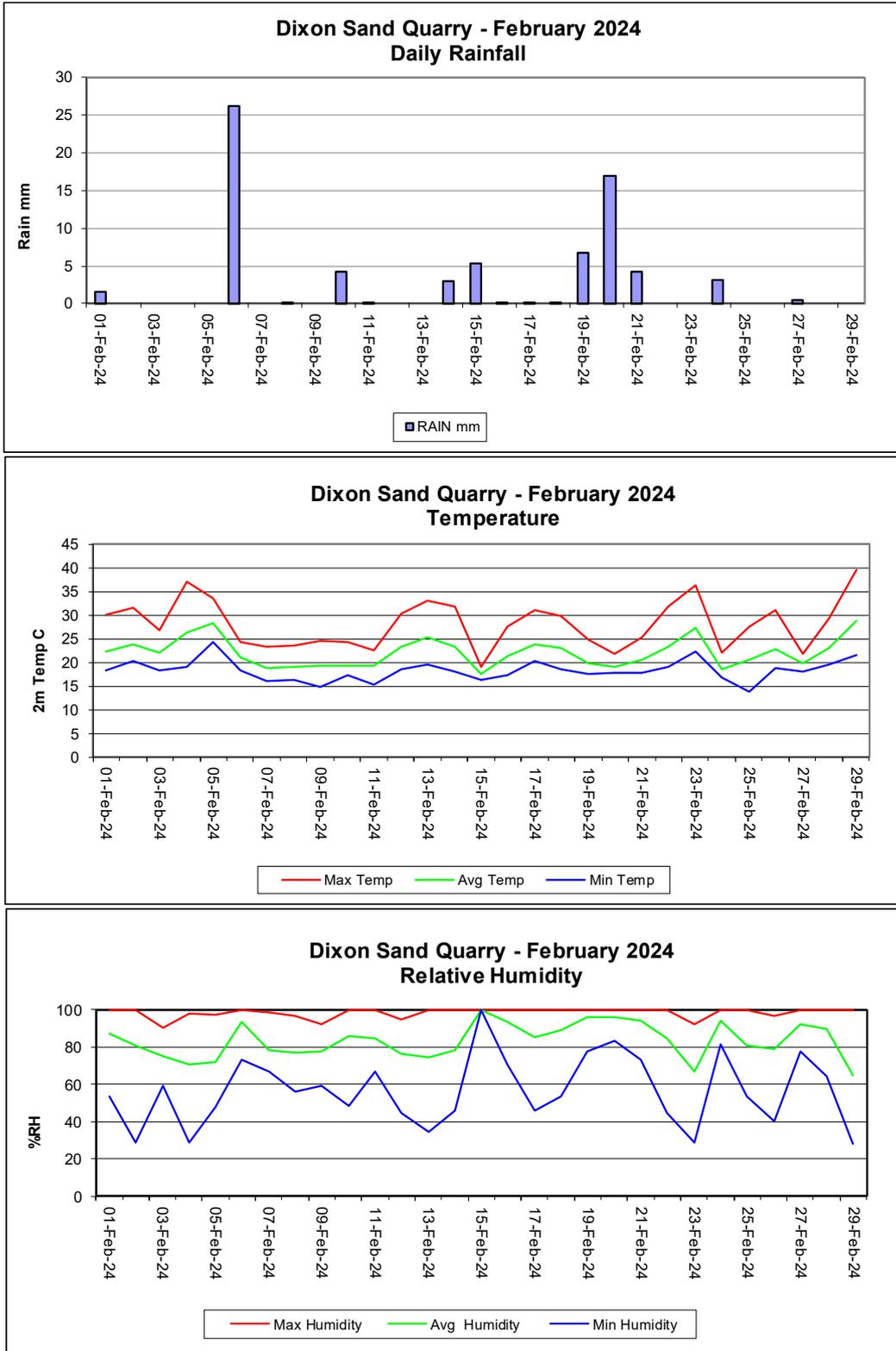


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

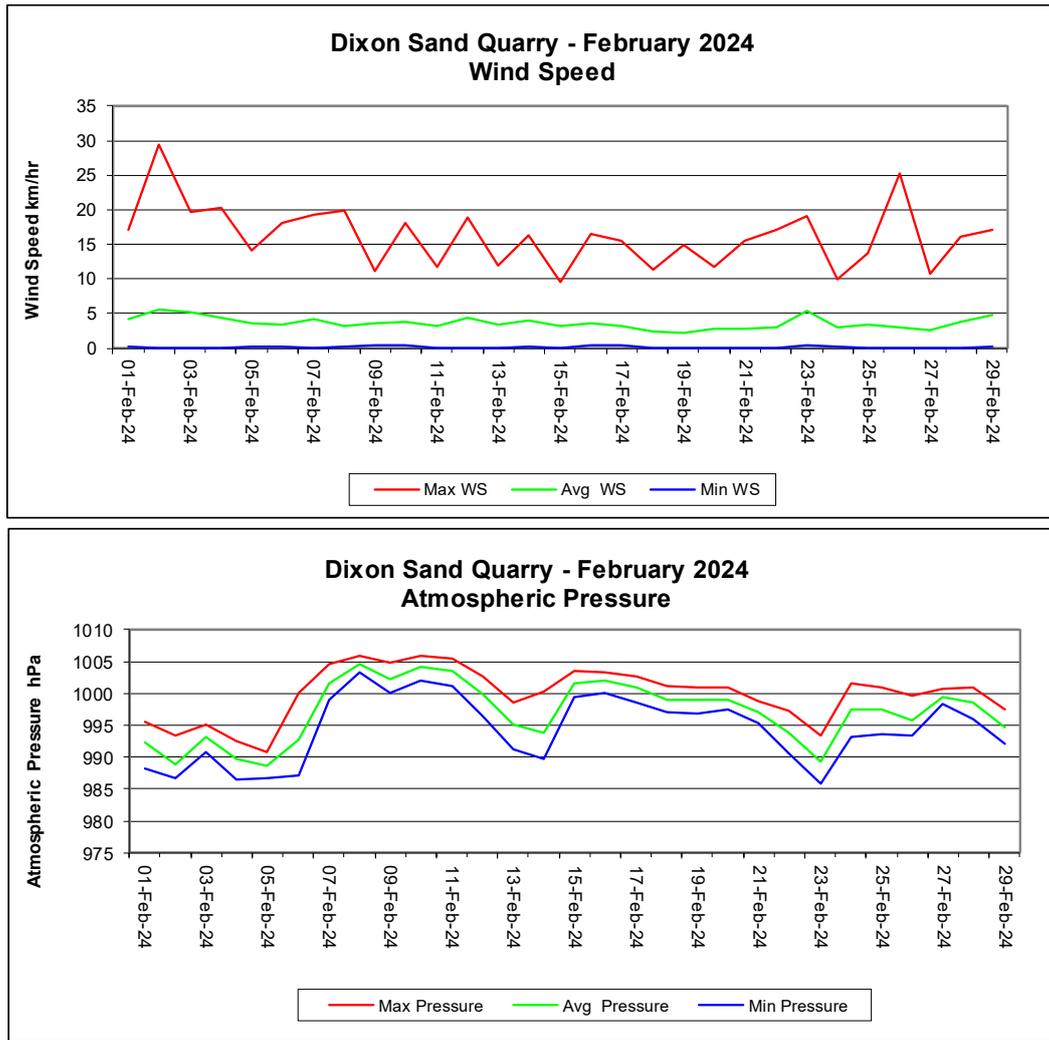


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose FEBRUARY 2024

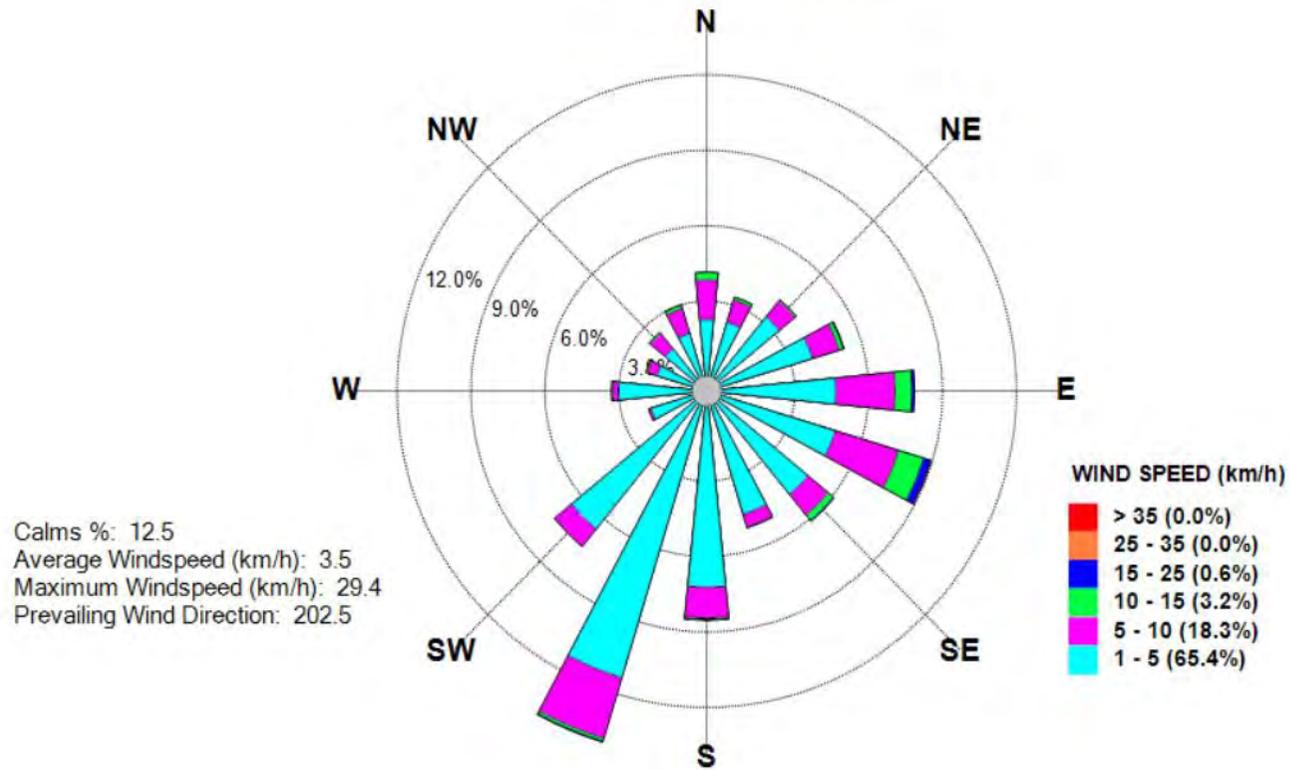


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

MARCH 2024

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 24 April 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for March 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for March 2024.

Approximately 100% of valid TEOM data was available for March 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for March 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted on 7 March 2024. The next calibration is due to be completed in June 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for March 2024 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/03/2024	31.8	15.3	79.5	38.1
2/03/2024	21.6	15.3	54.0	38.2
3/03/2024	14.1	15.3	35.2	38.2
4/03/2024	22.0	15.3	55.0	38.3
5/03/2024	18.4	15.3	46.0	38.3
6/03/2024	20.0	15.3	50.0	38.3
7/03/2024	29.3	15.4	73.3	38.5
8/03/2024	14.7	15.4	36.8	38.5
9/03/2024	16.5	15.4	41.3	38.5
10/03/2024	14.2	15.4	35.5	38.5
11/03/2024	19.4	15.4	48.5	38.5
12/03/2024	22.3	15.4	55.8	38.6
13/03/2024	27.0	15.5	67.5	38.7
14/03/2024	24.7	15.5	61.8	38.8
15/03/2024	12.5	15.5	31.3	38.7
16/03/2024	10.1	15.5	25.3	38.7
17/03/2024	6.7	15.4	16.8	38.6
18/03/2024	11.8	15.4	29.5	38.6
19/03/2024	11.6	15.4	29.0	38.5
20/03/2024	15.5	15.4	38.8	38.5
21/03/2024	17.6	15.4	44.0	38.6
22/03/2024	13.2	15.4	33.0	38.5
23/03/2024	16.3	15.4	40.8	38.5
24/03/2024	12.5	15.4	31.3	38.5
25/03/2024	16.2	15.4	40.5	38.5
26/03/2024	23.9	15.4	59.8	38.6
27/03/2024	22.0	15.5	55.0	38.7
28/03/2024	16.8	15.5	42.0	38.7
29/03/2024	12.3	15.5	30.8	38.6
30/03/2024	14.3	15.5	35.8	38.6
31/03/2024	9.1	15.4	22.8	38.6

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

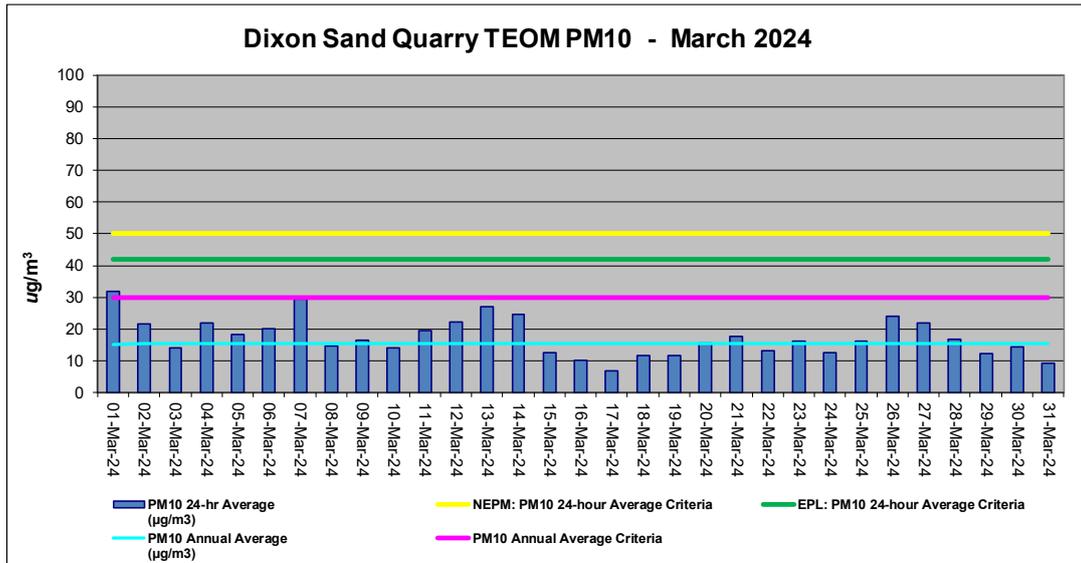


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted on 7 March 2024 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for March 2024.

Table 3: Meteorological Data Summary for March 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/03/2024	21.0	23.9	28.1	0.0	0.1	4.4	13.3	66.7	89.1	97.6	992.6	995.1	997.3
2/03/2024	19.7	23.2	27.3	1.4	0.0	2.5	9.6	79.7	92.6	99.1	990.3	994.2	998.4
3/03/2024	17.2	22.9	31.9	0.0	0.0	2.9	14.8	24.2	77.2	100.0	991.2	994.6	998.1
4/03/2024	16.2	19.6	22.8	0.0	0.2	3.0	18.6	56.8	76.8	99.8	997.2	1001.8	1004.8
5/03/2024	14.4	19.4	25.3	0.0	0.1	3.2	14.5	48.9	70.1	89.0	1000.2	1002.7	1005.2
6/03/2024	16.7	22.6	30.3	0.0	0.1	3.8	16.1	39.8	72.8	92.9	997.2	999.9	1002.3
7/03/2024	19.7	23.5	28.9	0.0	0.2	2.9	22.6	61.0	83.8	100.0	998.3	1001.8	1006.0
8/03/2024	19.5	22.7	27.9	0.0	0.1	4.0	20.5	51.1	80.2	99.9	1003.5	1005.0	1006.4
9/03/2024	17.9	22.6	28.3	0.0	0.0	4.0	18.4	43.5	76.4	99.2	1004.5	1006.0	1007.8
10/03/2024	17.9	22.5	28.3	0.0	0.1	4.4	22.1	40.9	78.1	100.0	1006.0	1007.4	1009.1
11/03/2024	18.5	22.4	28.0	0.0	0.0	3.9	19.0	41.4	75.3	98.9	1002.6	1005.5	1008.1
12/03/2024	17.2	24.0	33.8	0.0	0.0	3.2	23.6	25.2	64.2	96.3	995.3	998.7	1003.0
13/03/2024	16.8	22.3	28.2	0.0	0.1	3.7	20.9	47.4	74.5	100.0	994.4	996.7	998.9
14/03/2024	17.9	23.4	34.8	2.2	0.1	3.9	11.9	26.6	75.1	100.0	988.5	992.2	996.7
15/03/2024	15.2	18.1	22.9	2.0	0.1	4.4	23.2	57.9	84.0	100.0	996.8	1000.4	1003.9
16/03/2024	13.7	17.8	23.4	0.2	0.0	3.3	21.6	62.4	83.8	100.0	998.9	1001.4	1003.8
17/03/2024	16.6	18.2	21.2	4.8	0.1	2.7	12.8	77.7	93.4	100.0	994.7	996.9	999.1
18/03/2024	16.8	19.5	25.5	0.0	0.0	2.6	17.4	62.7	90.8	100.0	994.9	996.0	997.4
19/03/2024	18.1	21.7	28.2	0.0	0.0	3.3	13.9	55.6	86.7	100.0	994.6	996.6	998.9
20/03/2024	17.0	21.2	25.5	0.0	0.1	3.2	16.4	71.8	86.5	100.0	993.4	997.8	1006.2
21/03/2024	12.2	16.2	20.7	0.4	0.0	3.2	18.1	49.2	67.9	90.9	1006.1	1007.8	1010.1
22/03/2024	13.5	17.0	21.5	0.0	0.2	2.5	8.9	67.5	82.7	95.6	1002.7	1005.1	1007.5
23/03/2024	14.0	18.5	24.4	0.0	0.1	3.0	12.8	51.1	81.9	99.8	1001.3	1003.0	1004.8
24/03/2024	16.5	19.9	26.8	0.4	0.0	3.0	12.7	44.4	83.0	100.0	998.0	1000.6	1003.1
25/03/2024	15.9	21.7	29.5	0.0	0.2	2.8	12.4	18.2	68.0	100.0	996.9	999.0	1000.5
26/03/2024	14.6	19.9	28.8	0.0	0.2	3.3	21.9	37.3	80.5	100.0	997.9	1000.1	1002.4
27/03/2024	16.4	19.8	25.1	0.0	0.0	4.3	24.1	53.3	86.9	100.0	1002.1	1003.6	1005.3
28/03/2024	16.7	18.9	24.0	2.2	0.0	3.0	17.2	66.3	93.3	100.0	1003.4	1005.1	1007.0
29/03/2024	16.4	19.0	24.5	0.2	0.0	3.0	16.8	62.3	85.8	100.0	1005.5	1007.0	1009.2
30/03/2024	15.8	20.7	28.4	0.0	0.1	3.8	18.2	39.3	75.5	99.7	1003.1	1005.4	1007.3
31/03/2024	15.6	19.5	26.6	0.0	0.1	2.8	15.8	48.2	85.8	100.0	1000.7	1002.9	1005.4
Monthly	12.2	20.7	34.8	13.8	0.0	3.4	24.1	18.2	80.7	100.0	988.5	1001.0	1010.1

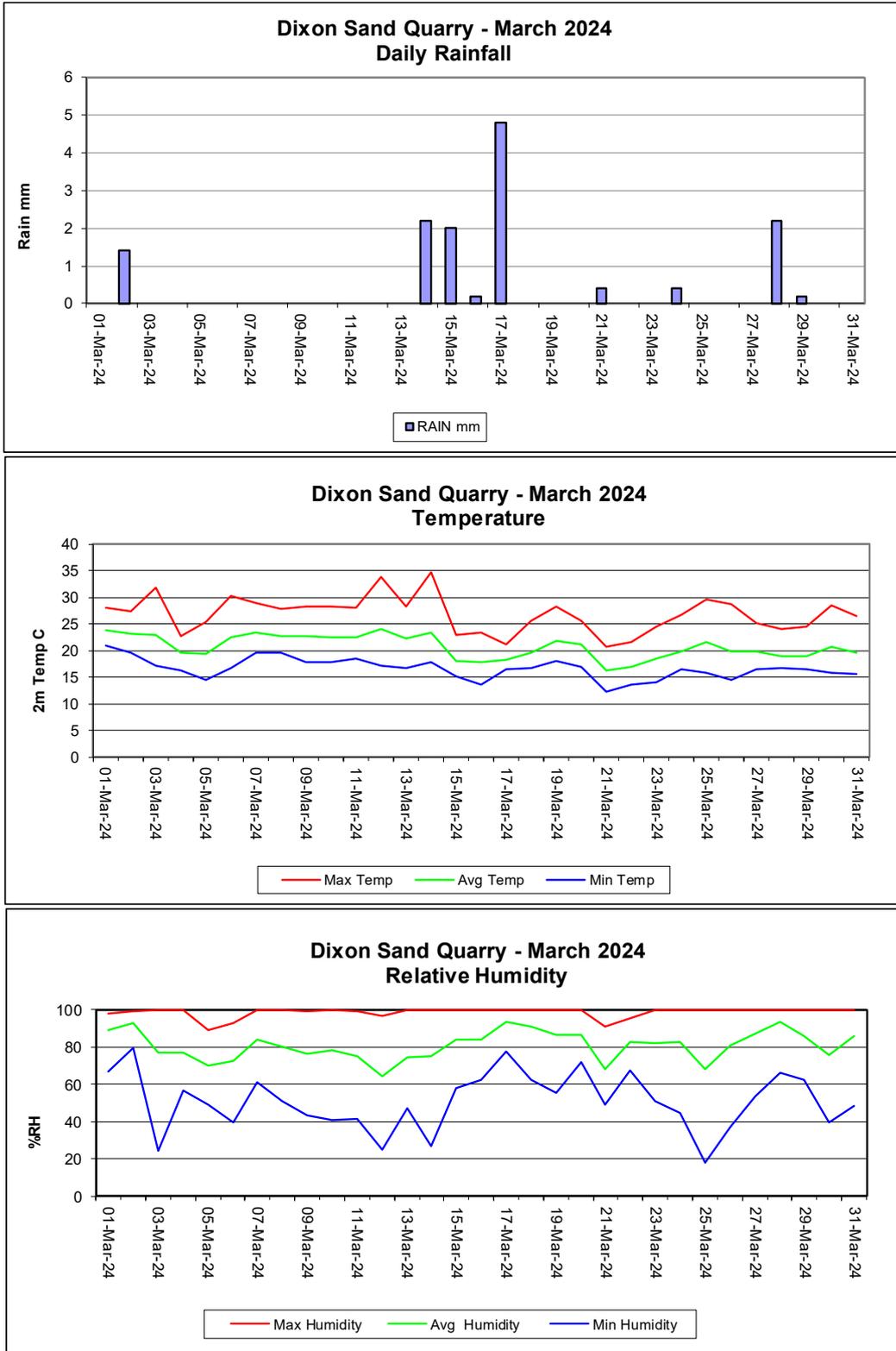


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

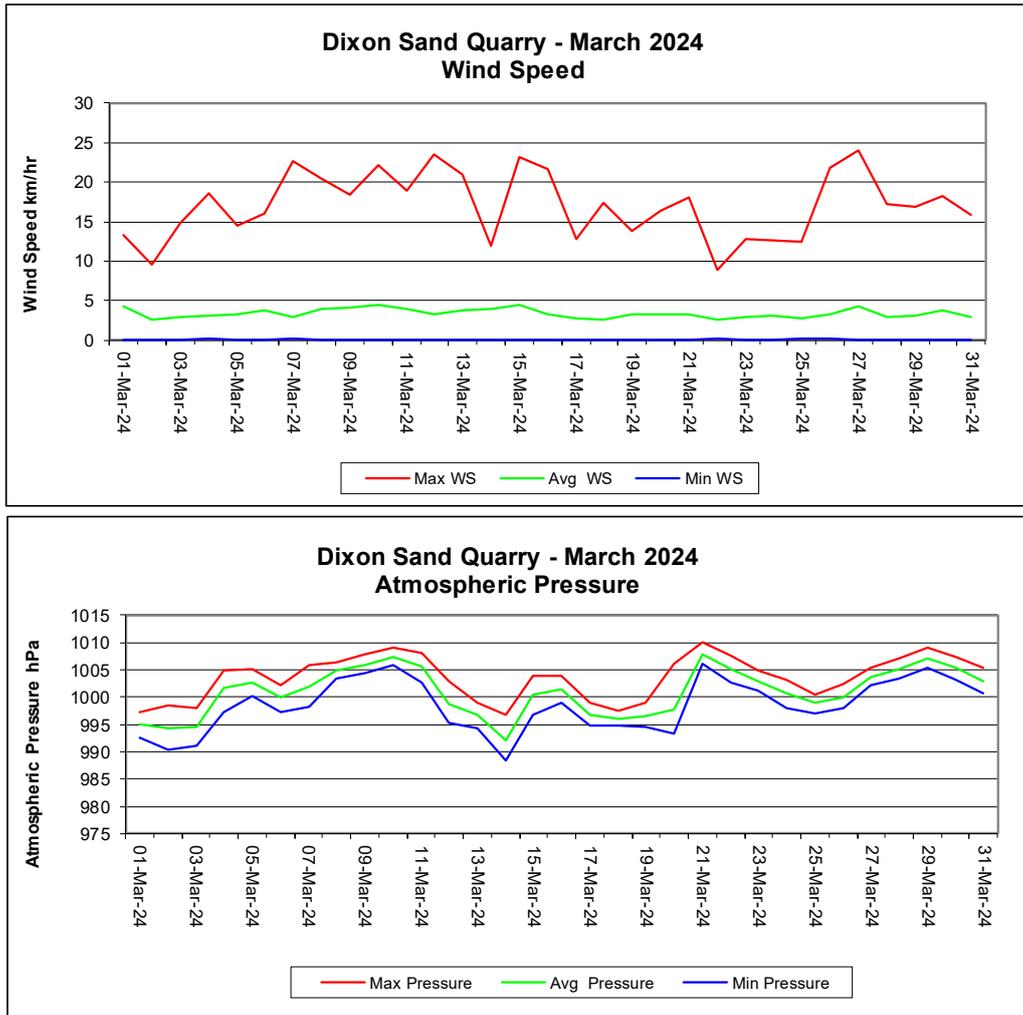


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose MARCH 2024

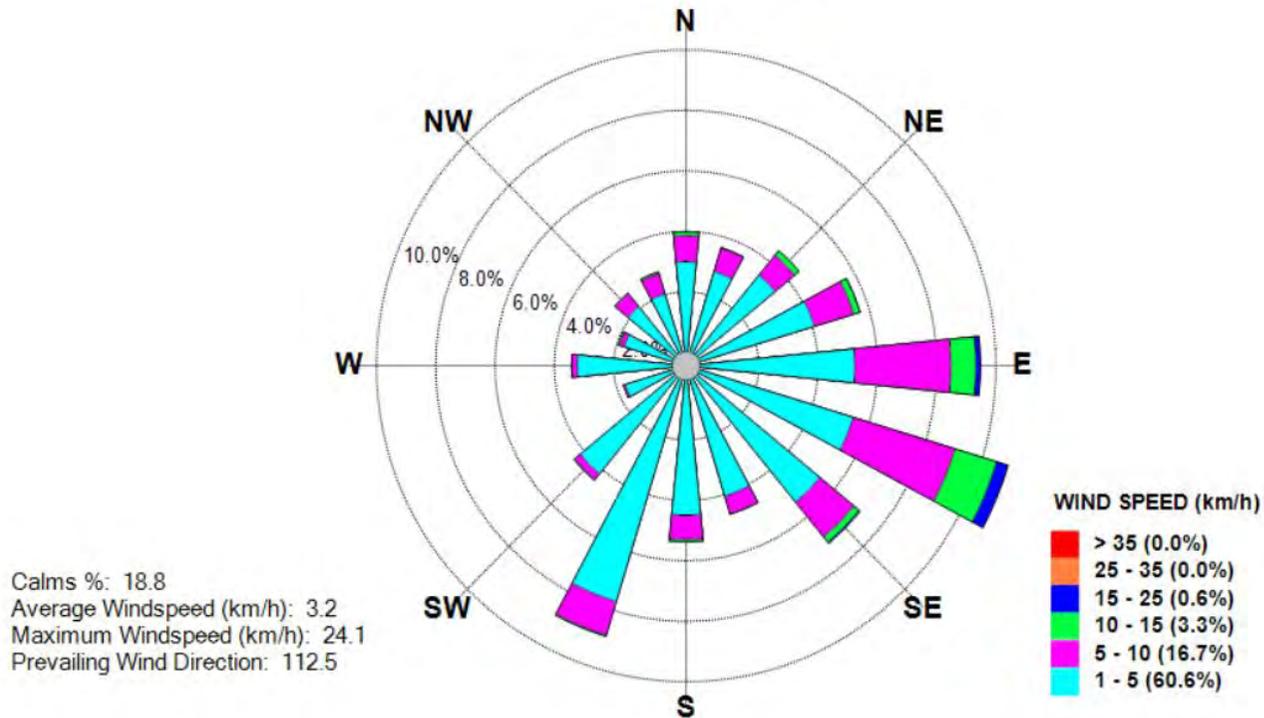


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB



TEOM Client/Site: Dixon Sands / TEOM

Date: 7/3/24

1. TEOM Data Screen SERIAL No: 25570 Firmware: N/A

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OK +	Green - Normal	✓	
Date/time	TEOM: 14:05 Actual: 14:07	Current Date/time correct within 5 minutes	✓ OK	
PM-10 24hr av	27.4	Positive values	✓	
Filter loading PM10	39	<80 %	✓	
Frequency PM-10	253-87649	200-300 Hz	✓	
Noise PM-10	0.036	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	NA OK	<0.50 atm	✓	
Warnings	NIL	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/**NO** (circle)

Technician Name : COLIN DAVIES Signed [Signature]



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	30.7	-10 to 50 C	/	
Ambient Dew Point	NA	-10 to 50 C	/	
Ambient Pressure	0.970	0.9-1.1 atm	/	
Ambient Relative Humidity	NA	10-100 %RH	/	
Cap temperature	50.00	50.00 +/- 0.10 C	/	
Case temperature	50.00	50.00 +/- 0.10 C	/	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	/	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	/	
Bypass Flow rate	13.68	12.95 – 14.39 lpm	/	
Total Flow rate	16.68	15.67 – 17.67 lpm	/	

Comments:

Results: (Tick box)

- There were NO equipment faults found. No action required – (file report)**
- There were faults found (Fails) – Were these fixed on site: YES/NO (circle)**
Any Fails that cannot be repaired on site must be reported to CBased:
Office: 65713334 or email cbased@bigpond.com
Date faults notified to CBased: _____

Comments/Action Required:



Calibration/Maintenance

- 1. 1405A: Were Filters replaced YES/NO
- 2. PM10 Inlet head cleaned YES/NO
- 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	16	253.52859	253.52862	253.52864	257.52864

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable) OK
 Pass/Fail – if Fail – install new filter and redo stability test.

- 4. Instrument clock verified (Refer Section 1) YES/NO.
 If Time changed – clock reset OK YES/ NO or NA (not changed)
 Comments:

- 5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.
 Comments if changed:

- 6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: _____

Tetracal Flow/Temp/Pressure Calibrator Serial No: 1009 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

- 1. Flow Verification – Conducted YES/NO

PM10 Flow verified Flow l/min 3.03 Error % 1.0 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.69 Error % 0.1 (allowed error <6%) PASS/FAIL

If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

- 2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.45 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.

Comments:



Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO

Reference Temperature: _____ C TEOM Temperature _____ C

if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: _____ atm TEOM Pressure _____ atm

if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

**Note: Tetralcal measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetralcal result by 1013.25 to change units to atm.
For mmHg divide tetralcal result by 760 to change units to atm.**

2. Flow Calibration – Conducted YES/NO

MA

PM10

Set point 2.4 Actual: _____

Set point 3.6 Actual: _____

Set point 3.0 Actual: _____ After calibration Final: _____ l/min

BYPASS

Set point 10.9 Actual: _____

Set point 16.4 Actual: _____

Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (KO) Verification – Conducted YES/NO

Actual measured KO = _____ TEOM stated KO _____ Error %: _____

Allowed Error +/- 2.5%. PASS/FAIL

If Error +/- 2.5% repeat. If confirmed consult manufacturer.

Second Error % = _____ PASS/FAIL. Comments:

If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:

Start date/time: _____ Finish date/time: _____

Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³

Noise was less than 5ug/m³ YES/NO

5. Maintenance

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:





CBased Environmental Pty Limited
ABN 62 611 924 264

Weather Station Field Check

Site: Dixon Sands
Date/Time: 7/03/2024 15:00

Measured Against Reference Sensors

Parameter	Units	Site	Reference	Difference	Pass/Fail	Reference Description
Temperature 10m	°C	27.8	28.0	-0.2	Pass	Ref Thermometer
Humidity	%RH	64	65	-1.0	Pass	Ref RH sensor
Rainfall	mm	3.0	3.0	0.0	Pass	Glass Pipette
Wind Speed	km/hr	5.9	6.0	-0.1	Pass	Ref Anemometer
Wind Direction	Degrees	140	143	-3.0	Pass	Sighting compass

Reference Instruments Specifications: *Calibration expires: 10/02/2025

Sensor	Serial Number	Specifications	Accuracy
*Temperature	230210N04	-40 to 65°C	+/- 0.3°C
*Barometer	BF230207001	20 to 30" Hg	+/- 1.1hPa
*Humidity	230210N04	10 to 90%RH	+/- 2%RH
*Anemometer	230210N06	0 to 64km/hr	+/- 3.6km/hr or 5%
**Rainfall	Standard number of tips	3.2mm	+/- 0.2mm
Compass	Sighting Compass	0 to 360 degrees	+/- 5 Deg

** 100mL used.

Reference sensors were certified by Davis Instruments USA using a reference traceable to National Institute of Standards and Technology (NIST) and were "in calibration" when used.

Comments:

The weatherstation was in conformance with the reference instruments at the monitored levels. Wind direction is referenced to true north. The calibration check of the raingauge involved adding water to the raingauge. Rain total of 3.0mm should be deleted from site records on the 7/3/2024.

NA=Not Available

The meteorological station meets the requirements of the Approved Methods for the Sampling and Analysis of Air Pollutants in NSW.

The weather station has Passed the field check. Next annual field check due:

Sep-24

Checked by: Colin Davies

10/03/2024

CBased Environmental Pty Limited
Unit 3, 2 Enterprise Crescent
SINGLETON NSW 2330
P: 65 713 334



CBased Environmental Pty Limited

ABN 62 611 924 264

Weather Station Physical Screening Field Check

Client DIXON SANDS

Site Name: DIXON SANDS AWS

Date: 7/3/24

Time: 15:00

	Yes (Pass)	No (Fail)	Comments
Grass / Vegetation Impacts			
Compound Grass height <10cm	✓		
No objects within impact area (10 x height of object)		✓	Trees/buildings nearby
Ground Anchor / Guy Wires / Mast Condition			
Bottom guy wires tight (correct tension = 35-50mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		fixed mast
Top Guy wires tensioned (correct tension = 60-75mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		" "
Mast Vertical and in good condition	✓		OK
Ground anchors/star pickets tight in ground	NA		fix mast
Guy Wires insignificant corrosion	NA		" "
Ground anchors/D shackles/ winders insignificant corrosion	NA		" "
Bolts/hinge points in mast are secure	NA		" "
Cables / Connectors / Logger Cabinet / Solar Panel			
Cables attached to mast/guy wires via ties are secure	NA		mast design -> cant attach
Insignificant corrosion to plugs/connectors	✓		
No water ingress in logger/battery cabinet	✓		
Wiring/plugs in cabinet OK, Logger OK	✓		
Battery terminals and condition OK	NA		Battery Volts = 240V System
Battery volts (charging >13V, not charging >12V)	NA		No solar
Solar panel undamaged and clean	NA		No solar
Sensor shields clean	✓		
Sensor Check			
Wind direction aligned True North/Magnetic North (strike out N/A)	✓		Compass Bearing: 348 degrees
Rain gauge cleaned, working OK (1 tip check) or 100ml Cal	✓		100ml cal check
Rain gauge level OK	✓		
Anemometer/wind vane moving freely (analogue sensors)	NA		gill
Other sensors visually checked and OK	✓		
Last months data checked and OK / Logging data OK	✓		

Checked By: Name COLIN DAVIE Signed [Signature]

CBased Environmental Pty Limited
Unit 3, 2 Enterprise Crescent
SINGLETON NSW 2330
P: (02) 6571 3334



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

APRIL 2024

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 28 May 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for April 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in **green** indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in **red** indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for April 2024.

Approximately 100% of valid TEOM data was available for April 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser*”; and
- AS/NZS 3580.1.1 - “*Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment*”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for April 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted in March 2024. The next calibration is due to be completed in June 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for April 2024 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/04/2024	12.9	15.4	32.3	38.6
2/04/2024	12.8	15.4	32.0	38.5
3/04/2024	16.1	15.4	40.3	38.5
4/04/2024	9.6	15.4	24.0	38.5
5/04/2024	6.0	15.4	15.0	38.4
6/04/2024	3.4	15.3	8.5	38.3
7/04/2024	6.2	15.3	15.5	38.2
8/04/2024	9.8	15.3	24.4	38.2
9/04/2024	11.1	15.3	27.8	38.1
10/04/2024	10.5	15.2	26.3	38.1
11/04/2024	14.9	15.2	37.3	38.1
12/04/2024	13.3	15.2	33.3	38.1
13/04/2024	18.2	15.2	45.5	38.1
14/04/2024	17.6	15.2	44.0	38.1
15/04/2024	22.3	15.3	55.8	38.2
16/04/2024	25.7	15.3	64.3	38.3
17/04/2024	17.7	15.3	44.3	38.3
18/04/2024	13.6	15.3	34.0	38.3
19/04/2024	16.7	15.3	41.8	38.3
20/04/2024	9.1	15.3	22.8	38.2
21/04/2024	12.6	15.3	31.5	38.2
22/04/2024	12.0	15.3	30.0	38.2
23/04/2024	9.3	15.3	23.3	38.1
24/04/2024	13.9	15.2	34.8	38.1
25/04/2024	16.1	15.2	40.3	38.1
26/04/2024	13.8	15.2	34.5	38.1
27/04/2024	14.6	15.2	36.5	38.1
28/04/2024	10.6	15.2	26.5	38.1
29/04/2024	14.6	15.2	36.5	38.1
30/04/2024	16.0	15.2	40.0	38.1

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

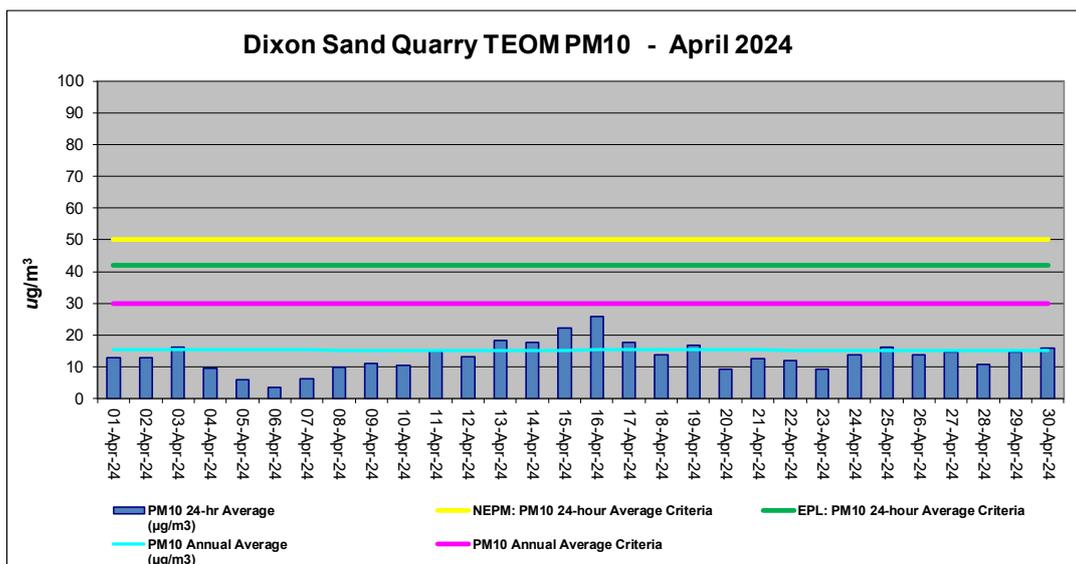


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2024 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for April 2024.

Table 3: Meteorological Data Summary for April 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/04/2024	16.7	22.1	29.7	0.0	0.3	4.4	18.7	32.1	69.9	94.7	996.2	999.3	1002.1
2/04/2024	16.5	20.1	24.7	4.4	0.5	4.7	20.3	42.8	76.8	98.8	990.3	993.5	997.2
3/04/2024	13.4	17.9	24.9	0.0	0.0	3.2	16.9	43.9	71.9	97.5	996.1	999.2	1003.3
4/04/2024	15.8	16.5	17.4	15.0	0.2	2.4	11.7	88.4	98.2	100.0	1002.0	1004.0	1006.1
5/04/2024	15.9	17.2	18.7	90.0	0.1	5.3	28.1	96.7	99.8	100.0	997.7	1002.4	1005.4
6/04/2024	17.2	21.2	26.2	30.8	0.6	5.0	18.4	46.8	75.9	100.0	992.9	994.9	997.6
7/04/2024	16.5	20.9	26.9	0.0	0.1	3.5	13.0	42.1	67.0	85.9	988.9	991.5	994.5
8/04/2024	15.9	18.4	25.3	0.0	0.1	2.9	15.7	48.9	80.6	96.5	989.8	991.1	992.7
9/04/2024	10.1	15.0	20.9	0.0	0.1	3.8	18.6	42.5	84.0	100.0	989.5	991.4	994.3
10/04/2024	10.6	14.8	19.6	0.0	0.0	5.4	20.3	43.3	58.7	72.4	993.6	996.0	998.1
11/04/2024	9.8	15.5	21.7	0.0	0.1	3.9	13.0	42.8	70.1	95.3	998.0	1000.2	1001.6
12/04/2024	11.6	17.6	23.1	0.0	0.0	4.4	11.9	44.8	72.6	100.0	998.7	1000.9	1003.3
13/04/2024	13.0	17.7	24.2	0.0	0.0	3.1	21.3	51.3	85.3	100.0	999.8	1001.4	1003.6
14/04/2024	14.5	18.6	25.3	0.0	0.0	2.8	16.1	45.6	86.3	100.0	1000.6	1002.6	1004.3
15/04/2024	14.3	18.5	26.3	0.0	0.1	2.4	17.6	29.8	78.4	100.0	1000.8	1002.8	1004.6
16/04/2024	13.2	17.6	24.2	0.0	0.1	3.3	17.2	55.2	86.5	99.3	1001.4	1003.4	1005.3
17/04/2024	14.7	17.6	23.6	0.8	0.2	3.1	18.6	71.0	94.0	100.0	1001.1	1003.2	1005.7
18/04/2024	14.2	17.2	23.5	2.2	0.0	2.1	10.3	58.1	92.0	100.0	994.4	997.4	1001.1
19/04/2024	10.9	14.8	18.9	0.2	0.0	2.2	8.9	50.7	80.4	99.9	995.5	998.4	1002.6
20/04/2024	13.2	14.6	17.7	3.8	0.8	5.5	14.2	76.4	93.1	100.0	1002.0	1004.9	1007.8
21/04/2024	12.6	15.4	20.1	0.2	0.1	3.8	14.0	67.5	84.9	100.0	1007.0	1008.3	1009.6
22/04/2024	12.1	16.0	21.6	0.0	0.0	2.7	8.1	62.8	87.7	100.0	1006.2	1008.0	1009.9
23/04/2024	12.7	18.4	23.9	0.0	0.0	3.6	11.6	49.7	74.4	100.0	999.5	1003.2	1006.6
24/04/2024	14.1	18.4	24.4	0.0	0.0	4.5	20.1	50.8	70.2	84.0	995.9	998.2	1001.0
25/04/2024	11.9	15.0	20.3	0.0	0.3	4.0	11.3	38.8	69.0	83.6	999.0	1000.5	1002.3
26/04/2024	8.8	13.8	20.0	0.0	0.0	3.2	10.5	40.4	74.4	98.3	1001.7	1003.7	1006.0
27/04/2024	9.1	14.8	21.0	0.0	0.0	2.4	8.8	59.6	87.0	100.0	1005.4	1006.8	1008.6
28/04/2024	12.1	17.0	23.4	0.0	0.0	2.4	11.0	45.4	84.6	100.0	1003.6	1005.9	1008.2
29/04/2024	13.7	18.9	25.0	0.0	0.0	3.2	10.9	37.1	67.9	97.3	1001.9	1003.5	1005.5
30/04/2024	12.8	14.9	16.8	2.8	0.3	3.7	10.2	80.8	90.3	100.0	1002.9	1005.8	1008.4
Monthly	8.8	17.2	29.7	150.2	0.0	3.6	28.1	29.8	80.4	100.0	988.9	1000.7	1009.9

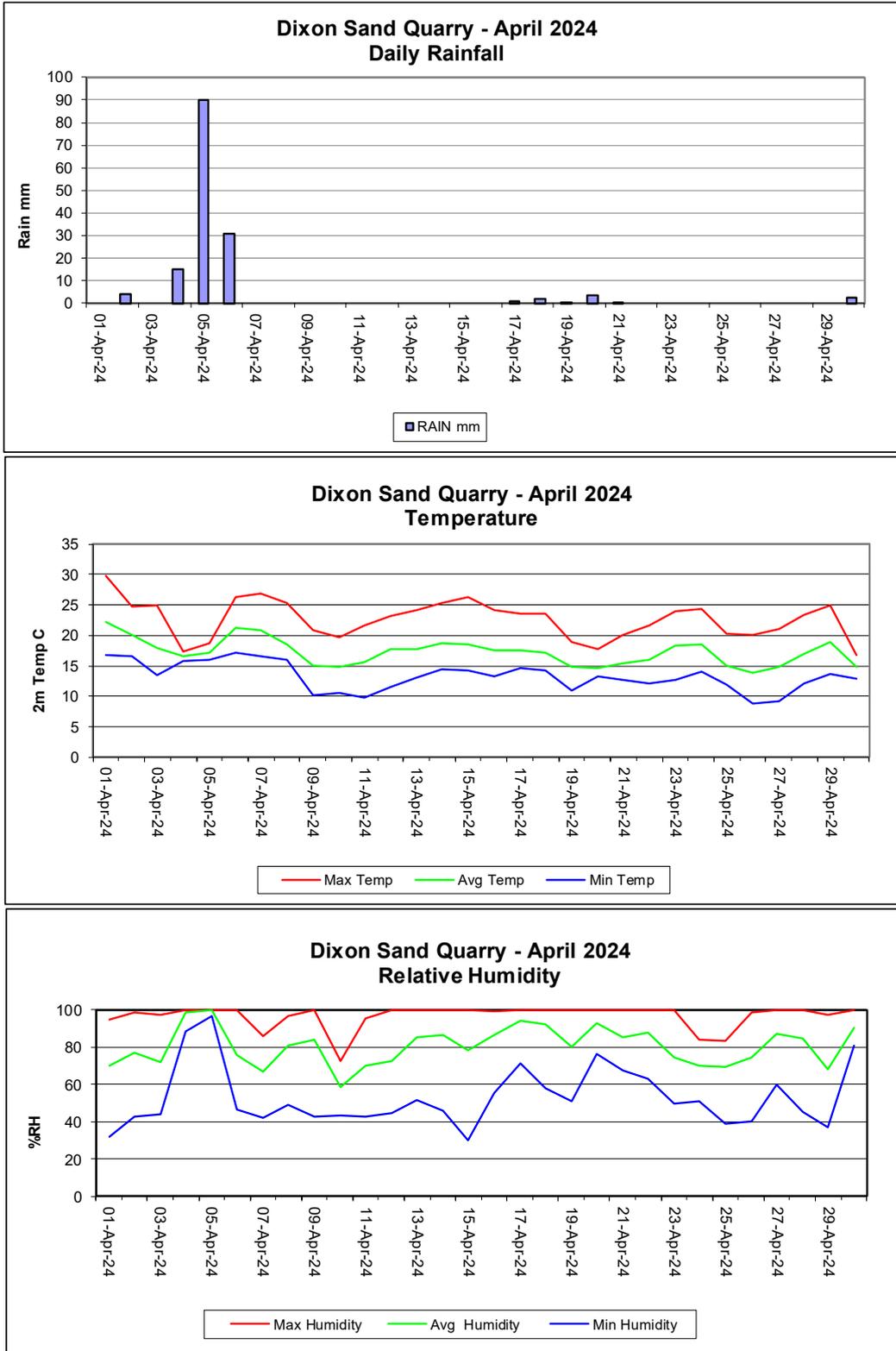


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

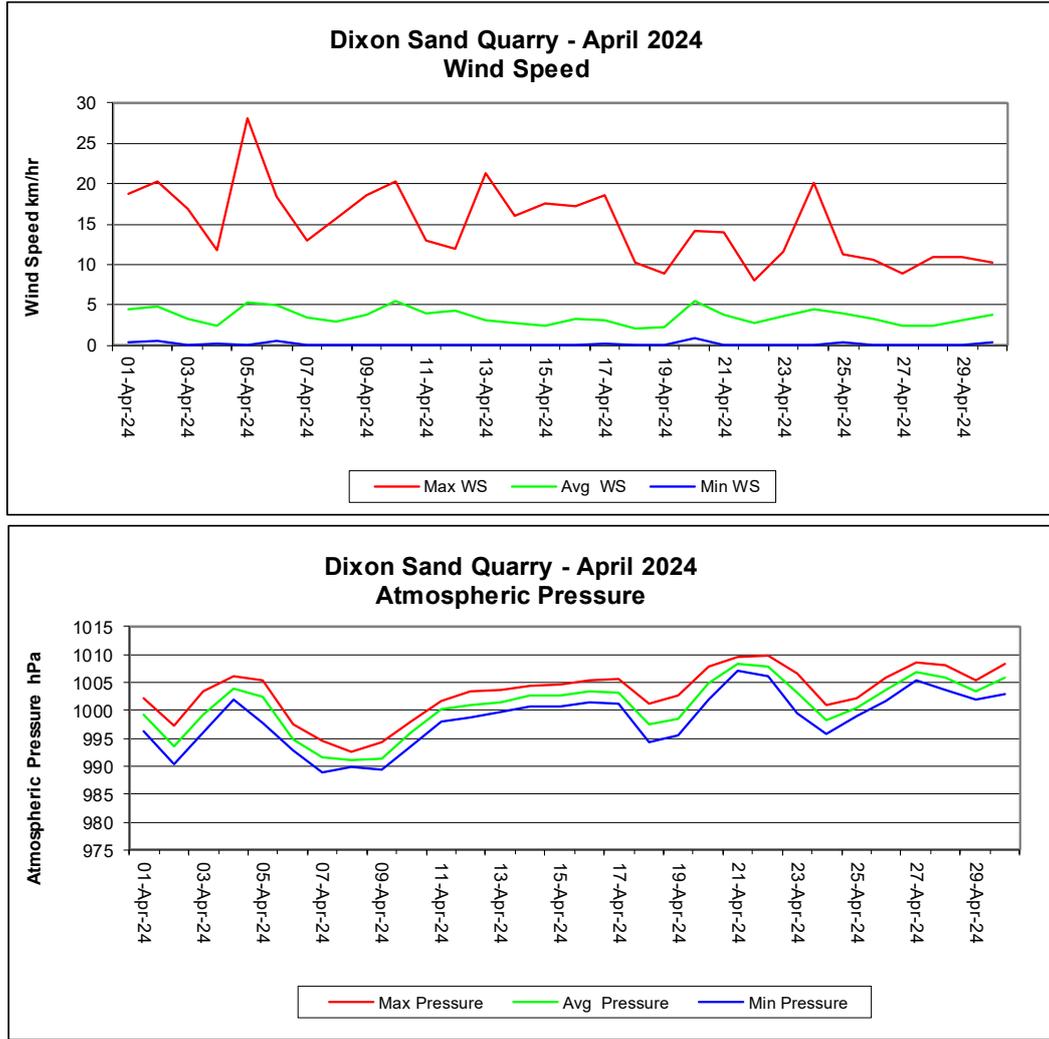


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose APRIL 2024

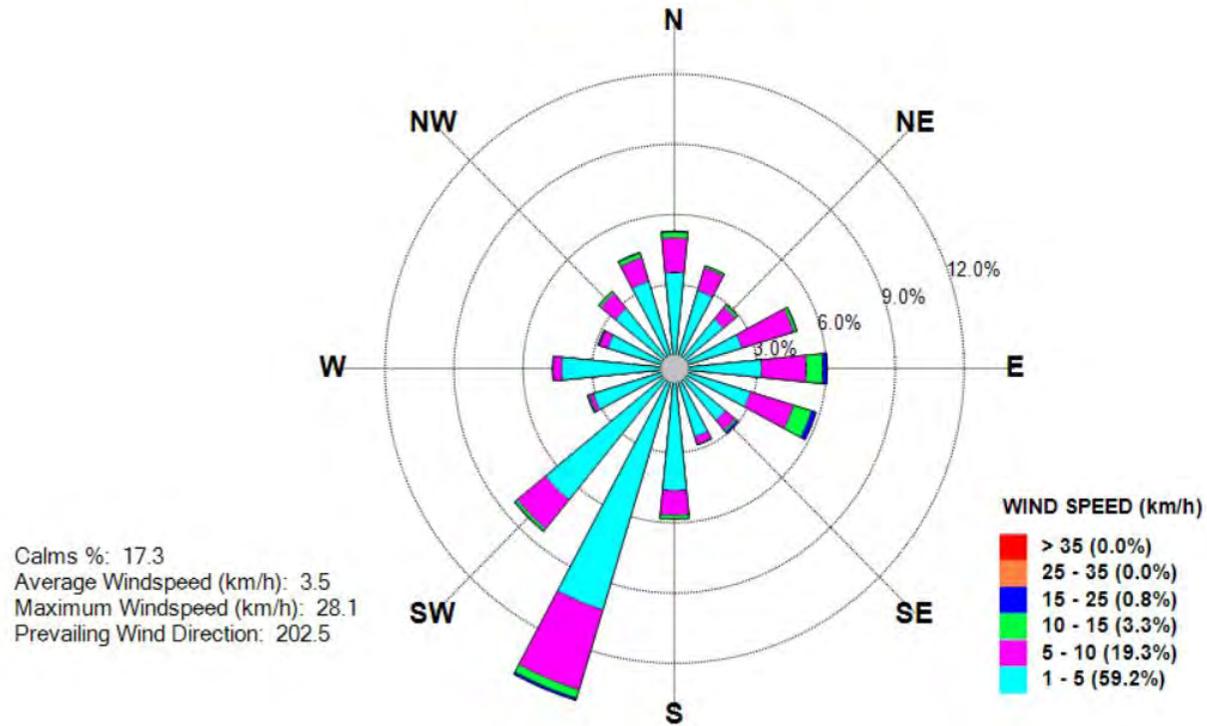


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

MAY 2024

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 28 June 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for May 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of valid meteorological data was recorded for May 2024.

Approximately 100% of valid TEOM data was available for May 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”; and
- AS/NZS 3580.1.1 - “Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for May 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has not yet been collected.

The quarterly TEOM calibration was conducted on 23 May 2024 (for June). The next calibration is due to be completed in September 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for May 2024 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/05/2024	11.1	15.2	27.8	38.0
2/05/2024	9.1	15.2	22.8	38.0
3/05/2024	9.9	15.2	24.8	37.9
4/05/2024	10.4	15.2	26.0	37.9
5/05/2024	7.0	15.1	17.5	37.8
6/05/2024	9.5	15.1	23.8	37.8
7/05/2024	10.0	15.1	25.0	37.8
8/05/2024	12.2	15.1	30.5	37.7
9/05/2024	10.5	15.1	26.3	37.7
10/05/2024	11.0	15.1	27.5	37.7
11/05/2024	8.0	15.0	20.0	37.6
12/05/2024	6.9	15.0	17.3	37.5
13/05/2024	13.7	15.0	34.3	37.5
14/05/2024	16.2	15.0	40.5	37.5
15/05/2024	18.0	15.0	45.0	37.6
16/05/2024	20.7	15.0	51.8	37.6
17/05/2024	17.8	15.1	44.5	37.6
18/05/2024	9.6	15.0	24.0	37.6
19/05/2024	9.0	15.0	22.5	37.5
20/05/2024	15.5	15.0	38.8	37.5
21/05/2024	11.3	15.0	28.3	37.5
22/05/2024	12.7	15.0	31.8	37.5
23/05/2024	10.6	15.0	26.4	37.5
24/05/2024	20.8	15.0	52.0	37.5
25/05/2024	16.5	15.0	41.3	37.5
26/05/2024	18.3	15.0	45.8	37.5
27/05/2024	20.8	15.0	52.0	37.6
28/05/2024	20.1	15.0	50.3	37.6
29/05/2024	19.6	15.1	49.0	37.7
30/05/2024	16.0	15.1	40.0	37.7
31/05/2024	11.5	15.1	28.8	37.6

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 ug/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

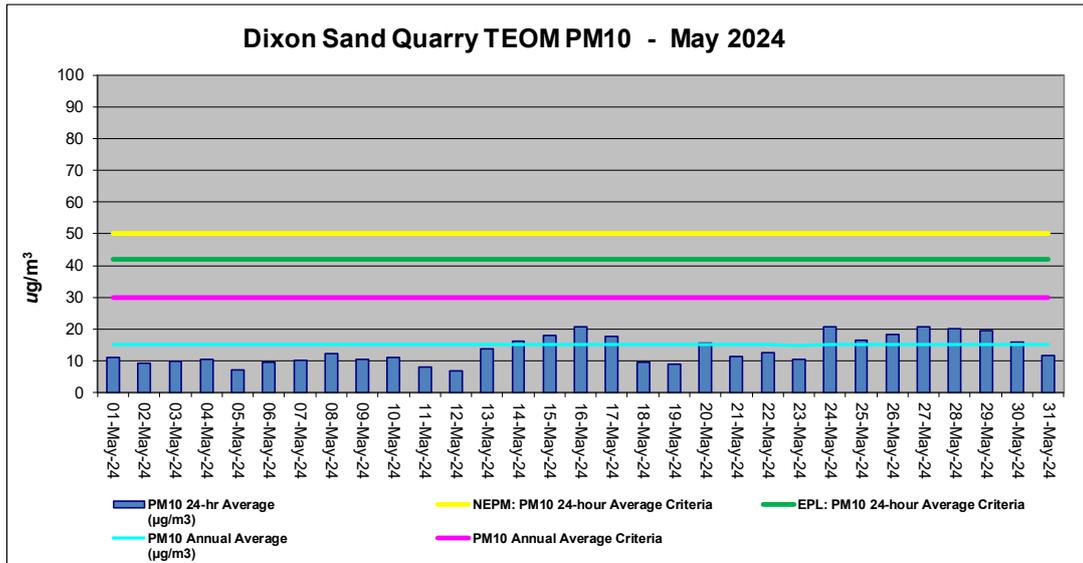


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2024 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for May 2024.

Table 3: Meteorological Data Summary for May 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/05/2024	11.2	13.4	17.0	1.4	0.4	4.8	16.3	76.4	90.1	100.0	1007.5	1009.5	1011.0
2/05/2024	11.1	13.7	18.2	0.6	0.2	3.3	13.9	68.5	92.5	100.0	1009.2	1010.4	1012.0
3/05/2024	11.3	13.3	16.2	10.2	0.2	2.5	9.7	86.0	98.1	100.0	1006.6	1008.5	1010.4
4/05/2024	12.5	14.4	18.1	3.8	0.1	2.0	7.4	83.9	98.1	100.0	1001.9	1004.1	1006.4
5/05/2024	12.8	13.8	16.0	13.4	0.1	3.7	11.6	98.0	99.9	100.0	1000.6	1002.0	1004.1
6/05/2024	11.4	14.4	19.0	32.6	0.2	4.7	19.0	60.9	90.3	100.0	1003.9	1007.3	1010.2
7/05/2024	11.4	14.0	18.5	0.4	0.1	2.8	9.6	67.9	94.1	100.0	1009.0	1010.1	1011.7
8/05/2024	11.5	14.0	17.7	7.2	0.1	1.9	5.6	92.0	99.5	100.0	1008.8	1010.4	1012.2
9/05/2024	13.1	14.8	19.1	1.0	0.1	2.0	7.9	80.0	98.2	100.0	1009.7	1010.9	1012.5
10/05/2024	13.5	14.9	18.5	0.2	0.0	2.0	13.7	73.9	96.4	100.0	1007.9	1009.6	1011.2
11/05/2024	13.6	14.6	16.1	15.6	0.0	3.0	14.9	90.5	99.1	100.0	1002.7	1005.4	1008.2
12/05/2024	13.1	14.6	19.8	1.8	0.1	3.3	14.8	72.6	95.1	100.0	998.4	1000.3	1002.7
13/05/2024	13.4	15.8	19.2	0.8	0.2	4.1	18.9	76.6	91.8	100.0	997.6	1000.3	1003.3
14/05/2024	11.9	15.9	21.5	0.0	0.1	2.4	9.1	44.9	79.5	100.0	1003.1	1005.5	1008.7
15/05/2024	11.5	15.7	20.4	0.0	0.0	2.8	12.0	62.8	88.4	100.0	1006.1	1008.2	1010.2
16/05/2024	11.5	15.1	19.5	0.0	0.0	1.8	6.2	75.2	92.5	100.0	1006.7	1008.4	1010.6
17/05/2024	11.8	15.9	21.7	0.0	0.0	1.6	6.6	52.8	84.0	99.9	1001.0	1003.5	1006.7
18/05/2024	9.2	11.4	14.0	0.2	0.3	7.4	23.2	60.1	75.4	92.6	1000.8	1003.0	1004.3
19/05/2024	6.9	11.3	16.9	0.0	0.0	3.1	13.3	38.0	62.3	83.8	1000.0	1001.7	1003.3
20/05/2024	6.8	11.4	16.7	0.0	0.0	3.2	11.4	54.6	68.7	81.8	1000.8	1003.1	1005.6
21/05/2024	10.4	13.0	17.9	0.0	0.2	4.5	13.9	56.9	76.1	92.6	1005.1	1006.4	1007.8
22/05/2024	8.0	12.2	17.8	0.0	0.1	2.6	8.6	47.8	75.0	99.2	1004.2	1006.1	1007.8
23/05/2024	7.8	12.5	19.1	0.0	0.0	1.9	8.7	45.5	77.8	99.9	1005.5	1006.6	1008.3
24/05/2024	8.3	12.9	19.1	0.0	0.0	2.0	7.5	51.7	86.3	100.0	1005.3	1006.8	1008.1
25/05/2024	10.1	12.8	16.8	0.0	0.0	1.4	5.1	71.1	92.3	100.0	1005.9	1007.1	1008.9
26/05/2024	9.9	14.1	20.0	0.0	0.0	2.1	7.5	51.1	84.2	100.0	1003.2	1005.1	1006.5
27/05/2024	8.6	13.1	19.5	0.0	0.1	1.9	7.4	50.7	83.1	100.0	1004.0	1005.3	1007.3
28/05/2024	8.4	14.0	20.7	0.0	0.1	2.4	8.0	47.1	76.8	100.0	1006.7	1007.8	1009.3
29/05/2024	8.7	14.8	22.0	0.2	0.2	3.2	11.0	52.2	80.6	100.0	1006.0	1007.9	1009.6
30/05/2024	10.2	16.3	22.0	0.0	0.2	4.3	15.8	50.3	71.7	97.3	1000.7	1004.7	1007.5
31/05/2024	15.5	17.7	19.7	0.0	0.6	7.1	22.5	59.4	72.1	95.1	996.3	998.5	1000.6
Monthly	6.8	14.1	22.0	89.4	0.0	3.1	23.2	38.0	86.1	100.0	996.3	1005.9	1012.5

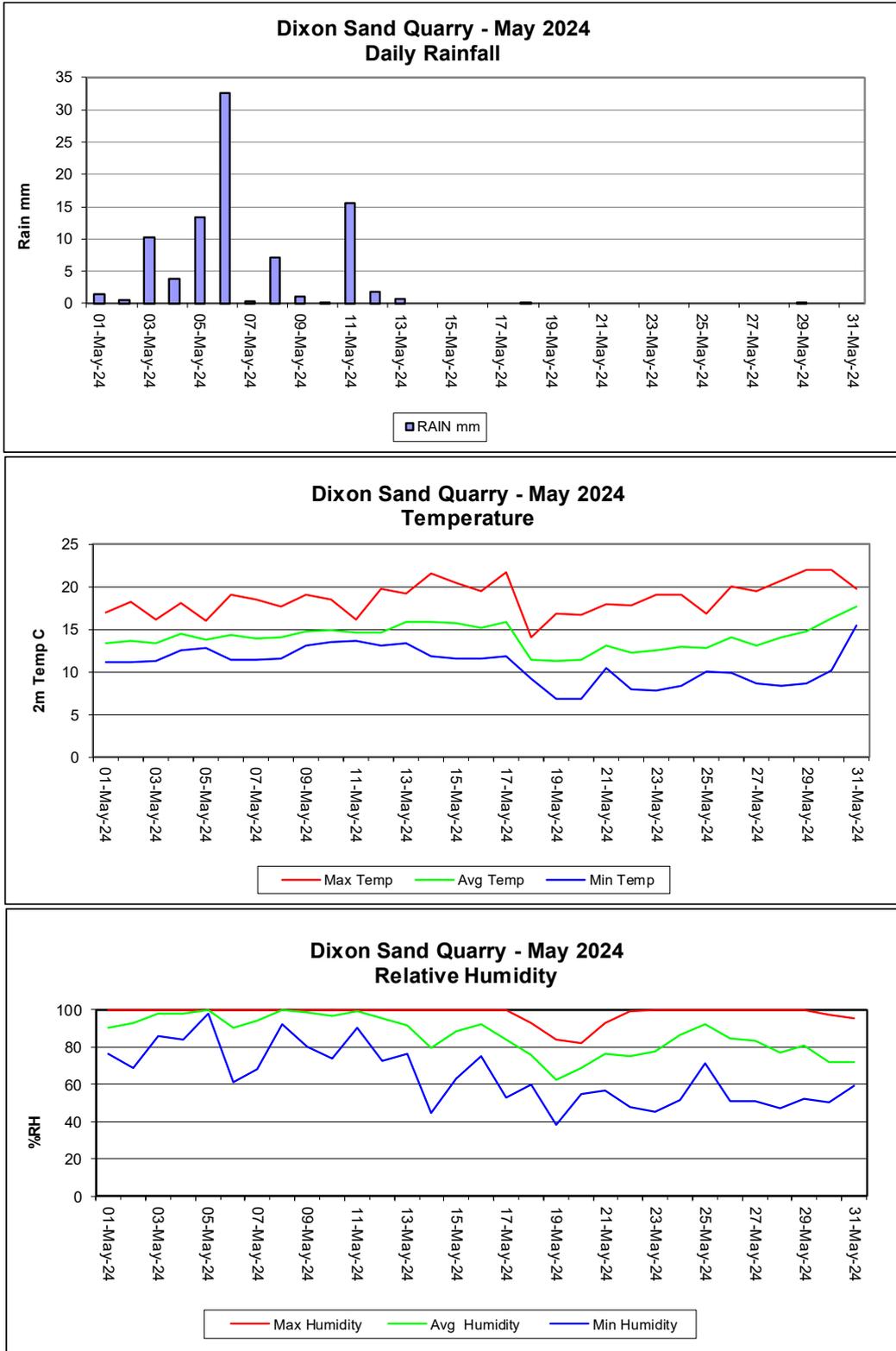


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

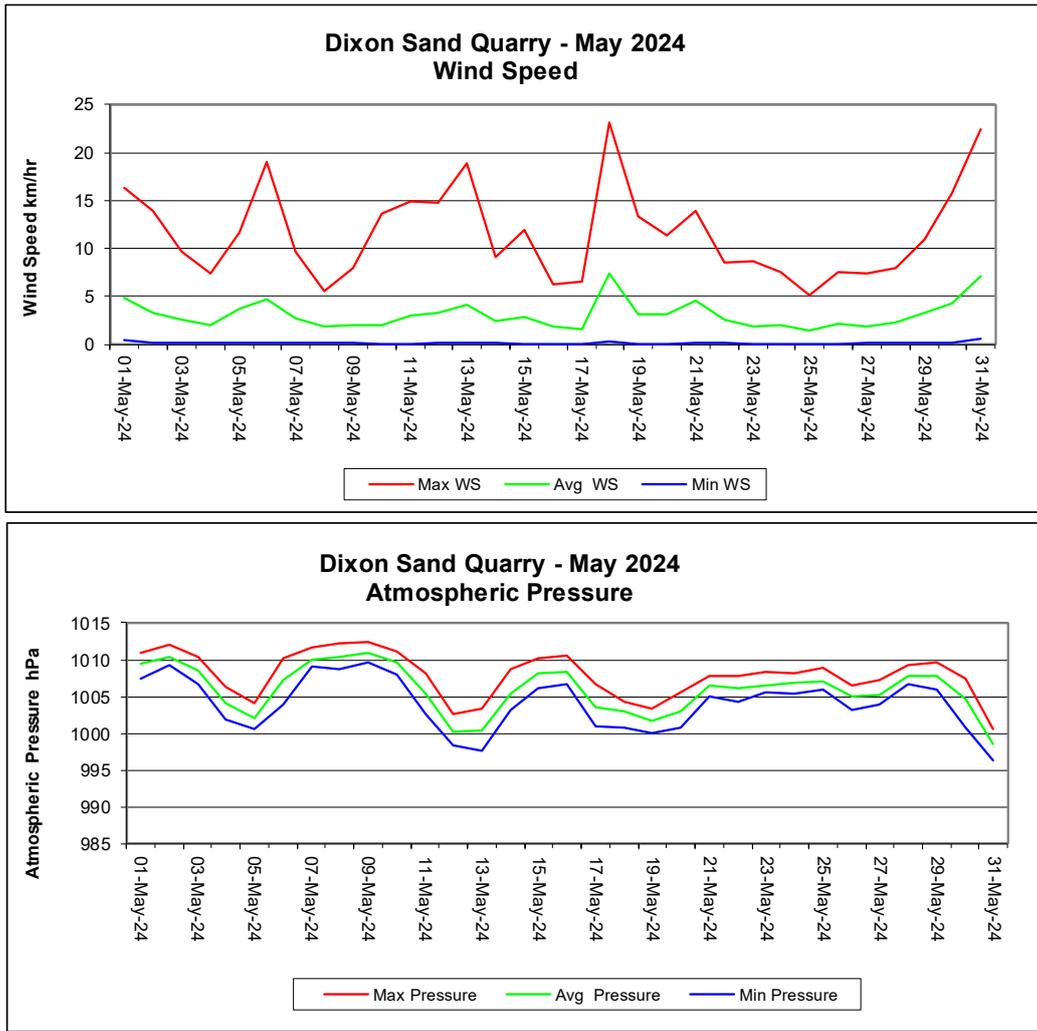


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose MAY 2024

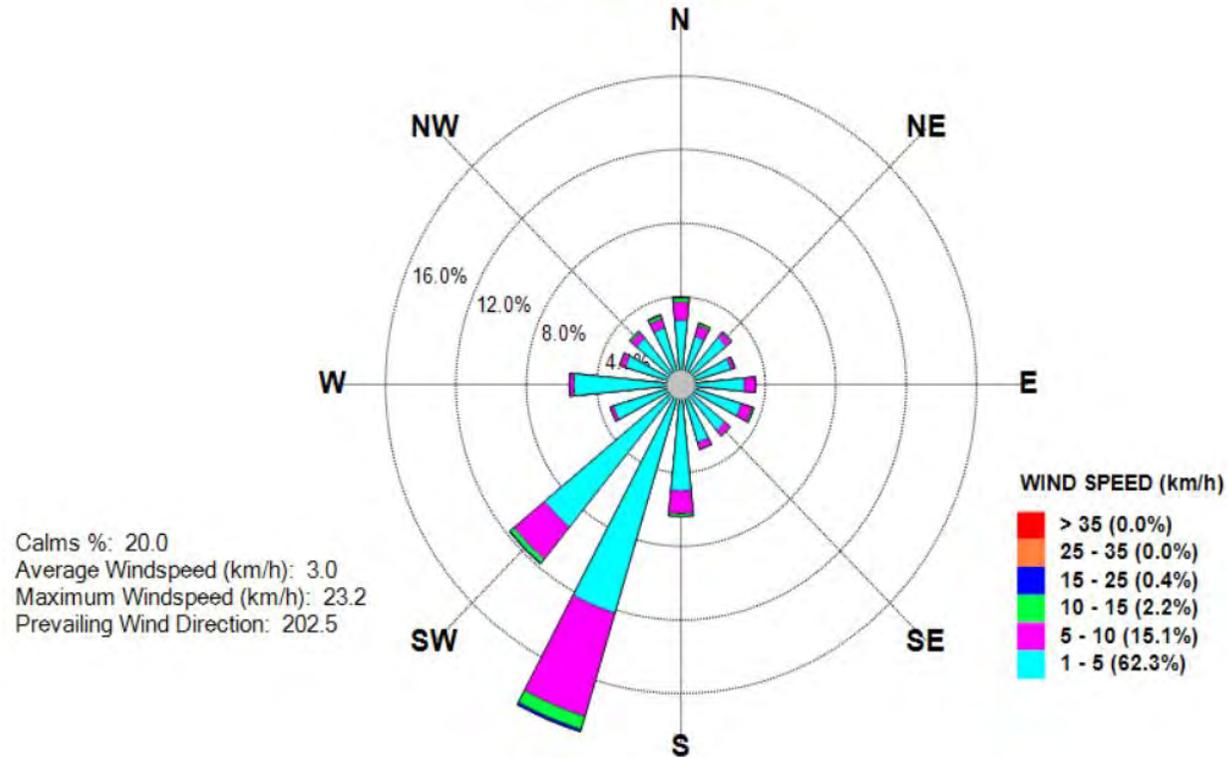


Figure 4: Monthly Windrose

Appendix 1

Calibration Documents (when required)



Continuous Air Quality Monthly/Quarterly/Six Monthly/Annual TEOM Maintenance and Calibration – 1400AB



TEOM Client/Site: Dixon Sudd Teom1

Date: 23/5/24

1. TEOM Data Screen SERIAL No: 25570 Firmware: AB version

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>OK</u>	Green - Normal	✓	
Date/time	TEOM: <u>16-26</u> Actual: <u>15-20</u>	Current Date/time correct within 5 minutes	✓ DST	
PM-10 24hr av	<u>12.2</u>	Positive values	✓	
Filter loading PM10	<u>56</u>	<80 %	✓	
Frequency PM-10	<u>253.62831</u>	200-300 Hz	✓	
Noise PM-10	<u>0.034</u>	<0.100ug	✓	

Comment: If filter load >80% but <90% and if flows Ok then data is OK

Comments:

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>NA: OK</u>	<0.50 atm	✓	
Warnings	<u>NIL</u>	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DAVIS Signed [Signature]



3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	17.3	-10 to 50 C	/	
Ambient Dew Point	NA	-10 to 50 C		
Ambient Pressure	0.981	0.9-1.1 atm	/	
Ambient Relative Humidity	NA	10-100 %RH		
Cap temperature	50.00	50.00 +/- 0.10 C	/	
Case temperature	50.00	50.00 +/- 0.10 C	/	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	/	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	/	
Bypass Flow rate	13.68	12.95 – 14.39 lpm	/	
Total Flow rate	16.68	15.67 – 17.67 lpm	/	

Comments:

Results: (Tick box)

- There were NO equipment faults found. No action required – (file report)
- There were faults found (Fails) – Were these fixed on site: YES/NO (circle)
 Any **Fails** that cannot be repaired on site must be reported to CBased:
 Office: 65713334 or email cbased@bigpond.com
 Date faults notified to CBased: _____

Comments/Action Required:



Calibration/Maintenance

- 1. 1405A: Were Filters replaced YES/NO
- 2. PM10 Inlet head cleaned YES/NO
- 3. If measurement filters were replaced, confirm stable results after change. Stable particulate results confirmed YES/NO

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	18	255.56541	255.56538	255.56539	255.56538

✓OK

Frequency should not drift by more than 0.0010 between readings (if instrument is thermodynamically stable)
 Pass/Fail – if Fail – install new filter and redo stability test.

- 4. Instrument clock verified (Refer Section 1) YES/NO.
 If Time changed – clock reset OK YES/NO or NA (not changed)
 Comments:

- 5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.
 Comments if changed:

- 6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: 5 med cool

Tetralcal Flow/Temp/Pressure Calibrator Serial No: 1007 Refer to calibration corrections for Temperature/Pressure and Flows and apply to all readings.

Quarterly or Six Monthly Calibration

- 1. Flow Verification – Conducted YES/NO

PM10 Flow verified Flow l/min 3.05 Error % 1.7 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.95 Error % 2.0 (allowed error <6%) PASS/FAIL
 If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

- 2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.42 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.
 Comments: OK



Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO

Reference Temperature: _____ C TEOM Temperature _____ C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: _____ atm TEOM Pressure _____ atm
if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

**Note: Tetralcal measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetralcal result by 1013.25 to change units to atm.
For mmHg divide tetralcal result by 760 to change units to atm.**

2. Flow Calibration – Conducted YES/NO

PM10

Set point 2.4 Actual: _____
Set point 3.6 Actual: _____
Set point 3.0 Actual: _____ After calibration Final: _____ l/min

BYPASS

Set point 10.9 Actual: _____
Set point 16.4 Actual: _____
Set point 13.67 Actual: _____ After calibration Final: _____ l/min

3. Mass calibration (K0) Verification – Conducted YES/NO

Actual measured K0 = _____ TEOM stated K0 _____ Error %: _____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % = _____ PASS/FAIL. Comments:
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO

Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____ Finish date/time: _____
Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³
Noise was less than 5ug/m³ YES/NO

5. Maintenance

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:

NA





**CBased Environmental
Pty Limited**
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM₁₀) and Meteorological Data

JUNE 2024

A handwritten signature in black ink that reads "Colin Davies".

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date 24 July 2024

CBased Environmental Pty Ltd
Unit 3, 2 Enterprise Crescent SINGLETON NSW 2330
☎ (02) 65713334

1.0 Summary

CBased Environmental Pty Limited is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for fine particulates (PM₁₀) and meteorological monitoring for the Dixon Sand Quarry. The information is required to assess air quality levels. The results for the TEOM and meteorological site are included in this report.

The monitoring programme includes:

- One continuous TEOM PM₁₀ monitor; and
- One continuous meteorological station.

This monthly report for June 2024 was prepared by CBased Environmental and includes the following:

- TEOM (PM₁₀) monitoring results; and
- Meteorological results.

In accordance with Schedule 3, Condition 7 of the Dixon Sand development Consent and the Dixon Sand EPL;

- 24-hour average PM₁₀ results were below the NEPM 24-hour maximum criteria of 50ug/m³;
- 24-hour average PM₁₀ results were below the Dixon Sand Quarry EPL limit of 42ug/m³;
- The PM₁₀ annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m³; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m³.

Note: Based on the available data, statements in green indicate current conformance to Dixon Sand Quarry Air Quality Impact Assessment criteria, statements in red indicate possible non-conformance. Year to date annual average for PM₁₀ is calculated from 1 July 2023 for TEOM's coinciding with the Dixon Sand project year.

Approximately 100% of valid meteorological data was recorded for June 2024.

Approximately 100% of valid TEOM data was available for June 2024.

2.0 Sampling Programme

The TEOM is sited and operated to the applicable Australian Standard and/or NSW EPA approved methods. The following Australian Standards were used:

- AS3580.9.8 - “Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM₁₀ continuous direct mass method using a tapered element oscillating microbalance analyser”; and
- AS/NZS 3580.1.1 - “Methods for Sampling and Analysis of Ambient Air Part 1.1 Guide to Siting Air Monitoring Equipment”.

TEOM PM₁₀ results are 24-hour averages at midnight and are reported as µg/m³ corrected to 0 degrees C and 101.3kPa.

All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

Air Quality monitoring site descriptions and locations are provided in **Table 1**.

Table 1: Dixon Sand Air Quality Monitoring Description and Locations

Monitor	Site Code	Location Description
TEOM PM ₁₀	TEOM	Old North Road, Maroota NSW
Meteorological Station	MET	Old North Road, Maroota NSW

3.0 Results

3.1 TEOM PM₁₀

24-hour average TEOM PM₁₀ results from the AQMS data collection software are provided in **Table 2** and a chart of the data is provided in **Figure 1**.

During the monitoring period, individual 24-hour TEOM PM₁₀ results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m³ and the Dixon Sand Quarry EPL limit of 42ug/m³.

Approximately 100% of valid TEOM data was available for June 2024.

At present, the current TEOM PM₁₀ annual average is below the Dixon Sand Quarry annual average PM₁₀ criteria of 30ug/m³. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m³. The TSP is calculated by multiplying the PM₁₀ by 2.5. Note: the annual average is calculated from 1 July 2023 and therefore an annual amount of data has now been collected.

The quarterly TEOM calibration was conducted in May 2024 (for June). The next calibration is due to be completed in September 2024. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for June 2024 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2023.

Date	PM ₁₀ 24-hr Average (µg/m ³)	PM ₁₀ Annual Average (µg/m ³)	24-hr Average TSP* (µg/m ³)	Annual Average TSP** (µg/m ³)
1/06/2024	8.9	15.0	22.3	37.6
2/06/2024	5.4	15.0	13.5	37.5
3/06/2024	12.4	15.0	31.0	37.5
4/06/2024	12.9	15.0	32.3	37.5
5/06/2024	14.8	15.0	37.0	37.5
6/06/2024	12.8	15.0	32.0	37.5
7/06/2024	5.0	15.0	12.5	37.4
8/06/2024	7.6	14.9	19.0	37.3
9/06/2024	6.6	14.9	16.5	37.3
10/06/2024	7.3	14.9	18.3	37.2
11/06/2024	9.0	14.9	22.5	37.2
12/06/2024	12.7	14.9	31.8	37.2
13/06/2024	10.4	14.9	26.0	37.1
14/06/2024	14.1	14.9	35.3	37.1
15/06/2024	7.1	14.8	17.8	37.1
16/06/2024	5.3	14.8	13.3	37.0
17/06/2024	9.3	14.8	23.3	37.0
18/06/2024	12.9	14.8	32.3	37.0
19/06/2024	8.2	14.8	20.5	36.9
20/06/2024	13.9	14.8	34.8	36.9
21/06/2024	12.2	14.8	30.5	36.9
22/06/2024	7.9	14.7	19.8	36.8
23/06/2024	6.5	14.7	16.3	36.8
24/06/2024	10.6	14.7	26.5	36.7
25/06/2024	10.8	14.7	27.0	36.7
26/06/2024	13.3	14.7	33.3	36.7
27/06/2024	12.9	14.7	32.3	36.7
28/06/2024	13.9	14.7	34.8	36.7
29/06/2024	9.6	14.7	24.0	36.7
30/06/2024	8.1	14.6	20.3	36.6

*Calculated from PM₁₀

**Calculated from PM₁₀ Annual Average

Note: results above the Dixon Sand EPL criteria limit of 42 µg/m³ highlighted in yellow, when applicable

No Data (ND) = <18hrs hour of valid data to calculate a 24hr average

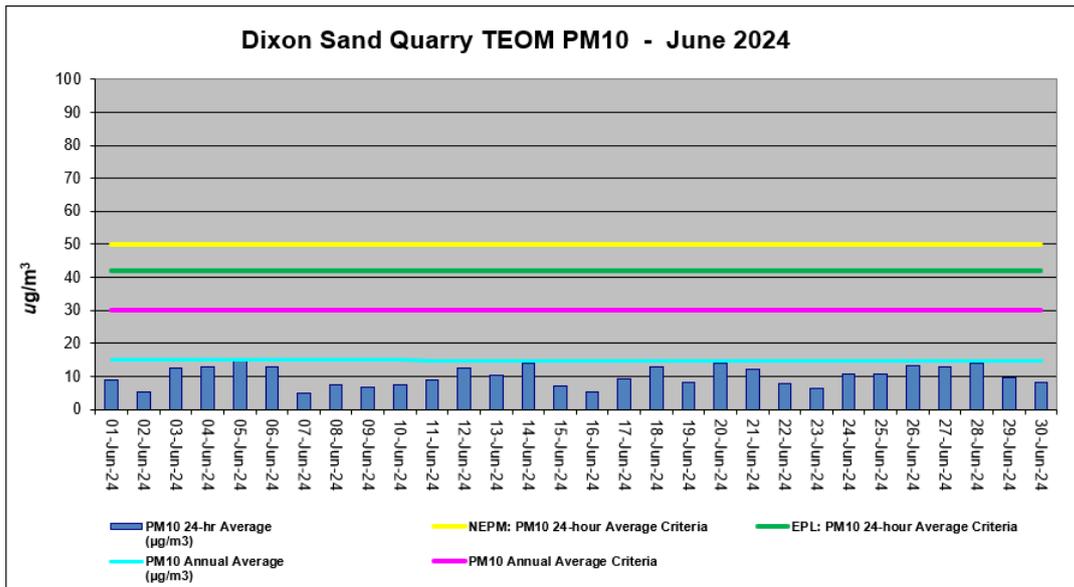


Figure 1: TEOM PM₁₀ 24 hr, Annual Average and Criteria

3.2 Meteorological Data

The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site <http://console.teledata.com.au/index.html>.

A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

A 6-monthly physical screening and system check of the meteorological station was conducted in March 2024 and is next due in September 2024. The screening and system check certificates are provided in **Appendix 1** (when required).

Approximately 100% of valid meteorological data was recorded for June 2024.

Table 3: Meteorological Data Summary for June 2024

Date	Min Temp	Avg Temp	Max Temp	RAIN mm	Min WS	Avg WS	Max WS	Min Humidity	Avg Humidity	Max Humidity	Min Pressure	Avg Pressure	Max Pressure
1/06/2024	10.3	12.7	15.5	39.2	0.4	4.8	20.0	75.3	94.1	100.0	998.1	999.5	1000.7
2/06/2024	9.6	11.4	14.1	8.0	0.4	3.8	15.6	67.4	85.1	100.0	995.0	997.0	999.1
3/06/2024	8.6	11.3	15.5	0.0	0.3	3.6	18.7	41.4	65.5	82.6	991.1	992.9	995.0
4/06/2024	7.6	10.6	15.2	0.0	0.0	2.6	9.6	60.4	73.7	87.0	992.8	995.9	999.2
5/06/2024	8.2	11.8	15.9	0.0	0.1	2.7	9.4	68.1	89.9	100.0	997.1	998.6	999.9
6/06/2024	10.9	12.3	16.2	17.2	0.2	2.7	8.9	86.7	98.4	100.0	996.7	998.3	999.7
7/06/2024	11.2	12.6	15.3	5.6	0.2	4.3	13.7	83.4	96.7	100.0	992.3	993.9	996.7
8/06/2024	11.1	14.1	19.5	0.0	0.1	2.6	12.5	55.0	80.7	100.0	991.1	992.9	995.3
9/06/2024	8.9	13.8	19.8	0.0	0.0	3.1	11.4	47.2	69.6	86.4	995.1	997.2	1000.7
10/06/2024	8.0	11.2	15.8	0.0	0.3	2.9	18.9	46.9	70.0	81.7	999.9	1001.6	1003.8
11/06/2024	7.5	12.0	16.3	0.0	0.6	5.1	20.3	45.6	67.8	92.3	991.5	998.0	1003.1
12/06/2024	8.5	13.6	17.2	0.0	0.1	5.3	21.7	38.5	58.8	80.6	988.8	992.5	999.2
13/06/2024	6.9	9.8	13.6	0.0	0.4	3.9	15.0	53.0	67.5	91.3	998.9	1000.3	1001.6
14/06/2024	7.5	10.0	12.5	3.2	0.1	2.2	7.9	72.2	87.9	100.0	997.7	999.3	1000.7
15/06/2024	9.2	10.3	13.2	3.2	0.7	5.0	15.5	84.9	94.1	100.0	995.9	997.1	998.2
16/06/2024	6.5	9.8	14.8	0.2	0.1	3.5	13.1	44.9	68.9	89.4	993.5	995.1	996.7
17/06/2024	7.2	10.8	15.4	0.0	0.2	4.6	18.2	55.6	67.1	93.1	992.8	994.7	997.0
18/06/2024	6.6	10.3	15.2	0.0	0.0	2.5	16.9	47.2	72.3	94.6	994.8	996.4	997.8
19/06/2024	4.5	9.0	13.9	0.0	0.1	2.5	8.1	42.2	64.9	93.1	994.8	996.5	997.9
20/06/2024	5.0	10.0	15.0	0.0	0.1	2.6	9.9	41.6	62.9	82.6	996.1	997.0	998.5
21/06/2024	6.9	10.6	15.7	2.6	0.0	2.2	10.5	52.2	77.6	97.9	996.0	998.7	1002.7
22/06/2024	6.7	9.1	11.9	11.4	0.1	4.1	12.9	83.5	96.5	100.0	1002.4	1004.7	1006.2
23/06/2024	8.6	10.8	14.3	0.2	0.3	4.2	12.1	81.3	92.1	100.0	1001.4	1003.7	1005.8
24/06/2024	6.1	10.8	16.3	0.2	0.2	2.8	7.0	59.0	86.2	99.9	998.3	1000.1	1001.4
25/06/2024	7.2	11.9	17.4	0.0	0.0	3.3	10.9	46.7	75.2	96.9	999.8	1001.1	1003.1
26/06/2024	9.5	14.2	19.9	0.0	0.2	3.5	16.6	48.2	70.2	94.8	997.8	999.9	1001.5
27/06/2024	8.4	12.4	17.5	0.0	0.2	2.3	7.6	44.4	60.0	74.7	1000.7	1002.2	1004.1
28/06/2024	7.0	11.7	18.0	0.0	0.0	2.3	9.4	34.9	60.8	79.0	1003.5	1004.7	1007.3
29/06/2024	6.3	13.6	20.7	0.0	0.4	6.0	15.9	47.9	65.1	85.3	994.5	999.3	1003.4
30/06/2024	7.5	11.6	16.1	9.8	0.2	4.2	12.9	75.6	95.4	100.0	992.0	995.7	1000.6
Monthly	4.5	11.5	20.7	100.8	0.0	3.5	21.7	34.9	77.2	100.0	988.8	998.2	1007.3

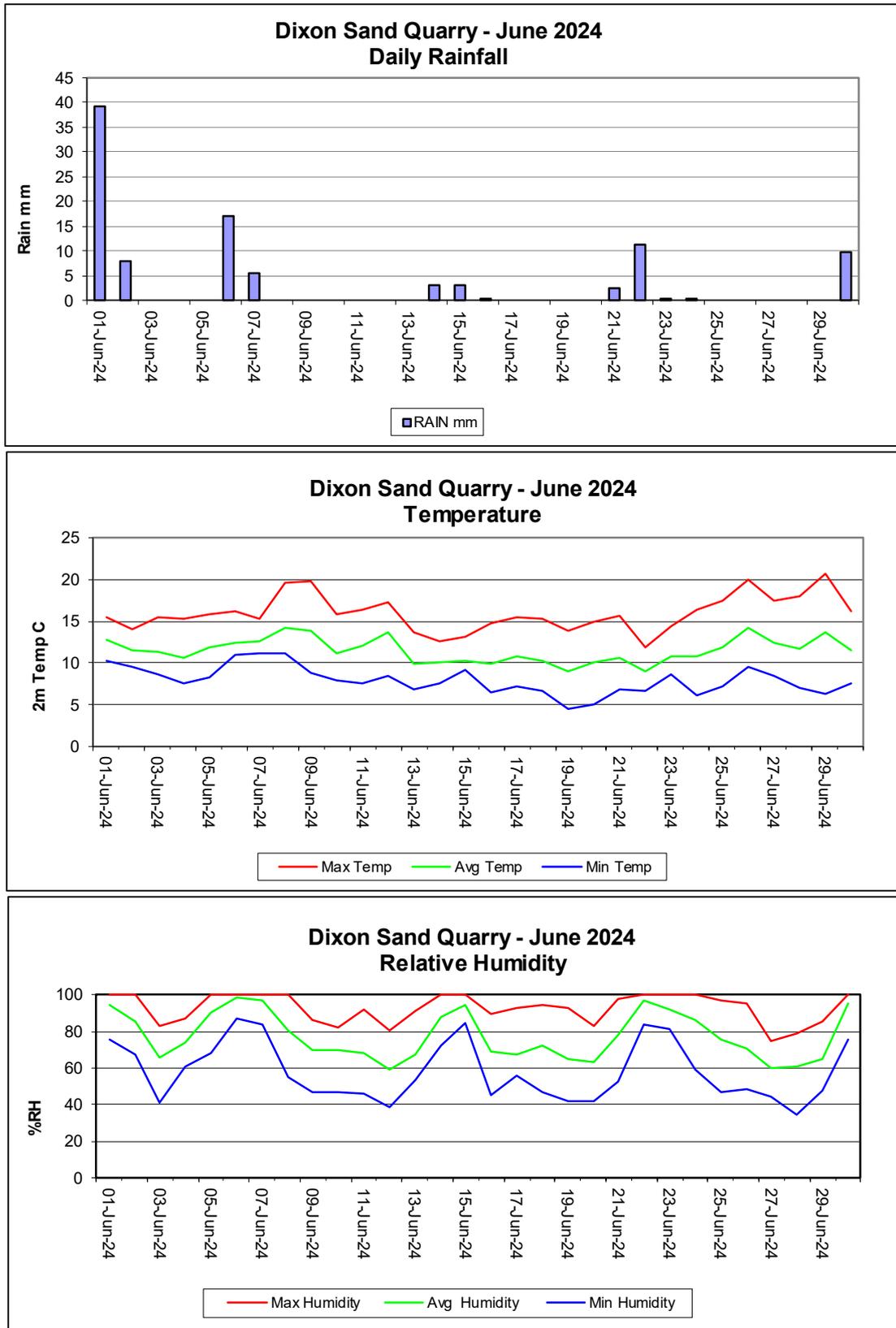


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

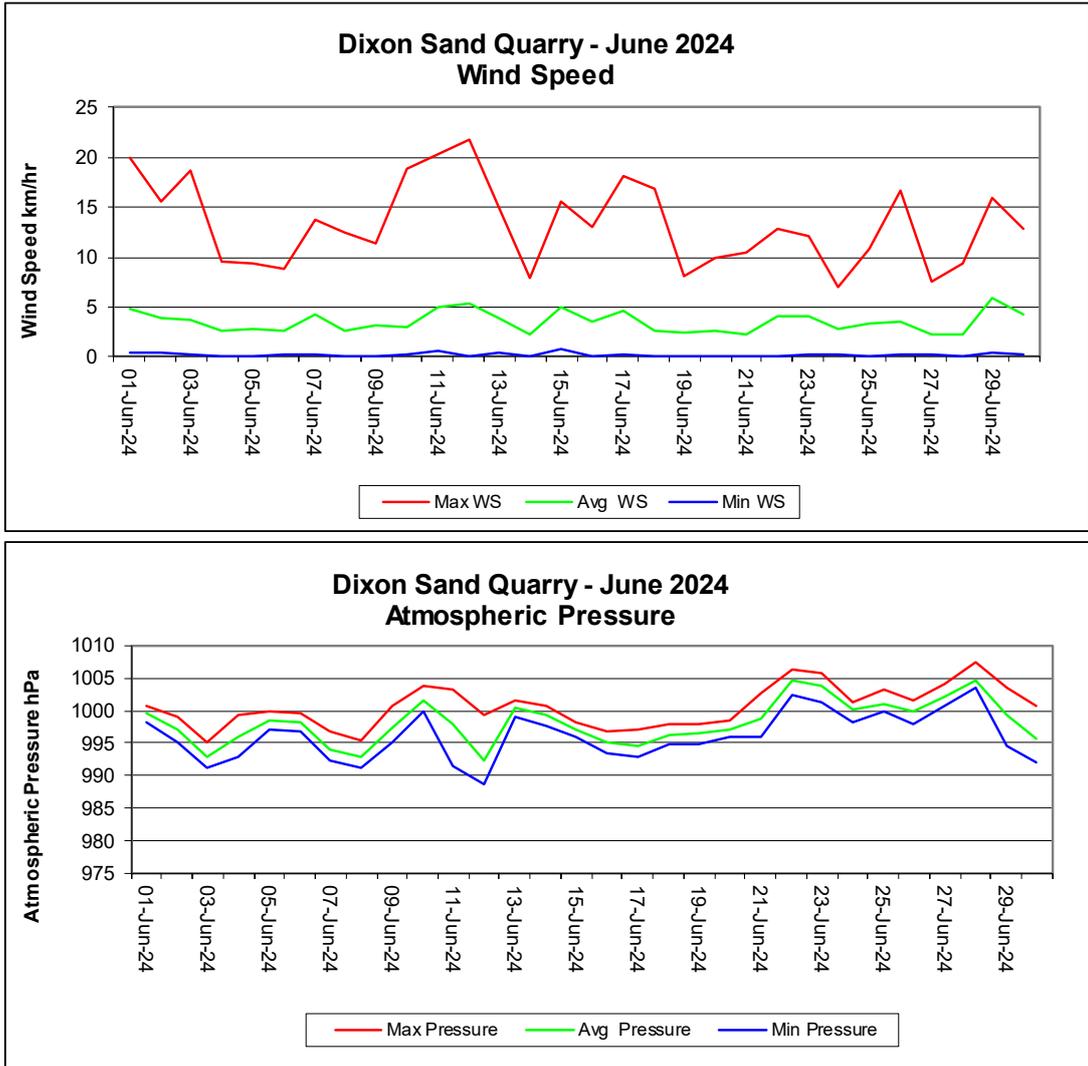


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JUNE 2024

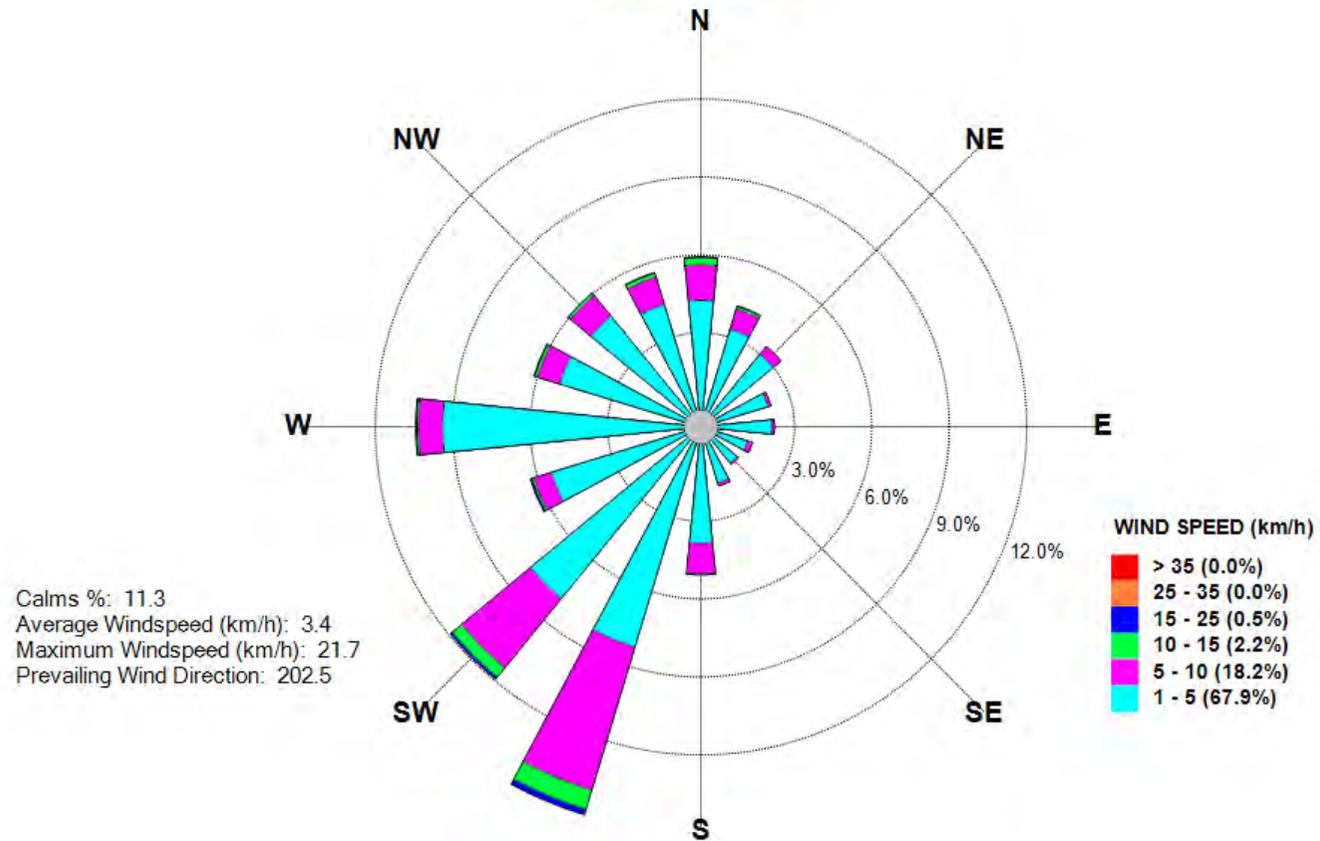


Figure 4: Monthly Windrose

Appendix C – Groundwater and Surface Water Monitoring Data

Groundwater Monitoring Data

Report Number: 15474

Date Issued: 10/01/2024

Revision Number: 00

Site/Job: Haerses Road H 6 Mnth Ground Water

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 7 groundwater sample(s) were received on 18/12/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
H6	18/12/2023	15474/1	Water	
H7	18/12/2023	15474/2	Water	
H9	18/12/2023	15474/3	Water	
H12	18/12/2023	15474/4	Water	
BH4	18/12/2023	15474/5	Water	
H14	18/12/2023	15474/6	Water	
H2	18/12/2023	15474/7	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 10/01/2024.

Test Report Number: 15474

Date Issued: 10/01/2024

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID Units	15474/1 18/12/2023 H6	15474/2 18/12/2023 H7	15474/3 18/12/2023 H9	15474/4 18/12/2023 H12	15474/5 18/12/2023 BH4
Depth to Water (TOM)	AS5667.11	m(bTOM)	12.04	13.17	8.98	12.32	37.44
Temperature	Temp	°C	18.3	18.8	19.6	20.5	19.7
pH	APHA 4500-H B	pH Units	4.3	4.3	4.8	4.8	5.4
Electrical Conductivity	APHA 2510 B	µS/cm	164	215	111	194	122

Field Analysis	Method	Lab ID Sample Date Sample ID Units	15474/6 18/12/2023 H14	15474/7 18/12/2023 H2
Depth to Water (TOM)	AS5667.11	m(bTOM)	7.51	3.31
Temperature	Temp	°C	19.0	19.2
pH	APHA 4500-H B	pH Units	4.4	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	135	96.0

Solids	Method	Lab ID Sample Date Sample ID Units	15474/1 18/12/2023 H6	15474/2 18/12/2023 H7	15474/3 18/12/2023 H9	15474/4 18/12/2023 H12	15474/5 18/12/2023 BH4
Total Dissolved Solids	AS3550.4	mg/L	100	110	49	120	50

Solids	Method	Lab ID Sample Date Sample ID Units	15474/6 18/12/2023 H14	15474/7 18/12/2023 H2
Total Dissolved Solids	AS3550.4	mg/L	52	<20

Date Tested	Method	Lab ID Sample Date Sample ID Units	15474/1 18/12/2023 H6	15474/2 18/12/2023 H7	15474/3 18/12/2023 H9	15474/4 18/12/2023 H12	15474/5 18/12/2023 BH4
Date Tested - Field	--	--	18/12/2023	18/12/2023	18/12/2023	18/12/2023	18/12/2023
Date Tested - TDS	AS3550.4	--	8/1/2024	8/1/2024	8/1/2024	9/01/2024	9/01/2024

Date Tested	Method	Lab ID Sample Date Sample ID Units	15474/6 18/12/2023 H14	15474/7 18/12/2023 H2
Date Tested - Field	--	--	18/12/2023	18/12/2023
Date Tested - TDS	AS3550.4	--	9/01/2024	9/01/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15474

Date Issued: 10/01/2024

Revision No: 00

Sampling Conditions: Fine, 21°- 33°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15474/1	H6		T & D.Walker	18/12/2023 9:43 AM	AS5667.11, Bail	AS5667.1
15474/2	H7		T & D.Walker	18/12/2023 9:58 AM	AS5667.11, Bail	AS5667.1
15474/3	H9		T & D.Walker	18/12/2023 10:29 AM	AS5667.11, Pump	AS5667.1
15474/4	H12		T & D.Walker	18/12/2023 11:37 AM	AS5667.11, Pump	AS5667.1
15474/5	BH4		T & D.Walker	18/12/2023 10:57 AM	AS5667.11, Pump	AS5667.1
15474/6	H14		T & D.Walker	18/12/2023 12:43 PM	AS5667.11, Bail	AS5667.1
15474/7	H2		T & D.Walker	18/12/2023 12:07 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
15474/1	H6	
15474/2	H7	
15474/3	H9	
15474/4	H12	
15474/5	BH4	1.50m knot in bailer string
15474/6	H14	
15474/7	H2	

Sampling procedures have been approved and report finalised on 10/01/2024.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road H 6 Mnth Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
H6	312989	6295066			
H7	312855	6294643			
H9	312796	6294232			
H12	312709	6294090			
BH4	312843	6293870			
H14	312659	6293363			
H2	312515	6294585			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
H6	28/10/2019	0.78	15.75	Slow	3
H7	28/10/2019	0.81	16.67	Fast	5
H9	28/10/2019	0.78	16.23	Slow	14
H12	28/10/2019	0.86	17.04	Fast	9.62
BH4	28/10/2019	0.64	>60	Moderate	>45
H14	28/10/2019	0.84	13.97	Fast	7
H2	28/10/2019	0.69	5.79	Slow	5

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS

Report Number: 15475

Date Issued: 10/01/2024

Revision Number: 00

Site/Job: Haerses Road 6 Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following 12 groundwater sample(s) were received on 18/12/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	18/12/2023	15475/1	Water	
BH01B	18/12/2023	15475/2	Water	
BH01C	18/12/2023	15475/3	Water	
BH02A	18/12/2023	15475/4	Water	
BH02B	18/12/2023	15475/5	Water	
BH02C	18/12/2023	15475/6	Water	
BH03A	18/12/2023	15475/7	Water	
BH03B	18/12/2023	15475/8	Water	
BH03C	18/12/2023	15475/9	Water	
BH05B	18/12/2023	15475/10	Water	
BH5	18/12/2023	15475/11	Water	
BH07	18/12/2023	15475/12	Water	New borehole - First time sampled

The sample(s) have been tested as received and results relate specifically to the samples tested.
 The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager

Authorised by:

Results have been approved and report finalised on 10/01/2024.



Test Report Number: 15475

Date Issued: 10/01/2024

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID Units	15475/1 18/12/2023 BH01A	15475/2 18/12/2023 BH01B	15475/3 18/12/2023 BH01C	15475/4 18/12/2023 BH02A	15475/5 18/12/2023 BH02B
Depth to Water (TOM)	AS5667.11	m(bTOM)	9.48	15.58	5.78	22.39	18.33
Temperature	Temp	°C	20.6	20.2	19.1	21.8	21.8
pH	APHA 4500-H B	pH Units	6.0	4.7	4.6	4.4	4.3
Electrical Conductivity	APHA 2510 B	µS/cm	228	164	194	189	186

Field Analysis	Method	Lab ID Sample Date Sample ID Units	15475/6 18/12/2023 BH02C	15475/7 18/12/2023 BH03A	15475/8 18/12/2023 BH03B	15475/9 18/12/2023 BH03C	15475/10 18/12/2023 BH05B
Depth to Water (TOM)	AS5667.11	m(bTOM)	14.96	[NT]	[NT]	[NT]	19.05
Temperature	Temp	°C	19.9	[NT]	[NT]	[NT]	20.4
pH	APHA 4500-H B	pH Units	4.9	[NT]	[NT]	[NT]	4.3
Electrical Conductivity	APHA 2510 B	µS/cm	187	[NT]	[NT]	[NT]	234

Field Analysis	Method	Lab ID Sample Date Sample ID Units	15475/11 18/12/2023 BH5	15475/12 18/12/2023 BH07
Depth to Water (TOM)	AS5667.11	m(bTOM)	29.46	52.61
Temperature	Temp	°C	20.9	20.9
pH	APHA 4500-H B	pH Units	4.8	6.3
Electrical Conductivity	APHA 2510 B	µS/cm	199	201

Solids	Method	Lab ID Sample Date Sample ID Units	15475/1 18/12/2023 BH01A	15475/2 18/12/2023 BH01B	15475/3 18/12/2023 BH01C	15475/4 18/12/2023 BH02A	15475/5 18/12/2023 BH02B
Total Dissolved Solids	AS3550.4	mg/L	96	58	68	68	66

Solids	Method	Lab ID Sample Date Sample ID Units	15475/6 18/12/2023 BH02C	15475/10 18/12/2023 BH05B	15475/11 18/12/2023 BH5	15475/12 18/12/2023 BH07
Total Dissolved Solids	AS3550.4	mg/L	90	130	110	120

Date Tested	Method	Lab ID Sample Date Sample ID Units	15475/1 18/12/2023 BH01A	15475/2 18/12/2023 BH01B	15475/3 18/12/2023 BH01C	15475/4 18/12/2023 BH02A	15475/5 18/12/2023 BH02B
Date Tested - Field	--	--	18/12/2023	18/12/2023	18/12/2023	18/12/2023	18/12/2023
Date Tested - TDS	AS3550.4	--	9/01/2024	9/01/2024	9/01/2024	9/01/2024	9/01/2024



Date Tested	Method	Lab ID Sample Date Sample ID Units	15475/6 18/12/2023 BH02C	15475/7 18/12/2023 BH03A	15475/8 18/12/2023 BH03B	15475/9 18/12/2023 BH03C	15475/10 18/12/2023 BH05B
<i>Date Tested - Field</i>	--	--	18/12/2023	[NT]	[NT]	[NT]	18/12/2023
<i>Date Tested - TDS</i>	AS3550.4	--	9/01/2024				9/01/2024

Date Tested	Method	Lab ID Sample Date Sample ID Units	15475/11 18/12/2023 BH5	15475/12 18/12/2023 BH07
<i>Date Tested - Field</i>	--	--	18/12/2023	18/12/2023
<i>Date Tested - TDS</i>	AS3550.4	--	9/01/2024	9/01/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15475

Date Issued: 10/01/2024

Revision No: 00

Sampling Conditions: Fine, 21°- 33°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15475/1	BH01A		T & D.Walker	18/12/2023 3:47 PM	AS5667.11, Pump	AS5667.1
15475/2	BH01B		T & D.Walker	18/12/2023 4:18 PM	AS5667.11, Pump	AS5667.1
15475/3	BH01C		T & D.Walker	18/12/2023 4:02 PM	AS5667.11, Bail	AS5667.1
15475/4	BH02A		T & D.Walker	18/12/2023 2:18 PM	AS5667.11, Pump	AS5667.1
15475/5	BH02B		T & D.Walker	18/12/2023 2:47 PM	AS5667.11, Pump	AS5667.1
15475/6	BH02C		T & D.Walker	18/12/2023 2:31 PM	AS5667.11, Bail	AS5667.1
15475/7	BH03A		T & D.Walker	18/12/2023		
15475/8	BH03B		T & D.Walker	18/12/2023		
15475/9	BH03C		T & D.Walker	18/12/2023		
15475/10	BH05B		T & D.Walker	18/12/2023 1:47 PM	AS5667.11, Pump	AS5667.1
15475/11	BH5		T & D.Walker	18/12/2023 2:02 PM	AS5667.11, Pump	AS5667.1
15475/12	BH07		T & D.Walker	18/12/2023 1:10 PM	AS5667.11, Bail	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
15475/1	BH01A	
15475/2	BH01B	
15475/3	BH01C	
15475/4	BH02A	
15475/5	BH02B	
15475/6	BH02C	
15475/7	BH03A	Decommissioned, no longer monitored
15475/8	BH03B	Decommissioned, no longer monitored
15475/9	BH03C	Decommissioned, no longer monitored
15475/10	BH05B	
15475/11	BH5	
15475/12	BH07	First time monitored

Sampling procedures have been approved and report finalised on 10/01/2024.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road 6 Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312190	6293971			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH5	312159	6293753			
BH07					

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
BH01A	28/10/2019	1.05	>60	Slow	>100
BH01B	28/10/2019	0.92	40.92	Slow	50
BH01C	28/10/2019	1.01	11.02	Medium	6
BH02A	28/10/2019	0.81	>60	Slow	>65
BH02B	28/10/2019	0.77	42.57	Slow	30
BH02C	28/10/2019	0.98	16.12	Slow	<1
BH03A	28/10/2019	0.87	>60	Slow	>5
BH03B	28/10/2019	1.05	23.75	Slow	3
BH03C	28/10/2019	1.08	15.98	Slow	4
BH05B	28/10/2019	0.97	33.87	Medium	27
BH5	28/10/2019	0.57	>60	Fast	>60
BH07					

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS

Report Number: 16247

Date Issued: 20/06/2024

Revision Number: 00

Site/Job: Haerses Road H 6 Mnth Ground Water

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following groundwater sample(s) were received on 13/06/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
H6	13/06/2024	16247/1	Water	
H7	13/06/2024	16247/2	Water	
H9	13/06/2024	16247/3	Water	
H12	13/06/2024	16247/4	Water	
BH4	13/06/2024	16247/5	Water	
H14	13/06/2024	16247/6	Water	
H2	13/06/2024	16247/7	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager



Liane Peyra
Technical Officer

Authorised by:

Results have been approved and report finalised on 20/06/2024.

Test Report Number: 16247

Date Issued: 20/06/2024

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID Units	16247/1 13/06/2024 H6	16247/2 13/06/2024 H7	16247/3 13/06/2024 H9	16247/4 13/06/2024 H12	16247/5 13/06/2024 BH4
Depth to Water (TOM)	AS5667.11	m(bTOM)	11.87	12.90	8.39	12.53	37.41
Temperature	Temp	°C	16.8	18.5	17.5	17.0	17.3
pH	APHA 4500-H B	pH Units	4.7	4.4	4.4	4.7	5.1
Electrical Conductivity	APHA 2510 B	µS/cm	119	151	107	198	111

Field Analysis	Method	Lab ID Sample Date Sample ID Units	16247/6 13/06/2024 H14	16247/7 13/06/2024 H2
Depth to Water (TOM)	AS5667.11	m(bTOM)	7.48	1.78
Temperature	Temp	°C	19.3	17.4
pH	APHA 4500-H B	pH Units	4.3	4.6
Electrical Conductivity	APHA 2510 B	µS/cm	79.0	60.0

Solids	Method	Lab ID Sample Date Sample ID Units	16247/1 13/06/2024 H6	16247/2 13/06/2024 H7	16247/3 13/06/2024 H9	16247/4 13/06/2024 H12	16247/5 13/06/2024 BH4
Total Dissolved Solids	AS3550.4	mg/L	110	110	96	150	78

Solids	Method	Lab ID Sample Date Sample ID Units	16247/6 13/06/2024 H14	16247/7 13/06/2024 H2
Total Dissolved Solids	AS3550.4	mg/L	50	50

Date Tested	Method	Lab ID Sample Date Sample ID Units	16247/1 13/06/2024 H6	16247/2 13/06/2024 H7	16247/3 13/06/2024 H9	16247/4 13/06/2024 H12	16247/5 13/06/2024 BH4
Date Tested - Field	--	--	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024
Date Tested - TDS	AS3550.4	--	17/06/2024	17/06/2024	17/06/2024	17/06/2024	17/06/2024

Date Tested	Method	Lab ID Sample Date Sample ID Units	16247/6 13/06/2024 H14	16247/7 13/06/2024 H2
Date Tested - Field	--	--	13/06/2024	13/06/2024
Date Tested - TDS	AS3550.4	--	17/06/2024	17/06/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16247

Date Issued: 20/06/2024

Revision No: 00

Sampling Conditions: Cloudy, 12 °- 16 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16247/1	H6		T & D.Walker	13/06/2024 9:59 AM	AS5667.11, Bail	AS5667.1
16247/2	H7		T & D.Walker	13/06/2024 10:17 AM	AS5667.11, Bail	AS5667.1
16247/3	H9		T & D.Walker	13/06/2024 10:36 AM	AS5667.11, Pump	AS5667.1
16247/4	H12		T & D.Walker	13/06/2024 11:19 AM	AS5667.11, Pump	AS5667.1
16247/5	BH4		T & D.Walker	13/06/2024 10:54 AM	AS5667.11, Pump	AS5667.1
16247/6	H14		T & D.Walker	13/06/2024 11:37 AM	AS5667.11, Bail	AS5667.1
16247/7	H2		T & D.Walker	13/06/2024 4:01 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
16247/1	H6	
16247/2	H7	
16247/3	H9	
16247/4	H12	
16247/5	BH4	
16247/6	H14	
16247/7	H2	

Sampling procedures have been approved and report finalised on 20/06/2024.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road H 6 Mnth Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
H6	312989	6295066			
H7	312855	6294643			
H9	312796	6294232			
H12	312709	6294090			
BH4	312843	6293870			
H14	312659	6293363			
H2	312515	6294585			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
H6	28/10/2019	0.78	15.75	Slow	3
H7	28/10/2019	0.81	16.67	Fast	5
H9	28/10/2019	0.78	16.23	Slow	14
H12	28/10/2019	0.86	17.04	Fast	9.62
BH4	28/10/2019	0.64	>60	Moderate	>45
H14	28/10/2019	0.84	13.97	Fast	7
H2	28/10/2019	0.69	5.79	Slow	5

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS

Report Number: 16248

Date Issued: 20/06/2024

Revision Number: 00

Site/Job: Haerses Road 6 Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd
 Address: PO Box 4019
 PITT TOWN NSW 2756
 Contact: David Dixon

The following groundwater sample(s) were received on 13/06/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	13/06/2024	16248/1	Water	
BH01B	13/06/2024	16248/2	Water	
BH01C	13/06/2024	16248/3	Water	
BH02A	13/06/2024	16248/4	Water	
BH02B	13/06/2024	16248/5	Water	
BH02C	13/06/2024	16248/6	Water	
BH05B	13/06/2024	16248/7	Water	
BH5	13/06/2024	16248/8	Water	
BH07	13/06/2024	16248/9	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.
 The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
 Laboratory Manager



Liane Peyra
 Technical Officer

Authorised by:

Results have been approved and report finalised on 20/06/2024.



Test Report Number: 16248

Date Issued: 20/06/2024

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID Units	16248/1 13/06/2024 BH01A	16248/2 13/06/2024 BH01B	16248/3 13/06/2024 BH01C	16248/4 13/06/2024 BH02A	16248/5 13/06/2024 BH02B
Depth to Water (TOM)	AS5667.11	m(bTOM)	8.92	15.45	5.41	22.37	18.46
Temperature	Temp	°C	17.3	17.6	18.2	17.9	17.9
pH	APHA 4500-H B	pH Units	5.7	4.6	4.6	4.7	4.6
Electrical Conductivity	APHA 2510 B	µS/cm	191	149	181	170	168

Field Analysis	Method	Lab ID Sample Date Sample ID Units	16248/6 13/06/2024 BH02C	16248/7 13/06/2024 BH05B	16248/8 13/06/2024 BH5	16248/9 13/06/2024 BH07
Depth to Water (TOM)	AS5667.11	m(bTOM)	15.01	18.96	29.34	52.05
Temperature	Temp	°C	18.0	17.8	18.0	18.9
pH	APHA 4500-H B	pH Units	4.6	4.7	5.0	6.7
Electrical Conductivity	APHA 2510 B	µS/cm	170	177	188	285

Solids	Method	Lab ID Sample Date Sample ID Units	16248/1 13/06/2024 BH01A	16248/2 13/06/2024 BH01B	16248/3 13/06/2024 BH01C	16248/4 13/06/2024 BH02A	16248/5 13/06/2024 BH02B
Total Dissolved Solids	AS3550.4	mg/L	110	86	110	110	110

Solids	Method	Lab ID Sample Date Sample ID Units	16248/6 13/06/2024 BH02C	16248/7 13/06/2024 BH05B	16248/8 13/06/2024 BH5	16248/9 13/06/2024 BH07
Total Dissolved Solids	AS3550.4	mg/L	110	100	130	170

Date Tested	Method	Lab ID Sample Date Sample ID Units	16248/1 13/06/2024 BH01A	16248/2 13/06/2024 BH01B	16248/3 13/06/2024 BH01C	16248/4 13/06/2024 BH02A	16248/5 13/06/2024 BH02B
Date Tested - Field	--	--	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024
Date Tested - TDS	AS3550.4	--	17/06/2024	17/06/2024	18/06/2024	18/06/2024	18/06/2024

Date Tested	Method	Lab ID Sample Date Sample ID Units	16248/6 13/06/2024 BH02C	16248/7 13/06/2024 BH05B	16248/8 13/06/2024 BH5	16248/9 13/06/2024 BH07
Date Tested - Field	--	--	13/06/2024	13/06/2024	13/06/2024	13/06/2024
Date Tested - TDS	AS3550.4	--	18/06/2024	18/06/2024	19/06/2024	19/06/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16248

Date Issued: 20/06/2024

Revision No: 00

Sampling Conditions: Cloudy, 12 °- 16 °C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16248/1	BH01A		T & D.Walker	13/06/2024 3:12 PM	AS5667.11, Pump	AS5667.1
16248/2	BH01B		T & D.Walker	13/06/2024 3:29 PM	AS5667.11, Pump	AS5667.1
16248/3	BH01C		T & D.Walker	13/06/2024 3:43 PM	AS5667.11, Bail	AS5667.1
16248/4	BH02A		T & D.Walker	13/06/2024 1:39 PM	AS5667.11, Pump	AS5667.1
16248/5	BH02B		T & D.Walker	13/06/2024 1:47 PM	AS5667.11, Pump	AS5667.1
16248/6	BH02C		T & D.Walker	13/06/2024 1:56 PM	AS5667.11, Bail	AS5667.1
16248/7	BH05B		T & D.Walker	13/06/2024 1:17 PM	AS5667.11, Pump	AS5667.1
16248/8	BH5		T & D.Walker	13/06/2024 1:29 PM	AS5667.11, Pump	AS5667.1
16248/9	BH07		T & D.Walker	13/06/2024 12:24 PM	AS5667.11, Bail	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
16248/1	BH01A	
16248/2	BH01B	
16248/3	BH01C	
16248/4	BH02A	
16248/5	BH02B	
16248/6	BH02C	
16248/7	BH05B	
16248/8	BH5	
16248/9	BH07	

Sampling procedures have been approved and report finalised on 20/06/2024.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road 6 Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312190	6293971			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH05B	312160	6293752			
BH5	312159	6293753			
BH07	312139	6293374			

Well ID	Date Well Measured	Monument Height (TOM) (m)	Depth to Bottom (bTOM) (m)	Recharge Rate	Approximate Volume (L)
BH01A	28/10/2019	1.05	>60	Slow	>100
BH01B	28/10/2019	0.92	40.92	Slow	50
BH01C	28/10/2019	1.01	11.02	Medium	6
BH02A	28/10/2019	0.81	>60	Slow	>65
BH02B	28/10/2019	0.77	42.57	Slow	30
BH02C	28/10/2019	0.98	16.12	Slow	<1
BH05B	28/10/2019	0.97	33.87	Medium	27
BH5	28/10/2019	0.57	>60	Fast	>60
BH07					>60

Note: NATA accreditation does not cover information provided in this section

*Where indicated AHD from ground level (m) estimated based on handheld GPS

Surface water Monitoring Data

Report Number: 14910

Date Issued: 28/07/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 26/07/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	26/07/2023	14910/1	Water	Not Discharging

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 28/07/2023.

Test Report Number: 14910

Date Issued: 28/07/2023

Revision No: 00

Results

Field Analysis		Lab ID	14910/1
		Sample Date	26/07/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Date Tested	--	--	26/07/2023
Temperature	Temp	°C	16.5
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	33

Solids		Lab ID	14910/1
		Sample Date	26/07/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Date Tested	--	--	27/07/2023
Total Suspended Solids	AS3550.4	mg/L	37

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14910

Date Issued: 28/07/2023

Revision No: 00

Sampling Conditions: Fine, 16°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14910/1	Basin 1 - Mod 1		T.Walker	26/07/2023 12:10 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14910/1	Basin 1 - Mod 1			Shallow, algae, no flow.

Sampling procedures have been approved and report finalised on 28/07/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 14986

Date Issued: 25/08/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following water sample(s) were received on 23/08/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	23/08/2023	14986/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.
The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager



Liane Peyra
Technical Officer

Authorised by:

Results have been approved and report finalised on 25/08/2023.

Test Report Number: 14986

Date Issued: 25/08/2023

Revision No: 00

Results

Field Analysis		Lab ID	14986/1
		Sample Date	23/08/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Date Tested	--	--	23/08/2023
Temperature	Temp	°C	20.9
pH	APHA 4500-H B	pH Units	4.7
Turbidity	APHA 2130 B	NTU	16

Solids		Lab ID	14986/1
		Sample Date	23/08/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Date Tested	--	--	24/08/2023
Total Suspended Solids	AS3550.4	mg/L	26

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 14986

Date Issued: 25/08/2023

Revision No: 00

Sampling Conditions: Fine, 20°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
14986/1	Basin 1 - Mod 1		T.Walker	23/08/2023 12:20 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
14986/1	Basin 1 - Mod 1			No Flow, clear.

Sampling procedures have been approved and report finalised on 25/08/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15105

Date Issued: 25/09/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 20/09/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	20/09/2023	15105/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Liane Peyra

Authorised by: Technical Officer

Results have been approved and report finalised on 25/09/2023.

Test Report Number: 15105

Date Issued: 25/09/2023

Revision No: 00

Results

Field Analysis		Lab ID	15105/1
		Sample Date	20/09/2023
		Sample ID	Basin 1 - Mod 1
Method		Units	
Date Tested	--	--	20/09/2023
Temperature	Temp	°C	26.3
pH	APHA 4500-H B	pH Units	4.6
Turbidity	APHA 2130 B	NTU	5.5

Solids		Lab ID	15105/1
		Sample Date	20/09/2023
		Sample ID	Basin 1 - Mod 1
Method		Units	
Date Tested	--	--	21/09/2023
Total Suspended Solids	AS3550.4	mg/L	12



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15105

Date Issued: 25/09/2023

Revision No: 00

Sampling Conditions: Fine, 34°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15105/1	Basin 1 - Mod 1		T.Walker	20/09/2023 1:12 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15105/1	Basin 1 - Mod 1			Almost dry, no flow. Shape changed due to earthworks at Basin 1.

Sampling procedures have been approved and report finalised on 25/09/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15246

Date Issued: 19/10/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 1 water sample(s) were received on 18/10/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	18/10/2023	15246/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.
The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 19/10/2023.

Test Report Number: 15246

Date Issued: 19/10/2023

Revision No: 00

Results

Field Analysis		Lab ID	15246/1
		Sample Date	18/10/2023
		Sample ID	Basin 1 - Mod 1
	Method	Units	
Date Tested - Field	--	--	18/10/2023
Temperature	Temp	°C	18.5
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	11

Solids		Lab ID	15246/1
		Sample Date	18/10/2023
		Sample ID	Basin 1 - Mod 1
	Method	Units	
Date Tested - TSS	AS3550.4	--	19/10/2023
Total Suspended Solids	AS3550.4	mg/L	11

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15246

Date Issued: 19/10/2023

Revision No: 00

Sampling Conditions: Cloudy, 20 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15246/1	Basin 1 - Mod 1		D.Walker	18/10/2023 1:32 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15246/1	Basin 1 - Mod 1			Sample site has changed, same location, lower elevation.

Sampling procedures have been approved and report finalised on 19/10/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15326

Date Issued: 17/11/2023

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 1 water sample(s) were received on 15/11/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	15/11/2023	15326/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 17/11/2023.

Test Report Number: 15326

Date Issued: 17/11/2023

Revision No: 00

Results

Field Analysis		Lab ID	15326/1
		Sample Date	15/11/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	27.5
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	10

Solids		Lab ID	15326/1
		Sample Date	15/11/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	8

Date Tested		Lab ID	15326/1
		Sample Date	15/11/2023
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	15/11/2023
<i>Date Tested - TSS</i>	AS3550.4	--	16/11/2023



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15326

Date Issued: 17/11/2023

Revision No: 00

Sampling Conditions: Cloudy, 28°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15326/1	Basin 1 - Mod 1		T & D.Walker	15/11/2023 12:54 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15326/1	Basin 1 - Mod 1			No Flow, clear

Sampling procedures have been approved and report finalised on 17/11/2023.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 15476

Date Issued: 19/12/2023

Revision Number: 00

Site/Job: Haerses Rd 6 Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 6 water sample(s) were received on 18/12/2023

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Stage 1 Pit Sump	18/12/2023	15476/1	Water	
Stage 2 West Sediment	18/12/2023	15476/2	Water	
Stage 2 West Pit Sump	18/12/2023	15476/3	Water	
Stage 2 East Sediment Dam	18/12/2023	15476/4	Water	
Basin 1 - Mod 1	18/12/2023	15476/5	Water	
Basin 4	18/12/2023	15476/6	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 19/12/2023.

Test Report Number: 15476

Date Issued: 19/12/2023

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID	15476/1 18/12/2023 Stage 1 Pit Sump	15476/2 18/12/2023 Stage 2 West Sediment	15476/3 18/12/2023 Stage 2 West Pit Sump	15476/4 18/12/2023 Stage 2 East Sediment Dam	15476/5 18/12/2023 Basin 1 - Mod 1
		Units					
Temperature	Temp	°C	24.4	30.0	29.9	26.6	28.1
pH	APHA 4500-H B	pH Units	4.9	5.1	4.8	6.7	4.8
Electrical Conductivity	APHA 2510 B	µS/cm	90.0	58.0	143	146	126
Turbidity	APHA 2130 B	NTU	14	24	9.4	14	15

Field Analysis	Method	Lab ID Sample Date Sample ID	15476/6 18/12/2023 Basin 4
		Units	
Temperature	Temp	°C	25.9
pH	APHA 4500-H B	pH Units	4.2
Electrical Conductivity	APHA 2510 B	µS/cm	174
Turbidity	APHA 2130 B	NTU	9.6

Solids	Method	Lab ID Sample Date Sample ID	15476/1 18/12/2023 Stage 1 Pit Sump	15476/2 18/12/2023 Stage 2 West Sediment	15476/3 18/12/2023 Stage 2 West Pit Sump	15476/4 18/12/2023 Stage 2 East Sediment Dam	15476/5 18/12/2023 Basin 1 - Mod 1
		Units					
Total Suspended Solids	AS3550.4	mg/L	11	26	7	10	10

Solids	Method	Lab ID Sample Date Sample ID	15476/6 18/12/2023 Basin 4
		Units	
Total Suspended Solids	AS3550.4	mg/L	10

Date Tested	Method	Lab ID Sample Date Sample ID	15476/1 18/12/2023 Stage 1 Pit Sump	15476/2 18/12/2023 Stage 2 West Sediment	15476/3 18/12/2023 Stage 2 West Pit Sump	15476/4 18/12/2023 Stage 2 East Sediment Dam	15476/5 18/12/2023 Basin 1 - Mod 1
		Units					
Date Tested - Field	--	--	18/12/2023	18/12/2023	18/12/2023	18/12/2023	18/12/2023
Date Tested - TSS	AS3550.4	--	19/12/2023	19/12/2023	19/12/2023	19/12/2023	19/12/2023

Date Tested	Method	Lab ID Sample Date Sample ID	15476/6 18/12/2023 Basin 4
		Units	
Date Tested - Field	--	--	18/12/2023
Date Tested - TSS	AS3550.4	--	19/12/2023



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15476

Date Issued: 19/12/2023

Revision No: 00

Sampling Conditions: Fine, 21°- 33°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15476/1	Stage 1 Pit Sump		T & D.Walker	18/12/2023 10:13 AM	AS5667.4 Lake, Grab	AS5667.1
15476/2	Stage 2 West Sediment		T & D.Walker	18/12/2023 2:58 PM	AS5667.4 Lake, Grab	AS5667.1
15476/3	Stage 2 West Pit Sump		T & D.Walker	18/12/2023 3:19 PM	AS5667.4 Lake, Grab	AS5667.1
15476/4	Stage 2 East Sediment Dam		T & D.Walker	18/12/2023 11:16 AM	AS5667.4 Lake, Grab	AS5667.1
15476/5	Basin 1 - Mod 1		T & D.Walker	18/12/2023 1:32 PM	AS5667.4 Lake, Grab	AS5667.1
15476/6	Basin 4		T & D.Walker	18/12/2023 12:29 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15476/1	Stage 1 Pit Sump			
15476/2	Stage 2 West Sediment			
15476/3	Stage 2 West Pit Sump			
15476/4	Stage 2 East Sediment Dam			
15476/5	Basin 1 - Mod 1			Clear, no flow
15476/6	Basin 4			

Sampling procedures have been approved and report finalised on 19/12/2023.
 Where method is "unknown" sampling procedures are not endorsed

Report Number: 15567

Date Issued: 12/01/2024

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 1 water sample(s) were received on 10/01/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	10/01/2024	15567/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 12/01/2024.

Test Report Number: 15567

Date Issued: 12/01/2024

Revision No: 00

Results

Field Analysis		Lab ID	15567/1
		Sample Date	10/01/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	28.7
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	50

Solids		Lab ID	15567/1
		Sample Date	10/01/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	38

Date Tested		Lab ID	15567/1
		Sample Date	10/01/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	10/01/2024
<i>Date Tested - TSS</i>	AS3550.4	--	11/01/2024

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15567

Date Issued: 12/01/2024

Revision No: 00

Sampling Conditions: Cloudy, 28 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15567/1	Basin 1 - Mod 1		D.Walker	10/01/2024 1:24 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15567/1	Basin 1 - Mod 1			No Flow, Low Flow, High FLOW

Sampling procedures have been approved and report finalised on 12/01/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 15692

Date Issued: 8/02/2024

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 1 water sample(s) were received on 7/02/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	7/02/2024	15692/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.
The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 8/02/2024.

Test Report Number: 15692

Date Issued: 8/02/2024

Revision No: 00

Results

Field Analysis		Lab ID	15692/1
		Sample Date	7/02/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	22.9
pH	APHA 4500-H B	pH Units	4.9
Turbidity	APHA 2130 B	NTU	9.4

Solids		Lab ID	15692/1
		Sample Date	7/02/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	6

Date Tested		Lab ID	15692/1
		Sample Date	7/02/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	07/02/2024
<i>Date Tested - TSS</i>	AS3550.4	--	08/02/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15692

Date Issued: 8/02/2024

Revision No: 00

Sampling Conditions: Cloudy, 23°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15692/1	Basin 1 - Mod 1		T & D.Walker	7/02/2024 1:01 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15692/1	Basin 1 - Mod 1			No flow. Dead wallaby in water.

Sampling procedures have been approved and report finalised on 8/02/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 15755

Date Issued: 7/03/2024

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following 1 water sample(s) were received on 6/03/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	6/03/2024	15755/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.
The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 7/03/2024.

Test Report Number: 15755

Date Issued: 7/03/2024

Revision No: 00

Results

Field Analysis		Lab ID	15755/1
		Sample Date	6/03/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	27.6
pH	APHA 4500-H B	pH Units	4.5
Turbidity	APHA 2130 B	NTU	11

Solids		Lab ID	15755/1
		Sample Date	6/03/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	10

Date Tested		Lab ID	15755/1
		Sample Date	6/03/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	06/03/2024
<i>Date Tested - TSS</i>	AS3550.4	--	7/03/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15755

Date Issued: 7/03/2024

Revision No: 00

Sampling Conditions: Fine, 30°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15755/1	Basin 1 - Mod 1		T & D.Walker	6/03/2024 12:41 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15755/1	Basin 1 - Mod 1			Clear, no flow

Sampling procedures have been approved and report finalised on 7/03/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 15918

Date Issued: 4/04/2024

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 1 water sample(s) were received on 3/04/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	3/04/2024	15918/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 4/04/2024.

Test Report Number: 15918

Date Issued: 4/04/2024

Revision No: 00

Results

Field Analysis		Lab ID	15918/1
		Sample Date	3/04/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	24.7
pH	APHA 4500-H B	pH Units	4.6
Turbidity	APHA 2130 B	NTU	4.3

Solids		Lab ID	15918/1
		Sample Date	3/04/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	<5

Date Tested		Lab ID	15918/1
		Sample Date	3/04/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	03/04/2024
<i>Date Tested - TSS</i>	AS3550.4	--	4/04/2024

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 15918

Date Issued: 4/04/2024

Revision No: 00

Sampling Conditions: Cloudy, 26 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
15918/1	Basin 1 - Mod 1		T & D.Walker	3/04/2024 3:26 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
15918/1	Basin 1 - Mod 1			Clear, no flow

Sampling procedures have been approved and report finalised on 4/04/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 16043

Date Issued: 2/05/2024

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 1 water sample(s) were received on 1/05/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	1/05/2024	16043/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 2/05/2024.

Test Report Number: 16043

Date Issued: 2/05/2024

Revision No: 00

Results

Field Analysis		Lab ID	16043/1
		Sample Date	1/05/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	18.1
pH	APHA 4500-H B	pH Units	4.7
Turbidity	APHA 2130 B	NTU	5.4

Solids		Lab ID	16043/1
		Sample Date	1/05/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	<5

Date Tested		Lab ID	16043/1
		Sample Date	1/05/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	01/05/2024
<i>Date Tested - TSS</i>	AS3550.4	--	2/05/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16043

Date Issued: 2/05/2024

Revision No: 00

Sampling Conditions: 100% Cloudcover, 18 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16043/1	Basin 1 - Mod 1		T & D.Walker	1/05/2024 12:40 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16043/1	Basin 1 - Mod 1			Clear, No flow

Sampling procedures have been approved and report finalised on 2/05/2024.

Where method is "unknown" sampling procedures are not endorsed



Report Number: 16213

Date Issued: 30/05/2024

Revision Number: 00

Site/Job: Haerses Rd - Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following water sample(s) were received on 29/05/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Basin 1 - Mod 1	29/05/2024	16213/1	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)

Anthony Crane
Laboratory ManagerLiane Peyra
Technical Officer

Authorised by:

Results have been approved and report finalised on 30/05/2024.

Test Report Number: 16213

Date Issued: 30/05/2024

Revision No: 00

Results

Field Analysis		Lab ID	16213/1
		Sample Date	29/05/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Temperature	Temp	°C	16.5
pH	APHA 4500-H B	pH Units	4.7
Turbidity	APHA 2130 B	NTU	12

Solids		Lab ID	16213/1
		Sample Date	29/05/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
Total Suspended Solids	AS3550.4	mg/L	11

Date Tested		Lab ID	16213/1
		Sample Date	29/05/2024
		Sample ID	Basin 1 - Mod 1
		Units	
Method			
<i>Date Tested - Field</i>	--	--	29/05/2024
<i>Date Tested - TSS</i>	AS3550.4	--	30/05/2024

Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16213

Date Issued: 30/05/2024

Revision No: 00

Sampling Conditions: Fine, 22 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16213/1	Basin 1 - Mod 1		T.Walker	29/05/2024 1:58 PM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16213/1	Basin 1 - Mod 1			Clear, no flow

Sampling procedures have been approved and report finalised on 30/05/2024.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 16249

Date Issued: 17/06/2024

Revision Number: 00

Site/Job: Haerses Rd 6 Monthly Surface water

Client: Dixon Sand (No.1) Pty Ltd
Address: PO Box 4019
PITT TOWN NSW 2756
Contact: David Dixon

The following water sample(s) were received on 13/06/2024

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
Stage 1 Pit Sump	13/06/2024	16249/1	Water	
Stage 2 West Sediment	13/06/2024	16249/2	Water	
Stage 2 West Pit Sump	13/06/2024	16249/3	Water	
Stage 2 East Sediment Dam	13/06/2024	16249/4	Water	
Basin 1 - Mod 1	13/06/2024	16249/5	Water	
Basin 4	13/06/2024	16249/6	Water	

The sample(s) have been tested as received and results relate specifically to the samples tested.

The following reports are included:

- Test Report
- Sampling Report
- Chain of Custody (if available)



Anthony Crane
Laboratory Manager

Authorised by:

Results have been approved and report finalised on 17/06/2024.

Test Report Number: 16249

Date Issued: 17/06/2024

Revision No: 00

Results

Field Analysis	Method	Lab ID Sample Date Sample ID	16249/1 13/06/2024 Stage 1 Pit Sump	16249/2 13/06/2024 Stage 2 West Sediment	16249/3 13/06/2024 Stage 2 West Pit Sump	16249/4 13/06/2024 Stage 2 East Sediment Dam	16249/5 13/06/2024 Basin 1 - Mod 1
		Units					
Temperature	Temp	°C	10.4	14.8	15.0	14.3	14.3
pH	APHA 4500-H B	pH Units	5.3	5.1	4.8	5.0	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	45.0	43.0	93.0	97.0	82.0
Turbidity	APHA 2130 B	NTU	60	19	3.4	17	12

Field Analysis	Method	Lab ID Sample Date Sample ID	16249/6 13/06/2024 Basin 4
		Units	
Temperature	Temp	°C	14.5
pH	APHA 4500-H B	pH Units	4.8
Electrical Conductivity	APHA 2510 B	µS/cm	73.0
Turbidity	APHA 2130 B	NTU	26

Solids	Method	Lab ID Sample Date Sample ID	16249/1 13/06/2024 Stage 1 Pit Sump	16249/2 13/06/2024 Stage 2 West Sediment	16249/3 13/06/2024 Stage 2 West Pit Sump	16249/4 13/06/2024 Stage 2 East Sediment Dam	16249/5 13/06/2024 Basin 1 - Mod 1
		Units					
Total Suspended Solids	AS3550.4	mg/L	44	16	6	14	10

Solids	Method	Lab ID Sample Date Sample ID	16249/6 13/06/2024 Basin 4
		Units	
Total Suspended Solids	AS3550.4	mg/L	19

Date Tested	Method	Lab ID Sample Date Sample ID	16249/1 13/06/2024 Stage 1 Pit Sump	16249/2 13/06/2024 Stage 2 West Sediment	16249/3 13/06/2024 Stage 2 West Pit Sump	16249/4 13/06/2024 Stage 2 East Sediment Dam	16249/5 13/06/2024 Basin 1 - Mod 1
		Units					
Date Tested - Field	--	--	13/06/2024	13/06/2024	13/06/2024	13/06/2024	13/06/2024
Date Tested - TSS	AS3550.4	--	14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024

Date Tested	Method	Lab ID Sample Date Sample ID	16249/6 13/06/2024 Basin 4
		Units	
Date Tested - Field	--	--	13/06/2024
Date Tested - TSS	AS3550.4	--	14/06/2024



Report Comments:

Where present, indicates NATA accreditation does not cover the performance of this service.

Results in **bold** indicate an exceedance of the relevant guideline.

When considering the pass or fail of tests the measurement of uncertainty of each parameter must be considered.

<https://www.vgt.com.au/measurement-uncertainty>

[NT]: Not tested

Location Analysed : Field and 4/30 Glenwood Dr Thornton NSW 2322.

Sampling Report Number: 16249

Date Issued: 17/06/2024

Revision No: 00

Sampling Conditions: Cloudy, 12 °- 16 °C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
16249/1	Stage 1 Pit Sump		T & D.Walker	13/06/2024 9:29 AM	AS5667.4 Lake, Grab	AS5667.1
16249/2	Stage 2 West Sediment		T & D.Walker	13/06/2024 2:08 PM	AS5667.4 Lake, Grab	AS5667.1
16249/3	Stage 2 West Pit Sump		T & D.Walker	13/06/2024 2:46 PM	AS5667.4 Lake, Grab	AS5667.1
16249/4	Stage 2 East Sediment Dam		T & D.Walker	13/06/2024 11:04 AM	AS5667.4 Lake, Grab	AS5667.1
16249/5	Basin 1 - Mod 1		T & D.Walker	13/06/2024 12:46 PM	AS5667.4 Lake, Grab	AS5667.1
16249/6	Basin 4		T & D.Walker	13/06/2024 11:49 AM	AS5667.4 Lake, Grab	AS5667.1

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
16249/1	Stage 1 Pit Sump	312739	6294472	
16249/2	Stage 2 West Sediment	312403	6293815	
16249/3	Stage 2 West Pit Sump	312612	6293745	
16249/4	Stage 2 East Sediment Dam	312770	6293687	
16249/5	Basin 1 - Mod 1	312148	6293404	No Flow
16249/6	Basin 4	312576	6293303	

Sampling procedures have been approved and report finalised on 17/06/2024.
Where method is "unknown" sampling procedures are not endorsed

Appendix D – Noise Compliance Reports

Dixon Sand (No.1) Pty Ltd

Haerses Road Quarry, Maroota

Noise monitoring report
December 2023

Doc no. 19020-NV-RP-15-0





Dixon Sand (No.1) Pty Ltd
Haerses Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-15-0
Revision	0
Date	5 December 2023
Author	John Hutchison
Reviewer	Scott Hughes

Hutchison Weller Pty Ltd
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13/357 Military Road
Mosman NSW 2008

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Revision history

0	11 May 2024	Draft report to client
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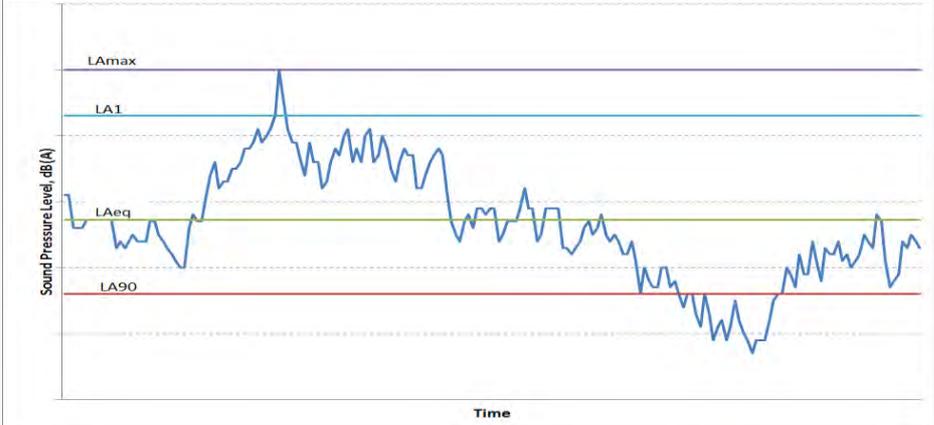


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Definition of terms

Background noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation.
Decibel (dB)	A measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm (to base 10) of the ratio of a given sound power to a reference power.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
dB(C)	Unit used to measure 'C-weighted' sound pressure levels, an adjustment made to sound level to approximate low frequency noise between 10 Hz and 200 Hz.
EPA	Environment Protection Authority
Extraneous noise	Noise resulting from activities that are not typical of the area such as construction, and traffic generated by holiday periods or special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Noise level statistics	<p>L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise.</p> <p>L_{Aeq} – The equivalent continuous A-weighted noise level—the level of noise equivalent to the energy average of noise levels occurring over a measurement period.</p> <p>L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period.</p> <p>L_{Amax} – The maximum A-weighted noise level associated with the measurement period.</p> 
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all the days measured. There is therefore an RBL value for each period (day, evening and night)
Receiver	The land use at which noise is heard
SLM	Sound Level Meter
Sound Power Level (SWL)	The A-weighted sound power level is a logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
Sound Pressure Level (SPL)	<p>This is the level of noise, usually expressed in dB(A), as measured by a standard sound level meter (SLM) with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of noise.</p> <p>A technical definition for the sound pressure level, in decibels, is 20 times the logarithm (base 10) of the ratio of any two quantities related to a given sound pressure to a reference pressure (typically $20 \mu\text{Pa}$ equivalent to 0 dB).</p>
Tonal noise	Noise with perceptible and definite pitch or tone



1. Introduction

Dixon Sand (No.1) Pty Ltd operates the Haerses Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Wisemans Ferry Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and loading of trucks for shipment.

The Quarry operates under Development Consent DA 165-7-2005 and Environment Protection Licence (EPL) 12513, which set noise limits for its operation. Extraction in the areas described in Modification 1 of the development consent and utilisation of the processing plant area commenced in December 2019 and require attended noise monitoring on a six-monthly basis to ensure compliance with the conditions.

Hutchison Weller was commissioned by Dixon Sand to undertake the six-monthly noise monitoring in accordance with the conditions of consent, EPL and requirements of the Noise Management Plan.

This document outlines the consent conditions, monitoring methodology and results of the monitoring undertaken on 5 December 2023.

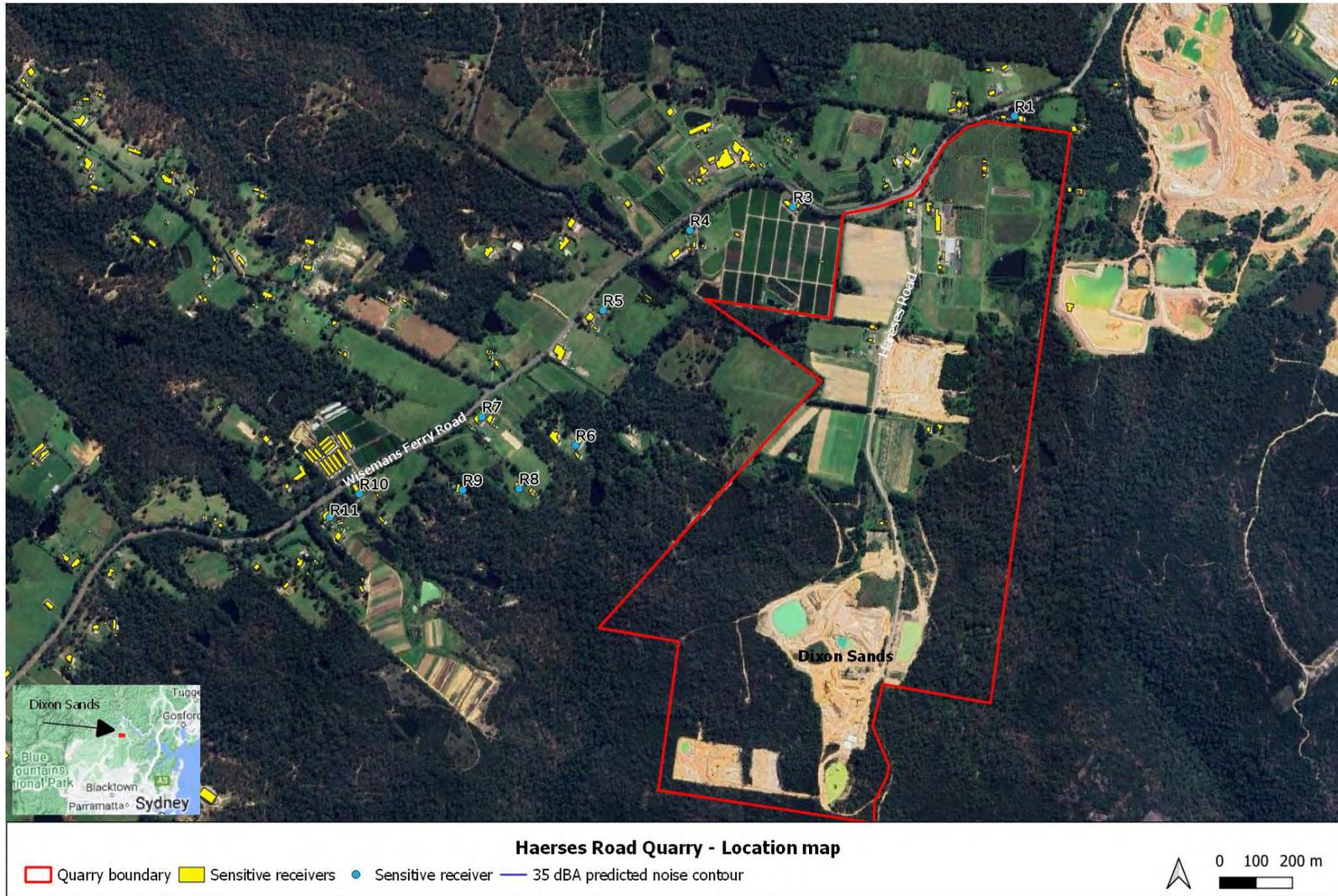


Figure 1 Location of the Quarry



2. Noise compliance criteria

Conditions 1 and 2 of Schedule 3 of development consent DA 165-7-2005 outline the Quarry operating hours and condition 3 defines the noise criteria for compliance.

1. The Applicant must comply with the operating hours set out in Table 1.

Table 1 Operating hours

Activity	Permissible hours
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Truck arrival, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 am to 5.00 pm Monday to Friday. At no time on Saturdays, Sundays, or public holidays
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations.

2. The following activities may be carried out outside the hours specified in condition 1 above:
 - (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and
 - (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

3. The Applicant must ensure that the noise generated by the development (excluding acoustic bund construction) does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2 Noise criteria dB(A)

Receiver	Day	Shoulder (6.00 am to 7.00 am)	
	LAeq (15 minute)	LAeq (15 minute)	LAmix
R05, R06	41	35	52
R03	40	37	
R13, R14	40	36	
All other receivers	40	35	

Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry.

However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Agreements are currently in place between Dixon Sand and adjacent private landowners including:

- Residential receivers identified as R2 and R12 in the planning consent and
- All identified receivers to the east of Haerses Road quarry on Hitchcock Road



3. Monitoring methodology

Operator-attended noise monitoring was undertaken on 7 June 2023 by John Hutchison of Hutchison Weller, an independent acoustic specialist. Monitoring locations included those described in the Quarry Noise Management Plan, as illustrated in Figure 1 and summarised in Table 3.

Table 3 Monitoring locations

Receiver	Address	Description
R3	1643 Wisemans Ferry Road	Private residence adjacent to plant nursery
R4	1617 Wisemans Ferry Road	No access granted – levels extrapolated from site measurements
R6	1543 Wisemans Ferry Road	Private residence. Monitoring conducted on the southeastern side of the residence facing the quarry.
R8	1521 Wisemans Ferry Road	Private residence. Monitoring conducted at boundary between R7 and R8 since no access granted to R8.
HAS1	Haerses Road Quarry	Close to equipment within Haerses Road boundary

Monitoring was conducted in general accordance with the Noise Policy for Industry and Section 6 of the Noise Management Plan.

At-receiver monitoring locations were within 30 metres of residential dwellings, whilst onsite measurement locations were selected for safe access and to be representative of the operations, without extraneous noise from sources such as traffic and insects.

Instrumentation included a Bruel & Kjaer Class 1 sound level meter (SLM), serial no. 3008237, field-calibrated prior to and following monitoring. The SLM was within current calibration, next due January 2024.

Monitoring was undertaken with the SLM set on a tripod at 1.5 metres above ground and measuring A-weighted sound pressure levels under fast response. Each measurement period was 15 minutes and recorded the LAeq, LA90 and LMax statistics.

Meteorological data was recorded during each monitoring period adjacent to the Maroota public school, including wind speed, direction, temperature, relative humidity, and sigma-theta (to establish the Pascall-Guifford stability category). This data was used to establish whether meteorological conditions were suitable for monitoring.

Where extraneous noise such as road traffic or insects were the dominant noise sources, making it impractical to discern the contribution of the Quarry to ambient noise levels, noise levels measured at alternative locations closer to the Quarry were utilised, in line with procedures outlined in Noise Policy for Industry. This involved extrapolation from the near-distance location to the sensitive receiver location.



4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 4.

The main sources of noise from crusher operations in the processing area and area 2. Dozers, excavators and saw cutting also contribute.

In all cases, the Haerses Road quarry was compliant with the project noise objectives.

Quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise in all cases the dominant source of noise. No L_{Amax} noise levels were attributable to the quarry in the shoulder period.

During the day period, quarry noise was inaudible or barely audible at monitoring locations.

On-site measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were undertaken to establish representative sound pressure levels of the operation to allow extrapolation to receiver locations where background noise was too high to discern quarry noise contributions. This is discussed further in Section 4.3.

4.2 Modifying factors

No tonal, impulsive, or low frequency noise characteristics were observed at any residential monitoring location during the monitoring period. Therefore, application of modifying factors is not appropriate in this instance.



Table 4 Monitoring results

Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmix			
At-receiver measurements									
Shoulder (6.00am to 7.00am)	6:05 AM	R3	37	50.1	37.9	63	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 55-60 dBA for HV and 50-52 dBA for LV. Trucks visible at intersection of Wisemans Ferry and Haerses Roads – briefly 45-48 dBA as they join traffic but not audible over traffic. No quarry-related activity audible. No LAmix attributable to the quarry.	Calm to light breeze from NE @ <10 km/h Temperature 16-17°C Clear sky Moderately unstable conditions (B to C class)
	6:30 AM	R6	35	40.4	35.5	51.8	<35	Distant road traffic, birds and frogs contribute to overall ambient level ~40-41 dBA Some trucks noisier at 45-46 dBA with max 51.8 dBA Creek not audible Quarry not audible	
	6:50 AM	R7 (R8)	35	53.5	41.6	79.0	<35	Traffic on Wisemans Ferry Road is dominant and constant source of noise ~ 43-57 dBA Quarry not audible Birds in cage ~ 75 – 79 dBA - Lmax No LAmix values attributable to the quarry	



Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmx			
Onsite measurements									
Onsite	8:30 AM	OAS1	N/A	60.1	55.6	68.2	-	Top area 1 Large excavator on stockpile intermittently load moxy/idle other times ~ 52-55 dBA Small roller working flat area ~ 68 dBA Small excavator building bund wall ~ 55m dBA	Light breeze from NNW @ 3-13 km/h Temperature 21-25°C Clear sky Extremely unstable conditions (A class)
	8:50 AM	OAS2a		66.8	64.0	73.7	-	Area 1A Screen operating ~ 66 dBA Mobile equipment – excavator, FEL and D10 67-69 combined	
	9:25 AM	OAS2b		67.3	62.4	86.4	-	Area 3C Flat tray moxy carrying stone ~ 86 dBA passby 4 blade saw ~ 65-66 dBA Excavator ripping ~73 Excavator loading stone on moxy intermittent	
	9:53 AM	OAS3		73.4	73.1	74.3	-	Washplant 73 @ 15 m Mobile crusher loaded by excavator 74 @ 40m FEL takes spoil to screen Screen 65 @ 48 m	
At-receiver measurements									
Day (7.00am to 6.00pm)	11:02 AM	R3	40	47.4	34.1	64.0	<40 (See Section 4.3)	Wisemans Ferry Road remains dominant noise source at 56-64 dBA for HVs and 48-50 dBA for LVs Distant Old Northern Road – 31 dBA just audible Quarry inaudible over traffic Traffic dropped away with levels decreasing to 31.8 – quarry not audible. One haul truck passed by on Haerses Road 37 dBA	Calm to light breeze from NNW @ 1-13 km/h Temperature 27-29°C Clear sky Extremely unstable conditions (A class)



Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAm _{ax}			
	11:25 AM	R6	41	39.7	35.1	57.9	<41 (See Section 4.3)	<p>Insects are dominant ~ 38-40 dBA and when they drop out ambient level decreases to 35 dBA</p> <p>Road traffic is intermittent ~ 40-42 dBA</p> <p>Quarry not audible</p> <p>Kookaburra is L_{max} ~57.9</p> <p>Neighbours property started operating machinery ~ 38 dBA</p>	
	11:48 AM	R8	40	50.6	37.5	67.2	<40 (See Section 4.3)	<p>Traffic on Wisemans Ferry Road ~ 44 -46</p> <p>Dogs ~ 67 L_{max} – actually increased overall leq by around 3 dB in final few minutes</p> <p>Quarry intermittently just audible at ambient levels of 39 dBA – some engine revs</p> <p>Short period of tracking noise – possibly a dozer</p> <p>When ambient level dropped to 36 dBA, possibly crusher noise barely audible</p>	

4.3 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels affected by other ambient sounds including road traffic. Therefore, measurements captured on-site without substantial influence from traffic were used to calculate sound pressure levels at each receiver.

Based on observations close to the quarry and processing area, the following plant and equipment was in use during the monitoring period. Measurements close to these plant items were undertaken to establish a representative noise model of the quarry operations. A summary of noise emission data for these items is presented in Appendix A. See Figure 2 for work locations.

1. Processing plant – 2 screens, crusher, front end loader, moxies, haulage trucks
2. Quarry -
 - Area 1: Excavator and haul truck, excavator building bund wall and roller
 - Area 2: Crusher, FEL, Excavator and Dozer
 - Area 3: Excavator ripping stone, excavator loading truck, excavator with 4 blade saw



Haerses Road modelled work areas

- Quarry boundary
- Intermediate receiver
- Plant location
- Work area

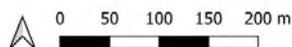


Figure 2 Work areas and noise sources included in the model



Predictions of noise at nearby receivers were based on measured onsite noise levels and propagation methods described in ISO 9613-2:1996 *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*, which accounts for geometric spreading, air and ground absorption as well as barrier effects, assuming worst case meteorology of a gentle breeze from source to receiver and stable conditions.

Based on the above, modelled noise levels for each monitoring location are presented in Table 5. Results are shown for equipment operating in each quarry area and processing plant.

Table 5 Extrapolated monitoring results to intermediate measurement locations

Location	Modelled noise level, dBA	Measured noise level, LAeq, 15 minute, dBA
OAS1	60	60
OAS2	66	67
OAS3	67	67

Based on measurements described in Table 4, extrapolated noise results for each receiver are presented in Table 6. Results are shown for all equipment operating.

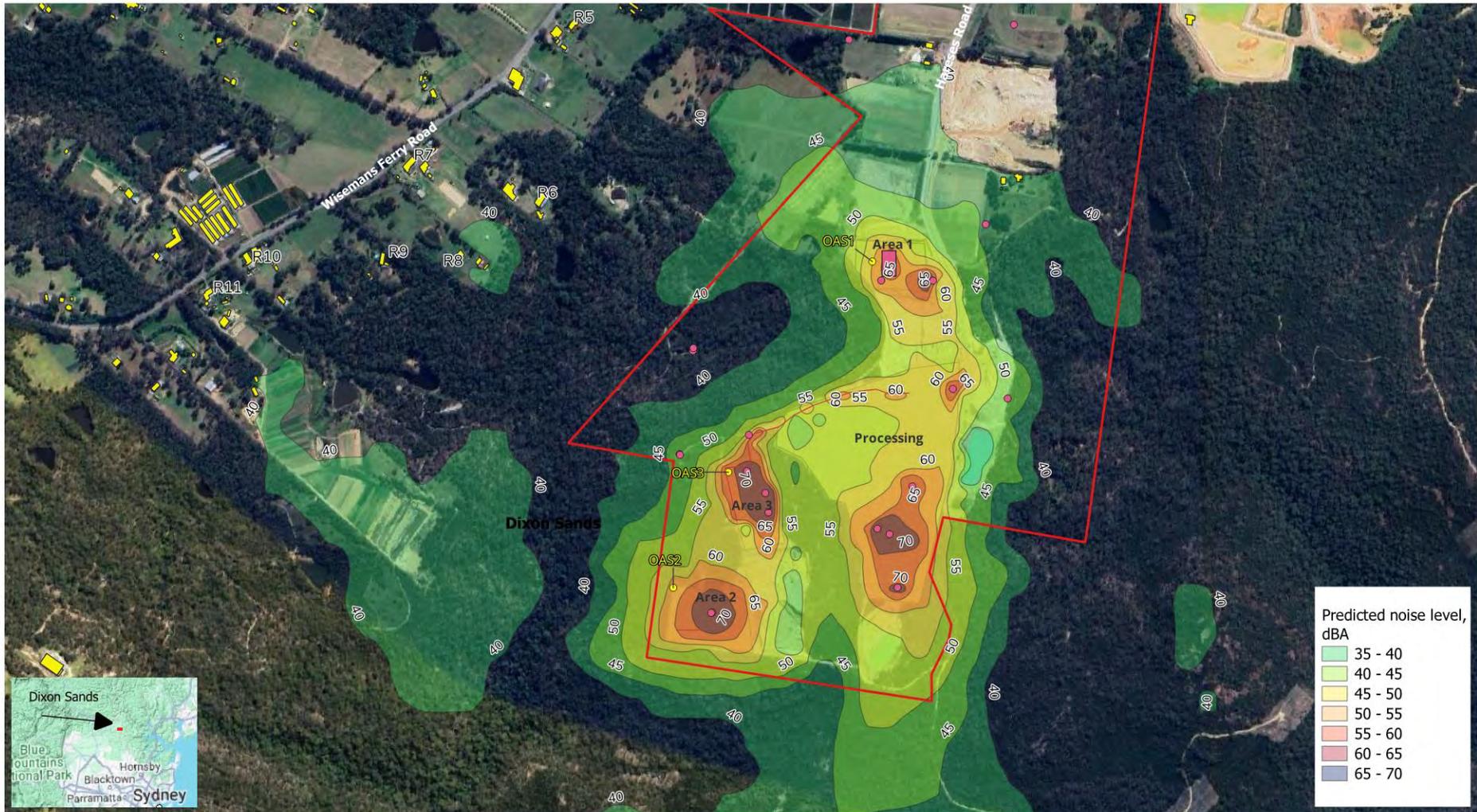
Extrapolated results demonstrate the Quarry is compliant with the criteria for shoulder and daytime operations when all observed equipment is operating.

Table 6 Extrapolated monitoring results

Receiver	Noise criteria	Extrapolated noise level, LAeq, 15 minute	Comment
R3	40	37	All locations comply with noise limits.
R4	40	37	
R6	41	38	
R8	40	40	
All other receivers	40	See Figure 3	

4.4 Compliance summary

Results of attended monitoring and extrapolated noise levels demonstrate observed operations during shoulder and day periods were compliant with the noise criteria at each receiver under the meteorological conditions at the time.



Haerses Road Quarry - Predicted noise levels

□ Quarry boundary
 □ Sensitive receivers
 ● Monitoring location



Figure 3 Extrapolated noise levels from Haerses Road quarry based on on-site measurements.



Appendix A. On-site measurements

Plant item	Height, m	Sound Power Level, (third octave, Hz), dBA																													
		Sum	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k
Small roller	1	99	92	92	88	87	91	96	116	101	91	110	102	95	90	91	96	93	89	95	88	84	84	83	83	82	81	79	76	75	75
Small excavator	2	94	85	84	82	80	83	83	96	104	87	90	100	89	92	84	85	92	89	85	83	83	81	80	81	77	76	74	71	69	66
Large excavator loading moxy	2	109	101	99	97	99	97	99	111	104	103	106	102	101	96	95	97	102	104	101	99	99	99	99	98	96	96	93	89	87	84
Crusher and D10 (OAS2)	2	116	107	106	103	106	111	118	119	118	119	115	104	99	100	100	107	111	109	106	107	107	106	104	102	101	100	98	93	91	91
Moxy hauling stone	2	106	91	90	89	91	95	107	107	112	117	114	105	106	97	95	95	96	97	97	96	96	95	94	92	88	87	85	82	79	76
Rock saw, ripping and excavation (OAS3)	1	115	103	103	103	104	110	114	116	118	117	118	117	116	109	105	108	107	105	107	105	105	104	103	105	102	100	97	94	92	90
Washplant	2	105	91	94	104	92	96	97	97	100	113	111	100	103	92	100	96	95	96	95	96	93	93	94	93	92	91	92	87	86	83
Crusher	2	114	104	104	104	107	114	115	118	119	120	130	111	112	113	108	106	110	107	106	104	104	103	102	102	99	98	97	93	89	86

Dixon Sand (No.1) Pty Ltd

Haerses Road Quarry, Maroota

Noise monitoring report
June 2024

Doc no. 19020-NV-RP-17-0





Dixon Sand (No.1) Pty Ltd
Haerses Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-17-0
Revision	0
Date	4 June 2024
Author	John Hutchison
Reviewer	Scott Hughes

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Revision history

0	18 September 2024	Draft report to client
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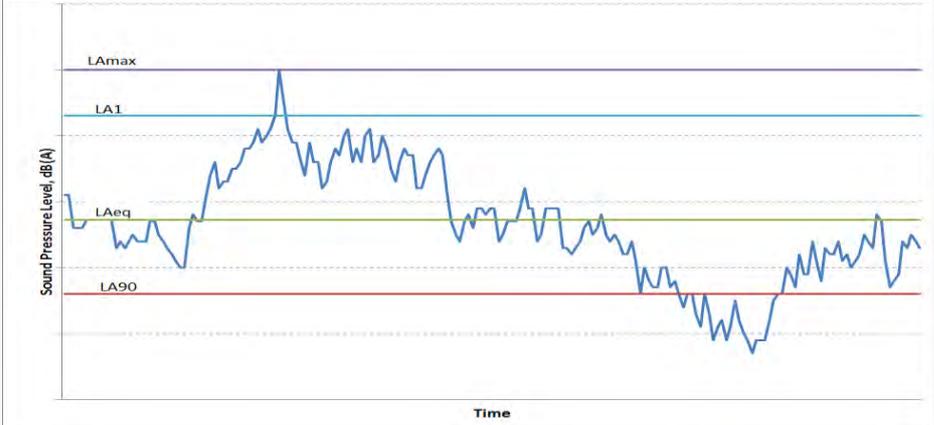


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Definition of terms

Background noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation.
Decibel (dB)	A measure of sound equivalent to 20 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure, and 10 times the logarithm (to base 10) of the ratio of a given sound power to a reference power.
dB(A)	Unit used to measure 'A-weighted' sound pressure levels. A-weighting is an adjustment made to sound-level measurement to approximate the response of the human ear.
dB(C)	Unit used to measure 'C-weighted' sound pressure levels, an adjustment made to sound level to approximate low frequency noise between 10 Hz and 200 Hz.
EPA	Environment Protection Authority
Extraneous noise	Noise resulting from activities that are not typical of the area such as construction, and traffic generated by holiday periods or special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous.
Noise level statistics	<p>L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise.</p> <p>L_{Aeq} – The equivalent continuous A-weighted noise level—the level of noise equivalent to the energy average of noise levels occurring over a measurement period.</p> <p>L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period.</p> <p>L_{Amax} – The maximum A-weighted noise level associated with the measurement period.</p> 
RBL	The Rating Background Level for each period is the medium value of the ABL values for the period over all the days measured. There is therefore an RBL value for each period (day, evening and night)
Receiver	The land use at which noise is heard
SLM	Sound Level Meter
Sound Power Level (SWL)	The A-weighted sound power level is a logarithmic ratio of the acoustic power output of a source relative to 10^{-12} watts and expressed in decibels. Sound power level is calculated from measured sound pressure levels and represents the level of total sound power radiated by a sound source.
Sound Pressure Level (SPL)	<p>This is the level of noise, usually expressed in dB(A), as measured by a standard sound level meter (SLM) with a pressure microphone. The sound pressure level in dB(A) gives a close indication of the subjective loudness of noise.</p> <p>A technical definition for the sound pressure level, in decibels, is 20 times the logarithm (base 10) of the ratio of any two quantities related to a given sound pressure to a reference pressure (typically $20 \mu\text{Pa}$ equivalent to 0 dB).</p>
Tonal noise	Noise with perceptible and definite pitch or tone



1. Introduction

Dixon Sand (No.1) Pty Ltd operates the Haerses Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Wisemans Ferry Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and loading of trucks for shipment.

The Quarry operates under Development Consent DA 165-7-2005 and Environment Protection Licence (EPL) 12513, which set noise limits for its operation. Extraction in the areas described in Modification 1 of the development consent and utilisation of the processing plant area commenced in December 2019 and require attended noise monitoring on a six-monthly basis to ensure compliance with the conditions.

Hutchison Weller was commissioned by Dixon Sand to undertake the six-monthly noise monitoring in accordance with the conditions of consent, EPL and requirements of the Noise Management Plan.

This document outlines the consent conditions, monitoring methodology and results of the monitoring undertaken on 4 June 2024.

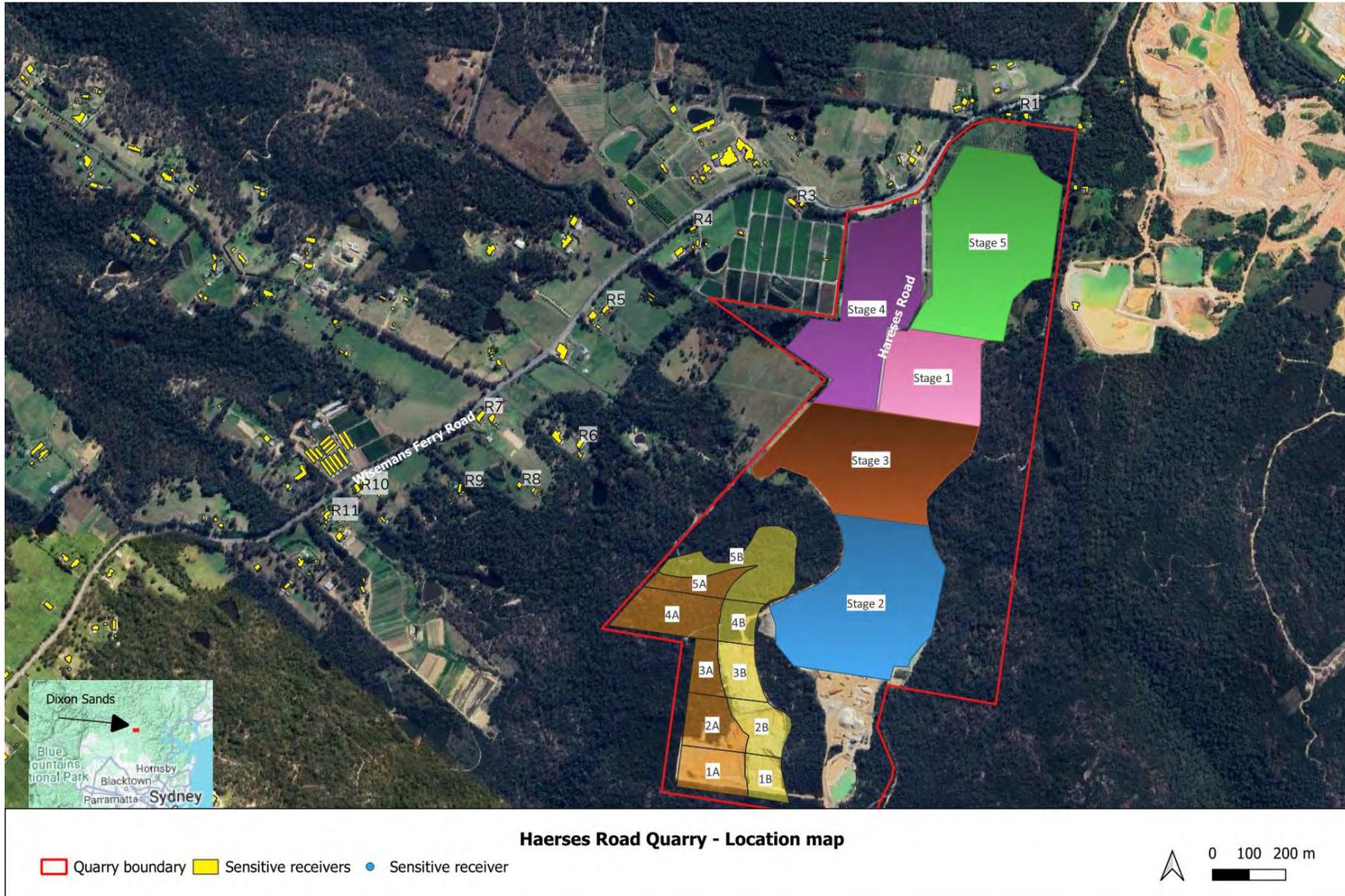


Figure 1 Location of the Quarry



2. Noise compliance criteria

Conditions 1 and 2 of Schedule 3 of development consent DA 165-7-2005 outline the Quarry operating hours and condition 3 defines the noise criteria for compliance.

1. The Applicant must comply with the operating hours set out in Table 1.

Table 1 Operating hours

Activity	Permissible hours
Quarrying operations (excluding truck arrival, loading and dispatch)	7.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Truck arrival, loading and dispatch	6.00 am to 6.00 pm Monday to Saturday At no time on Sundays or public holidays
Acoustic bund construction and road and intersection works on Haerses Road and Wisemans Ferry Road	8.00 am to 5.00 pm Monday to Friday. At no time on Saturdays, Sundays, or public holidays
Maintenance	At any time, provided that these activities are not audible at any privately-owned residence outside of permissible hours for quarrying operations.

2. The following activities may be carried out outside the hours specified in condition 1 above:
 - (a) delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and
 - (b) emergency work to avoid the loss of lives, property or to prevent environmental harm.

In such circumstances, the Applicant must notify the Secretary and affected residents prior to undertaking the activities, or as soon as is practical thereafter.

3. The Applicant must ensure that the noise generated by the development (excluding acoustic bund construction) does not exceed the criteria in Table 2 at any residence on privately-owned land.

Table 2 Noise criteria dB(A)

Receiver	Day	Shoulder (6.00 am to 7.00 am)	
	LAeq (15 minute)	LAeq (15 minute)	LAmix
R05, R06	41	35	52
R03	40	37	
R13, R14	40	36	
All other receivers	40	35	

Noise generated by the development must be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Noise Policy for Industry.

However, the noise criteria in Table 2 do not apply if the Applicant has an agreement with the relevant landowner to exceed the noise criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

Agreements are currently in place between Dixon Sand and adjacent private landowners including:

- Residential receivers identified as R2 and R12 in the planning consent and
- All identified receivers to the east of Haerses Road quarry on Hitchcock Road



3. Monitoring methodology

Operator-attended noise monitoring was undertaken on 7 June 2023 by John Hutchison of Hutchison Weller, an independent acoustic specialist. Monitoring locations were selected in line with the Haerses Road Quarry Noise Management Plan (May 2019), which addresses specific stages of quarry development, as outlined in

Table 3 Noise monitoring locations for each stage and extraction cell (from Noise and Vibration Management Plan, 2019)

Location	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Mod 1, Extraction cells 1A to 5B
R1	-	-	-	-		-
R3	✓	✓	✓	✓	✓	-
R4	✓	✓	✓	✓	✓	-
R6	-	-	-	-	-	✓
R8	-	-	-	-	-	✓

Monitoring locations are illustrated in Figure 1 and specific addresses are summarised in Table 4.

Table 4 Monitoring locations

Receiver	Address	Description
R3	1643 Wisemans Ferry Road	Private residence adjacent to plant nursery
R4	1617 Wisemans Ferry Road	No access granted – levels extrapolated from site measurements
R6	1543 Wisemans Ferry Road	Private residence. Monitoring conducted on the southeastern side of the residence facing the quarry.
R8	1521 Wisemans Ferry Road	Private residence. Monitoring conducted at boundary between R7 and R8 since no access granted to R8.
HAS1	Haerses Road Quarry	Close to equipment within Haerses Road boundary

Monitoring was conducted in general accordance with the Noise Policy for Industry and Section 6 of the Noise Management Plan. At-receiver monitoring locations were within 30 metres of residential dwellings, whilst onsite measurement locations were selected for safe access and to be representative of the operations, without extraneous noise from sources such as traffic and insects.

Instrumentation was a Bruel & Kjaer Class 1 sound level meter (SLM), serial no. 3008237, field-calibrated prior to and following monitoring. The SLM was within current calibration, next due January 2026.

Monitoring was undertaken with the SLM set on a tripod at 1.5 metres above ground and measuring A-weighted sound pressure levels under fast response. Each measurement period was 15 minutes and recorded the LAeq, LA90 and LMax statistics.

Meteorological data was recorded during each monitoring period adjacent to the Maroota public school, including wind speed, direction, temperature, relative humidity, and sigma-theta (to establish the Pascall-Guifford stability category). This data was used to establish whether meteorological conditions were suitable for monitoring.

Where extraneous noise such as road traffic or insects were the dominant noise sources, making it impractical to discern the contribution of the Quarry to ambient noise levels, noise levels measured at alternative locations closer to the Quarry were utilised, in line with procedures outlines in *Noise Policy for Industry*. This involved extrapolation from the near-distance location to the sensitive receiver location.



4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 5.

Quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise on Wisemans Ferry Road in all cases the dominant source of noise. No L_{Amax} noise levels were attributable to the quarry in the shoulder period.

During the day period, quarry noise was inaudible or barely audible at monitoring locations. Again, ambient noise masked noise from the quarry.

Based on measured noise at each location, the Haerses Road quarry was compliant with the project noise objectives.

On-site measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were undertaken to establish representative sound pressure levels of the operation to allow extrapolation to receiver locations where background noise was too high to discern quarry noise contributions. This is discussed further in Section 4.3.

4.2 Modifying factors

No tonal, impulsive, or low frequency noise characteristics were observed at any residential monitoring location during the monitoring period. Therefore, application of modifying factors is not appropriate in this instance.



Table 5 Monitoring results

Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmix			
At-receiver measurements									
Shoulder (6.00am to 7.00am)	6:04 AM	R3	37	50.9	35.0	64.8	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 55-62 dBA for HV and 49-52 dBA for LV. During break in flow, dropped to 33-34 dBA. No quarry-related activity audible. No tones or Low Frequency No LAmix attributable to the quarry.	Calm to light breeze from N @ <10 km/h Temperature 8°C Clear sky Moderately unstable conditions (B class)
	6:25 AM	R6	35	44.5	41.9	59.0	<35	Local creek a steady noise ~ 42 dBA (LA90) Road traffic not as dominant here, ~40-44 dBA Kookaburras started ~ 53 – 59 (LAmix) Quarry not audible	
	6.46 AM	R7 (R8)	35	47.6	38.8	62.3	<35	Traffic on Wisemans Ferry Road is dominant and constant source of noise ~ 50-56 dBA , some HVs up to 59 dBA and a motorcycle 60 dBA Dog barking ~ 57-59 dBA When traffic dropped away for a moment – 39 dBA Quarry not audible throughout most of measurement, although a tonal alarm was briefly audible No LAmix values attributable to the quarry	



Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmix			
Onsite measurements									
Onsite	7:33 AM	OAS1	N/A	74.0	72.4	76	-	Stage 2 – stockpile area Excavator on stockpile loading screen, with FEL servicing spoil. 74.0 dBA. Screen is dominant source and reflected by LA90.	Light breeze from NNW @ 1-8 km/h Temperature 9-12°C Clear sky Extremely unstable conditions (A class)
	7:58 AM	OAS2		55.3	51.7	69.0	-	Stage 2 Pit Rock saw, FEL and excavator with grinder in pit – visibility blocked by pit wall Saw operating alone ~ 55 dBA All equipment together ~ 60 dBA	
	8:29 AM	OAS3		80.3	77.2	84.7	-	Area 1A Saw 81-82 dBA, 76 dBA when saw stops Grinding and ripping around 80-100m east of saw not audible over saw	
	9:27 AM	OAS4		69.9	56.4	87.1	-	Area 3A D11 pushing ~ 60dBA Excavator with rock breaker – intermittent use. Hammer ~ 66-67 dBA Moxys loaded by excavator on rotation around 3-4 mins Moxies passing monitoring position ~ 82 dBA	
	10:54AM	OAS5		70.5	69.4	78.9	-	Processing area Screens loaded by excavator ~70 dBA 2 x FEL operating Washplant active	



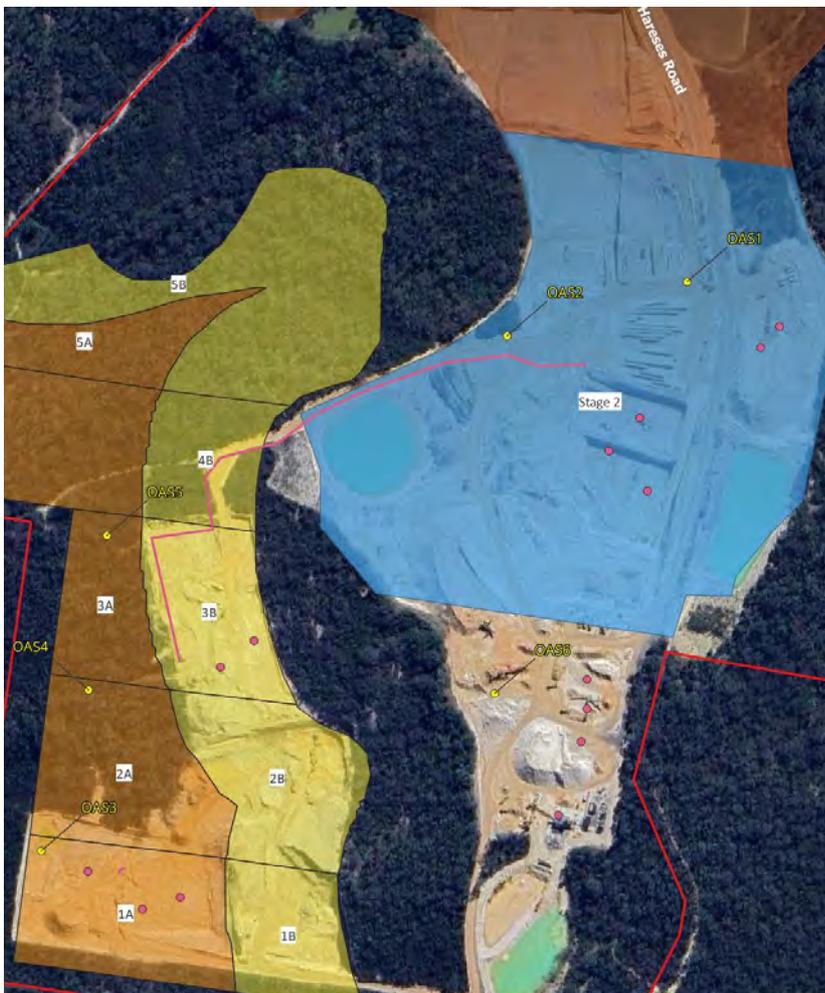
Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAm _{ax}			
At-receiver measurements									
Day (7.00am to 6.00pm)	11:25 AM	R3	40	47.4	34.9	63.6	<40 (See Section 4.3)	Wisemans Ferry Road remains dominant noise source at 56-59 dBA for LVs and 59-60 dBA for HVs Quarry inaudible over traffic Traffic dropped away with levels decreasing to 37-38 – quarry not audible. Distant tractor just audible.	Calm to light breeze from NNe @ 1-4 km/h Temperature 12°C Clear sky Extremely unstable conditions (A class)
	11:25 AM	R6	41	N/A	N/A	N/A	<41 (See Section 4.3)	Not accessible	
	11:51 AM	R8	40	52.3	38.3	69.2	<40 (See Section 4.3)	Traffic on Wisemans Ferry Road ~ 56-59 Dogs ~ 64 L _{max} Quarry intermittently just audible at ambient – some engine revs, potentially moxy No saw or hammering audible. Estimate 37-38 dBA	

4.3 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels affected by other ambient sounds including road traffic. Therefore, measurements captured on-site without substantial influence from traffic were used to calculate sound pressure levels at each receiver.

Based on observations close to the quarry and processing area, the following plant and equipment was in use during the monitoring period. Measurements close to these plant items were undertaken to establish a representative noise model of the quarry operations. A summary of noise emission data for these items is presented in Appendix A. See Figure 2 for work locations.

1. Processing plant – Washplant, 2 screens, front end loader, excavator, haulage trucks
2. Quarry -
 - Stage 2: in Pit - Rock saw, grinder, FEL and excavator; stockpiling area – screen, excavator and FEL
 - Area 1A: Rock saw, grinder and excavator ripping
 - Area 3b: Excavator ripping stone, Dozer pushing up and excavator loading moxies



Haerses Road modelled work areas

- Quarry boundary
- Intermediate receiver
- Plant location
- Work area

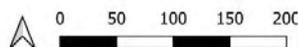


Figure 2 Work areas and noise sources included in the model



Predictions of noise at nearby receivers were based on measured onsite noise levels and propagation methods described in ISO 9613-2:1996 *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*, which accounts for geometric spreading, air and ground absorption as well as barrier effects, assuming worst case meteorology of a gentle breeze from source to receiver and stable conditions.

Based on the above, modelled noise levels for each monitoring location are presented in Table 6. Results are shown for equipment operating in each quarry area and processing plant. Modelled noise levels are within 2 dB of measured values indicating the model is sufficiently accurate to represent operating conditions.

Table 6 Extrapolated monitoring results to intermediate measurement locations

Location	Modelled noise level, dBA	Measured noise level, LAeq, 15 minute, dBA
OAS1	72.4	72.4
OAS2	54.3	55.3
OAS3	78.7	80.3
OAS4	69.4	69.9
OAS5	69.8	70.5

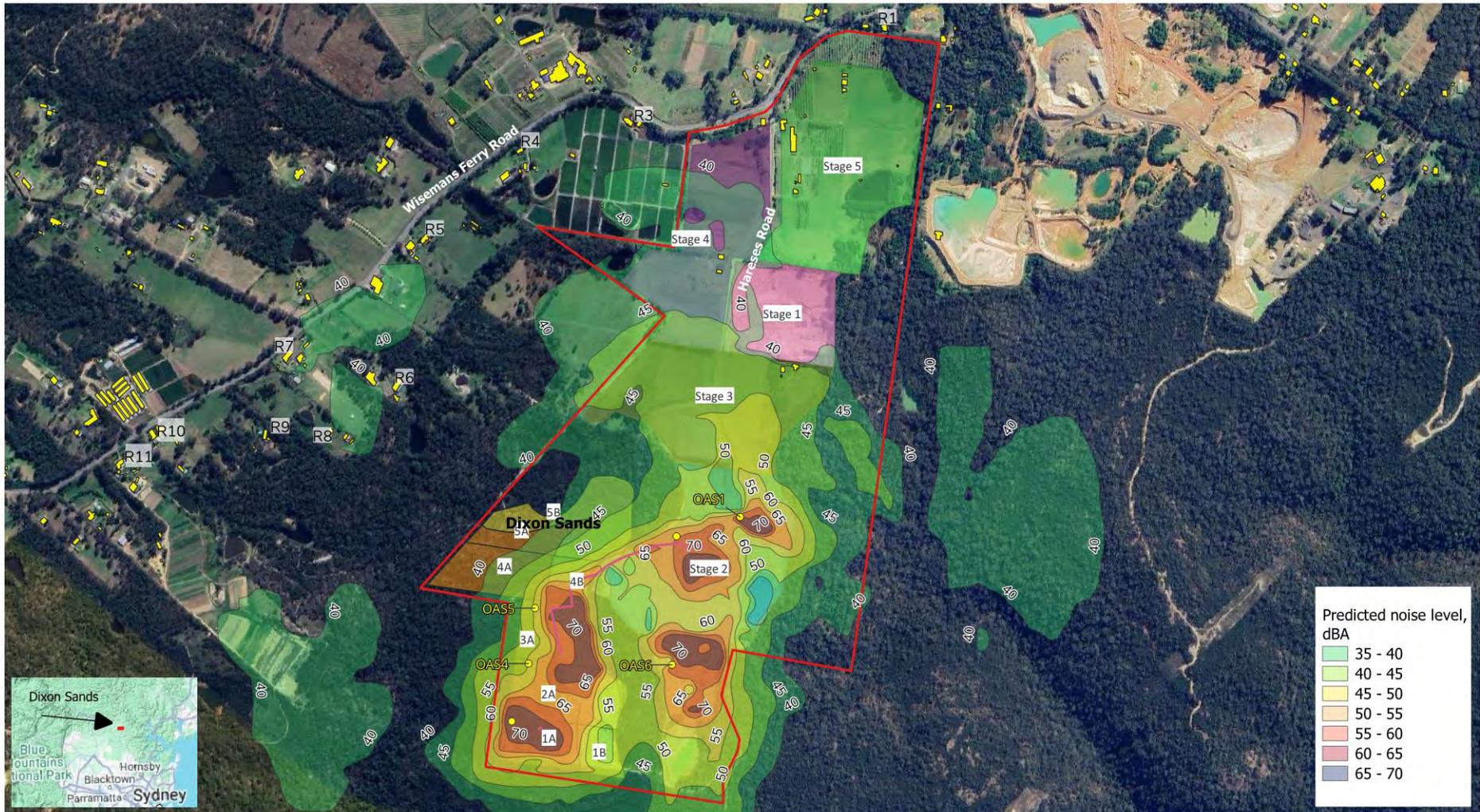
Based on measurements described in Table 5, extrapolated noise results for each receiver are presented in Table 7. Results are shown for all equipment operating. Extrapolated results demonstrate the Quarry is compliant with the criteria for shoulder and daytime operations when all observed equipment is operating.

Table 7 Extrapolated monitoring results

Receiver	Noise criteria	Extrapolated noise level, LAeq, 15 minute	Comment
R3	40	39	All locations comply with noise limits.
R4	40	39	
R6	41	38	
R8	40	39	
All other receivers	40	See Figure 3	

4.4 Compliance summary

Results of attended monitoring and extrapolated noise levels demonstrate observed operations during shoulder and day periods were compliant with the noise criteria at each receiver under the meteorological conditions at the time.



Predicted noise level, dBA

35 - 40
40 - 45
45 - 50
50 - 55
55 - 60
60 - 65
65 - 70

□ Quarry boundary
 ■ Sensitive receivers
 ● Monitoring location

Haerses Road Quarry - Predicted noise levels

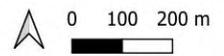


Figure 3 Extrapolated noise levels from Haerses Road quarry based on on-site measurements.



Appendix A. On-site measurements

Plant item	Height, m	Sound Power Level, (third octave, Hz), dBA																													
		Sum	12.5	16	20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1k	1.25k	1.6k	2k	2.5k	3.15k	4k	5k	6.3k	8k
Exc with hammer	1.5	120	52	58	58	65	74	83	88	92	95	101	99	104	96	99	102	100	105	110	107	109	112	110	111	109	108	104	100	94	88
Excavator loading moxy	2	109	38	43	47	54	58	64	81	78	80	87	86	88	85	86	90	97	100	99	98	99	99	100	99	98	97	94	90	87	82
Excavator with grinder	1.5	109	38	43	47	54	58	64	81	78	80	87	86	88	85	86	90	97	100	99	98	99	99	100	99	98	97	94	90	87	82
Moxy	2	109	26	34	43	54	66	66	70	84	83	86	88	88	90	95	94	97	97	98	101	99	99	98	97	95	94	91	87	84	80
Excavator ripping	1.5	115	40	47	53	59	70	80	86	91	95	99	101	103	98	97	102	102	102	105	105	105	104	104	106	104	101	99	95	92	89
Rock saw stage 1	1	118	29	38	44	50	61	74	78	84	87	92	88	91	101	103	105	109	111	111	108	104	105	105	104	101	98	95	92	87	82
Rock saw Stage 2	1	107	46	52	55	58	72	76	78	82	80	86	88	90	87	85	92	96	95	99	99	98	97	96	94	91	88	85	82	77	71
Screen loaded by excavator Processing	2	118	46	63	56	59	71	82	86	90	95	97	98	100	100	105	111	108	108	106	103	105	108	109	107	103	100	97	94	90	83
Screen loaded by excavator Stage 2	2	114	42	49	48	59	69	78	82	85	86	94	91	95	102	100	106	106	104	103	102	101	101	101	102	102	99	94	91	86	81
Washplant	1.5	105	27	37	53	48	56	62	67	74	90	92	84	89	82	92	90	90	92	93	95	93	94	95	94	93	92	93	88	86	82

Appendix E – Monthly Site Inspection



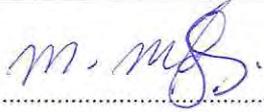
HAERSES ROAD QUARRY DIXON SAND, MAROOTA MONTHLY SITE CONDITION CHECKLIST

This checklist is to be completed monthly by the Environmental Officer.
Completed checklists are to be retained and included in the Annual Review.

Date of inspection:		31/10/2023		
Inspection by:		Melissa Mass		
Measured monthly rainfall (mm)		28/9/2023 - 31/10/2023 Rainfall = 40.4 mm		
	Yes (✓) No (X) NA	Comments	Actions	Actions Complete (Date/Sign)
SEDIMENT CONTROLS				
Site checked for potential erosion issues or transport of sediment from batters, vehicle access points, excavations, haul roads, vegetation clearing etc.	✓	No erosion or transport of sediment noted		
Effectiveness and capacity of Erosion and Sediment controls checked (drains, basins, filters etc.)	✓	All drains, basins etc clear		
Stockpiles located and maintained correctly	✓			
Tree clearance restricted to required area	✓	Clearance in approved areas only		
WATER QUALITY AND QUANTITY				
Monthly water quality samples collected from monitoring bores. Samples tested for pH and electrical conductivity	N/A			
Monthly surface water monitoring of the in-pit sump	✓			
6 monthly monitoring of groundwater quality at 13 bores	✓	undertaken by V&T		
Monthly depth measurement of all groundwater bores and comparison with rainfall	✓	undertaken on 31/10/2023		
Monthly inspection of drainage & sediment controls including water storages, pumps, pipes and dams' walls	✓	undertaken on 31/10/2023		
Any Fuel or oil spills reported and maintained	✓	No spills recorded this period.		
Fuels/chemicals stored in bunded areas	✓	EPA bunding approved.		
AIR QUALITY				
Monitoring station (TEOM) and continuous automatic meteorological station are maintained and operating in the vicinity of the Maroota Public School	✓	TEOM and weather station managed by COASED		
On site dust suppression	✓	use of water cart when required.		

Loads covered entering and leaving site	✓	In compliance with TMP		
Drop height of material minimised during truck loading and unloading	✓			
Active extraction areas minimised within the project area through progressive clearing and rehabilitation	✓			
Cessation or restriction of dust generating activities during period of high winds	✓			
NOISE				
Compliance with approved hours of operation	✓	In compliance with Nmp + TMP		
No complaints received from surrounding residences	✓	No complaints this period		
Annual attended and unattended monitoring	✓	undertaken by Hutchison + Weller		
Either one of a dozer or front end loader (not both) operating in Cell 4 and Cell 5 during early extraction, clearing or construction of bund walls, to minimise noise	N/A			
The use of noisy equipment scheduled at the least sensitive time of day	✓			
Plant switched off when not in use	✓	In compliance with Nmp		
In the wet processing plant area, stockpiles are located along to western boundary of the area to shield loading and unloading activities	✓			
Additional noise monitoring at the potentially most affected locations near the south-western end of the site, such as Location R6 and R8, when extraction operations are being conducted in the additional extraction area	✓	undertaken by Hutchison + Weller		
FLORA & FAUNA/ REHABILITATION				
Sightings of threatened species reported	N/A			
No disturbance of buffer/conservation areas	✓			
All buffer/conservation area fencing/markings intact	✓			
Rehabilitation undertaken to schedule	✓	monthly visit by Bush-It		
Success of rehabilitation of buffers, conservation areas & rehabilitation areas	✓			
Flora and fauna monitoring program undertaken to schedule	✓			
ARCHAEOLOGY				
Stop work if sites located – OEH notified	✓	None this period		

WASTE AND SITE CONDITION				
No rubbish visible or buried on site	✓			
Recyclables removed by licensed Contractors	✓	By council contractor		
Putrescible waste covered and regularly removed	✓			
ROADS AND TRANSPORT				
Monthly inspection of haul roads, site access road and Haerses Road/site access road intersection	✓			
Weekly inspection of Haerses Road/site access road intersection and sand/clay removed as necessary	✓			
Continuous recording of the amount of quarry products transported from the site and total truck movements	✓	Refer to truck records		
Truck movements have not exceeded 56 per day, or 20 between 6:00 am and 7:00 am	✓	Refer to truck records	Hurry to creek.	
Weighbridge/log book records retained and recorded	✓	Refer to truck records		
At the Channelised Right Hand turning lane located at the intersection of Wisemans Ferry Road and Haerses Road, for each month, undertake 1-hour duration monitoring during each of the peak periods below: <ul style="list-style-type: none"> 6:00 – 7:00 am, 8:00 – 9:00 am, and 3:00 – 4:00 pm Identify (when applicable) when haulage truck queuing in the right-hand turn lane into Haerses Road is exceeding the design capacity:	✓	6:00 – 7:00 am: Nil 8:00 – 9:00 am: Nil 3:00 – 4:00 pm: Nil		 30/10/23 Ashleigh Hardy NHK Officer
REPORTING				
Complaints register maintained	✓	updated and published monthly		
Environmental incidents reported to EPA and DPIE	✓	No incidents to report this period		
Monitoring results and statements of compliance with Development Consent and EPL conditions provided in the Annual Review and EPL Annual Return	✓			
Staff and Contractors undergo relevant environmental inductions. Sighting of training/induction records	✓			
PIRMP / SPILL KIT				
Spill kits inspected and used items replaced	✓			
A copy of PIRMP flowchart available in each Spill Kit	✓			

Signed:  (Environmental Officer or Delegate)

Appendix F – Morning Truck Data

Dixon Sand Haerses Road - Maroota Quarry Morning Trucks				
FEBRUARY		2024		6.00am - 7.00am
Date	Time in	Docket No.	Tonnes	Daily Morning Truck No. (laden)
1/02/2024	6.01	H11788M\1	39.00 t	
1/02/2024	6.06	H11789M\1	38.70 t	
1/02/2024	6.11	H11790M\1	38.10 t	
1/02/2024	6.20	H11791M\1	38.50 t	
1/02/2024	6.27	H11792M\1	26.40 t	5
2/02/2024	6.07	H11833M\1	19.80 t	
2/02/2024	6.11	H11834M\1	38.50 t	
2/02/2024	6.20	H11835M\1	37.40 t	
2/02/2024	6.26	H11836M\1	43.00 t	
2/02/2024	6.28	H11837M\1	31.70 t	
2/02/2024	6.38	H11838M\1 & H11839M\1	39.00 t	
2/02/2024	6.58	H11840M\1	20.00 t	7
3/02/2024	6.00	H11870M\1	39.00 t	
3/02/2024	6.06	H11871M\1	38.50 t	
3/02/2024	6.12	H11872M\1	19.80 t	
3/02/2024	6.50	H11873M\1	19.90 t	
3/02/2024	6.50	H11874M\1	19.50 t	
3/02/2024	6.54	H11875M\1	18.20 t	6
5/02/2024	6.01	H11887M\1	39.00 t	
5/02/2024	6.04	H11888M\1	37.00 t	
5/02/2024	6.12	H11889M\1	38.50 t	
5/02/2024	6.21	H11890M\1	39.50 t	
5/02/2024	6.35	H11891M\1	38.50 t	5
6/02/2024	6.16	H11923M\1	38.80 t	
6/02/2024	6.18	H11924M\1	38.50 t	
6/02/2024	6.23	H11925M\1	32.00 t	
6/02/2024	6.32	H11926M\1	39.40 t	
6/02/2024	6.34	H11927M\1	31.70 t	5
7/02/2024	6.03	H11946M\1	39.00 t	

7/02/2024	6.07	H11947M\1	32.00 t	
7/02/2024	6.11	H11948M\1	39.50 t	
7/02/2024	6.20	H11949M\1	37.40 t	
7/02/2024	6.29	H11950M\1	39.00 t	
7/02/2024	6.36	H11951M\1	20.00 t	
7/02/2024	6.47	H11952M\1	20.00 t	7
8/02/2024	6.07	H11987M\1	41.70 t	
8/02/2024	6.13	H11988M\1	38.50 t	
8/02/2024	6.19	H11989M\1	37.80 t	
8/02/2024	6.21	H11990M\1	26.40 t	
8/02/2024	6.28	H11991M\1	39.00 t	
8/02/2024	6.34	H11992M\1	16.00 t	
8/02/2024	6.39	H11993M\1	20.16 t	7
9/02/2024	6.05	H12032M\1	37.40 t	
9/02/2024	6.48	H12033M\1	18.50 t	
9/02/2024	6.51	H12034M\1	20.20 t	3
10/02/2024	6.04	H12079M\1	38.50 t	
10/02/2024	6.08	H12080M\1	39.00 t	
10/02/2024	6.36	H12081M\1	38.60 t	
10/02/2024	6.58	H12082M\1	18.50 t	
10/02/2024	6.59	H12083M\1	18.20 t	5
12/02/2024	6.05	H12095M\1	39.00 t	
12/02/2024	6.19	H12096M\1	38.80 t	
12/02/2024	6.17	H12097M\1	39.50 t	
12/02/2024	6.32	H12098M\1	20.00 t	
12/02/2024	6.49	H12099M\1	38.50 t	5
13/02/2024	6.04	H12137M\1	39.00 t	
13/02/2024	6.10	H12138M\1	38.80 t	
13/02/2024	6.19	H12139M\1	43.20 t	
13/02/2024	6.22	H12140M\1	38.50 t	
13/02/2024	6.27	H12141M\1	32.00 t	
13/02/2024	6.29	H12142M\1	19.80 t	
13/02/2024	6.34	H12143M\1	37.40 t	

13/02/2024	6.42	H12144M\1	39.50 t	
13/02/2024	6.44	H12145M\1	32.00 t	
13/02/2024	6.54	H12146M\1	38.50 t	10
14/02/2024	6.00	H12187M\1	39.00 t	
14/02/2024	6.06	H12188M\1	38.50 t	
14/02/2024	6.11	H12189M\1	37.40 t	
14/02/2024	6.15	H12190M\1	19.80 t	
14/02/2024	6.19	H12191M\1	39.50 t	
14/02/2024	6.26	H12192M\1	26.40 t	
14/02/2024	6.34	H12193M\1	38.80 t	
14/02/2024	6.40	H12194M\1	20.00 t	
14/02/2024	6.43	H12195M\1	31.60 t	9
15/02/2024	6.04	H12238M\1	39.00 t	
15/02/2024	6.09	H12239M\1	37.40 t	
15/02/2024	6.10	H12240M\1	38.50 t	
15/02/2024	6.24	H12241M\1	39.50 t	
15/02/2024	6.35	H12242M\1	31.70 t	5
16/02/2024	6.05	H12277M\1	39.00 t	
16/02/2024	6.08	H12278M\1	38.50 t	
16/02/2024	6.22	H12279M\1	38.50 t	
16/02/2024	6.25	H12280M\1	38.50 t	
16/02/2024	6.28	H12281M\1	19.80 t	
16/02/2024	6.31	H12282M\1	39.50 t	
16/02/2024	6.37	H12283M\1	26.40 t	
16/02/2024	6.42	H12284M\1	37.50 t	
16/02/2024	6.50	H12285M\1	19.00 t	
16/02/2024	6.52	H12286M\1	39.30 t	10
17/02/2024	6.02	H12314M\1	39.00 t	
17/02/2024	6.09	H12315M\1	38.50 t	2
19/02/2024	6.06	H12324M\1	38.50 t	
19/02/2024	6.24	H12325M\1	21.00 t	
19/02/2024	6.30	H12326M\1	39.00 t	
19/02/2024	6.42	H12327M\1	32.00 t	4

20/02/2024	6.01	H12369M\1	39.00 t	
20/02/2024	6.08	H12370M\1	20.20 t	
20/02/2024	6.15	H12371M\1	38.50 t	
20/02/2024	6.20	H12372M\1	32.00 t	
20/02/2024	6.25	H12373M\1	37.40 t	5
21/02/2024	6.04	H12410M\1	39.00 t	
21/02/2024	6.06	H12411M\1	20.20 t	
21/02/2024	6.12	H12412M\1	38.20 t	
21/02/2024	6.21	H12413M\1	39.50 t	
21/02/2024	6.51	H12414M\1	18.00 t	5
22/02/2024	6.01	H12439M\1	39.00 t	
22/02/2024	6.08	H12440M\1	28.80 t	
22/02/2024	6.37	H12441M\1	5.00 t	3
23/02/2024	6.02	H12474M\1	39.00 t	
23/02/2024	6.05	H12475M\1	20.20 t	
23/02/2024	6.16	H12476M\1	38.60 t	
23/02/2024	6.19	H12477M\1	26.40 t	
23/02/2024	6.12	H12478M\1	9.00 t	
23/02/2024	6.31	H12479M\1	6.00 t	6
24/02/2024	6.04	H12508M\1	39.00 t	
24/02/2024	6.38	H12509M\1	8.00 t	2
26/02/2024	6.00	H12518M\1	39.00 t	
26/02/2024	6.07	H12519M\1	20.20 t	
26/02/2024	6.09	H12520M\1	38.50 t	
26/02/2024	6.38	H12521M\2	39.50 t	
26/02/2024	6.49	H12522M\1	31.60 t	
26/02/2024	6.57	H12523M\1	39.00 t	6
27/02/2024	6.02	H12554M\1	39.00 t	
27/02/2024	6.08	H12555M\1	38.80 t	
27/02/2024	6.12	H12556M\1	20.20 t	
27/02/2024	6.17	H12557M\1	47.00 t	
27/02/2024	6.23	H12558M\1	38.50 t	
27/02/2024	6.30	H12559M\1	7.00 t	

27/02/2024	6.34	H12560M\1	32.00 t	
27/02/2024	6.58	H12561M\1	36.00 t	8
28/02/2024	6.04	H12589M\1	39.00 t	
28/02/2024	6.05	H12590M\1	37.40 t	
28/02/2024	6.08	H12591M\1	20.20 t	
28/02/2024	6.14	H12592M\1	19.80 t	
28/02/2024	6.17	H12593M\1	43.00 t	
28/02/2024	6.24	H12594M\1	32.20 t	
28/02/2024	6.32	H12595M\1	10.00 t	
28/02/2024	6.44	H12596M\1	21.00 t	
28/02/2024	6.56	H12597M\1	17.20 t	9
29/02/2024	6.02	H12633M\1	39.00 t	
29/02/2024	6.09	H12634M\1	20.20 t	2

Appendix G – Bush Regeneration Report



Dixon Sand (No.1) – Haerses Road Quarry
(Haerses Road DA 165-7-2005)



Annual Report

July 2023 – June 2024

Bush Regeneration Works

Author: Zoe Ridgway

Date finalised: 07/07/2024

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INTRODUCTION

This report summarises the assisted bush regeneration work undertaken by Bush-it Pty Ltd for Dixon Sand (No.1) Pty Ltd between July 2023 and June 2024 in accordance with Haerses Road DA 165-7-2005. A total of 287.5 hours (\$18421.76 excluding GST) were worked throughout the year with an average team size of four per visit.

Dixon Sand (No.1) Pty Ltd operate a mineral sand quarry on the Old Northern Road at Maroota, NSW. Under the Haerses Road DA 165-7-2005, Bush-it manages the vegetation of approximately 8.7 hectares on Haerses Road.

The Haerses Road (HR) offset is a strip of remnant native vegetation that is attached to the Haerses Road Biodiversity Offset Area. It is example of intact bushland with an area of rehabilitated open forest at the southern end herein referred to as the (2009) translocation area. The visual screen is a 30m wide vegetation buffer adjoining Wisemans Ferry Road. The vegetation at the Haerses Road offset site is managed under a biodiversity stewardship agreement between Dixon Sand and NSW Office of Environment and Heritage.

This agreement offers permanent protection for the native vegetation and any threatened species at Haerses Road. It also enables Dixon Sand to manage and enhance the biodiversity values of this land with the help of Bush-it Pty Ltd.

In carrying out our work for Dixon Sand, Bush-it:

- Practices low impact weed management techniques such as manual removal in plant communities containing threatened species.
- Regularly identifies and maps the density and extent of weed infestations especially those covering an area of greater than 25 m².
- Undertakes appropriate, targeted weed control activities to ensure minimum disturbance to natives and minimum off-target damage.
- Conducts site specific induction training for staff working at the quarry, including field identification of all threatened species.
- Routinely assesses the effectiveness of the control programs and in response makes necessary modifications.
- We undertake monthly inspections noting the presence of weeds in drainage lines, and along access tracks.
- And we follow industry standard protocols for bushland hygiene by ensuring all our tools, boots and equipment are clean before entering the work site.

Overview of management zones and work areas

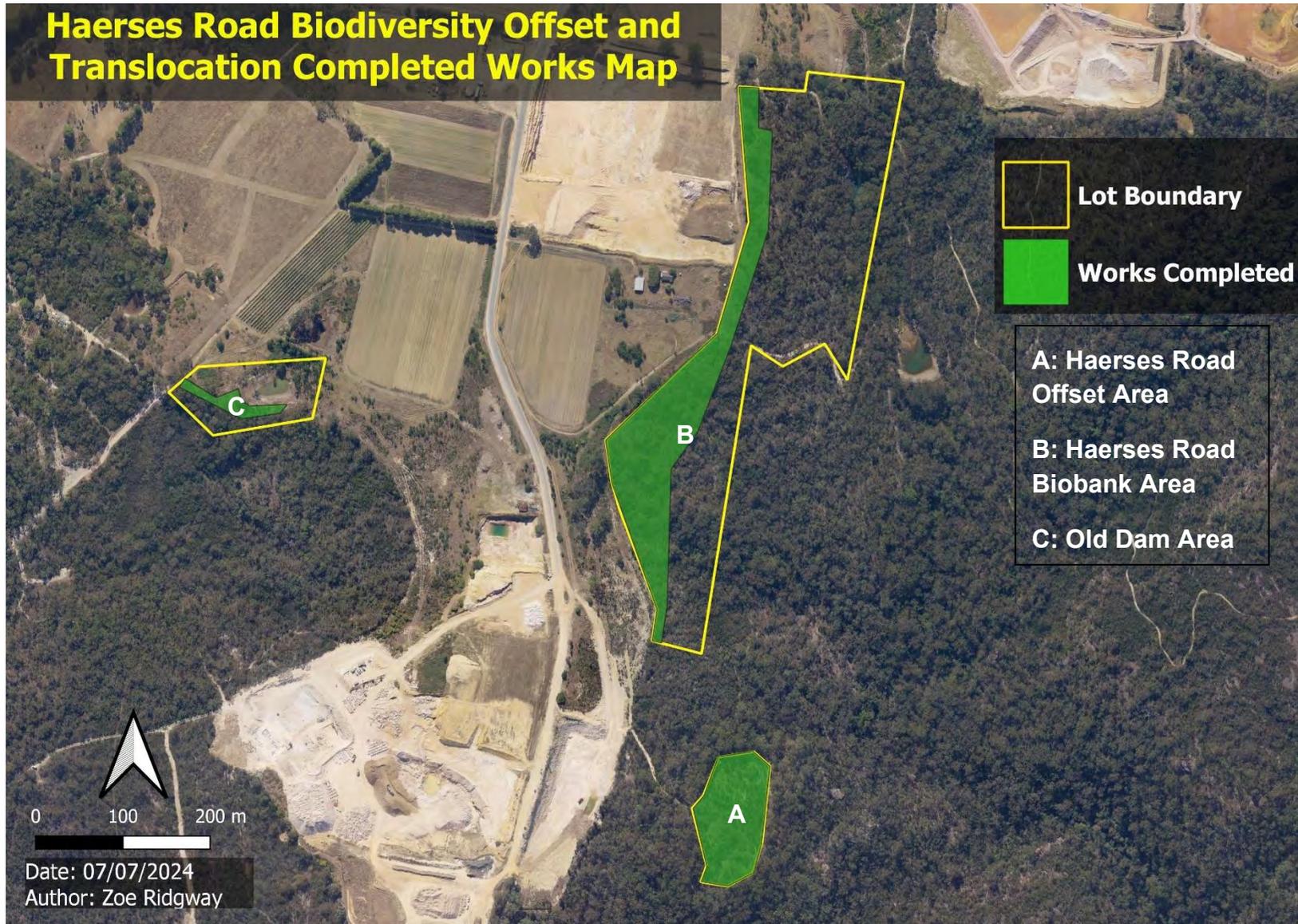


Figure 1 – Aerial photo illustrating the areas worked and overall biodiversity offset boundary.

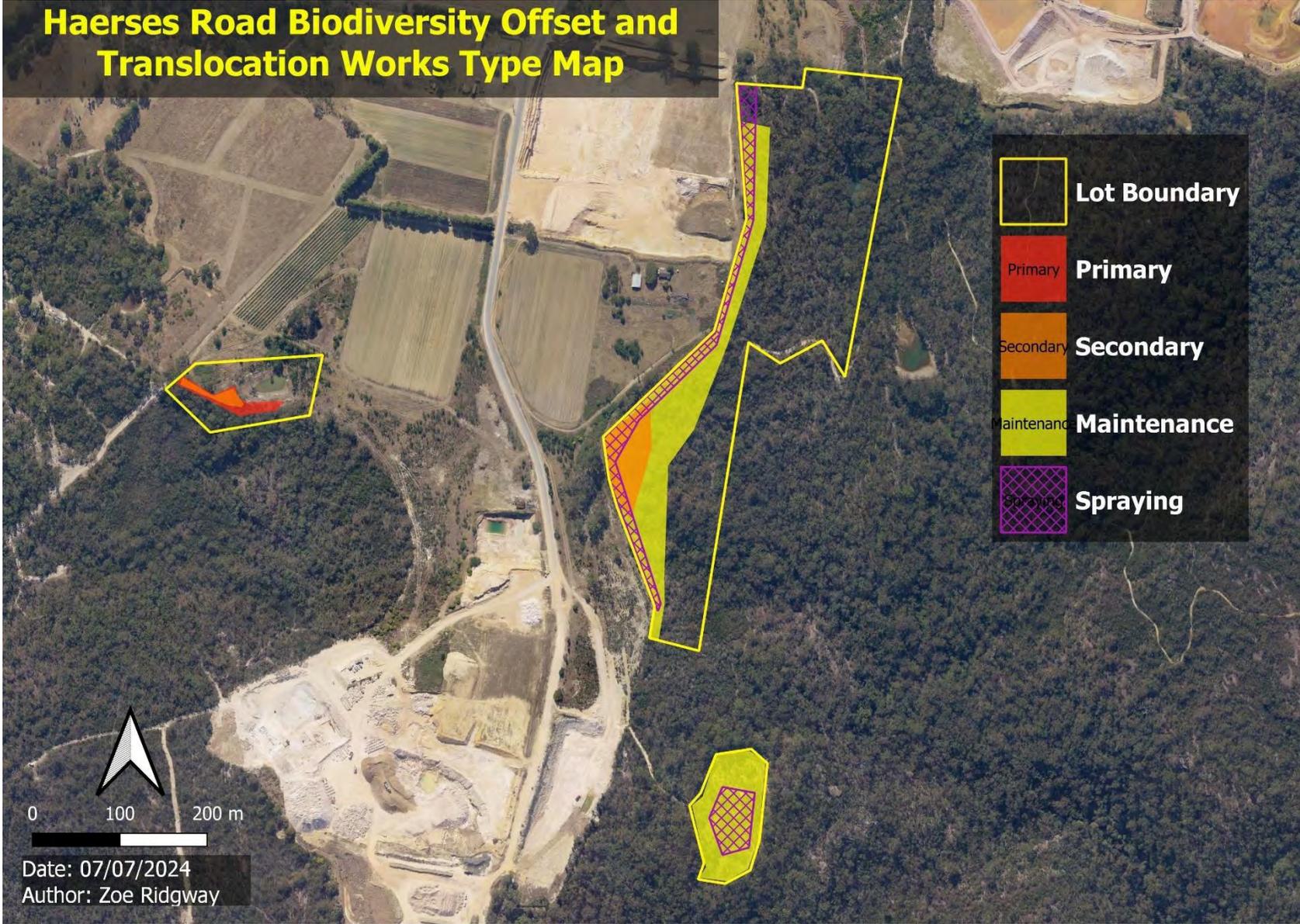


Figure 2 – Activities undertaken at Haerses Rd for 2023-2024.

Wisemans Ferry Road Vegetation Completed Works



Buffer Boundary



Works Completed

D: Wisemans Ferry Road Vegetation Buffer



D

0

100

200 m

Date: 07/07/2024
Author: Zoe Ridgway

Figure 3 – Aerial photo illustrating the areas worked in the Wisemans Ferry Rd vegetation buffer

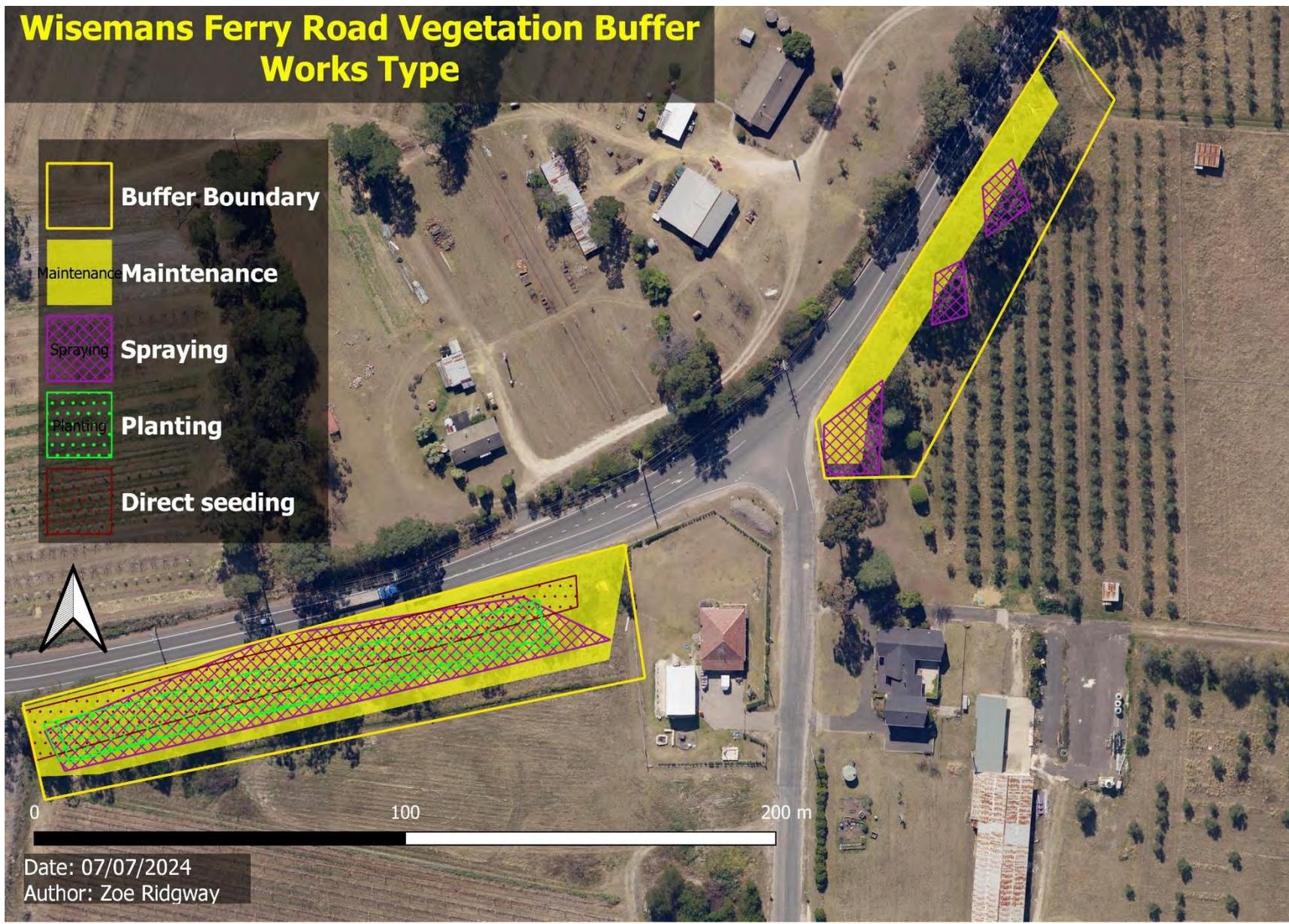


Figure 4 – Activities undertaken at Wisemans Ferry Road for 2023-2024

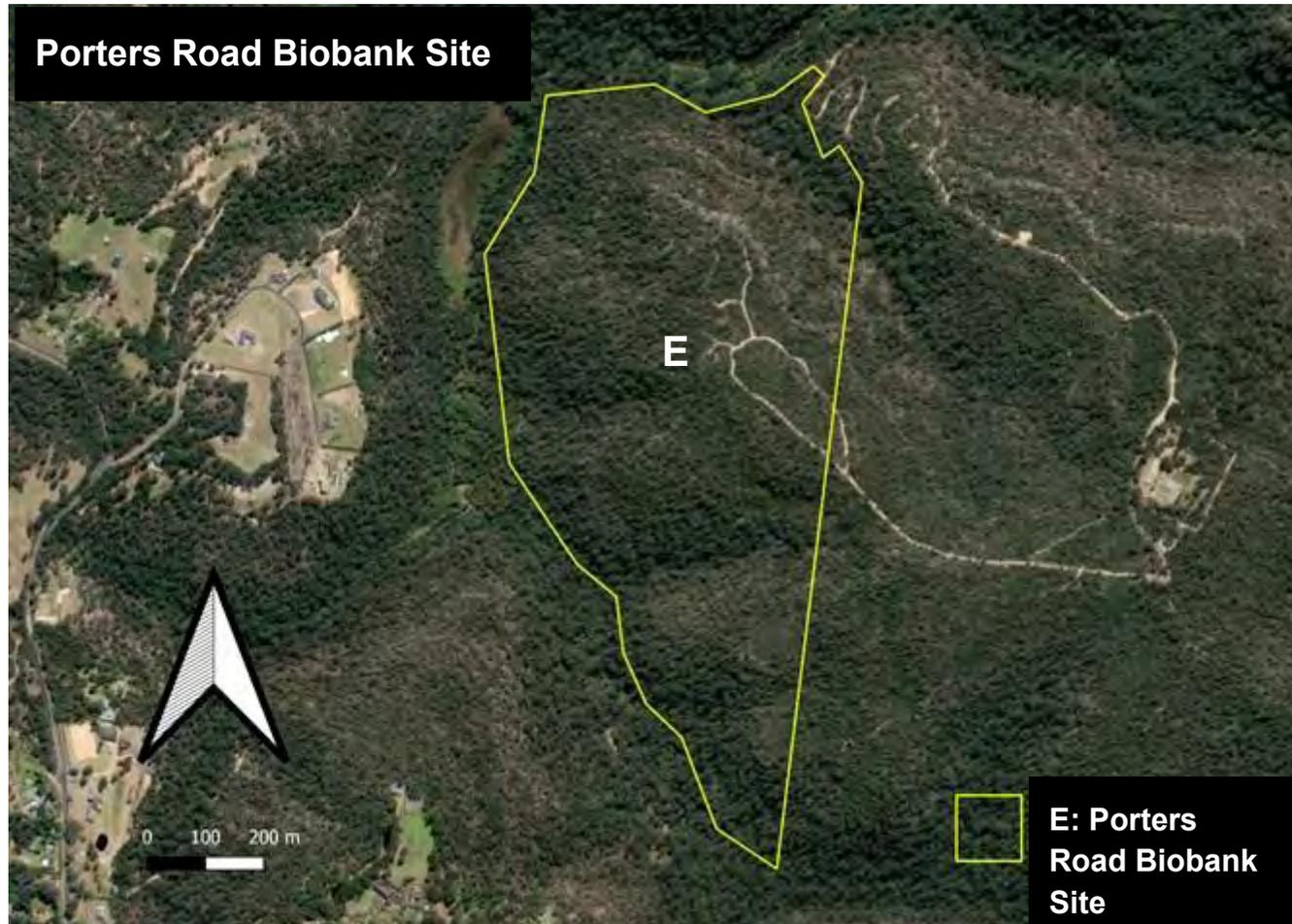


Figure 5 – Porters Rd Biobank Site (BCT) still under passive management.

Haerses Road Biobank Site and (2009) Translocation Area

SCOPE

Haerses Road Biobank (HR Biobank, Area A in Figure 1) site is 'passively' managed under a BCT agreement according to HR DA 165-7-2005.

The vegetation communities represented at HR Biobank include Sydney Sandstone Ridgetop Woodland and Sydney Sandstone Gully Forest.

The dominant canopy species along the top of the site include *Corymbia gummifera* and *Eucalyptus racemosa*. While on the lower portions of the site, *Angophora costata* and *Eucalyptus piperita* overshadow an understorey of *Syncarpia glomulifera* and *Ceratopetalum gummiferum*.

The HR Biobank is bordered along its western edge by an exotic grassland containing several different species of invasive perennial grass and numerous exotic annuals. The drainage line bisecting the site is also a vector for water and wind dispersed perennial brush weeds like crofton and lantana.

The open areas of the (2009) translocation site (Area B in Figure 1) support a mix of exotic and native grasses interspersed with thickets of *Pallaea* fern. The forested areas are largely overgrown by *Kunzea ambigua*. Indeed, this species really dominates the translocation site.

The maintenance work in this area is spent controlling infestations of whiskey, African love grass and couch. Regeneration is assisted by managing the growth of *K. ambigua* and other canopy trees that inhibit light filtering its way to the ground.

RESOURCES – 43 HOURS

Most of the hours spent working at the HR Biobank were used to control incursions of exotic grasses and annuals along the western boundary. Large stands of whiskey grass were brush-cut to prevent the spread and production of seed. Specimens amongst native regenerating shrubs were manually removed.

We successfully prevented the establishment of any new infestations and pursued *Ageratina adenophora* and *Lantana camara* down the drainage lines. Stands of *A. adenophora* were also treated with the cut-paint method just outside of the BCT border to prevent seed from blowing into the site in the future. Isolated stands of lantana amongst natives were also targeted in this area.

Outside of shrub and grass type specimens, *Pallaea viridis* and *Arujia sericifera* were hand removed and scrape/painted respectively between the track and the core bush. Seed collection was also conducted at the Offset site, namely *Angophora hispida*, *Petropile puchella* and *Persoonia sp.*

Works in the translocation area continued to focus on the suppression of exotic grasses; *Andropogon virginicus*, *Eragrostis curvula* and *Cynodon dactylon*. Techniques included crowning/manual removal, glyphosate application with tongs, brush cutting and 1 spray jobs of 75:1 glyphosate.

RECOMMENDATIONS

Regular brush cutting, select spraying of herbicide and hand removal of seeding grasses and annuals is required to control incursions in and around the perimeter of the HR Biobank area as well as areas of the translocation. Careful monitoring for *Pallaea viridis* should also be conducted as it is a relatively new incursion that can spread easily into core areas.

Monitor and manage competitive native shrubs and trees in the (2009) translocation area, especially *K. ambigua* where it overshadows or encroaches on ground dwelling plants. Bush-it will selectively cull or cut back growth to encourage the most diverse assemblage of plants possible.

Monitor drain lines and edges (including outside of boundary) of the BCT area for flowering *Ageratina Adenophora* and encroaching lantana and treat accordingly.



Figure 6 – Exotic grasses which were target sprayed in the translocation area.

SCOPE

Management and access of the buffer at the corner of Haerses Road and Wisemans Ferry Road (Area D in Figure 3) has improved since the roadwork undertaken by Roads and Maritime Services (RMS) in 2020. This is due to the western buffer strip being stripped back and capped with a sandstone crush in the previous financial year. The plantings conducted by Bush-it in that same year have also started to establish. The area is still very prone to weed infestations due to exposure and soil compaction, however the weed density has been significantly reduced since the sandstone capping conducted by Dixon Sand.

RESOURCES – 75.5 HOURS

In uncapped areas, regular scans were conducted through Wisemans Ferry Rd Visual Buffer targeting WONS, including the treatment and removal of significant infestations of *Asparagus aethiopicus*, *Asparagus asparagoides*, *Rumex sagittatus* and *Ligustrum lucidum*. This included one spray job of 100:1 glyphosate and another of 1g/10L metsulfuron, primarily for *R. sagittatus*, *Rubus fruticosus* and various annuals.

In the capped area, five targeted sprays of *Cynodon dactylon* was conducted with 75:1 glyphosate mix. The plantings were regularly watered and some of their guards were able to be removed due to being well-established. An experiment was conducted with flame weeding a patch of *R. sagittatus* adjacent to the capped area to prevent the spread of weed seed and will be monitored for results. Annuals and exotic grasses were regularly slashed and brush cut along the road edge. Seed dispersal was also conducted in the planting area with material collected from the Old Dam Area, primarily that of banksias.

An additional 50 plants were also planted into the capped are in May 2024. The species included were *Banksia serrata*, *Acacia longifolia* and *Imperata cylindrica*.

RECCOMENDATIONS

Regular scans of buffer zones for high priority WONS species, in particular regenerating or new infestations of turkey rhubarb, asparagus, bridal creeper moth vine and blackberry. Ongoing maintenance of weed species in the area is also recommended, in particular with biannual targeted sprays and deseeding when required. Ensure all weeds are treated in the section south of Haerses Road which has recently been capped and planted out.

Regular maintenance of most recent plantings; watering as required if season is particularly dry.



Figure 7 – Example of carefully targeted sprays of common couch surrounding plantings.

Haerses Road Old Dam Area

SCOPE

A new addition to areas worked under Haerses Rd is that surrounding the old dam on the western side of Haerses road, and north-west the BCT site (Area C in Figure 1). An established stand of *Lantana camara* was identified in the area and set to be targeted. Beyond this weed incursion is core bushland that remains in excellent condition.

RESOURCES – 97.5 HOURS

Primary works commenced in September 2023, targeting almost exclusively *L. camara* using cut/paint, hand removal and drilling methods. This was also followed by secondary works. Other weeds such as *Ageratina adenophora*, *Solanum mauritianum* and *Andropogon virginicus* were also removed. A session of seed collection was also undertaken in the core bush behind the lantana stand, which was later dispersed at Wisemans ferry buffer.

RECOMMENDATIONS

Further primary and secondary works are required to consolidate the lantana stand, then maintenance follow works can commence on a less frequent basis.



Figure 8 – Example of Lantana treatments that have been undertaken.

Porters Road Biobank Site

SCOPE

Porters Road Biobank site is an area that remains to be under passive management. It is an excellent reference site for areas that are currently being works and has proven useful for seed collection.

RESOURCES – 33 HOURS

A seed collection day was conducted at Porters Rd Biobank site from numerous Proteaceae and Eucalyptus specimens in the area. The material was sent to Oz Eco Flora to be processed.

RECOMMENDATIONS

Continue to conduct seed collections from the area to sustain future revegetation projects across other sites

APPENDIX

WEED SPECIES CONTROLLED AT HAERSES RD

Common name	Scientific name
Crofton	<i>Ageratina adenophora</i>
Whiskey Grass	<i>Andropogon virginicus</i>
Moth vine	<i>Araujia sericifera</i>
Asparagus	<i>Asparagus aethiopicus</i>
Bridal creeper	<i>Asparagus asparagoides</i>
Cobblers Pegs	<i>Bidens pilosa</i> var. <i>pilosa</i>
Italian Thistle	<i>Carduus pycnocephalus</i>
Kikuyu Grass	<i>Cenchrus clandestinus</i>
Common Couch	<i>Cynodon dactylon</i> var. <i>dactylon</i>
Fleabane	<i>Conyza</i> sp.
African Lovegrass	<i>Eragrostis curvula</i>
Flatweed	<i>Hypochaeris radicata</i>
Lantana	<i>Lantana camara</i>
Scotch Thistle	<i>Onopordum acanthium</i>
Dallas Grass	<i>Paspalum dilatatum</i>
Vasey's Grass	<i>Paspalum urvillei</i>
Green Cliff Brake	<i>Pellaea viridis</i>
Inkweed	<i>Phytolacca octandra</i>
Castor Oil Plant	<i>Ricinus communis</i>
Blackberry	<i>Rubus fruticosus</i>
Turkey Rhubarb	<i>Rumex sagittatus</i>
Paddy's Lucerne	<i>Sida rhombifolia</i>
Wild Tobacco	<i>Solanum mauritianum</i>
Sand Couch	<i>Sporobolus virginicus</i> var. <i>virginicus</i>

REGISTER OF HERBICIDE RECORDS

Date	Operator name	Herbicide name	Wind description	Direction	Notes	Application method	Qty	Volume	Start time	End time
17/08/2023	Tim	Glyphosate 360g/L	11	N	Added chemwet, targetting couch	Spray	0.3	10	9:00:00	9:30:00
31/08/2023	Leighton	Glyphosate 360g/L	10.1	NNE	Targeted Pellaea Vridis	Spray	200	10	13:30:00	14:30:00
18/12/2023	Leighton	Glyphosate 360g/L	10	NNE	Targeted annuals and Common Couch mostly.	Spray	200	10	7:30:00	9:30:00
18/12/2023	Tim	Metsulfuron-methyl 600g/kg	10.2	NE	Targeted Blackberry, Turkey Rhubarb along the entire buffer	Spray	3.5	35	7:30:00	10:00:00
10/01/2024	Tim	Metsulfuron-methyl 600g/kg	13	WNW	Targeted Blackberry and Turkey Rhubarb	Spray	1	10	8:30:00	9:30:00
10/01/2024	Tim	Glyphosate 360g/L	10.2	WNW	Targeted African Love Grass and Common Couch at WFR Buffer.	Spray	200	10	7:30:00	9:30:00
29/01/2024	Tim	Glyphosate 360g/L	11	NNE	Sprayed rate of 75:1 to effectively treat Common Couch and African Love Grass mostly.	Spray	600	40	7:30:00	13:30:00
19/03/2024	Maddy	1:1 Glyphosate 360g/L	9.3	N	Targetting couch at WFR buffer	Spray	375	5	12:00:00	13:30:00

DISTRIBUTION OF HOURS ACROSS MANAGEMENT ZONES

Zone	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Admin	2.5	15.75	1.5	1	2.5	0.5	3.25	0.5	0.5	2.5	7.75	0.5	38.75
HR - Offset Site (BCT site)	7.5	5	0	0	0	0	0	7.5	0	0	0	0	20
HR – Old Dam Area	0	0	24.5	30	0	0	0.5	0	0	10	25	7.5	97.5
HR - Translocation area	13	0	6	0	0	0	4	0	0	0	0	0	23
HR - Visual Screen Buffer	0	28.5	0	2	19	0	11	0	8	2	5	0	75.5
HR - Porters Rd Offset Site (BCT site)	0	3.5	0	8	21.5	0	0	0	0	0	0	0	33
TOTAL	25.5	68.5	33.5	42	45.5	1	22	8.5	9	17	45.5	8.5	287.5

Appendix H - Annual Biodiversity & Rehabilitation Management Report

**ANNUAL
BIODIVERSITY
&
REHABILITATION
MANAGEMENT
REPORT
HAERSES ROAD MAROOKA
2024**

Prepared for Dixon Sand Pty Ltd

September 2024



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**Annual Biodiversity
&
Rehabilitation Management
Report
Haerses Road Maroota
2024
Dixon Sand Pty Ltd**

This assessment has been prepared by

Melissa Mass

September 2024

Date

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Abbreviations

Abbreviation	Description
BAM	Biodiversity Assessment Method
BC Act	<i>Biodiversity Conservation Act 2016</i>
BCT	Biodiversity Conservation Trust
EEC	Endangered Ecological Community
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
HRBOA	Haerses Road Biodiversity Offset Area
HTW	High Threat Weed
KPI	Key Performance Indicators
KTP	Key Threatening Process
LEP	Local Environmental Plan
Mod 6	Modification 6
NSW OEH	New South Wales Office of Environment and Heritage
ONR	Old Northern Road
PCT	Plant Community Type
SEPP	State Environmental Planning Policy
THSC	The Hills Shire Council
VIS	Vegetation Information System
WoNS	Weed of National Significance

1 INTRODUCTION

This report presents the findings of the annual monitoring of the biodiversity value and rehabilitation effort within the Dixon Sand operation at Haerses Road Maroota. The Biodiversity Biobank offset at Porters Road Kenthurst and within the Haerses Road site is not addressed in detail within this report. A separate report is submitted to the Biodiversity Conservation Trust (BCT) throughout the reporting period addressing these areas.

1.1 BACKGROUND

Dixon Sand Pty Ltd operates a sand extraction and processing operation across 71 hectares on Lot 170 DP664766, Lot 170 DP664767, Lot A and B DP407341, Lot 176 and 177 DP752039 and Lot 216 DP752039 Haerses Road Maroota. The quarry operates in compliance to Development Consent 165-7-2005 issued by the Minister for Planning in 2006. The development consent has been modified several times since with the most recent modification (Mod 6) being approved in September 2023.

The development consent for the extraction and processing at Haerses Road permits operations to continue until 14 February 2046.

1.2 OBJECTIVES

The objectives of this Annual Biodiversity and Rehabilitation Management Report is to describe the current condition of the Haerses Road site and to advise Dixon Sand on the appropriate management measures required to be implemented in order to meet the expectations of the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan V5 (2020) prepared by Umwelt (Australia) Pty Ltd.

This report will:

- identify native flora and fauna species, populations and ecological communities known to or likely to occur within the Haerses Road site;
- describe the native vegetation and habitats within the Haerses Road site;
- describe the current condition of the threatened flora and its habitat found within the Haerses Road site;
- determine the legislative and conservation significance of species, populations and ecological communities known or likely to occur within the Haerses Road site with reference to the Commonwealth *EPBC Act 1999* and the *NSW BC Act 2016*;
- recommend appropriate biodiversity and environmental management measures that should be implemented to reach criteria for monitoring success set by the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 (2020);
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.



Image Source: Google Earth (Sep 2017)
 Data Source: Mc Ashby Morgan & Associates Pty Ltd (2018)

- | | | |
|--------------------------|---------------------------------------|-------------------------------|
| Haerses Road Quarry Site | Extraction Area Stage 5 | Indicative Unsealed Haal Road |
| Approved Extraction Area | Extraction Area A | Sealed Road Road |
| Extraction Area Stage 1 | Extraction Area B | Acoustic Bank |
| Extraction Area Stage 2 | Extraction Cell Number | Buffer Zone |
| Extraction Area Stage 3 | Site Office, Weighbridge and Workshop | |
| Extraction Area Stage 4 | Wet Processing Plant | |

FIGURE 1.2
 Haerses Road Quarry

File Name: [A4]-10614273_043.dgn
 30/08/2018 10:10

Image 1. Haerses Road Quarry site (source Umwelt Australia 2019)

2 METHODOLOGY

2.1 SITE HISTORY

2.1.1 Extraction area stage 1

Extraction area stage 1 is Lot B of DP407341 comprising of 9.5416ha. Approximately 5.68ha have been disturbed for sand extraction while the remaining 3.86ha is remnant native vegetation. Currently 3ha are in the process of agricultural rehabilitation with work continuing into the next reporting period.

2.1.2 Extraction area stage 2

Extraction area stage 2 is within Lot 177 of DP752039, utilising approximately 14.38ha of the 39.4956ha lot. Extraction is continuing in this area however approximately 2ha of rehabilitation has begun in earnest.

2.1.3 Extraction area A and B

Extraction areas A and B extend across Lot 177 of DP752039 and Lot 216 DP752039. Current extraction is underway in Cell 1A, 1B, 2A, 2B, 3A and 3B. Rehabilitation of these areas has not taken place within this reporting period, and is unlikely to take place in the next reporting period. The use and storage of soil with native seed bank and translocation of removed vegetation is worthy of discussion in this report to monitor success of the current process in use.

2.1.4 Wisemans Ferry Road buffer area

Assisted screen planting within the Wisemans Ferry Road buffer area took place in 2016 to supplement the existing native vegetation which was present. The buffer area is to be 30m wide extending along the boundary of Wisemans Ferry Road for the purpose of providing a visual screen to motorists. During the upgrade to the Haerses Road intersection in early 2020 the buffer area was disturbed by civil contractors. This work was deemed as essential. Assisted rehabilitation was undertaken in 2023 to aid with the restoration of the 30m buffer.

2.1.5 Maroota State Forest buffer area

The Maroota State Forest buffer area extends along the southern, eastern and western boundaries of extraction area A and B as well as the southern and eastern boundary of Lot B of DP407341, Lot 176 of DP752039 and Lot 177 of DP752039. Buffer areas area fenced along the boundary of extraction area A and B. A small area within the Maroota State Forest buffer was previously disturbed and is under current active rehabilitation management to restore a Scribbly Gum, Hairpin Banksia, Dwarf Apple heathy woodland. Rehabilitation is in advanced stages with weed management continuing.

2.2 FIELD SURVEY

The Biobanking offset areas are subject to separate reporting for the BCT providing annual photo monitoring, information regarding active management actions and reporting any disturbance within the site. To date, passive management is taking place throughout all locations of Biobanking offset.

Baseline monitoring locations within each vegetation community at Haerses Road have been established. Monitoring locations have been undertaken in a manner consistent with the Biodiversity Assessment Method (BAM) survey as described within Appendix 4 of the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 2020. Details and results of the field survey can be found within Chapter 3 of this report.

2.3 CRITERIA TO MONITOR SUCCESS OF REHABILITATION

The Key Performance Indicators (KPI) to measure success of the biodiversity and rehabilitation effort of the Haerses Road site have been outlined by Umwelt (Australia) 2019. The following tables depict the performance and completion criteria required for both native vegetation areas and agricultural land.

Table 1. Performance and completion criteria for Haerses Road Quarry (taken from Umwelt (Australia) 2019)

<i>Rehabilitation Performance and Completion Criteria</i>	
<i>Native Vegetation</i>	Revegetation areas contain flora species assemblages characteristic and ground cover is within OEH benchmark of the target native vegetation communities
	Second generation tree seedlings are present or likely to be, based on monitoring in comparable older rehabilitation sites (i.e. evidence of fruiting of native species observed)
	More than 75 percent of trees are healthy and growing as indicated by long term monitoring
	Ground cover species are characteristic of target vegetation communities
	The presence of weeds is within OEH benchmark of the target native vegetation communities
<i>Agricultural Land</i>	Rehabilitated land is compatible with proposed agricultural land use as demonstrated by soil assessment
	Landform comprised broad gentle slopes between 2-5%
<i>Weeds and Pests</i>	Land capable of supporting suitable sterile cover crop
	Regular inspections indicate a decline in weed diversity, density and abundance and a decline in signs of feral animal activity
	The presence of weeds is within OEH benchmark of the target native vegetation communities
	There is no evidence of significant damage resulting from feral animal activity

3 RESULTS

Annual vegetation surveys were undertaken for the Haerses Road Quarry site during this reporting period. Rehabilitation work has continued in extraction area stage 2 with rehabilitation of agricultural land in extraction area stage 1 set to begin in earnest over the next reporting period.

3.1 EXTRACTION AREA STAGE 1

Extraction of sand products is still taking place within the western portion of extraction area stage 1. Rehabilitation work in the eastern portion stage 1 has begun with overburden clay material from stage 2 and 3 being used to raise ground levels. These works are expected to continue during the 2024-2025 reporting period with an aim at rehabilitating stage 1 to agricultural usage sometime in the next few years.



Image 2. Extraction area stage 1 with rehabilitation material raising the ground level to final contour height



Image 3. Extraction area stage 1 active rehabilitation area (Image sourced from Google Earth Pro August 2024)

3.2 EXTRACTION AREA STAGE 2

Extraction area stage 2 is still in active operation however rehabilitation of the previous sandstone extraction area has commenced.

The construction of a water storage dam has taken place to fill the void and make the area beneficial for agricultural use. The expanse between the dam and native vegetation to the west has been spread with soil from extraction area A and B which contains native seed bank. The natural regeneration process has begun in earnest with a good diversity of ground cover species emerging. Threatened flora species *Darwinia biflora* and *Tetratheca glandulosa* have emerged with *Darwinia biflora* being prolific across the site. *Acacia bynoeana* has also emerged in the compact soils immediately surrounding the dam.

The dam wall which had previously sunk slightly on the western edge has undergone some remediation work to improve structural integrity. The dam had been leaking and therefore soils to the west became saturated and much of the rehabilitating vegetation was effected. Since corrective works have taken place the soil moisture has stabilised and plant recovery is evident. It is unlikely further rehabilitation assistance will be required.



Image 4. Extraction area stage 2 dam



Image 5. Stage 2 rehabilitation area west of the dam



Image 6. Extraction area stage 2 active rehabilitation area



Image 7. Emerging *Darwinia biflora* in stage 2 rehabilitation area



Image 8. *Acacia bynoeana* emerging on the dam wall in stage 2 rehabilitation area

3.3 EXTRACTION AREA A AND B

Sand and sandstone extraction is currently in active operation within Cell 1A, 1B, 2B, 2B, 3A and 3B within Lot 216 DO 752039.

Offsetting requirements for these areas incorporate vegetation conservation areas within the Haerses Road envelope and Porters Road at Kenthurst. Both of these conservation management areas are still in passive management phase although it is likely active management will be triggered within the 2024/2025 reporting period.

Baseline vegetation data was obtained prior to extraction operations in areas within the future extraction cells as outlined within the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 2020. The Haerses Road Quarry Biodiversity and Rehabilitation Management Plan outlines the annual monitoring of the extraction cells prior to disturbance for the purpose of providing baseline data for rehabilitation of the site post extraction. Each cell (A & B combined) is to have a monitoring location established within it. Extraction of sand and sandstone within Cell 1 (A & B) begun immediately following consent therefore establishing a monitoring site was not possible. The monitoring locations within cell 2 and 3 has now been disturbed for sand and sandstone extraction therefore monitoring of these sites are not able to continue. The remaining two monitoring locations, within Cells 4 – 5, were surveyed in July 2024 to collect further monitoring data which will contribute to the final rehabilitation of the site. Information collected was in line with the DPIE Biodiversity Assessment Methods as approved via the *Biodiversity Conservation Act 2016* and the *Biodiversity Conservation Regulation 2017*.

The survey sites were selected for ongoing survey monitoring to reflect upon the two dominant vegetation communities identified within the Haerses Road Quarry Biodiversity and Rehabilitation Management Plan v5 2020. The PCT 978 previously identified within extraction cell 5b was not able to be located. A secondary, and larger, area of this PCT occurs within the Biodiversity Offset Area which is outside of the survey area required for this annual report. A small area of PCT1181 was located within Extraction Cell 2A. This area of PCT is not large enough to be encompassed by the vegetation survey undertaken, therefore, part of this PCT is within quadrat 3 where transition between PCT 1181, PCT 1083 and PCT 1134 occurs.

Within the three vegetation survey quadrats the following information was collected:

- Composition – native plant species richness by growth form
- Structure – foliage cover of native and exotic species by growth form
- Function –
 - Number of large trees
 - Tree stem size class
 - Canopy species regeneration
 - Length of fallen logs
 - Percentage of litter cover
 - Number of trees with hollows
 - High threat exotic cover

A photo was taken at the start of each quadrat. Each 12 month period a photo will be taken in the same location with the same aspect for comparison purposes.

Flora identified onsite has been listed within Appendix A.



Image 9. Quadrat 1 start midline point

Table 2. Survey summary from Haerses Road monitoring survey site quadrat 1.

1083 - Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0312510 Northing – 06296390 Midline - 0°				
Vegetation Layer	Height Range	Vegetation Layer		
Trees	15 – 20m	<i>Corymbia gummifera, Eucalyptus haemastoma, Eucalyptus punctata, Angophora hispida, Eucalyptus oblonga</i>		
Shrubs	0.5 – 2m	<i>Grevillea buxifolia, Persoonia levis, Phyllanthus hirtellus, Lambertia Formosa, Calytrix tetragona</i>		
Groundcover	0.1 – 0.5m	<i>Lomandra multiflora, Entolasia stricta, Actinotus minor, Billardiera scandens, Cyathochaeta diandra</i>		
Stem Class	Hollows			
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm	✓		4	2
30-49cm	✓		2	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓			
<5cm	✓			
Composition & Structure	Composition Count		Structure cover %	
Trees	5		40	
Shrubs	26		70	
Grasses etc	13		30	
Forbs	8		10	
Ferns	0		0	
Other	3		1	
High Threat Weeds	0		0	
Ecosystem Functions				
Length of habitat logs	25m			
Litter cover	40%			
Bare ground cover	0%			
Cryptogam cover	15%			
Rock cover	5%			
Overstorey foliage cover	30%			
Mid-storey foliage cover	60%			
Groundcover foliage cover	25%			



Image 10. Quadrat 2 centre midline point

Table 3. Survey summary from Haerses Road monitoring survey site quadrat 2.

1134 – Scribbly Gum – Hairpin Banksia – Dwarf Apple heathy woodland on sandstone plateaux of the Central Coast, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0312226 Northing – 06293607 Midline - 190°				
Vegetation Layer	Height Range	Vegetation Layer		
Trees	15 – 20m	<i>Eucalyptus haemastoma, Angophora hispida, Eucalyptus squamosal, Banksia serrata</i>		
Shrubs	0.5 – 2m	<i>Banksia ericifolia, Grevillea buxifolia, Persoonia lanceolate, Lambertia Formosa, Petrophile pulchella, Banksia spinulosa</i>		
Groundcover	0.1 – 0.5m	<i>Lomandra multiflora, Cyathochaeta diandra, Lepidosperma neesii, Actinotus minor</i>		
Stem Class	Eucalyptus		Hollows	
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		2	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓			
<5cm	✓			
Composition & Structure	Composition Count		Structure cover %	
Trees	4		20	
Shrubs	22		70	
Grasses etc	9		50	
Forbs	3		5	
Ferns	1		0.1	
Other	2		0.1	
High Threat Weeds	0		0	
Ecosystem Functions				
Length of habitat logs	12.5m			
Litter cover	30%			
Bare ground cover	0%			
Cryptogam cover	10%			
Rock cover	0%			
Overstorey foliage cover	10%			
Mid-storey foliage cover	40%			
Groundcover foliage cover	50%			



Image 11. Quadrat 4 centre midline point

Table 4. Survey summary from Haerses Road monitoring survey site quadrat 4.

1083 - Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin, Sydney Basin Bioregion				
AGD Zone 56 Easting – 0312062 Northing – 06293587 Midline - 310°				
Vegetation Layer		Height Range	Vegetation Layer	
Trees		15 – 20m	<i>Corymbia gummifera, Eucalyptus haemastoma, Angophora hispida, Eucalyptus oblonga</i>	
Shrubs		0.5 – 2m	<i>Grevillea buxifolia, Persoonia levis, Banksia ericifolia, Lambertia Formosa, Petrophile pulchella, Leptospermum trinervium</i>	
Groundcover		0.1 – 0.5m	<i>Entolasia stricta, Lomandra obliqua, Actinotus minor, Caustis pentandra, Rytidosperma racemosum</i>	
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm	✓		1	1
30-49cm	✓		4	
20-29cm	✓			
10-19cm	✓			
5-9cm	✓			
<5cm	✓			
Composition & Structure		Composition Count		Structure cover %
Trees		5		40
Shrubs		25		50
Grasses etc		12		40
Forbs		13		10
Ferns		2		1
Other		3		1
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		12 m		
Litter cover		35%		
Bare ground cover		0%		
Cryptogam cover		0%		
Rock cover		0%		
Overstorey foliage cover		30%		
Mid-storey foliage cover		40%		
Groundcover foliage cover		30%		

3.4 WISEMANS FERRY ROAD BUFFER AREA

Assisted buffer planting commenced in 2016 with a variety of native species such as *Banksia*, *Melaleuca*, *Hakea* and *Acacia* to complement the existing native vegetation which occurred onsite. During early 2020 the buffer area was disturbed by civil contractors for road widening and intersection upgrade. Unfortunately this has resulted in much of the existing native vegetation buffer being removed and disturbance to some of the planted buffer area.

Assisted rehabilitation planting was undertaken in 2023 with soil and mulch containing native seed bank spread on the western side of Haerses Road intersection with a diversity of *Eucalyptus*, *Acacia*, *Leptospermum* and native grass and forb species emerging. Continued monitoring of this area will ensure the buffer meets the expectations of providing suitable vegetation screening from Wisemans Ferry Road.

The Eastern side of the Haerses Road intersection has not shown any signs of natural regeneration due to the density of exotic pasture species which dominate the immediate area. Assisted rehabilitation planting has taken place with further planting potentially required within the next reporting period to fill the gaps and strengthen the 30m buffer.

Exotic species occur in both areas with Weeds of National Significance (WoNS) and High Threat Weeds (HTW) present. Weed management and control will continue during the next reporting period with the WoNS and HTW being the species of targeted priority.



Image 12. Western side of Haerses Road within the Wisemans Ferry Road buffer area



Image 13. Eastern side of Haerses Road within the Wisemans Ferry Road buffer area

3.5 MAROOKA STATE FOREST BUFFER AREA

There has been no further disturbance to any areas of the Maroota State Forest buffer. Disturbance did take place in 2006 of a small area in the south eastern portion of Lot 177 in DP752039. This area has been under active rehabilitation since 2015. Bush-it undertake bush regeneration work on a regular basis in this area. An annual report is provided to Dixon Sand outlining the rehabilitation work undertaken with achievements outlined in detail.

4 DISCUSSION AND RECOMMENDATIONS

The rehabilitation of the Haerses Road Quarry site has begun with work commencing in extraction area stage 1 and 2, work continuing in the Maroota State Forest buffer area and within the Wisemans Ferry Road buffer area within the next reporting period. Rehabilitation work is in the early stages and will increase with both intensity and measurable criteria within the next reporting period.

Vegetation surveys have been undertaken within the extraction A and B areas. The data collected will serve as baseline information for measurable and quantifiable analysis for future reporting periods. The vegetation condition recorded will provide specific data on the local vegetation biometric score which will assist in rehabilitation of the quarry areas once extraction is completed. This will provide a measure in which rehabilitation success can be evaluated against via the criteria outlined within the Haerses Road Biodiversity and Rehabilitation Management Plan v5 2020.

The coming twelve months should see the following rehabilitation effort take place:

Extraction area stage 1

- Screening of stockpile material
- Final landform for active rehabilitation areas
- Stockpile material layered to create suitable agricultural terrain
- First agricultural planting event

Extraction area stage 2

- Native vegetation growth to the west of the dam

Wisemans Ferry Road buffer area

- Assisted rehabilitation of eastern side of Haerses Road intersection buffer area where disturbance has taken place

Maroota State Forest buffer area

- Continued bush regeneration maintenance work in disturbed area
- Baseline monitoring locations established

Extraction area A and B

- Continued monitoring of vegetation quadrats

It is not expected any new areas of rehabilitation will take place within the next reporting period as extraction across the site continues.

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6 APPENDIX

APPENDIX A – FLORA IDENTIFIED ONSITE AT HAERSES ROAD

Status	Botanical Name	Common Name	Plot 1	Plot 2	Plot 4
	<i>Acacia linifolia</i>	White Wattle	1		
	<i>Acacia suaveolens</i>	Sweet Wattle			1
	<i>Acacia ulicifolia</i>	Prickly Moses			1
	<i>Actinotus minor</i>	Lesser Flannel Flower	1		1
	<i>Allocasuarina distyla</i>	Scrub She-oak		1	
	<i>Angophora hispida</i>	Dwarf Apple	1	1	1
	<i>Aristida warburgii</i>	Fine Leaf Wire Grass	1		
	<i>Asplenium trichomanes</i>	Common Spleenwort			1
	<i>Austrostipa pubescens</i>	Spear Grass	1		1
	<i>Banksia ericifolia</i>	Heath Leaved Banksia	1	1	2
	<i>Banksia serrata</i>	Old Man Banksia		1	
	<i>Banksia spinulosa</i>	Hairpin Banksia	1	1	1
	<i>Billardiera scandens</i>	Hairy Apple Berry	1		1
	<i>Boronia floribunda</i>	Pale Pink Boronia	1		1
	<i>Boronia ledifolia</i>	Sydney Boronia			1
	<i>Bossiaea obcordata</i>	Spiny Bossiaea			1
	<i>Bossiaea scolopendria</i>	Sword Bossiaea	1		
	<i>Calytrix tetragona</i>	Common Fringe Myrtle	1	1	2
	<i>Cassytha glabella</i>	Slender Devils Twine	1	1	1
	<i>Caustis pentandra</i>	Thick Twist Rush	1		1
	<i>Cheilanthes sieberi</i>	Mulga Fern			1
	<i>Corymbia gummifera</i>	Red Bloodwood	2		1
	<i>Cyathochaeta diandra</i>	Sheath Rush	2	2	2
V	<i>Darwinia biflora</i>		2	1	2
	<i>Dillwynia retorta</i>	Heathy Parrot Pea	2	1	1
	<i>Drosera peltata</i>	Sundew		1	
	<i>Entolasia stricta</i>	Wiry Panic	1	2	2
	<i>Epacris pulchella</i>	Wallum Heath	1	1	1
	<i>Eucalyptus haemastoma</i>	Scribbly Gum	1	1	1
	<i>Eucalyptus oblonga</i>	Narrow-leaved Stringybark	1		1
	<i>Eucalyptus punctata</i>	Grey Gum	1		
	<i>Eucalyptus squamosa</i>	Scaly Gum		1	1
	<i>Gonocarpus teucroides</i>	Raspwort	1		1
	<i>Goodenia bellidifolia</i>	Daisy-leaved Goodenia	1		1
	<i>Goodenia hederacea</i>	Forest Goodenia	1		
	<i>Grevillea buxifolia</i>	Grey Spider Flower	2	1	1
En	<i>Grevillea parviflora subsp. supplicans</i>	Small-flowered Grevillea	1		
	<i>Grevillea speciosa</i>	Red Spider Flower	1	1	1
	<i>Hakea dactyloides</i>	Broad Leaved Hakea	1		1
	<i>Hakea sericea</i>	Needlebush	1		1
	<i>Hibbertia aspera</i>	Rough Guinea Flower			1
	<i>Hibbertia diffusa</i>	Wedge Guinea Flower	1		
	<i>Isopogon anemonifolius</i>	Broad-leaved Drumsticks	1	1	1
	<i>Juncus usitatus</i>	Common Rush		1	
	<i>Lambertia formosa</i>	Mountain Devil	2	1	2
	<i>Lepidosperma laterale</i>	Variable Swordsedge	1		2

	<i>Lepidosperma neesii</i>	Stiff Rapier-sedge		1	
	<i>Leptospermum trinervium</i>	Flaky-barked Tea-tree	2	2	2
	<i>Leucopogon microphyllus</i>	Small Leaved White Beard	1	1	
	<i>Lomandra brevis</i>	Tufted Mat-rush	1		1
	<i>Lomandra filiformis</i>	Wattle Mat-rush		1	
	<i>Lomandra Lomandra</i>	Spiny-headed Mat-rush	1		
	<i>Lomandra multiflora</i>	Many Flowered Mat-rush	2	1	2
	<i>Lomandra obliqua</i>	Fish Bones	1		1
	<i>Lomatia silaifolia</i>	Crinkle Bush	1		1
	<i>Micrantheum ericoides</i>	Micrantheum	1		1
	<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle		1	
	<i>Mirbelia rubiifolia</i>	Heath Mirbelia		1	
	<i>Patersonia sericea</i>	Silky Purple Flag			1
	<i>Persoonia lanceolate</i>	Lance Leaf Geebung			1
	<i>Persoonia levis</i>	Broad Leaved Geebung	1		1
	<i>Petrophile pulchella</i>	Conesticks	1	1	1
	<i>Phyllanthus hirtellus</i>	Thyme Spurge	1		1
	<i>Pimelea linifolia</i>	Slender Rice Flower	1		
	<i>Platysace linearifolia</i>	Carrot Tops	1	1	1
	<i>Pteridium esculentum</i>	Bracken Fern			1
	<i>Rytidosperma racemosum</i>	Wallaby Grass	1		1
	<i>Scaevola ramosissima</i>	Purple Fan-flower			1
	<i>Schoenus ericetorum</i>	Heath Bog Rush		2	
V	<i>Tetradlea glandulosa</i>	Glandular Pink Bells	1		1
	<i>Themeda australis</i>	Kangaroo Grass	1		1
	<i>Xanthorrhoea resinosa</i>	Grass Tree	1	1	1

En – Endangered species V – Vulnerable species

Appendix I – Annual Management Reports for Year 5 - Passive Management of Stewardship Sites

Biodiversity Stewardship Site landholder annual report & BCT audit (passive management)

Audit details

Biodiversity stewardship agreement year: **2024**

Reporting period: **2023-2024**

BCT site inspection date (if required):

BCT Auditor:

BS agreement ID: **BA00414 Haerses Road**

Landowner/site contact details: **David Dixon, 0414 330 490**

Property address: **B/407341, 4610 Old Northern Road, Maroota**

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
1. Fire management	1.1 Implementation of the fire for conservation management plan	N/A until under active management. No actions taken to date. No fire within the BSA site boundary during the previous 12 month period. Last inspection 28/02/2024		
2. Grazing management	2.1 Exclusion of grazing by Stock	No stock kept or located on property. No unauthorised grazing of stock noted. Last inspection 28/02/2024		
	2.3 Removal of Stock when observed	N/A		
	2.1 & 2.2 Stock grazing in accordance with BSA restrictions	N/A		
	2.3 Removal of stock when contrary to BSA grazing restrictions	N/A		

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
3. Native vegetation management	3.1 Retaining native vegetation	No disturbance to native vegetation in past 12 month period		
	3.2 Burning of native vegetation	No burning of native vegetation in past 12 month period		
	3.4 Restricted use of fertilisers, pesticides and herbicides.	No use of fertilisers, pesticides or herbicides within the BSA site during the past 12 month period		
	3.6.4 Management of supplementary planting areas	N/A		
	3.6.5 Local provenance of plants used for supplementary planting and audit template	N/A		
4. Threatened species habitat management and enhancement	4.1 Protection of threatened species breeding habitat	No disturbance to any threatened species breeding habitat in the past 12 month period. The Haerses Road BSA site is fenced and sign posted as an environmental protection area to deter unauthorised persons from entering and disturbing significant habitat areas		
8. Management of human disturbance	8.1 Removal, movement or use of dead timber	No removal, movement or use of dead timber within the BSA site in the past 12 month period		
	8.3 Removal or movement of rocks	No removal or movement of rocks in the past 12 month period		
	8.6 No storage or disposal of rubbish	No storage or disposal of rubbish within the BSA site in the past 12 month period		
	8.9 Maintenance of tracks and fences	Maintenance of tracks with the BSA site has occurred, particularly following extreme rainfall events which cause damage to the track pavement. Work has been carried out with care and no disturbance has occurred to native vegetation alongside these tracks. Fences are regularly checked to ensure they remain visible		

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
9. Monitoring	9.2 Establishing and sampling photo-points	Photo points have been established. This is the fifth year of photo point monitoring.		
	9.4 Establishing vegetation integrity survey plots	Vegetation integrity survey plots have been established. The most recent survey was undertaken in July 2021		

Additional site inspections

Management Actions		Landholder to complete	BCT annual report audit	
Description of additional site inspection or monitoring requirement	Required frequency	Completion dates, observations, actions undertaken and outcomes	Action completed Yes/No/N/A	Comments and recommendations by BCT
Inspection to determine percentage of living ground cover when grazing Stock.	Every 12 months	N/A		
Inspections to record grazing by Stock in accordance with Section 7A.2 of the management plan.	Every 3 months	N/A		
Inspections to document human disturbance, erosion or waste in accordance with Section 7A.2 of the management plan.	Every 6 months	The Haerses Road BSA site is inspected twice per year. During the last 12 month period the site was inspected during September 2023 and February 2024		
Inspection to document the condition of fences and gates in accordance with Section 7A.2 of the management plan.	Every 12 months	The fences at the Haerses Road BSA site are inspected regularly throughout the year with the last inspection occurring on the 28/02/2024		

Details of incidents or events that have had an adverse effect on biodiversity values on biodiversity stewardship site (landholder to complete)

Description of incident or event (e.g. natural events)	Actions taken and/or recommended actions

Details of incidents or events that have had an adverse effect on biodiversity values on biodiversity stewardship site (landholder to complete)

Any other comments or observations regarding the biodiversity stewardship site (landholder to complete)

Photo monitoring site 1.

A good increase in ground cover diversity within the site given the ideal climatic conditions for plant growth during the previous 12 month period.



Photo monitoring site 2.

Ground cover density has increased dramatically at this site during this monitoring period. Shrub growth is increasing in density and diversity. The woody weed *Lantana camara* has emerged within this monitoring location and is growing prolifically nearby just within the boundary of the BSA site.



Photo monitoring site 3.

A good increase in ground cover diversity within the site given the ideal climatic conditions for plant growth during the previous 12 month period. Small fallen shrubs noted to have perished during the 2018-2019 drought in the previous monitoring periods are now almost completely broken down into organic material.



Landholder Annual Report signature and declaration

I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements specified in Section 7 of Attachment 4 of the Biodiversity Stewardship Agreement.

All landowners must sign this annual report. If the land that forms the Biodiversity Stewardship Site is owned by multiple persons landowners may confirm in writing to the BCT that another person can complete and submit the annual report on their behalf.

Please submit a signed PDF version and a word version of your Annual Report submission to the BCT

Signed



Signed

Date

12 / 03 / 2024

Date

BCT approval of recommendations

Signature of auditor:

Authorisation signature:

Name of auditor:

Name of authorising officer:

Position of auditor:

Position of authorising officer:

Date:

Date:

Biodiversity Stewardship Site landholder annual report & BCT audit (passive management)

Audit details

Biodiversity stewardship agreement year: **2024**

Reporting period: **2023-2024**

BCT site inspection date (if required):

BCT Auditor:

BS agreement ID: **BA00415 Porters Road**

Landowner/site contact details: **David Dixon, 0414 330 490**

Property address: **1/565423, 143 Porters Road, Kenthurst**

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
1. Fire management	1.1 Implementation of the fire for conservation management plan	N/A until under active management. No actions taken to date. No fire within the BSA site boundary during the previous 12 month period. Last inspection 28/02/2024		
2. Grazing management	2.1 Exclusion of grazing by Stock	No stock kept or located on property. No unauthorised grazing of stock noted. Last inspection 28/02/2024		
	2.3 Removal of Stock when observed	N/A		
	2.1 & 2.2 Stock grazing in accordance with BSA restrictions	N/A		
	2.3 Removal of stock when contrary to BSA grazing restrictions	N/A		

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
3. Native vegetation management	3.1 Retaining native vegetation	No disturbance to native vegetation in past 12 month period		
	3.2 Burning of native vegetation	No burning of native vegetation in past 12 month period		
	3.4 Restricted use of fertilisers, pesticides and herbicides.	No use of fertilisers, pesticides or herbicides within the BSA site during the past 12 month period		
	3.6.4 Management of supplementary planting areas	N/A		
	3.6.5 Local provenance of plants used for supplementary planting and audit template	N/A		
4. Threatened species habitat management and enhancement	4.1 Protection of threatened species breeding habitat	No disturbance to any threatened species breeding habitat in the past 12 month period. The Porters Road BSA site is accessed via two locked gates which only RFS and property owners have keys for.		
8. Management of human disturbance	8.1 Removal, movement or use of dead timber	No removal, movement or use of dead timber within the BSA site in the past 12 month period		
	8.3 Removal or movement of rocks	No removal or movement of rocks in the past 12 month period		
	8.6 No storage or disposal of rubbish	No storage or disposal of rubbish within the BSA site in the past 12 month period		
	8.9 Maintenance of tracks and fences	No maintenance of tracks has occurred. The tracks within the BSA site are suitable for 4wd vehicle only. Maintenance is not expected to be required unless emergency services require access.		
9. Monitoring	9.2 Establishing and sampling photo-points	Photo points have been established. This is the fifth year of photo point monitoring.		

BAM passive management actions		Annual report (landholder to complete)	BCT annual report audit	
Passive management actions as per Agreement	Management item description	Completion dates, actions undertaken and outcomes	Action completed Yes/No/N/A	Auditor comments and recommendations
	9.4 Establishing vegetation integrity survey plots	Vegetation integrity survey plots have not been established.		

Additional site inspections

Management Actions		Landholder to complete	BCT annual report audit	
Description of additional site inspection or monitoring requirement	Required frequency	Completion dates, observations, actions undertaken and outcomes	Action completed Yes/No/N/A	Comments and recommendations by BCT
Inspection to determine percentage of living ground cover when grazing Stock.	Every 12 months	N/A		
Inspections to record grazing by Stock in accordance with Section 7A.2 of the management plan.	Every 3 months	N/A		
Inspections to document human disturbance, erosion or waste in accordance with Section 7A.2 of the management plan.	Every 6 months	The Porters Road site is currently inspected annually. There has been no human disturbance, erosion or waste noted within the site with last inspection being on the 28/02/2024		
Inspection to document the condition of fences and gates in accordance with Section 7A.2 of the management plan.	Every 12 months	The access into the Porters Road BSA site is via two locked RFS gates. The RFS may periodically inspect these gates and locks. The last inspection of the locked gates by the landowners representative was on the 28/02/2024		

Details of incidents or events that have had an adverse effect on biodiversity values on biodiversity stewardship site (landholder to complete)	
Description of incident or event (e.g. natural events)	Actions taken and/or recommended actions

Details of incidents or events that have had an adverse effect on biodiversity values on biodiversity stewardship site (landholder to complete)

Any other comments or observations regarding the biodiversity stewardship site (landholder to complete)

Photo monitoring site 1.

Shrub density has increased within the site over the past 12 month period. No other changes were noted.

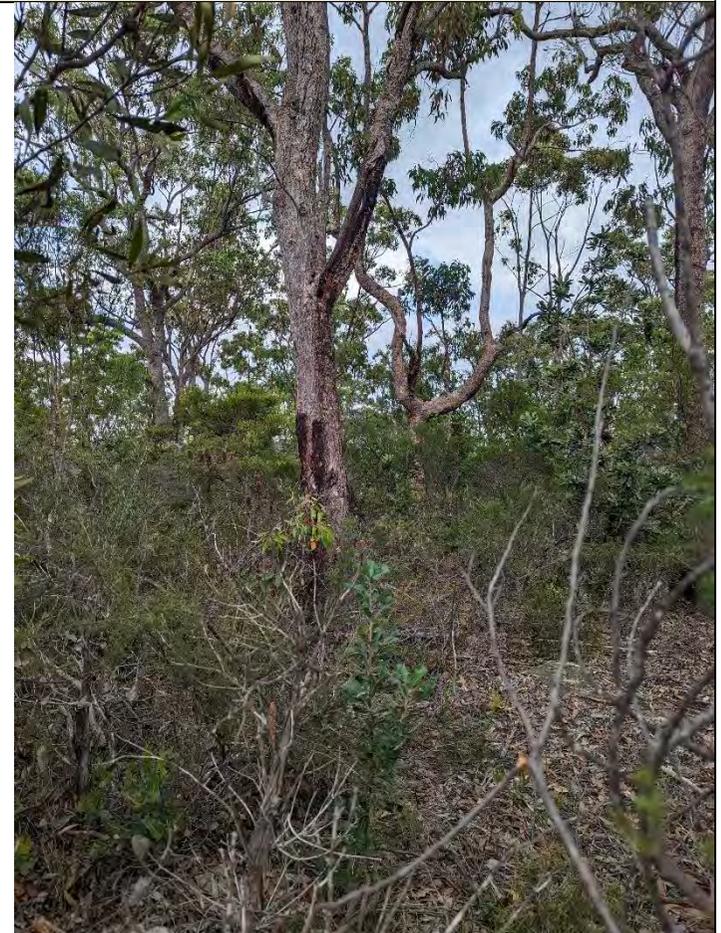


Photo monitoring site 2.

No changes to the site were noted during the past 12 month period.



Photo monitoring site 3.

Shrub density has increased at this location during the past 12 month period.



Landholder Annual Report signature and declaration

I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements specified in Section 7 of Attachment 4 of the Biodiversity Stewardship Agreement.

All landowners must sign this annual report. If the land that forms the Biodiversity Stewardship Site is owned by multiple persons landowners may confirm in writing to the BCT that another person can complete and submit the annual report on their behalf.

Please submit a signed PDF version and a word version of your Annual Report submission to the BCT

Signed



Signed

Date

12 / 03 / 2024

Date

BCT approval of recommendations

Signature of auditor:

Authorisation signature:

Name of auditor:

Name of authorising officer:

Position of auditor:

Position of authorising officer:

Date:

Date:

Appendix J – Example of S94 Contribution

SECTION 94 CONTRIBUTION

SAND & SANDSTONE SALES NOVEMBER 2023

1	1,114.99
2	1,318.66
3	999.60
4	460.86
6	1,049.04
7	1,150.00
8	1,141.70
9	1,228.40
10	1,147.26
11	253.56
13	1,223.15
14	1,189.40
15	1,491.75
16	1,578.62
17	1,241.20
18	290.20
20	1,229.62
21	1,192.40
22	794.46
23	1,214.38
24	1,279.60
25	334.34
27	1,123.00
28	797.50
29	702.40
30	874.80

26,420.89

Tonnes @ \$1.11
\$29,327.19

Appendix K – Community Engagement and CCC Meeting Minutes



DIXON SAND

**MINUTES OF THE BI-ANNUAL
COMMUNITY CONSULTATIVE COMMITTEE
WEDNESDAY 8 NOVEMBER 2023
GLENORIE RSL CLUB**

PRESENT	NAME	ORGANISATION
	Lisa Andrews (LA)	Independent Chairperson
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	Mark Dixon (MD)	Dixon Sand
	Melissa Mass (MM)	Dixon Sand - Ecologist
	Pat Schwartz (PS)	Community Representative
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
APOLOGIES	Jemma Roberts (JR)	Community Representative (alternate)
	Farley Roberts (FR)	Community Representative
	Lisa Aylward (LAy)	Maroota Public School Representative
	David Dixon (DD)	General Manager, Dixon Sand

WELCOME & INTRODUCTION	LA opened the meeting at 12.54pm following a light luncheon. All members were welcomed.	
APOLOGIES	As listed above.	
DECLARATIONS OF INTEREST	LA declared that she is approved by the Department of Planning and Environment to chair the meeting and engaged by Dixon Sand.	No changes to previous declarations.
BUSINESS ARISING FROM PREVIOUS MEETING (3/5/23)	Nil.	
CORRESPONDENCE (as emailed with Meeting Notice on 10/10/23 with 1 additional item)	<ul style="list-style-type: none"> 10/5/23- Draft minutes sent to members for review 19/5/23 – Email to members with the finalised minutes 3/10/23 – Email from HC with advice that DPE regarding Modification 6 for DA 165-7-2005 for Haerses Road Quarry has been approved and submission of the 2022-2023 Annual Review. 10/10/23 – Email to members with meeting notice & agenda for 8/11/23. 6/11/23 – Email to members with the reminder for this meeting. 	
PROJECT REPORT, INCLUDING PRODUCTION/SALES	HC (on behalf of DD). There have been a few changes at ONR. The quarry is producing speciality sand for all the NSW Racecourses. The Australian Turf Club tested 14 different sands from different suppliers and Dixon Sand’s product was the best performing and most suited to the requirements of racetracks.	Questions asked and answered throughout the presentation.

	<p>Dixon Sand continue to provide sand for Golf Courses, the SCG, Brookvale Oval, etc.</p> <p>Extraction on Lots 1 & 2. There has been minimal extraction from Cons Hill. The silt ponds are being capped and will bake over summer in preparation for rehabilitation. Hopefully weather conditions will be stable for this purpose.</p> <p>Stockpiled materials containing seeds of native flora is going to be transferred on to the silt pond area to continue the Native Vegetation Corridor.</p> <p>KM sought clarification on the aerial map regarding water storage. It was confirmed as contained run-off from the floods 2 years ago. MD advised that because it is deep and cold, that it doesn't evaporate very quickly. However, this is likely to occur this summer.</p> <p>HC stated that the sediment pond on Lots 1 & 2 will progress towards the school. Construction of the 250m noise bund to the school has commenced and will continue.</p> <p>HC stated that extraction at ONR is restricted to the same areas and increasing in depth. Extraction at Haerses Road currently occur in Stages 1 and 2 (Tertiary sand, original DA) and Cells 1A, 1B, 2B, 3B and parts of 1A (Friable sandstone, Mod 1 extraction area) Dixon Sand has purchased enough biodiversity credits for the whole project.</p>	
<p>Haerses Rd Quarry – Proposed Mod 6.</p>	<p>MOD 6 was approved by DPE on 7 September 2023. This involves the relocation of the sand stone cutting shed and the maintenance shed – 90m to the north. The Construction Certificate for both sheds has been issued. Pre-commencement conditions have been completed. Construction will commence in 2 weeks.</p>	<p>Slides: 8</p>
<p>ONR – Proposed DA Mod 6 - Extraction within existing cells to maximise resource</p>	<ul style="list-style-type: none"> • Increase the depth of extraction within Lot 196 DP752025 to within 2m of the highest recorded regional wet weather groundwater level; • Import up to 250,000 tonnes per annum of virgin excavated natural material (VENM) and excavated natural material (ENM) within existing incoming trucks; and • Extend the quarry life by 11 years until 2053. <p>Extraction within existing cells to maximise resource</p> <ul style="list-style-type: none"> ○ 17 January 2023 - Scoping letter lodged with DPE ○ 21 March 2023 - DPE confirms pathway of modifying consent under section 4.56 of the EP&A Act. 	<p>Sides: 9 & 10</p>

	<p>DPE requests in addition to the matters identified in the scoping letter for the Modification Report to include:</p> <ul style="list-style-type: none"> ○ A traffic assessment that considers the growth in background traffic over the period of the proposed extension; and ○ An updated rehabilitation and final landform assessment that takes into account the proposed increase in extraction depth. ○ September 2023 – Consultation with Agencies ○ Current Status – Finalisation of Modification Report and 'soft' lodgement of the Modification Report to the DPE <p>MD advised that half the staff have moved over to this site with the main production being white sand and brickies sand.</p> <p>Sales and demand for Sandstone blocks are doing very well. Larger blocks are being sold for commercial sites (such as the development site in Camden) and small blocks for the residential market.</p> <p>Production overall is down 25%, due to the down turn in the market from interest rate rises which are affecting the building of homes.</p>	
BIODIVERSITY OFF SET CREDITS	Discussions on biodiversity off set credits. MD advised that Dixon Sand has purchased enough biodiversity credits to cover the whole project.	
ENVIRONMENTAL MONITORING RESULTS	<p>HC commenced by explaining the locations of all the monitoring points and the schedule for conducting the monitoring.</p> <p>HC advised that DPI Water has requested that an additional bore be installed to replace bores that were decommissioned. The new bore is located in the south west corner of cell 1A.</p>	Slides: 12-16
TEOM DATA	<p>HC explained the TEOM data and measurement criteria.</p> <ul style="list-style-type: none"> ○ TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc. ○ Monitoring Criteria – <ul style="list-style-type: none"> ● Long term: Annual PM10 average (light blue line) should not exceed the annual average criteria (pink line – 30µg/m3) – ● Short term: 24hr PM10 average (blue bars) should not exceed the 24hr PM10 NEPM Criteria (yellow line – 50µg/m3) – ● Short term: If the 24hr PM10 EPL Criteria Level (green line 	Slides: 17-18

	<p>– 42µg/m3) is exceeded by the 24hr PM10 average (blue bars), and the prevailing wind is from the specific quadrant Dixon Sand is required to:</p> <ul style="list-style-type: none"> • Notify EPA • Take immediate action to reduce PM10 levels • Stop works if levels do not fall below 42µg/m3 within 1 hour <p>o TEOM station represent the EPL Points 1 & 3</p>													
DEPOSITIONAL DUST DATA	<p>Dust data for this monitoring period: Dec 2022 – Oct 2023</p> <table border="1"> <thead> <tr> <th>Location</th> <th>Dust Gauge</th> </tr> </thead> <tbody> <tr> <td rowspan="4">Old Northern Road</td> <td>D1A Access road</td> </tr> <tr> <td>D4 Rehab area</td> </tr> <tr> <td>D5 Bundwall</td> </tr> <tr> <td>D7 Mullock Heap</td> </tr> <tr> <td rowspan="4">Haerses Road</td> <td>D8 Olive Grove</td> </tr> <tr> <td>D10 Haerses Road (EPL Point 3)</td> </tr> <tr> <td>D11 Receiver R6</td> </tr> <tr> <td>D12 Receiver R8</td> </tr> </tbody> </table>	Location	Dust Gauge	Old Northern Road	D1A Access road	D4 Rehab area	D5 Bundwall	D7 Mullock Heap	Haerses Road	D8 Olive Grove	D10 Haerses Road (EPL Point 3)	D11 Receiver R6	D12 Receiver R8	<p>See graphs for results. Slides: 19-28 (maps)</p>
Location	Dust Gauge													
Old Northern Road	D1A Access road													
	D4 Rehab area													
	D5 Bundwall													
	D7 Mullock Heap													
Haerses Road	D8 Olive Grove													
	D10 Haerses Road (EPL Point 3)													
	D11 Receiver R6													
	D12 Receiver R8													
NOISE MONITORING	<p>ONR & Haerses Rd:</p> <p>Tables of noise monitoring locations indicating: Receivers, property addresses, descriptions and extrapolated monitoring results.</p>	<p>See Slides 29-33 For location of monitoring sites and summary of data.</p>												
GROUND WATER MONITORING	<p>GW Monitoring wells</p> <ul style="list-style-type: none"> • ONR 11 x BH • HR 19 x BH <p>GW levels:</p> <ul style="list-style-type: none"> • Monthly + continuous data loggers <p>GW quality sampling & lab analysis:</p> <ul style="list-style-type: none"> • 6 monthly sampling and testing. 	<p>Graphs explained - See Slides 34-48 (maps)</p>												
SURFACE WATER MONITORING	<p>ONR</p> <ul style="list-style-type: none"> • SW19 = Surface water monitoring at creek on Lot 196 • LDP1 = EPL 3916 Licenced Discharge Point at Weir of Main Water Channel <p>HR</p> <ul style="list-style-type: none"> • SW1 = Surface water monitoring at creek east of extraction Stage 2 East (inside the Biodiversity Offset Area) • SW2 = Surface water monitoring at creek west of extraction Cell 1A (Mod 1) • Basin 1. <p>No discharges have been carried out. All within criteria.</p>	<p>Graphs/Tables explained - See Slides 49-52</p>												

	<p>ONR – Licensed Discharge Point on the EPL 3916 (Main Water Channel)</p> <table border="1"> <thead> <tr> <th colspan="2">EPL 3916 water quality criteria</th> </tr> <tr> <th>pH</th> <th>TSS (mg/L)</th> </tr> </thead> <tbody> <tr> <td>4.5 – 6.5</td> <td>50</td> </tr> </tbody> </table> <p>No planned discharge of water during period: May 2023 – November 2023.</p>	EPL 3916 water quality criteria		pH	TSS (mg/L)	4.5 – 6.5	50	
EPL 3916 water quality criteria								
pH	TSS (mg/L)							
4.5 – 6.5	50							
<p>BUSH REGENERATION WORKS</p>	<p>Presented by TB</p> <p><u>Old Northern Rd Works Areas: Rehabilitation of Lot 196</u></p> <p>Challenges:</p> <ul style="list-style-type: none"> • Machinery-compacted soils on North-facing aspect • Missing all native vegetation strata and microbial activity. <p>Achievements:</p> <ul style="list-style-type: none"> • Recent Melaleuca deanei plantings have struggled in hot/dry conditions experience in September in particular. • Direct seeded enrichment nodes where slashing is no longer being undertaken where there are natives shrubs recruiting ie mostly Kunzea ambigua. <p>Future Works:</p> <ul style="list-style-type: none"> • Continued revegetation with locally endemic trees, shrubs and grasses (creating dense enrichment nodes) in April-May 2023. • Seed collection currently being undertaken. <p><u>Assisted Regeneration - Native Vegetation Corridor (NVC)</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Minimal microbial and mycorrhizal fungi • Very minor Infestation of exotic grasses <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass has prevented seed-set and spread, in particular Pampas Grass. • Re-growth of mother Melaleuca deanei. <p>Future Work</p> <ul style="list-style-type: none"> • Continue to cull assertive shrub species to promote diversity • Monitor the impact of dry conditions. <p><u>Assisted Regeneration - Native Vegetation Corridor</u></p> <p>The 6 months to November has seen:</p> <ul style="list-style-type: none"> • Unprecedented hot and drier conditions. 	<p>See photographs in Slides 53-61</p> <p>TB spoke further about the Melaleuca deanei plantings. 11 of the 32 remain. Consideration of interfering vs not interfering.</p> <p>Discussions about climate proofing some species, ie bringing them from northern NSW as they are accustomed to the heat.</p>						

	<p>Rehabilitation of Lot 2</p> <p>Challenges</p> <ul style="list-style-type: none"> • Excessive surface water flows and waterlogged soils are drying out. • Extensive infestation of woody weeds. <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of Lantana to evict Bell Miners and promote tree health. • Recovery of native species by in-situ resilience only at this stage. <p>Future Work</p> <ul style="list-style-type: none"> • Continued revegetation of disturbed grassy areas with canopy species. • Follow-up work on Lantana needed to finish off. <p>Haerses Rd – New Work Areas (discussions on what to name this new area, Barry’s Bush?)</p> <p>Challenges</p> <ul style="list-style-type: none"> • Dense Lantana thicket • Runoff from surrounding fields <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of Lantana over the last few months <p>Future Work</p> <ul style="list-style-type: none"> • Follow-up work on Lantana needed. <p>Assisted Regeneration - Haerses Road Biodiversity Offset</p> <p>Challenges</p> <ul style="list-style-type: none"> • Encroachment of invasive species along an extended edge and along drainage lines <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of Crofton Weed to prevent seed-set and spread. • Manual treatment and minimal herbicide use has resulted in a dense buffer of native shrubs and canopy species. <p>Future Work</p> <ul style="list-style-type: none"> • Continued monitoring for incursions along the leading edge <p>Haerses Rd - Translocation</p> <p>Challenges</p> <ul style="list-style-type: none"> • Dominance of assertive native canopy species – Kunzea, Melaleuca and Acacia spp. • Infestation by invasive exotic grasses (Common Couch in particular). <p>Achievements</p> <ul style="list-style-type: none"> • Treatment of exotic grass to prevent seed-set and spread. 	
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	<ul style="list-style-type: none"> Select thinning of assertive native canopy species has promoted understorey natives. <p>Future Work</p> <ul style="list-style-type: none"> Continued treatment of grasses Thinning of assertive native canopy. <p>Haerses Rd – Visual buffer along Wisemans Ferry Road</p> <p>Challenges</p> <ul style="list-style-type: none"> Exposed to surrounding impacts and fairly degraded soil Weed density relatively low now. <p>Achievements</p> <ul style="list-style-type: none"> Treatment of Pellaea vridis and Asparagus Fern mostly. Control of Common Couch on sandstone capped area. Plantings mostly successful. <p>Future Work</p> <ul style="list-style-type: none"> Continued monitoring and maintenance weed control works. Supplementary planting required in April-May 2024. 	
<p>BIODIVERSITY AND REHABILITATION (Threatened Species Update)</p>	<p>MM provided the following presentation:</p> <p>Biodiversity and Rehabilitation Annual Report 2023</p> <ul style="list-style-type: none"> The Biodiversity and Rehabilitation Annual Report identifies native flora and fauna within the Native Vegetation Corridor and the Haerses Road Biodiversity Offset Area, it monitors the success of the rehabilitation area within the NVC and describes the current condition of threatened flora and fauna and their habitats within the Old Northern Road site and the HRBOA. The 2023 Biodiversity and Rehabilitation Annual Report was completed in September and submitted with the Annual Review on the 30th of September. The results found the rehabilitation areas are thriving and increasing in diversity and density. Ideal growing conditions with favourable temperatures and regular rainfall over the past 3 years has improved the overall biodiversity of all rehabilitation and monitoring sites. Survey work for the preparation of the 2024 report will begin in January 2024. <p>Rehabilitation process</p> <ul style="list-style-type: none"> Three stage process: Extraction operations completed and silt ponds created Silt ponds filled, dried and capped Rehabilitation of biodiversity begins. 	<p>See Slides 62 – 75 (see photographs)</p>

	<p>BCT Reporting</p> <ul style="list-style-type: none"> • The Annual Management Report for year 4 was completed in March - Passive Management at Haerses Road and Porters Road sites was completed in March 2023. Passive management continues at both locations. • PS enquired that when a site is cleared, do you have to comply with certain requirements. MM responded yes, a pre-clearing survey has to be undertaken, threatened species are mapped out, habitat (hollow) trees are marked and felling of potential habitat trees are undertaken in multi-stages to ensure maximum chance of fauna relocation. • PS asked if sound records were used as she has had great success. MM advised that she has been recording bat species. Commenting that a lot of fauna have moved away from the quarry. 	
<p>GENERAL BUSINESS</p>	<ul style="list-style-type: none"> ○ TB asked MD if Dixon Sand have excess bio diversity credits. MD responded yes and explained passive vs active management options. Stating that he is currently going through the government buy back system. ○ TB commented that the native garden at Dixon Sand is looking great. ○ MM advised that a few weeks ago, there were some comments made on a local Maroota Face Book page, following an enquiry about the impact of quarry activities on dust, noise, water quality, etc in the area. The original query came from someone looking at moving to the area. There were some negative responses/comments made. MM provided a positive response to the page, but suggested that CCC community members could make themselves available to the broader community to bring any issues to the CCC. PS commented that the Progress Association often receives questions as well. 	
<p>REVISED CCC GUIDELINES</p>	<p>LA confirmed that DPE have released its revised CCC Guidelines released in June 2023 (which are now available on the Department’s website) and referred to the Briefing Sheet provided to members with the meeting notice. LA provided an overview of the key changes, including the requirements for a specific Terms of Reference for the CCC. LA discussed potential recruitment, raising that there is availability on the committee for additional members.</p> <p>LA noted a new CCC member recruitment method means that it is now acceptable to refer potential new members via word of mouth. LA asked if the CCC knew of anyone that would like to join this forum to</p>	<p>Printed CCC guideline handed to PS.</p>

	<p>please provide them with LA's contact details and vice versa.</p> <p>LA stated that she would send out the draft Terms of Reference for members' review, as well as the new Code of Conduct and Pecuniary/Interest Forms for completion and return. Advising that these documents would be reviewed on an annual basis.</p>	
MEETING SCHEDULE FOR 2024	<p>It was agreed to continue with the bi-annual meetings, May & November 2024. Accordingly:</p> <ul style="list-style-type: none"> • Wednesday 1 May 2024 at 12.30pm (on site at quarry, Maroota – details to be confirmed). • Wednesday 6 November 2024. 	Agreed.

The meeting was closed at 3:08pm with the chair thanking all members for their attendance.

ACTION ITEM:

NO.	ITEM	RESPONSIBILITY
1	Send out draft Terms of Reference for comment and governance forms for members' completion and return.	LA



**MINUTES OF THE BI-ANNUAL
COMMUNITY CONSULTATIVE COMMITTEE
TUESDAY 28 MAY 2024
HAERSES ROAD QUARRY, ADMINISTRATION BUILDING**

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	David Dixon (DD)	Dixon Sand
	Melissa Mass (MM)	Dixon Sand - Ecologist
	Farley Roberts (FR)	Community Representative
	Lisa Aylward (LAy)	Maroota Public School Representative
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Zoe Ridgeway (ZR)	Bush-It (alternate)
	Jamie Baker (JB)	Dixon Sand – Business Development Manager
APOLOGIES	Jemma Roberts (JR)	Community Representative (alternate)
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
	Pat Schwartz (PS)	Community Representative

HC provided a 'housekeeping' induction to members as it was a new venue.

WELCOME & INTRODUCTION	LA opened the meeting at 1.25pm following a light luncheon. All members were welcomed.		
APOLOGIES	As listed above.		
DECLARATIONS OF INTEREST	LA declared that she is approved by the Department of Planning and Environment to chair the meeting and engaged by Dixon Sand.		FR & JR to complete their governance forms and submit to LA.
BUSINESS ARISING FROM PREVIOUS MEETING (9/11/23)	NO.	ITEM	RESPONSIBILITY
	1	Send out draft Terms of Reference for comment and governance forms for members' completion and return. Complete - Sent 24/11/23	LA
			LA noted that she had replaced Mark Dixon with Jamie Baker in the ToR & asked if members were happy to ratify. Agreed.

<p>CORRESPONDENCE (as emailed with Meeting Notice on 3/5/24 with 1 additional item)</p>	<ul style="list-style-type: none"> • 16/11/23- Draft minutes and draft Terms of Reference sent to members for review • 24/11/23 – Email to members with the finalised minutes and governance forms for completion and return. • 28/11/23 – Email from KM with completed declaration form. • 29/11/23 – Email from HC with completed governance forms and new logo for future documentation. • 23/1/24 – Email from HC advising of the updated EMS and Management Plans Distribution. • 5/2/24 – Email to members with reminder for governance forms to be completed and returned. • 23/2/24 – Email to members with the change in date from 1/5/24 to 28/5/24. • 18/3/24 – Email from LAy with completed governance forms. Acknowledged. • 26/3/24 – Email from HC with details of the DA250-09-01 Old Northern Road Quarry - Revision of Environmental Management strategy • 22/4/24 – Email from HC with completed governance forms from DD & JB. • 3/5/24 – Email to members with meeting notice & agenda for 28/5/24. • 21/5/24 – Email from KM requesting November CCC proceed as scheduled. Acknowledged. • 27/5/24 – Email to members with the reminder for this meeting. 	<p>LA to finalise.</p> <p>LA spoke to this item & moved to “Next Meeting” Agenda item for discussion.</p>
<p>PROJECT REPORT, INCLUDING PRODUCTION/SALES</p>	<p>DD advised that there has not been many changes at Old Northern Road operations. Progressing with the new silt ponds. Sandstone and sand extraction continues.</p> <p>Haerses Rd produces brick laying operations and sandstone cutting operations.</p> <p>MOD 5 (sandstone cutting operations) has been approved by DPHI. Two sheds (maintenance and processing) to be erected. Proposed works have been taking some time due to an industry lull.</p> <p>Currently providing product to Kembla Grange Racecourse as well as continuing to supply golf & sporting fields.</p> <p>The Quarry is reviewing a number of internal systems including OH&S to address the change and growth of quarry operations.</p>	<p>Questions asked and answered throughout the presentation.</p>
<p>ONR – Proposed DA Mod 6 - Extraction within existing cells to maximise resource</p>	<ul style="list-style-type: none"> • Increase the depth of extraction within Lot 196 DP752025 to within 2m of the highest recorded regional wet weather groundwater level; • Import up to 250,000 tonnes per annum of virgin excavated natural material (VENM) and excavated natural material (ENM) within existing incoming trucks; and • Extend the quarry life by 11 years until 2053. 	<p>Sides: 9 & 10</p>

	<p>Timeline</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Milestone</th> </tr> </thead> <tbody> <tr> <td>January 2023</td> <td>Scoping Letter lodge with DPE (now DPHI)</td> </tr> <tr> <td>March 2023</td> <td>DPE confirmed pathway and requests additional traffic assessment and rehabilitation and final landform assessment to be updated</td> </tr> <tr> <td>September 2023</td> <td>Consultation with Agencies</td> </tr> <tr> <td>November 2023</td> <td>Modification Report submitted to DPE</td> </tr> <tr> <td>November 2023 – April 2024</td> <td>Public Exhibition, received submissions from the community and agencies, submissions report submitted to DPE</td> </tr> <tr> <td>May 2024</td> <td>Received further comments from DCCEEW-Water. Submission report being prepared.</td> </tr> </tbody> </table>	Date	Milestone	January 2023	Scoping Letter lodge with DPE (now DPHI)	March 2023	DPE confirmed pathway and requests additional traffic assessment and rehabilitation and final landform assessment to be updated	September 2023	Consultation with Agencies	November 2023	Modification Report submitted to DPE	November 2023 – April 2024	Public Exhibition, received submissions from the community and agencies, submissions report submitted to DPE	May 2024	Received further comments from DCCEEW-Water. Submission report being prepared.	
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<p>ENVIRONMENTAL MONITORING RESULTS</p>	<p>HC commenced by explaining the locations of all the monitoring points and the schedule for conducting the monitoring.</p>	<p>Slides: 10-15 for results</p>														
<p>TEOM DATA</p>	<p>HC explained the TEOM data and measurement criteria.</p> <ul style="list-style-type: none"> ○ TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc. ○ Monitoring Criteria – <ul style="list-style-type: none"> ● Long term: Annual PM10 average (light blue line) should not exceed the annual average criteria (pink line – 30µg/m3) – ● Short term: 24hr PM10 average (blue bars) should not exceed the 24hr PM10 NEPM Criteria (yellow line – 50µg/m3) – ● Short term: If the 24hr PM10 EPL Criteria Level (green line – 42µg/m3) is exceeded by the 24hr PM10 average (blue bars), and the prevailing wind is from the specific quadrant Dixon Sand is required to: <ul style="list-style-type: none"> ● Notify EPA ● Take immediate action to reduce PM10 levels ● Stop works if levels do not fall below 42µg/m3 within 1 hour ○ TEOM station represent the EPL Points 1 & 3 <p>Lay asked why there weren't more TEMO monitors on site. DD explained it was due to costs (\$100k each) and confirmed that dust monitoring requirements are met in accordance with the projects' conditions of consent.</p>	<p>Slides: 16-17 for results</p>														

<p>DEPOSITIONAL DUST DATA</p>	<p>Dust data for this monitoring period: June 2023 –May 2024:</p> <table border="1"> <thead> <tr> <th>Date</th> <th>Milestone</th> </tr> </thead> <tbody> <tr> <td rowspan="5">Old Northern Road</td> <td>D1A Access road</td> </tr> <tr> <td>D4 Rehab area</td> </tr> <tr> <td>D5 Bundwall</td> </tr> <tr> <td>D6 School</td> </tr> <tr> <td>D7 Mullock Heap</td> </tr> <tr> <td rowspan="4">Haerses Road</td> <td>D8 Olive Grove</td> </tr> <tr> <td>D10 Haerses Road (EPL Point 3)</td> </tr> <tr> <td>D11 Receiver R6</td> </tr> <tr> <td>D12 Receiver R8</td> </tr> </tbody> </table> <p>Dust exceedances due to bundwall work, paddock maintenance and neighbouring farming activities at some of the dust gauges, trying to get these dust gauges removed/moved as they aren't indicative of quarry operations.</p> <p>A few elevated results, due to a fire at the school (burning off tree pruning, etc) and slashing works on the neighbouring property.</p> <p>FR advised that roadworks are also generating dust.</p> <p>DD advised that they continue to provide occupational dust monitoring for staff and equipment for inhalable and respirable dust and quartz, in addition to environmental monitoring requirements. One elevated dust result was attributed insufficient seal on the door of a crusher was rectified, retested and retested which returned results well before the exposure standard.</p> <p>Annual testing of employees including CT scans of lungs every year. Clean bill of health.</p>	Date	Milestone	Old Northern Road	D1A Access road	D4 Rehab area	D5 Bundwall	D6 School	D7 Mullock Heap	Haerses Road	D8 Olive Grove	D10 Haerses Road (EPL Point 3)	D11 Receiver R6	D12 Receiver R8	<p>See graphs for results. Slides: 18-27 (maps)</p>
Date	Milestone														
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<p>NOISE MONITORING</p>	<p>ONR & Haerses Rd:</p> <p>Tables of noise monitoring locations indicating: Receivers, property addresses, descriptions and extrapolated monitoring results.</p>	<p>See Slides 28-35 For location of monitoring sites and summary of data.</p>													
<p>GROUND WATER MONITORING</p>	<p>GW Monitoring wells</p> <ul style="list-style-type: none"> • ONR 11 x BH • HR 22 x BH <p>GW levels:</p> <ul style="list-style-type: none"> • Monthly + continuous data loggers <p>GW quality sampling & lab analysis:</p>	<p>Graphs explained - See Slides 36-49 (maps)</p>													

	<ul style="list-style-type: none"> • 6 monthly sampling and testing. <p>HC handed around a data logger that has been taken out of service, to show the equipment to members.</p>	
<p>BUSH REGENERATION WORKS</p>	<p>Summary of Assisted Bush Regeneration Work - November 2023 to May 2024 - presented by ZR.</p> <p><u>Old Northern Rd Works Areas: Rehabilitation of Lot 196</u></p> <p>Challenges:</p> <ul style="list-style-type: none"> • In the commander area, ongoing challenge of heavily compacted soils and absence of all native vegetation strata. • The majority of Melaleuca deanei plantings in this area did not survive, most likely due to September 2023 dry conditions, 4/11 remain (one at ONR entrance and estimated three at commander). • Repressing the established stand of Andropogon virginicus in such a heavily degraded area. <p>Achievements:</p> <ul style="list-style-type: none"> • Short term successful maintenance in repressing Andropogon virginicus. Mixed treatments of brush-cutting areas with 100% weed cover and hand removing amongst the direct seeded enrichment nodes consisting of juvenile Kunzea ambigua. € Planted 40 Acacia longifolias and 10 Imperata cylindricas to create more dense enrichment nodes in this heavily degraded edge of the site. <p>Future Works:</p> <ul style="list-style-type: none"> • Continued regular yet minimal maintenance of Andropogon virginicus, so as not to drain hours and results from more resilient areas. • Continue seed collection and revegetation, planting endemic canopy and shrub species that are more resistant to harsh conditions and soil compaction, as per most recent planting strategy. <p><u>Assisted Regeneration - Native Vegetation Corridor (NVC)</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Minor infestations of exotic grasses, namely Andropogon virginicus and Cynodon dactylon var. dactylon • Shrub density of Banksia ericifolia and Grevillea buxifolia threatens the biodiversity of the translocation due to changes in light levels. • Regrowth of mother Melaleuca deanei has come to a standstill but will continue to observe. 	<p>See photographs in Slides 50-65</p>

	<p>Achievements</p> <ul style="list-style-type: none"> • Suppression of exotic grasses in translocation, mainly from hand removal of <i>Andropogon virginicus</i> and <i>Cortaderia selloana</i>. Sprayed <i>Cynodon dactylon</i> var. <i>dactylon</i> growing on adjacent sand mounds to prevent it spreading into NVG. • Thinned out dominating shrubs to promote biodiversity, using the excess material to brushmat exposed bare ground on site, aiming to create microclimates that promote further regeneration from the seed bank. • <i>Melaleuca deanei</i> plantings are continuing to go well in the area. Removed some guards and brush matted around the bases. <p>Future Works</p> <ul style="list-style-type: none"> • Continue to monitor and suppress exotic grasses • Monitor domineering shrubs and thin/brushmat when deemed necessary <p><u>Rehabilitation of Lot 2</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Past access to site, working around development of bund that coincided with previous planting window. • Minor regrowth of woody weed infestations. • Ongoing maintenance of exotic grasses and <i>Ageratina adenophora</i> in exposed and/or waterlogged areas <p>Achievements</p> <ul style="list-style-type: none"> • Collection of <i>Pultenaea flexilis</i> seed on site, processed at OZ Eco Flora for propagation. • Extended primary works and continued follow up treatment on <i>Lantana camara</i> (lantana) regrowth in order to evict Bell Minors from the area • Suppression of exotic grasses • Planted 200 specimens that included <i>Acacia longifolia</i>, <i>Acacia linifolia</i>, <i>Banksia serrata</i>, <i>Allocasuarina littoralis</i>, <i>Imperata cylindrica</i>, <i>Eucalyptus punctata</i> and <i>Pultenea flexilis</i> seeds that were harvested from Lot 2 and other sites across Dixon Sands. <p>Future Work</p> <ul style="list-style-type: none"> • Continued revegetation of exposed areas. • Continued suppression of lantana <p><u>Rehabilitation of Haerses Rd – Old Dam Area</u></p> <p>Challenges</p> <ul style="list-style-type: none"> • Dense lantana infestation • Runoff from surrounding fields <p>Achievements</p> <ul style="list-style-type: none"> • Successful reduction and consolidation of lantana infestation 	
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	<p>Future Work</p> <ul style="list-style-type: none"> Continue to consolidate lantana, in the long term potential to follow up with planting native shrub species. <p><u>Assisted Regeneration - Haerses Road Biodiversity Offset</u></p> <p>Challenges</p> <ul style="list-style-type: none"> Encroachment of exotic grasses along disturbed edges of the site. Minor encroachments of Ageratina adenophora on edges and drainage lines on site <p>Achievements</p> <ul style="list-style-type: none"> Successful management of exotic grasses via non-chemical methods, brush-cutting and slashing. Dense native buffer remains in good condition. Continued suppression of Ageratina adenophora, minimal treatments have been required over this period. <p>Future Work</p> <ul style="list-style-type: none"> Continue maintenance of exotic grasses on disturbed edges Monitor for reshoots of Ageratina adenophora. Monitor for Pallaea viridis specimens and treat upon sighting. <p><u>Haerses Rd - Translocation</u></p> <p>Challenges</p> <ul style="list-style-type: none"> Infestations of invasive exotic grasses, namely Cynodon dactylon var. Dactylon, Eragrostis curvula and Andropogon virginicus. Pallaea viridis specimen was found on site. <p>Achievements</p> <ul style="list-style-type: none"> Target-sprayed exotic grasses with 50:1 and 75:1 water:glyphosate for effective treatment. Successfully manual removal of known Pallaea viridis from site. <p>Future Work</p> <ul style="list-style-type: none"> Continued treatment of grasses Continue to monitor for Pallaea viridis specimens <p><u>Haerses Rd – Visual buffer along Wisemans Ferry Road</u></p> <p>Challenges</p> <ul style="list-style-type: none"> High proportion of resources required to maintain these areas. Sites on both sides of Hearses Road are highly exposed to invasive species such as Rumex 	
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	<p>sagittarius, Cynodon dactylon var. Dactylon and Rubus fruticosus, as well as annuals.</p> <ul style="list-style-type: none"> • Soil quality is degraded <p>Achievements</p> <ul style="list-style-type: none"> • Able spray and suppress aforementioned invasive species. • Continued control of Cynodon dactylon var. dactylon in the planting site via careful spray and manual removal. Slashed annuals in the area as well. • Planting continue to succeed and have started to remove guards on fast growing specimens ∅ Planted 50 specimens of Banksia serrata, Acacia longifolia and Imperata cylindrica into site. <p>Future Work</p> <ul style="list-style-type: none"> • Continued maintenance of aforementioned invasive species. Potential to supplement plantings again in the future Haerses Rd – Visual buffer along Wisemans Ferry Rd <p>Porters Rd Offset Site</p> <ul style="list-style-type: none"> • This site remains in excellent condition and is an ideal reference site for the area. • We successfully collected seed from native shrub and canopy species in the area, which were sent to Oz Eco Flora for propagation. Mainly Banksia, Acacia and Proteaceae species. • Will continue to conduct seed collection. 	
<p>BIODIVERSITY AND REHABILITATION (Threatened Species Update)</p>	<p>MM provided the following presentation: Biodiversity and Rehabilitation Annual Report 2024</p> <ul style="list-style-type: none"> ✚ The Biodiversity and Rehabilitation Annual Report identifies native flora and fauna within the Native Vegetation Corridor and the Haerses Road Biodiversity Offset Area, it monitors the success of the rehabilitation area within the NVC and describes the current condition of threatened flora and fauna and their habitats within the Old Northern Road site and the HRBOA. ✚ The 2023 Biodiversity and Rehabilitation Annual Report was completed in September and submitted with the Annual Review on the 30th of September 2024. ✚ The results found the rehabilitation areas are thriving and increasing in diversity and density. Ideal growing conditions with favourable temperatures and regular rainfall over the past 4 years has improved the overall biodiversity of all rehabilitation and monitoring sites. ✚ Survey work has begun in preparation for the 2024-2025 report. 	<p>See Slides 66 – 77 (see photographs)</p>

	<p>Monitoring Fauna Fauna monitoring is undertaken in the summer months when activity is at the highest and more likely to be observed</p> <ul style="list-style-type: none"> ○ Fauna monitoring includes: Recording bat calls via an Anabat sound recorder; The use of unbaited infra-red motion detection cameras on animal trails; ○ Looking for scats, prints and other signs such as diggings, scratches, feed scars; ○ Aural survey for birds; and ○ Visual observation. <p>Monitoring flora</p> <ul style="list-style-type: none"> • Flora monitoring is undertaken in the winter months as many of the threatened species are flowering or budding up preparing for early spring flowering • Vegetation quadrats are repeated annually in monitoring locations. Quadrats are 20m x 50m, 20m x 20m and 1m x 1m which record the following information: <ul style="list-style-type: none"> ○ Species present and percentage of cover; ○ Stem class including recruitments present or absent; ○ Number of hollow bearing trees; ○ Total length of coarse woody debris; ○ Litter cover, rock surface area, bare ground <p>BCT Reporting</p> <p>Annual Management Report for year 5 was completed in March - Passive Management at Haerses Road and Porters Road continues</p>	
GENERAL BUSINESS	<ul style="list-style-type: none"> ○ HC showed drone footage of rehabilitation areas. ○ LAy thanked Dixon Quarry for the donation to the School. ○ FR stated that truck drivers seem to be responding to the signage regarding exhaust brakes. Commenting on a very loud truck at 1am, possibly associated with the roadworks. ○ DD spoke about building waste dumped on the side of the road, just before the golf course on the right hand side. 	
NEXT MEETING	Next meeting will be held Wednesday 6 November 2024 as scheduled.	Agreed.

The meeting was closed at 2:58pm with the chair thanking all members for their attendance.

ACTION ITEM:

NO.	ITEM	RESPONSIBILITY
1	Send out finalised Terms of Reference for CCC to members	LA

Appendix L – Complaints Register

Dixon Sand (No. 1) Pty Ltd
Haerses Road Quarry
Complaints Register - Summary

Period	Number of Complaints received	Complaint Register Published on Website
Jul 2023	0	23 Aug 2023
Aug 2023	0	4 September 2023
Sep 2023	0	5 October 2023
Oct 2023	0	13 November 2023
Nov 2023	0	19 December 2023
Dec 2023	0	11 January 2024
Jan 2024	0	5 February 2024
Feb 2024	0	25 March 2024
Mar 2024	0	16 April 2024
Apr 2024	0	3 May 2024
May 2024	0	6 June 2024
June 2024	0	10 July 2024
Total No. of Complaints	0	

Appendix M – Waste and ENM/VENM Registers

Haerses Road Waste Tracking Register 2023-2024

Date	Waste Type	Amount	Measurement	Contractor	Disposal / Recycle	Receipt No
01/07/23 - 30/06/24	General Solid Waste - putrescible	12.48	cubic metre	Council Waste Contractor	Disposal	Council Rate
14/08/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9674
27/07/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9663
26/07/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9661
13/07/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9653
16/11/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9709
20/09/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9696
20/09/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9697
31/08/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9687
18/01/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9733
12/12/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9724
8/12/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9723
12/10/2023	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9489
27/11/2023	Non-Putrescible skip	6	cubic metre	Asquith Mini Skips	Disposal	9717
21/03/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9764
12/03/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9759
23/02/2024	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9749
19/10/2023	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9494
8/05/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9788
19/04/2024	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9780
27/03/2024	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9767
8/04/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9773
12/06/2024	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9802
26/04/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9781
12/06/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9803
25/06/2024	Non-Putrescible skip	4	cubic metre	Asquith Mini Skips	Disposal	9808
27/06/2024	Non-Putrescible skip	2	cubic metre	Asquith Mini Skips	Disposal	9811
01/07/23 - 30/06/24	General Solid Waste - recyclable	6.24	cubic metre	Council Waste Contractor	Recycle	Council Rate
1/7/23 - 30/6/24	Sewage -		As per manufacturer's specification			N/A
01/07/23 - 30/06/24	Printer Ink Catridge	0.1	cubic metre	Post Office or Officeworks	Disposal	N/A
01/07/23 - 30/06/24	Coffee Pods	<0.1	cubic metre	Return to manufacturer for recycling and composting	Recycle	N/A

Total	Non-Putrescible skip	80	m3
	Council Putrescible	12.48	m3
	Council Recycle	6.24	m3
	Printer Ink Catridge	0.1	m3
	Coffee Pods	<0.1	m3
	Sewage	As per manufacturer's specification	

End of document