

Dixon Sand Pty Ltd

Haerses Road Quarry, Maroota

Annual Review

2020 – 2021




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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
Dixon Sand	Dixon Sand (No.1) Pty Ltd
DRG	Department of Planning, Industry and Environment – Resources Regulator
DPIE	Department of Planning, Industry and Environment
DPIE (Resources Regulator)	Department of Planning, Industry and Environment – Resources Regulator
DPIE – Water	Department of Planning, Industry and Environment – Water
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
MTSGS	Maroota Tertiary Sands Groundwater Source
NRAR	Department of Planning, Industry 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

Statement of Compliance

Table 1: Statement of Compliance

All Conditions of the relevant approval(s) were complied with?		
Haerses Road Quarry	DA165-7-2005	Yes
	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
N/A	N/A	N/A	N/A	N/A
Compliance Status Key				
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)		

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 with current extraction occurring in Stage 1, Stage 2 and Cell 1A. 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. Sand extraction commenced in Extraction Cell 1A in December 2019 and was suspended from June 2020 whilst awaiting the outcome of DA165-7-2005 Modification 4.

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, Industry and Environment (DPIE). The reporting period is from 01 July 2020 to 30 June 2021, 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 2) 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 DPIE for the submission deadline of the Annual Review to be adjusted to reflect the financial year reporting. Approval was granted by the DPIE 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 2), Environment Protection License (EPL) # 12513 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 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.

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

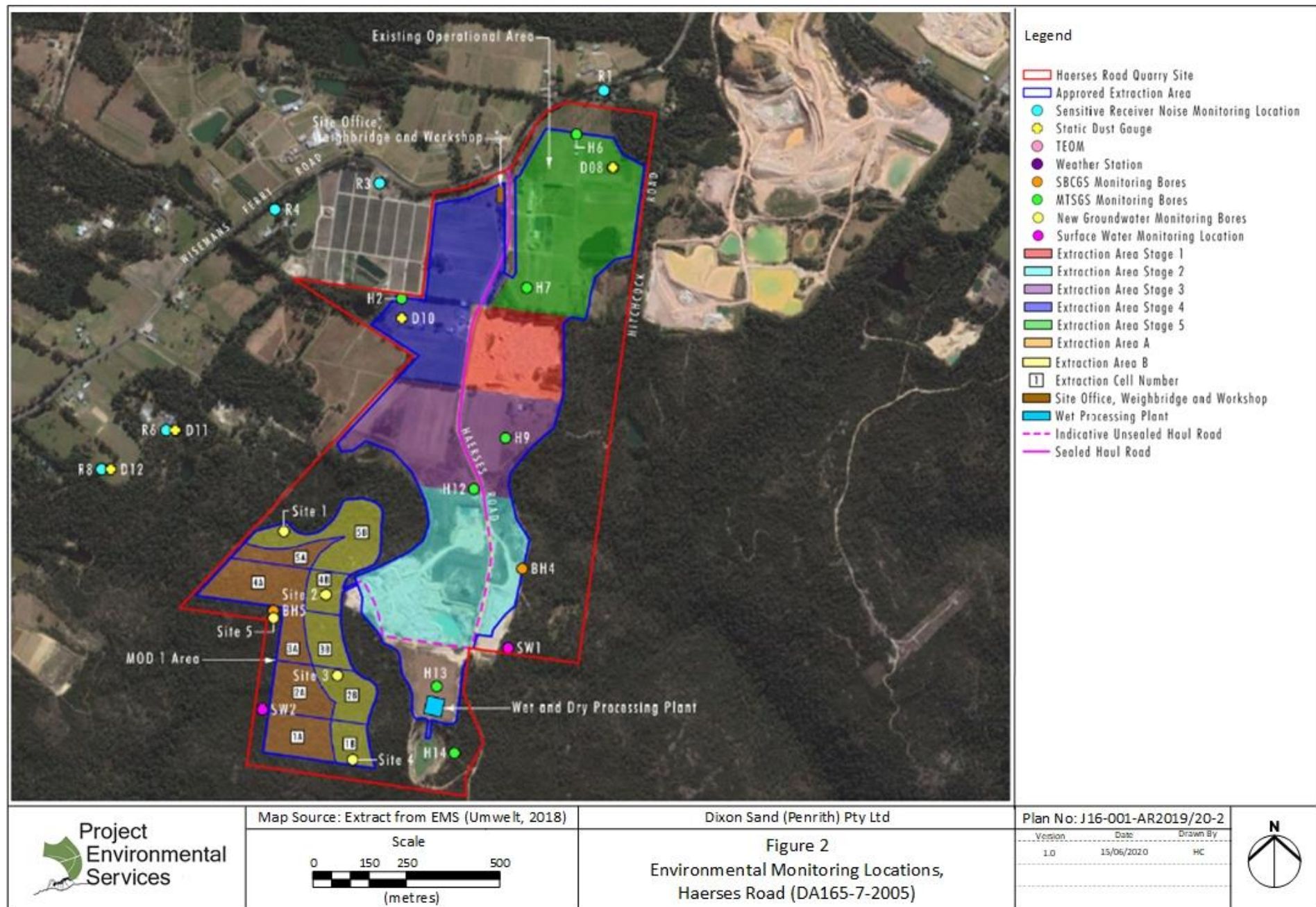
- the extraction rate from 250,000 tpa to 495,000 tpa,
- overall truck movements from 56 movements to 180 movements per day,
- the disturbance footprint by 1 hectare in Stage 5 and accessing an additional 250,000 tonnes of resource,
- the maximum rate of VENM/ENM importation from 100,000 tpa to 250,000 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. A summary of the development consents and modifications is provided in Table 3.

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 current	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.

For the purpose of the reporting period which falls within this Annual Review, Development consent DA165-07-2005 Modification 2 is most applicable to the timeframe and is the consent used for the assessment of Dixon Sand's environmental compliance and performance.



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 **54,019.8** tonnes of product has been extracted at Haerses Road quarry, of which **52,870** tonnes were transferred to Old Northern Road for processing in **1,489** truckloads (laden) and **1,149.8** tonnes of sandstone products have been sold directly to local and regional markets from the Haerses Road quarry 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 products sold directly to market from HR quarry (t)	Total Transfers from Haerses Rd to Old Northern Road (t)	Total Extraction at Haerses Rd (t) *	Total Production of Haerses Rd Products (processed and sold at ONR) (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 2020	0	4,544.0	4,544.0	2,592.3	20	4
Aug 2020	0	4,792.5	4,792.5	2,719.5	20	4
Sep 2020	0	5,786.5	5,786.5	3,423.4	24	2
Oct 2020	0	5,005.5	5,005.5	2,920.7	30	2
Nov 2020	0	6,638.5	6,638.5	3,749.2	28	4
Dec 2020	0	5,857.5	5,857.5	3,664.8	38	4
Jan 2021	0	4,224.5	4,224.5	2,453.2	26	4
Feb 2021	0	4,331.0	4,331.0	3,061.7	22	6
Mar 2021	0	2,870.0	2,870.0	2,603.3	46	2
Apr 2021	0	4,725.0	4,725.0	3,281.5	56	2
May 2021	270	2,275.0	2,275.0	3,206.8	42	2
Jun 2021	879.8	1,820.0	1,820.0	3,033.2	38	2
Totals / Maximum	1,149.8	52,870.0	54,019.8	36,709.6	56	6
Annual Limit	60,000	190,000	250,000			
Daily Max Criteria					56	20

*Note *: Total Extraction at Haerses Road equates to Total transfers from Haerses Road to Old Northern Road. The extracted materials were not processed at Haerses Road. In future, extracted and production quantities may differ if materials are processed at Haerses Road, particularly with the use of a wet processing plant where the finer materials are lost in the process.*

3.2 Submission of Quarry Production Data to DRG

Condition 16 of Schedule 2 of DA 165-7-2005 requires Dixon Sand to submit calendar year annual production data to the DRG (no MEG) using the standard form, and include a copy of this data in the Annual Review.

The DRG (now MEG) 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 2019 – 2020 was submitted to DRG (now MEG) on 20 October 2020. At the time of this Annual Review, Dixon Sand is awaiting the 2020 – 2021 Mineral Return form to be supplied. The same production data contained in Table 4 will form the basis for calculations for MEG Minerals Return reporting. The forms will be completed and submitted to the DRG within the specified deadline.

4. Actions Required from Previous Annual Review

The proposed recommendations contained in the previous 2019-2020 Annual Review have been actioned by Dixon Sand, as summarised in Table 5.

Table 5: Summary of Recommendations and Actions from the 2019-2020 Annual Review.

Recommendation from the 2019 – 2020 Annual Review	Actions
Vegetation clearing	
<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
Rehabilitation and bush regeneration	
<ul style="list-style-type: none"> Haerses Road Stage 1 Extraction Area: 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 Wisemans Ferry Road Buffer Area: Remediate the disturbed area utilising appropriate rehabilitation methodologies 	<ul style="list-style-type: none"> Ongoing Roadwork associated with the upgrade of intersection at Haerses Road and Wisemans Ferry Road received final approval and signoff by Transport for NSW in May 2021. Rehabilitation of this area will commence in the next 2021-2022 reporting period.

<ul style="list-style-type: none"> • Weed Management: Continue with weed management as per the recommendations contained in BushIT and Ecologist reports • Pest fauna species survey and management Continue with feral fauna species monitoring and implement any actions as required • Haerses Road and Porters Road Biobank Sites: Monitoring and Management of the Haerses Road and Porters Road biobank sites to be undertaken in accordance with the Biobanking Agreement and BCT reporting. 	<ul style="list-style-type: none"> • Ongoing weed management undertaken at Haerses Road • Feral fauna species monitoring undertaken – no specific management of feral fauna species deemed necessary at this stage • Passive Management of the biobank sites were undertaken. Passive Management Reports were submitted to the BCT on 26 February 2021.
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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; • crushing and screening • wind erosion from stockpiles; • loading sand products into trucks; • vehicle movement and haulage on site; 	<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

<ul style="list-style-type: none"> product transportation along unsealed haul roads; and occasional haul road grading. 	<ul style="list-style-type: none"> regularly maintaining mobile and fixed equipment to minimise exhaust emissions.
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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 operations
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 2020	Aug 2020	Sep 2020	Oct 2020	Nov 2020	Dec 2020	Jan 2021	Feb 2021	Mar 2021	Apr 2021	May 2021	Jun 2021
Ave Temp (°C)	11.8	12.2	15.8	17.8	19.9	19.7	21.4	20.3	19.3	16.7	14.2	11.7
Total Rainfall (mm)	161.8	52.2	33	103.6	46.8	133	43.8	55.4	341.6	12.2	68.4	38.6

Data presented in Table 8 shows that the highest monthly rainfall of 341.6 mm was recorded in March 2021 and the lowest monthly rainfall of 12.2 mm was recorded in April 2021. The total annual rainfall recorded during this reporting period is 1090.4 mm, representing a higher annual rainfall than the previous 5 reporting periods (313.2 mm for 2019-2020, 165.2 mm for 2018-2019, 372.8 mm in 2017-2018, 924 mm in 2016-2017 and 1026.4 mm in 2015-2016).

From the recorded monthly temperature data, January 2021 experienced the highest average temperature at 21.4°C with June 2021 experiencing the lowest average temperature at 11.7°C.

Fluctuations in temperatures and rainfalls are generally influenced largely by the El-Nino and La-Nina climate cycle.

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&D09	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 are collected and analysed monthly by a NATA accredited laboratory. Table 10 presents the monthly dust deposition results between July 2020 and June 2021. Table 11 contains the calculated 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 2017-2018, 2018-2019, 2019-2020 and 2020-2021 respectively.

Table 10: Dust Deposition Results: July 2020 – June 2021.

Dust Gauge Location	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21
	(g/m2/month)											
D08 Hitchcock Rd Grove	0.8	0.5	0.9*	0.8*	1.0	1.2	1.4*	0.8	0.5	0.2	0.8	0.4
D10 Haerses Rd (Pt 3, EPL12513)	0.5	0.4	0.5*	0.5*	2.1*	0.7	2.9*	5.2*	2.2*	0.9	3.2*	2.7*
D11	0.1	0.5	0.5	0.4*	0.4*	1.3*	1.2	1.1*	0.5*	0.5*	1.3	0.8*
D12	0.1	0.4	0.4*	0.4	0.4	0.9	0.7*	0.7	0.4*	0.2	0.2	0.3

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

Table 11: Calculated Annual Averages of Dust Deposition: June 2020 – June 2021.

Dust Gauge Location	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20	Jan-21	Feb-21	Mar-21	Apr-21	May-21	Jun-21
	(g/m2/month)											
D08 Hitchcock Rd Grove	0.8	0.7	0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.8
D10 Haerses Rd (Pt 3, EPL12513)	0.5	0.5	0.5	0.5	0.8	0.7	1.0	1.5	1.6	1.5	1.6	1.7
D11	0.1	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.7	0.7	0.7	0.7
D12	0.1	0.3	0.3	0.3	0.3	0.4	0.5	0.5	0.5	0.5	0.4	0.4

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° quadrat (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 8 show the PM₁₀ results for the reporting periods of 2017-2018, 2018-2019, 2019-2020 and 2020-2021 respectively.

Two PM₁₀ exceedance events occurred in the reporting period. Out of the two exceedances, both events exceeded the EPL rolling 24-hour average PM₁₀ of 42 ug/m³, with one event also exceeded the NEPM 50 ug/m³ criteria.

Reporting of TSP results commenced in December 2017 and are shown in Charts 9 to 12. No TSP exceedance occurred in this reporting period.

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

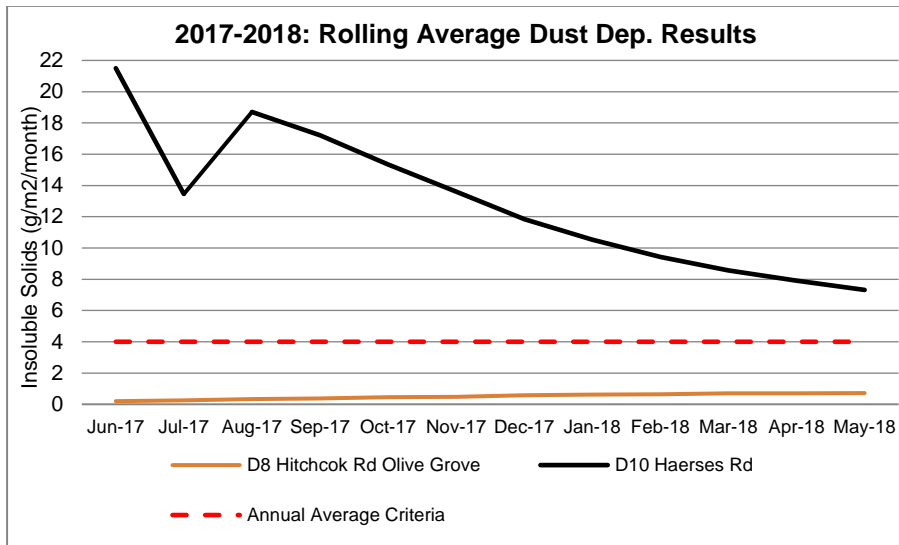


Chart 1: 2017 – 2018 Rolling Average of Dust Deposition Results

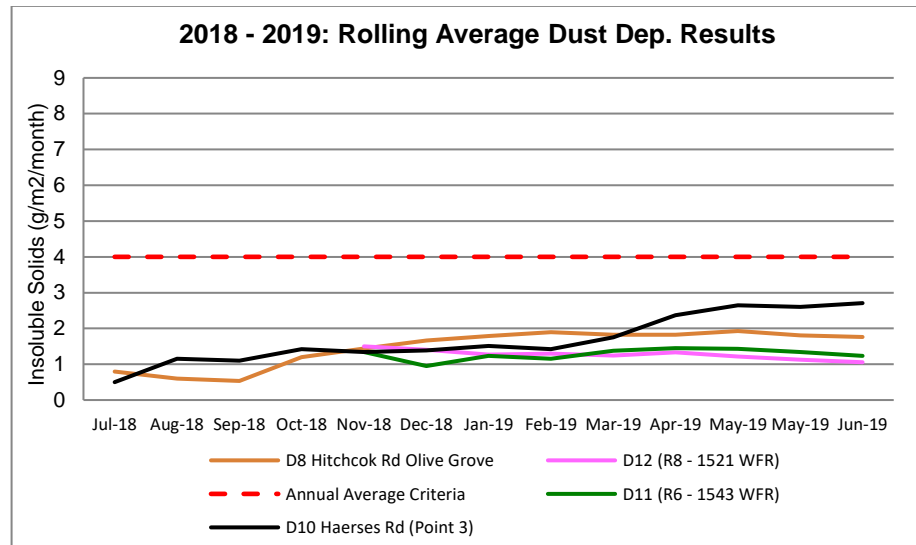


Chart 2: 2018 – 2019 Rolling Average of Dust Deposition Results

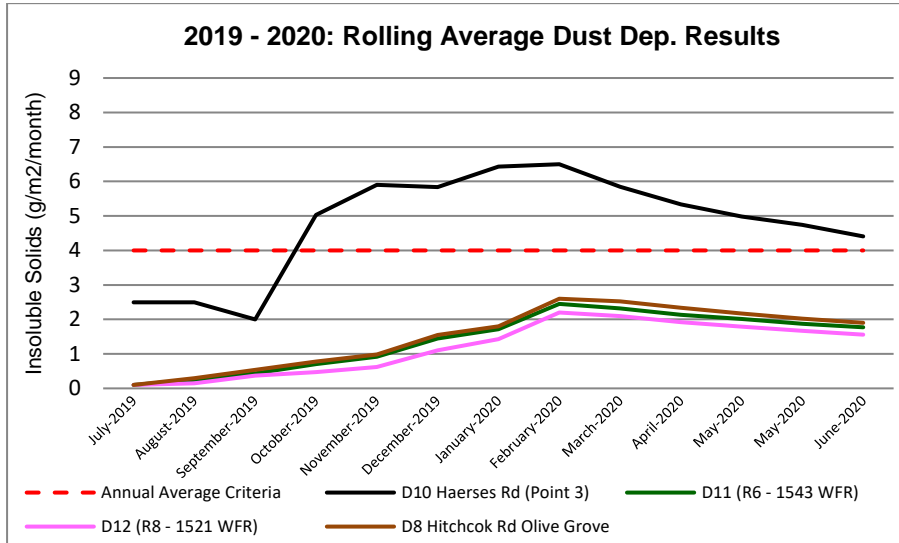


Chart 3: 2019 – 2020 Rolling Average of Dust Deposition Results

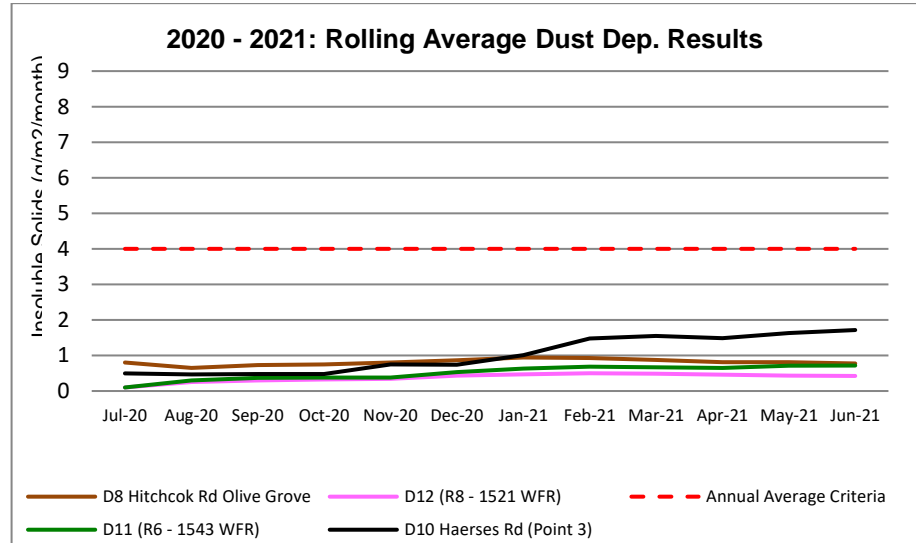


Chart 4: 2020 – 2021 Rolling Average of Dust Deposition Results

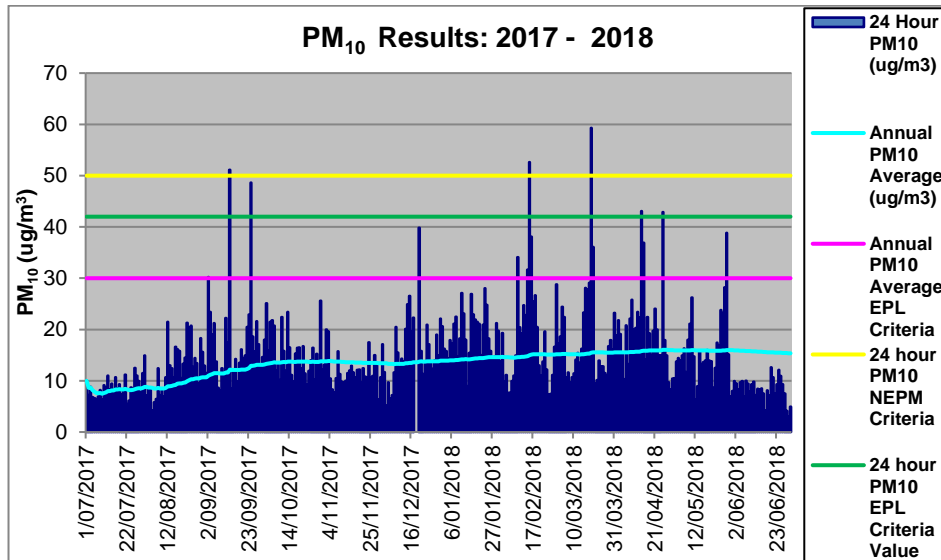


Chart 5: 2017 - 2018 PM10 Results and Criteria

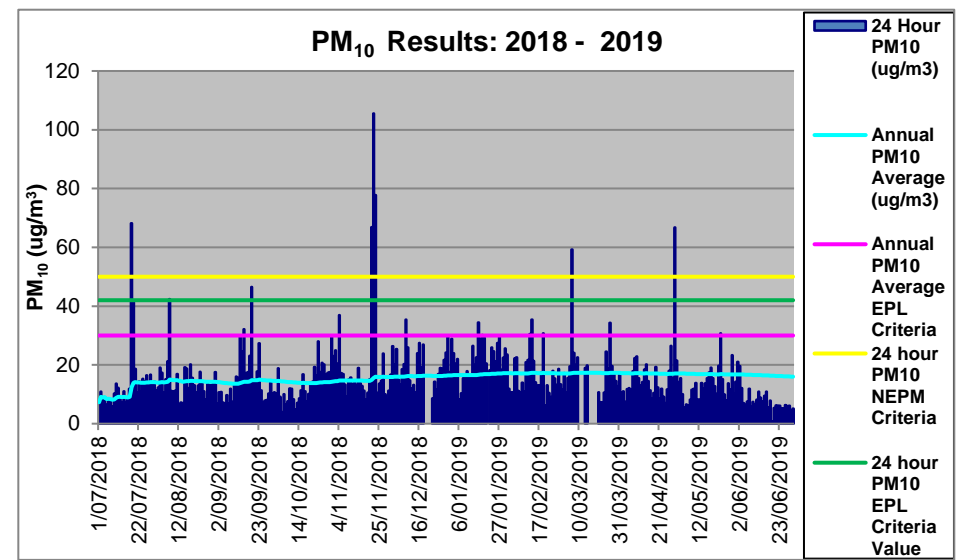


Chart 6: 2018 - 2019 PM10 Results and Criteria

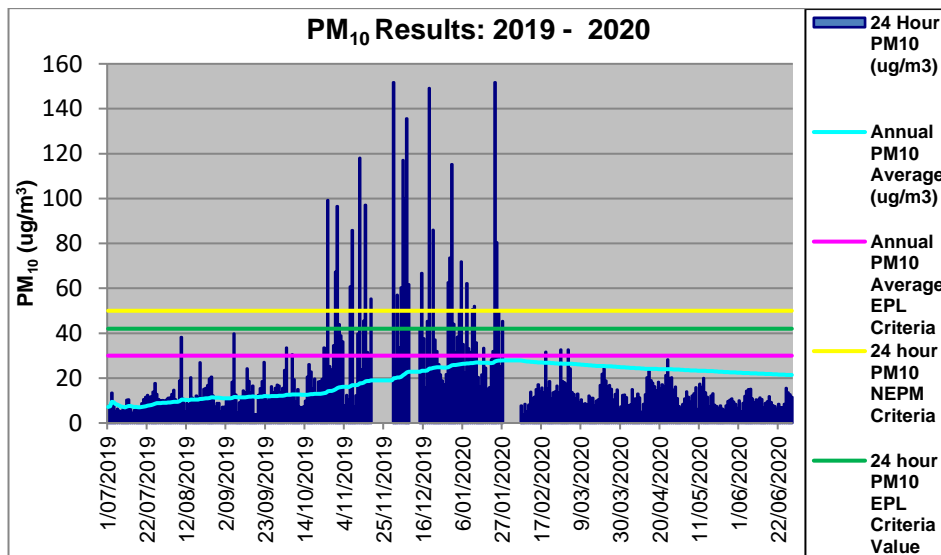


Chart 7: 2019 - 2020 PM10 Results and Criteria

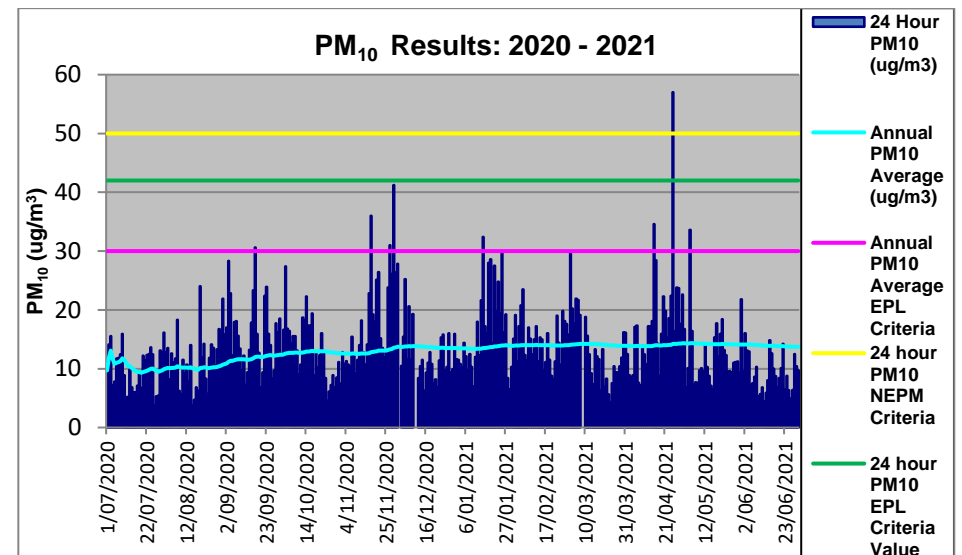


Chart 8: 2020 - 2021 PM10 Results and Criteria

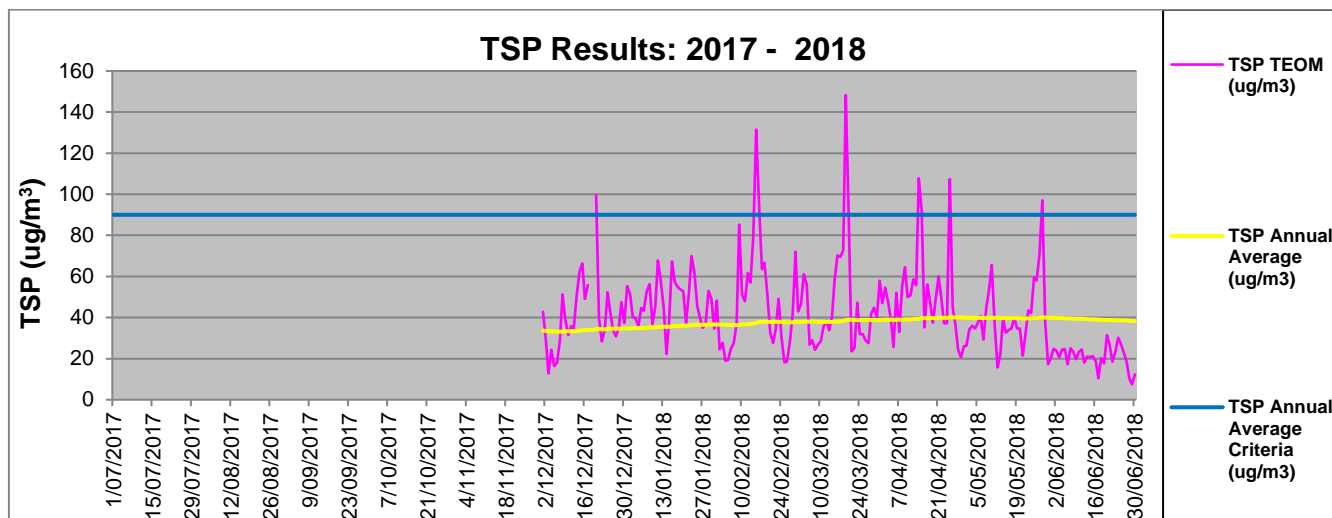


Chart 9: 2017 - 2018 TSP Results and Criteria

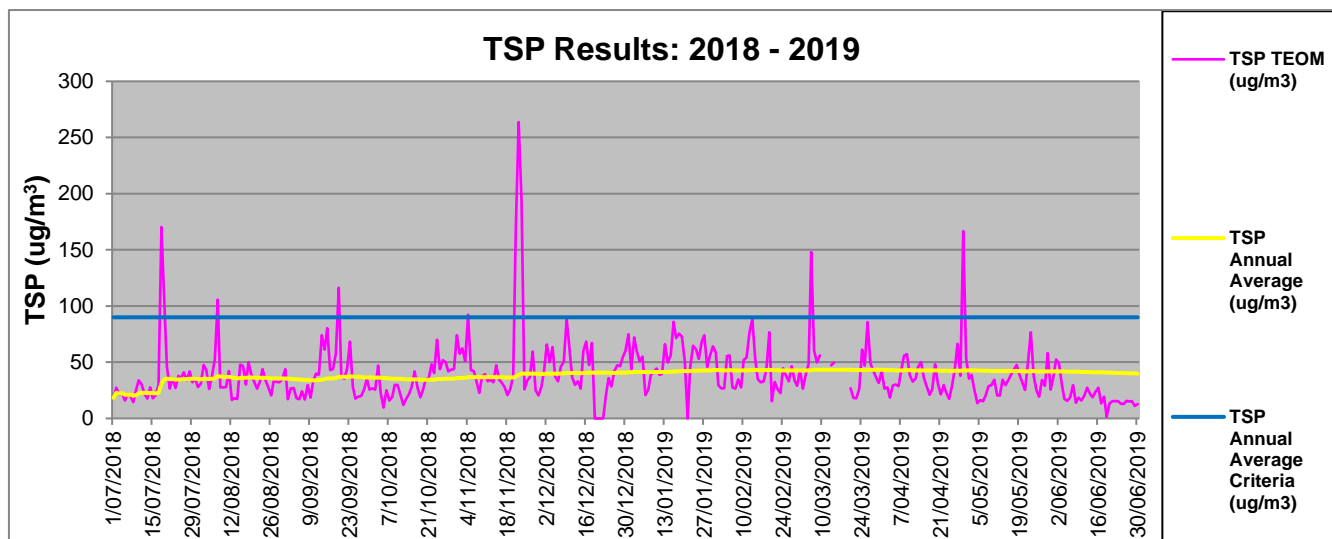


Chart 10: 2018 - 2019 TSP Results and Criteria

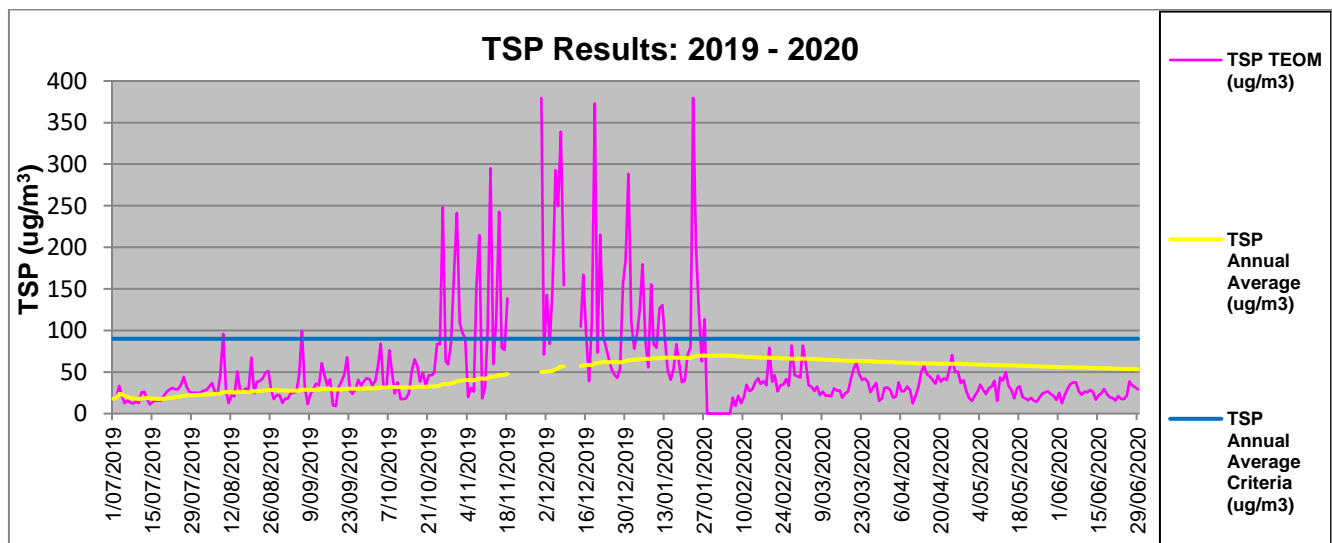


Chart 11: 2019 - 2020 TSP Results and Criteria

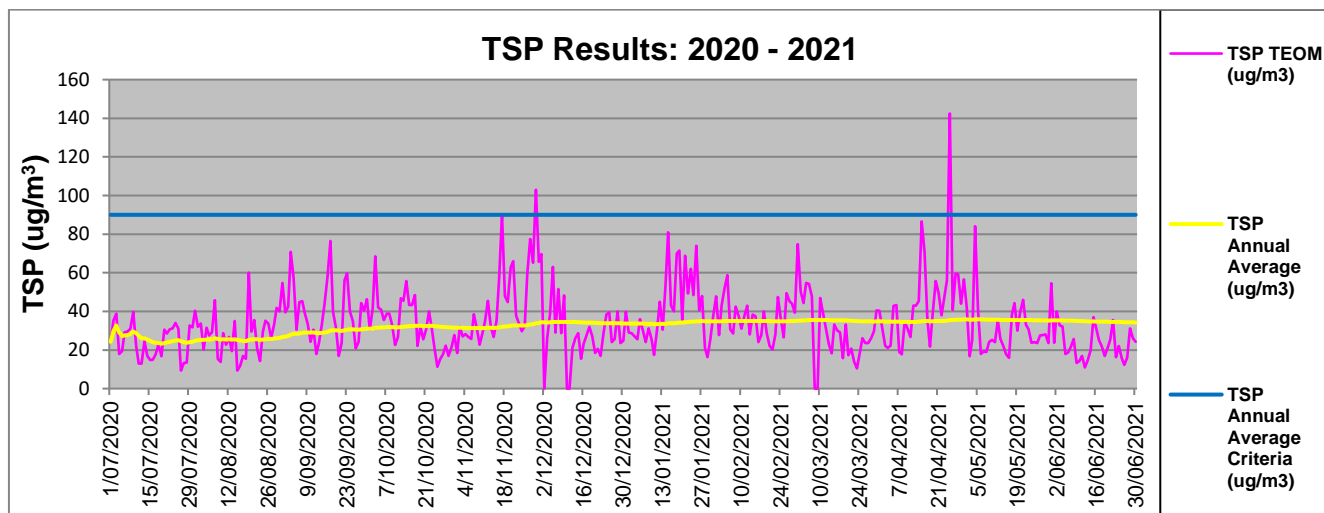


Chart 12: 2020-2021 TSP Results and Criteria

5.1.4 Analysis

Dust Deposition

Reporting Period 2020-2021

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

Monthly results and annual dust deposition averages for D08 (Olive Grove, Hitchcock Road), D10 (EPL Monitoring Point 3), D11 (Receiver R6) and D12 (Receiver R8) for the July 2020 to June 2021 period were in compliance. All annual averages were in compliance with the 4 g/m²/month criteria.

The Environmental Assessment prepared for the application for Haerses Road quarry development approval modification 1 (Umwelt, 2018) recently reviewed the long-term air quality monitoring data which yielded an annual average dust deposition of 2.1 g/m²/month. All dust deposition gauges yielded an annual dust deposition less than the predicted level.

Historical Data

It can be seen from Charts 1 to 4 that the majority of the dust deposition results are in compliance over the previous 4 years of monitoring. Annual average dust deposition at dust gauge D10 were exceeded through the 2017 – 2018 and 2019 – 2020 monitoring periods due to impacts from prolonged earthwork activities, exposed ground surface in the neighbouring property and poor air quality from bushfires and hazard reduction burns.

PM10

Reporting Period 2020-2021

The Environmental Assessment (Umwelt, 2018) indicated that the long term annual average PM10 concentration is 13 µg/m³.

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), except on 25 April 2021 during this reporting period. Table 12 lists the PM₁₀ exceedances and explanation.

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 during the 2017 - 2018 were attributed to bushfires and scheduled controlled hazard reductions burns in the local and regional areas. Exceedances during the 2018 - 2019 were attributed to a number of non-quarry related causes including scheduled hazard reduction burns, forecasted gusty winds, and storm cells and dust storms passing through Sydney. Exceedance in 2020 – 2021 was due to a number of scheduled RFS hazard reductions burns in Sydney.

The rolling annual PM₁₀ average for the 2020 - 2021 reporting period was 13.7 µg/m³, which was lower than the EPA criterion of 30µg/m³ and comparable to the annual average of 13 µg/m³ contained in the Environmental Assessment (Umwelt, 2018). This annual average is significantly lower than the previous reporting periods which recorded 21.3 3µg/m³ (2019 – 2020), 16.0 µg/m³ (2018 - 2019) and 15.3 µg/m³ (2017 – 2018), but is comparable to 12.4µg/m³ (2016 - 2017). The higher annual PM₁₀ averages over the past earlier 3 reporting years were due to relatively dryer and dustier conditions compared to historical records, and were highly influenced by cumulative poor air quality associated with local, regional and interstate bushfires and backburning operations.

Total Suspended Particles

Reporting Period 2020-2021

The Total Suspended Particles (TSP) results are reported in Charts 9 to 12 inclusive. The annual average TSP for this reporting period is 34.3 µg/m³ which is lower than the annual average TSP criteria of 90 µg/m³ set out by the consent and EPL. The 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 µg/m³ (2017-2018), 40.0 µg/m³ (2018-2019) and 53.4 µg/m³ (2019-2020). 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, regional and interstate areas.

Table 12: PM10 – EPL and NEPM Management criteria exceedance

Event No.	Exceedance Date	Exceeded PM10	Exceeded criteria (ug/m ³)	Comment
1	30 Nov 2020	Rolling 24-hour average PM10 values reached 49.1 µg/m ³	EPL 12513 Condition M2.3 Rolling 24-hour average PM10 criteria of 42 µg/m ³	Self-Reported to EPA on 30/11/2020 (EPA Ref C17678-2020) A Trigger Alarm was received at 1.06 am on 30/11/20 alerting that the rolling 24 hr average PM10 level has reached 42.1 µg/m ³ and continuing to rise, peaking at 49.1 µg/m ³ . The prevailing wind directions were easterly to south-easterly leading up to the time of the alarm. The exceedance was not attributed to quarry operations and therefore quarry operations will continue as normal with regular use of water cart for dust suppression. Note that windy conditions were experienced over the weekend. The DPIE was not notified of this exceedance event as the criteria is stipulated by specific EPL 12513 Condition M2.3 requirement. During this event, the 50 µg/m ³ NEPM 24-hour Average PM10 criteria was not exceeded.
2	25 Apr 2021	Rolling 24-hour average PM10 values reached 53.6 µg/m ³ and 24-hour average PM10 value reached 57.0 µg/m ³	EPL 12513 Condition M2.3 Rolling 24-hour average PM10 criteria of 42 µg/m ³ and 24-hour average PM10 NEPM criteria of 50 µg/m ³	Self-Reported to EPA on 26/04/21 (EPA Ref REF-NO-1263) A trigger alarm was received at 07:02 pm on the 25/04/21 alerting that the 24 hr average PM10 level has reached 43.1 µg/m ³ which continues to rise and peaked at 53.6 µg/m ³ meter between 09:05 and 10:00 pm. The prevailing wind direction leading up to this exceedance were not from the direction of the quarry as specified under EPL 12513 Condition M2.3. A number of RFS hazard reduction burns were carried out across greater Sydney and the Blue Mountains from the 23/04/21, including the one in the Fiddle Town, Dural, Annangrove, Maroota and Penrith. RFS issued a smoke advisory for the public today. The PM10 exceedance was not attributed to quarry operation as no work are carried out on Sundays. Quarry operations will continue as normal on Monday, 26/04/21, with regular use of water cart for dust suppression. The DPIE was notified of the incident on 26/04/21. A notification and incident report were provided to Maria Divis (Senior Compliance Officer) via email. The following criteria have been exceeded: <ol style="list-style-type: none"> 1) EPL Rolling 24-hour average PM10 criteria of 42 µg/m³, and 2) 24-hour average PM10 NEPM criteria of 50 µg/m³.

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 g/month/m² for all receptors. Stages 1, 2 east and 2 west are active extraction cells however, no extraction occurred in these locations during this monitoring period.

Dust deposition levels at all dust gauges D8 (Hitchcock Road Olive Grove), and D10 (Stage 5), D11 (Receiver R6) and D12 (Receiver R8) returned lower than predicted dust levels during this reporting period.

Monthly dust deposition at D8 ranged from 0.2 to 1.4 to g/m²/month which is less than the predicted air quality impacts.

Monthly dust deposition at D10 ranged from 0.4 to 5.2 g/m²/month, with the majority of monthly dust results falling less than or within the range of predicted air quality impacts. D10 returned a high monthly dust deposition level of 5.2

g/m²/month during the February 2021 period, constituting 4.4 g of ash content and 0.8 g of combustible matter. Field observations for this elevated monthly dust result indicated that minor sand, vegetation and algae were observed in the dust gauge, in conjunction with the adjacent paddock being dug up and replanted.

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 g/month/m². Topsoil stripping and extraction commenced in Extraction Cell 1A in December 2018 but was postponed from June 2019.

Monthly dust deposition at D11 ranged from 0.2 to 1.3 g/m²/month which is less than the predicted air quality impacts. The annual average dust deposition at D11 is 0.7 g/m²/month, which is less than the predicted dust impacts, and compliant with the annual average criteria of 4.0 g/m²/month.

Monthly dust deposition at D12 ranged from 0.1 to 1.9 g/m²/month which is less than the predicted air quality impacts. The annual average dust deposition at D12 is 0.4 g/m²/month, which is less than the predicted dust impacts, and compliant with the annual average criteria of 4.0 g/m²/month.

PM10

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 µg/m³ and an annual average PM10 to be 12 µg/m³. The EA (Umwelt, 2016) prepared for DA 165-7-2005 (Modification 1) predicted that no privately owned receivers will experience PM10 above the assessment criteria. The highest predicted PM10 will occur at receiver R1 as a result of Modification 1 extraction where the predicted incremental 24-hour PM10 concentration is 30.8 µg/m³.

The 24-hour average PM10 criteria of 50 µg/m³ has been exceeded on one occasion during this monitoring period, a direct consequence of poor air quality caused by prolonged scheduled RFS hazard reduction burns across Sydney. The rolling annual average PM10 for this monitoring period concluded at 13.7 µg/m³ (peaking at 14.4 µg/m³ in May 2021) which exceeded the EIS predictions but remained lower than the NEPM criteria of 30 µg/m³.

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.

During this monitoring period, the 24-hour average TSP levels have exceeded the predicted EIS figure on several occasions. The rolling annual average TSP for this monitoring period is 34.3 µg/m³ (peaking at 35.89 µg/m³ in May 2021) which exceeded the EIS predictions but remained lower than the NEPM criteria of 90 µg/m³.

5.1.6 Changes to Environmental Procedures

No changes to the environmental procedures are proposed or deemed necessary for air quality management. In the event significant amount of visible dust is present on the premise, follow the steps outlined in the Air Quality Management Plan.

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. 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

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 DPIE to revert to annual attended noise monitoring for the remainder of operations in the Mod 1 extraction area.

At the time of noise monitoring, no active quarry extraction operation were operating in the extraction cells. Extraction in the newly approved extraction cells under Modification 1 was suspended during the reporting period and therefore, noise monitoring frequency reverted back to annual monitoring.

The main sources of noise generated from Haerses Road quarry during the attended noise monitoring were sand processing utilising a screen, front end loaders and dump trucks.

5.2.2 Compliance Limits

Haerses Road's noise criteria 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 (E. H. Ramm),
- identified receivers on Hitchcock Road to the east of Haerses Road quarry, and
- R1 (F. & J. Roberts)

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 Condition	Conditions																																
DA165-7-2005, Condition 3 of Schedule 2	<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><i>Table 2: Operational noise criteria dB(A)</i></p> <table><tr><th rowspan="2">Receiver</th><th>Day</th><th colspan="2">Shoulder (6.00 am to 7.00 am)</th></tr><tr><th><i>L_{Aeq} (15 minute)</i></th><th><i>L_{Aeq} (15 minute)</i></th><th><i>L_A(max)</i></th></tr><tr><td>R1</td><td>37</td><td>37</td><td rowspan="8">45</td></tr><tr><td>R2</td><td>40</td><td>40</td></tr><tr><td>R3</td><td>38</td><td>38</td></tr><tr><td>R4</td><td>37</td><td>37</td></tr><tr><td>R6</td><td>37</td><td>35</td></tr><tr><td>R7</td><td>36</td><td>35</td></tr><tr><td>R8</td><td>36</td><td>35</td></tr><tr><td>All other receivers</td><td>35</td><td>35</td></tr></table> <p>Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the <i>NSW Industrial Noise Policy</i>. Appendix 5 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria.</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">• <i>Should an agreement with a landowner be terminated for any reason, the Applicant must comply with the noise criteria in Table 2.</i>	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>	R1	37	37	45	R2	40	40	R3	38	38	R4	37	37	R6	37	35	R7	36	35	R8	36	35	All other receivers	35	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>																														
R1	37	37	45																														
R2	40	40																															
R3	38	38																															
R4	37	37																															
R6	37	35																															
R7	36	35																															
R8	36	35																															
All other receivers	35	35																															

Table 15: Haerses Road Approved Hours of Operation.

Consent Condition	Condition										
DA165-7-2005, Condition 1 of Schedule 2	<p>The Applicant must comply with the operating hours set out in Table 1.</p> <p><i>Table 1: Operating hours</i></p> <table> <tr> <th>Activity</th><th>Permissible Hours</th></tr> <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> </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
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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, Condition 2 of Schedule 2	<p>The following activities may be carried out outside the hours specified in condition 1 above:</p> <ol style="list-style-type: none"> delivery or dispatch of materials as requested by the NSW Police Force or other public authorities; and 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>										

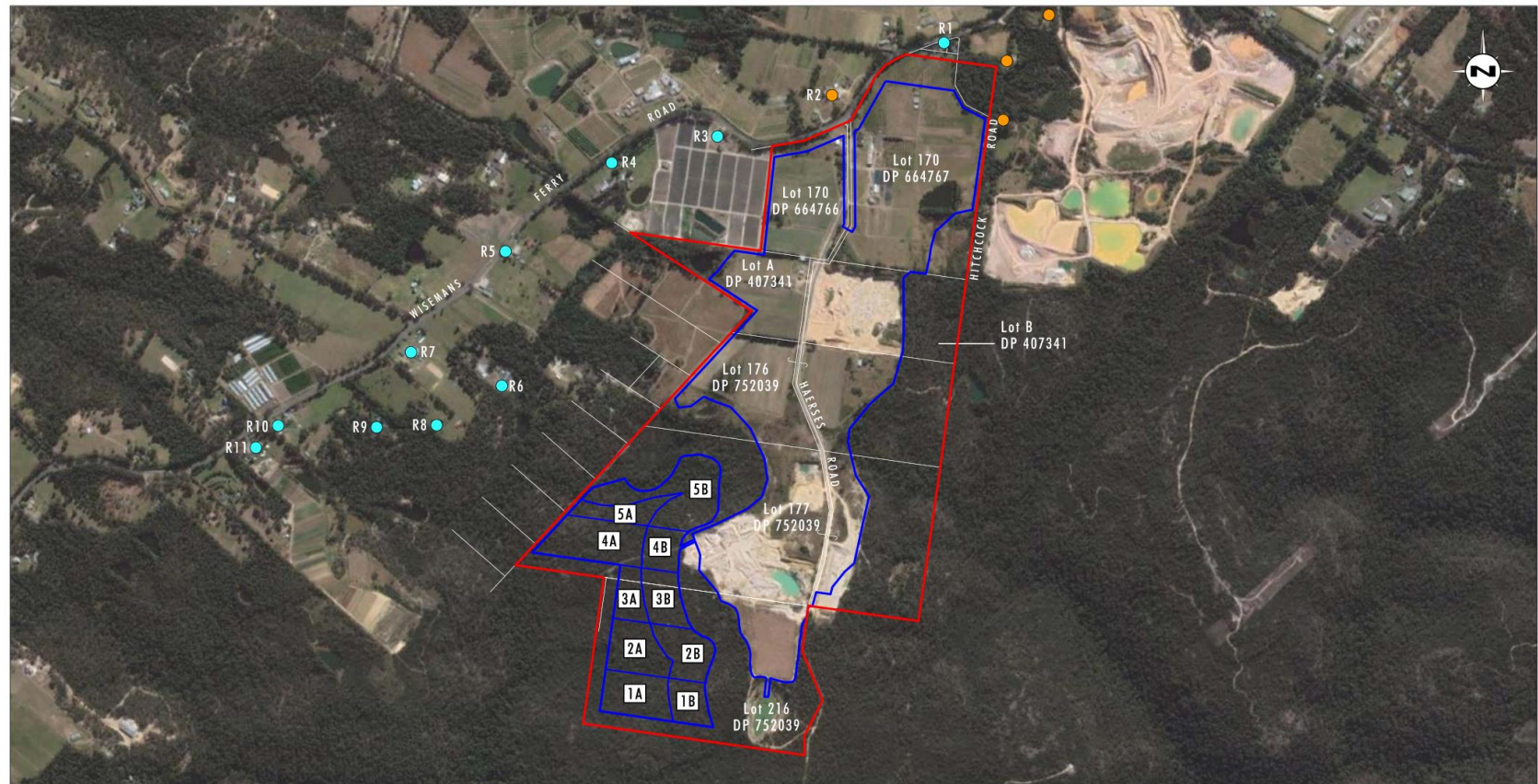


Image Source: Google Earth (Sep 2017)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014), ERM (2017)

Legend

- Haerses Road Quarry Site
- Approved Extraction Area
- Extraction Cell Number
- Noise Receiver Location
- Noise Receiver with Private Agreement

File Name (A4): R03/4272_036.dgn
20180504 13.30

Figure 3
Haerses Road Quarry
Noise Receiver Locations

5.2.3 Results

Attended noise monitoring for Haerses Road quarry was undertaken in June 2021. 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.

Quarry operations were inaudible at all residential receivers prior to 7:00am, with traffic noise in all cases the dominant noise source. No L_{Amax} noise levels were attributable to quarry operations during the shoulder period.

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_{Aeq15min} 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 June 2021 is contained in Appendix D

Table 16: Extrapolated Noise Monitoring results, June 2021.

Receiver	Noise Criteria		Extrapolated Daytime noise level (L _{Aeq} 15 min)	Comment
	Shoulder (dBA)	Daytime (dBA)		
R1	37	37	28	Predicted noise levels correlate well with measured noise levels and all locations shown to comply with noise limits.
R3	38	38	31	
R4	37	37	31	
R6	37	35	34	
R7	36	35	32	
R8	36	35	33	
All other receivers	35	35	See Figure 4	

*Note: A noise agreement between Dixon Sand and receiver R2, receivers located on Hitchcock Road and R1 are in place and therefore the noise criteria do not apply to these receivers.

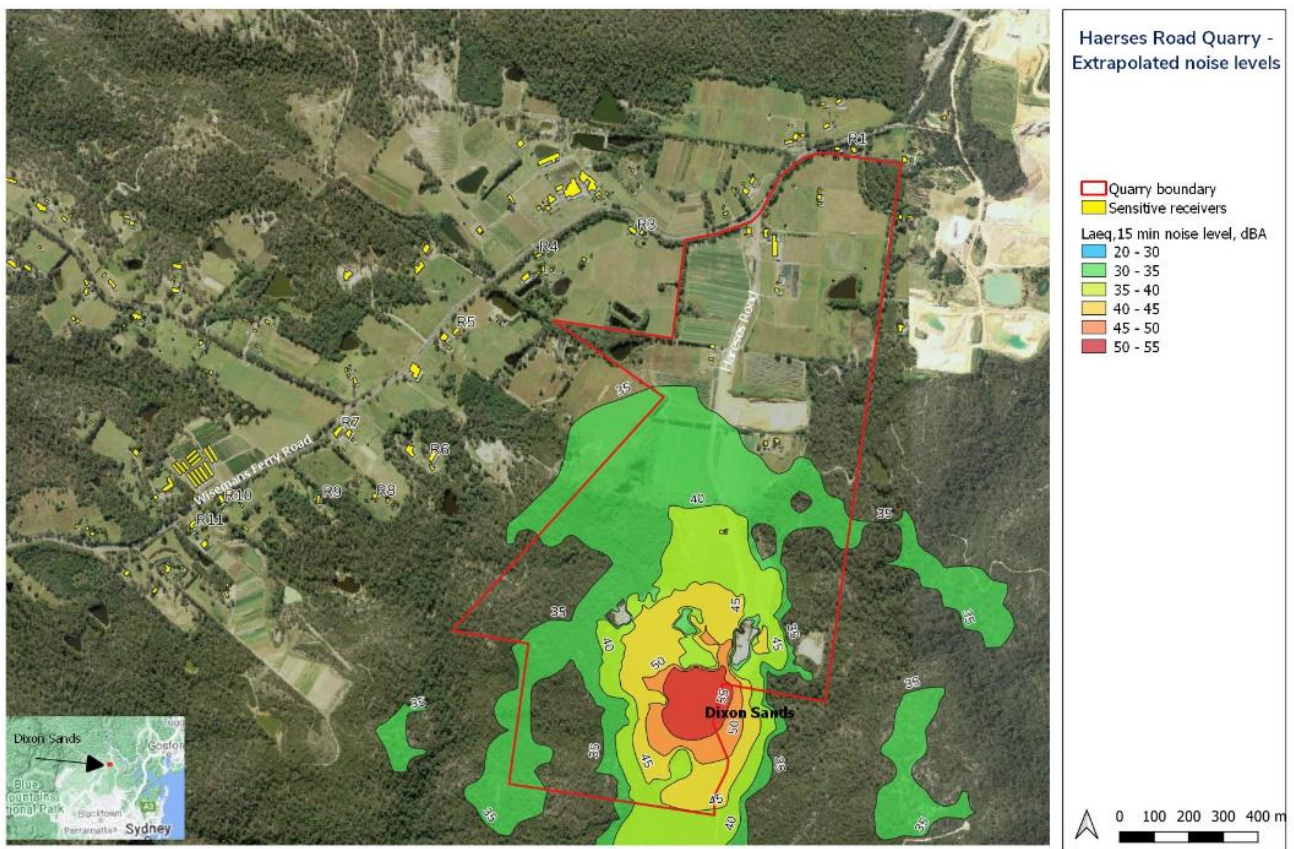


Figure 4 – Extrapolated noise levels from Haerses Road quarry, based on on-site measurements.

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.

5.2.5 Noise Trend

During this monitoring period, no extraction was undertaken in the areas under the original development consent. Topsoil stripping and minor extraction operation which commenced in Cell 1A (under development consent Modification 1) was suspended during this reporting period due to the application of development consent modification 4 which seeks permission to alter the sequence of extraction cells. Minor screening and loading of haulage truck for material transfer to Old Northern Road quarry occurred during this period.

Long term noise monitoring data for receivers R1 and R4 are depicted in Charts 13 and 15, showing fluctuations in quarry noise levels since 2006 to date due to varying proximity of receivers to quarry operations as work progressed through different extraction stages 1, 2 east and 2 west. Higher noise levels at receivers R1 and R4 were a result of

quarry operations in Stage 1 or operations closer to ground level. When quarry operations moved into Stage 2, lower noise impacts were observed due to increased distance between the receivers and quarry operations.

Monitoring has commenced for other receivers since the approval of new extraction cells under the development consent DA165-7-2005 modification 1. Long term data collection for other receivers has commenced in June 2018 with noise levels increased from June 2018 to June 2019, then reducing in June 2020. Noise levels extrapolated for June 2021 are comparable to the levels in June 2020. Quarry borne noise levels are within the noise criteria at these receivers, as shown in Charts 14, 16, 17 and 18. Future noise impact data will be required to determine the long-term trend, and in particular, to establish a noise trend associated with quarry operations in the new extraction areas.

Dixon Sand has a noise agreement in place with receiver R2 and therefore, noise criteria do not apply at this location.

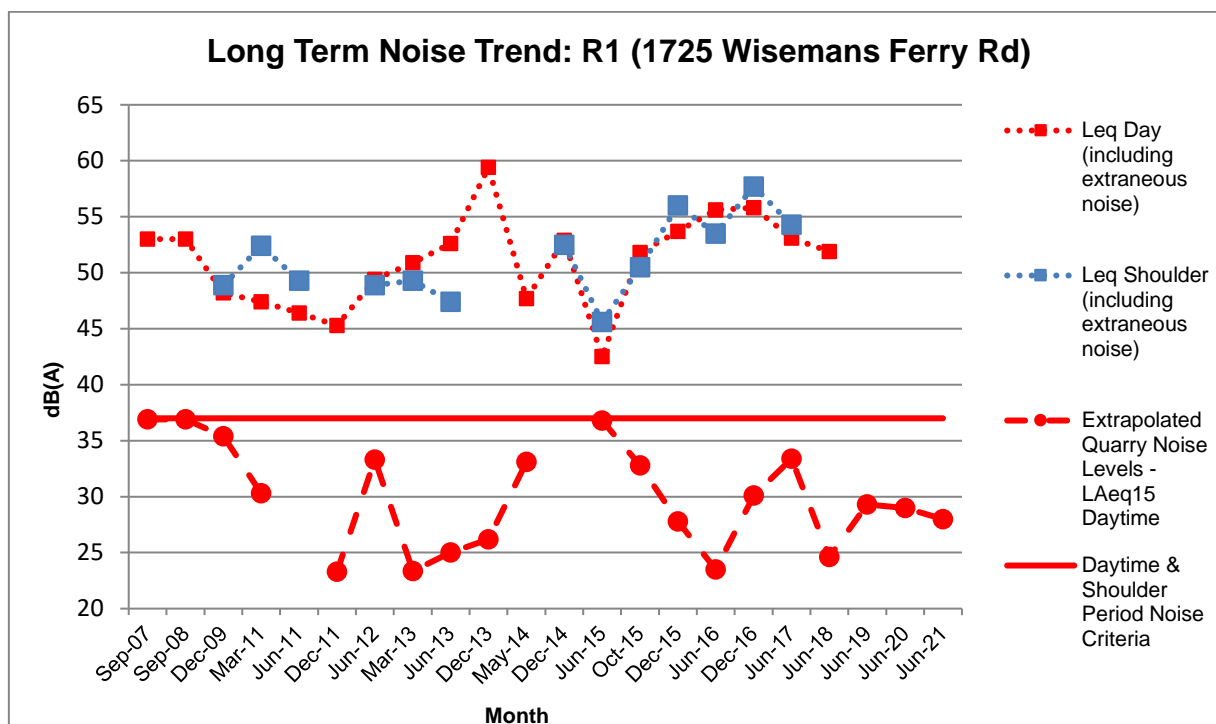


Chart 13: Long term noise trend – Receiver R1

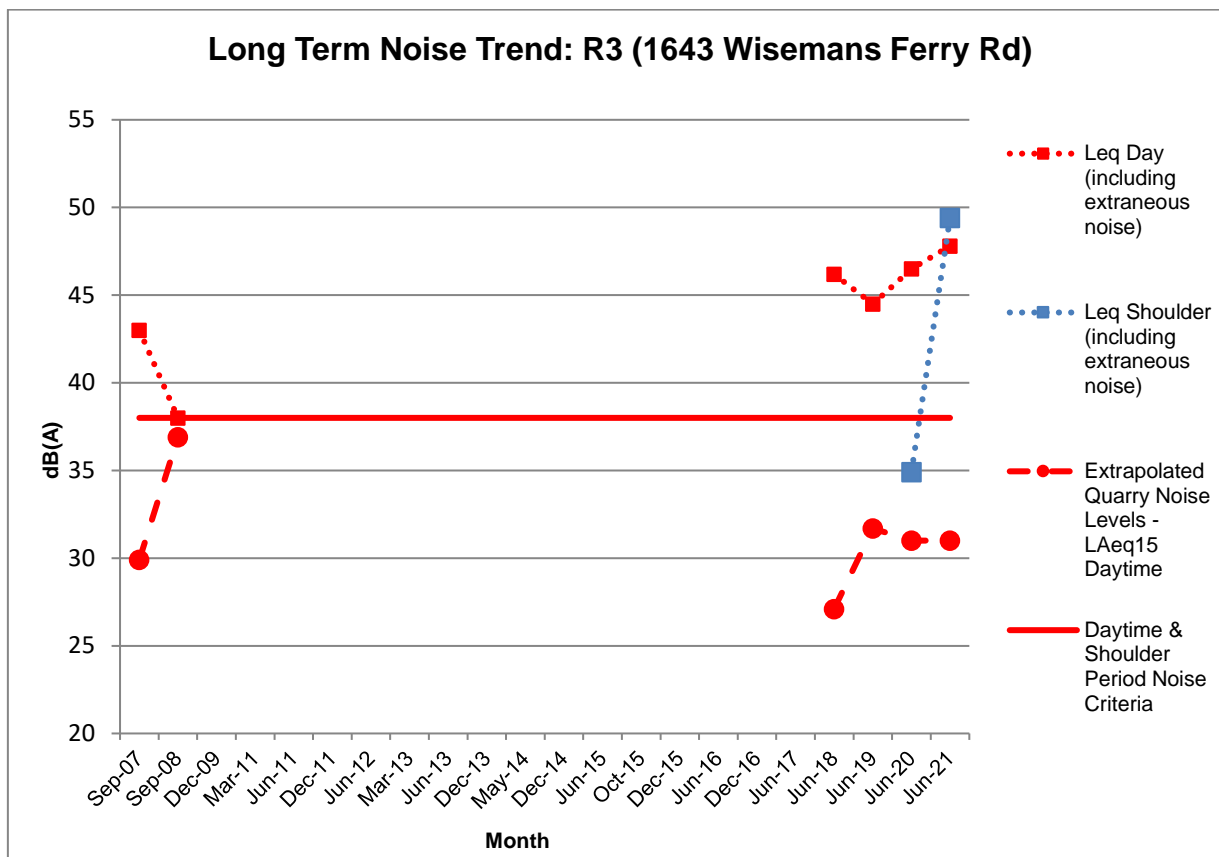


Chart 14: Long term noise trend – Receiver R3

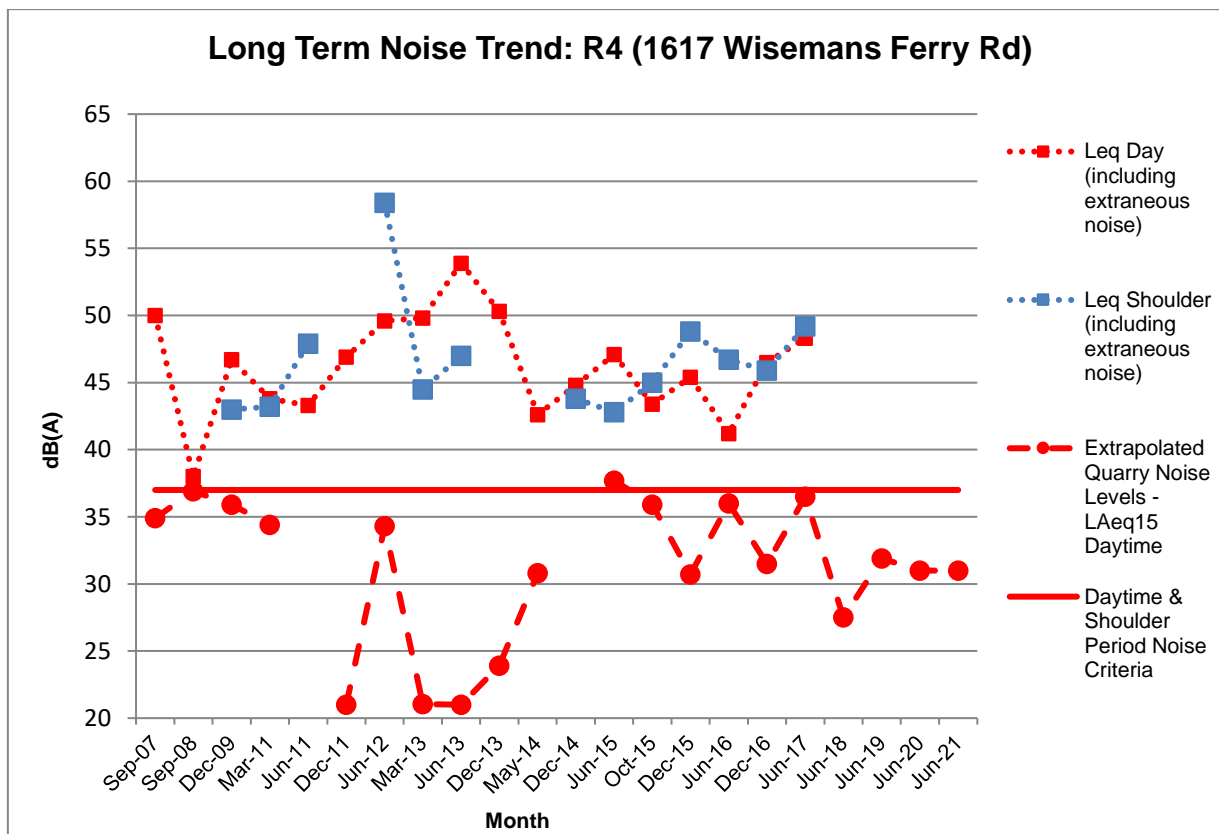


Chart 15: Long term noise trend – Receiver R4

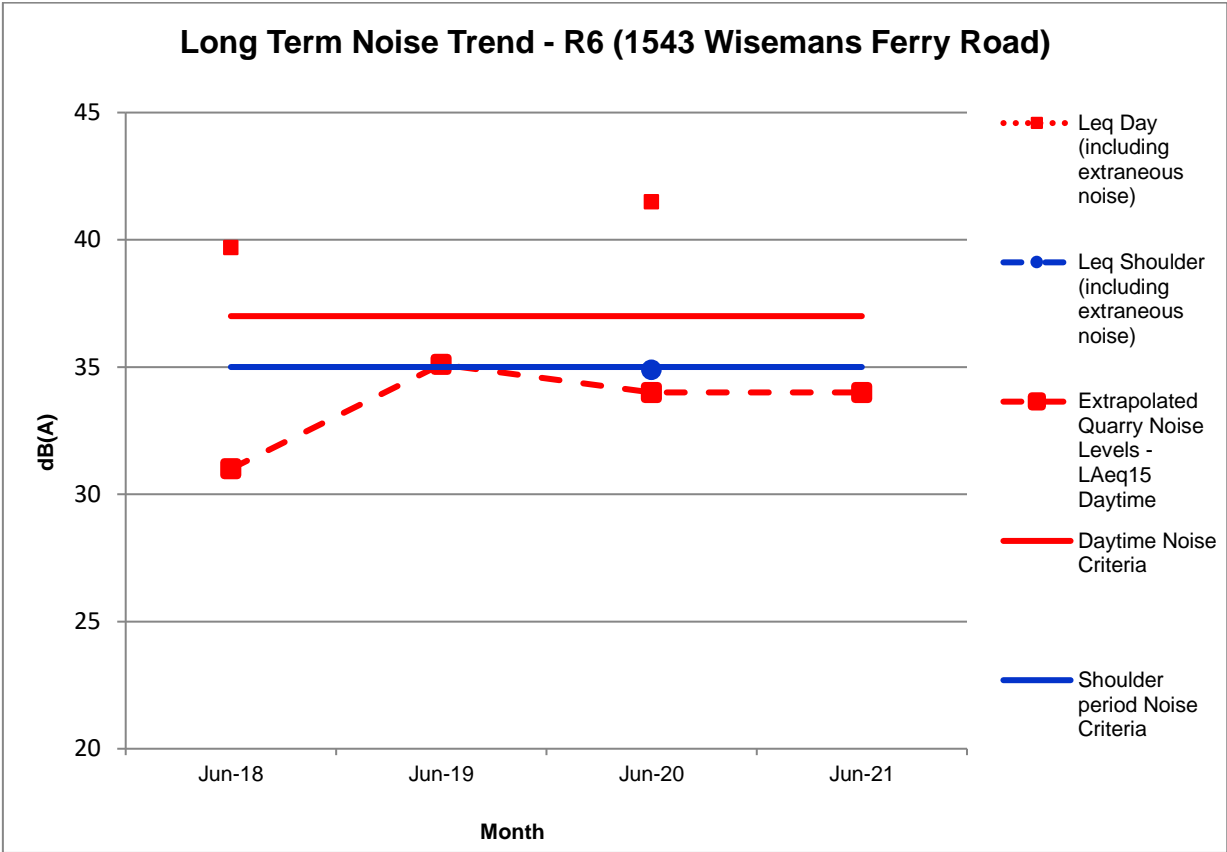


Chart 16: Long term noise trend – Receiver R6

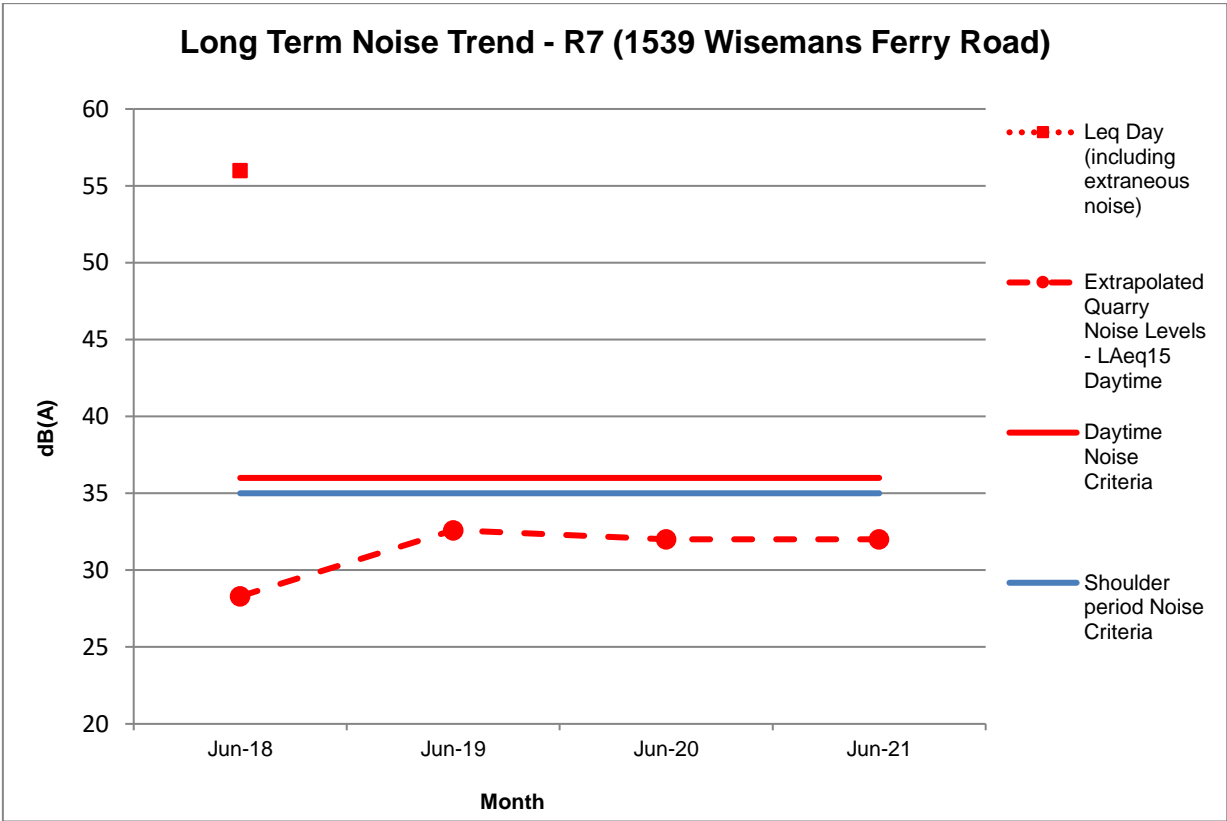


Chart 17: Long term noise trend – Receiver R7

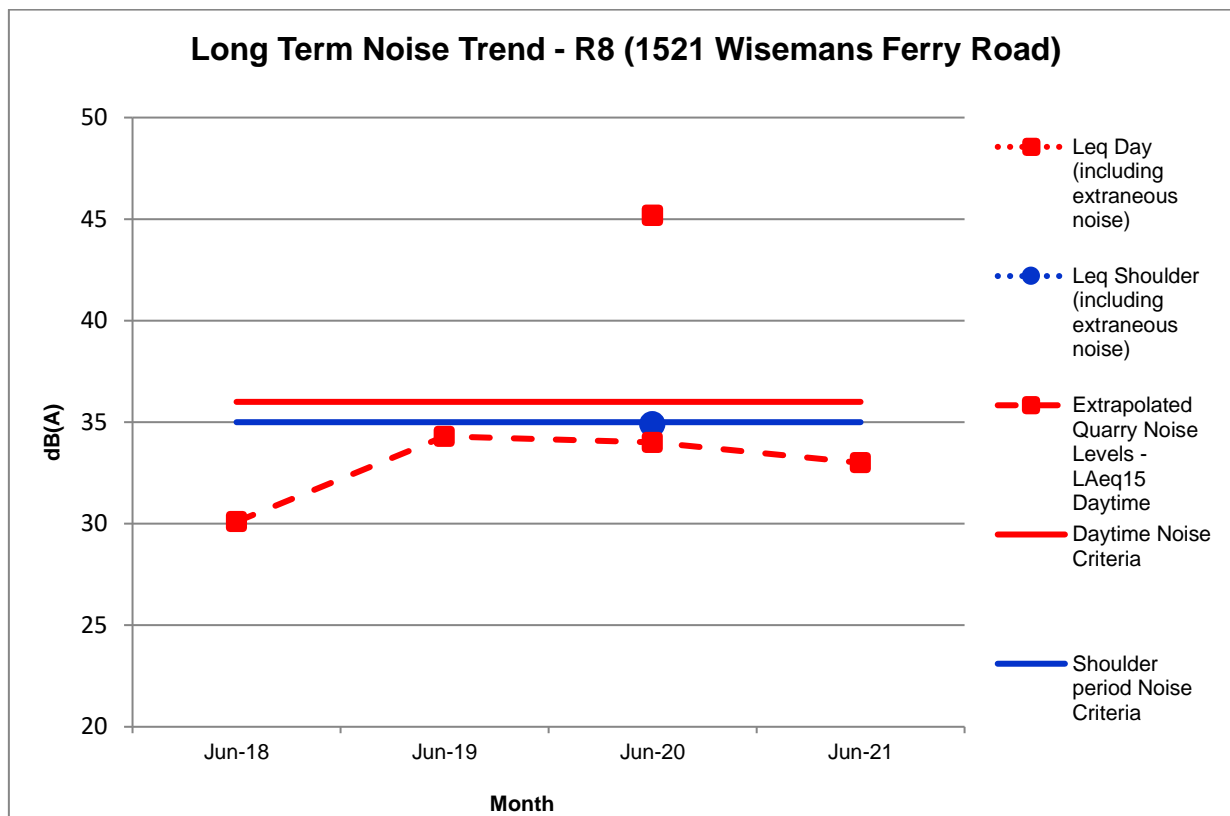


Chart 18: Long term noise trend – Receiver R8

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.

No quarry extraction occurred during noise monitoring in June 2021. The main source of noise from quarry operations on Lot 216 were mobile sand processing and loading of haulage trucks for transfer to Old Northern Road quarry (front end loaders, mobile screener and haulage trucks). The closest noise impact prediction locations to Lot 216 are that

from Cell 1 in the EA (Umwelt, 2016). Extrapolated daytime noise levels for receivers R1, R3, R4, R6, R7, R8 and other receivers from noise monitoring in June 2021 are several decibels below the predicted daytime noise impacts in the EA (Umwelt, 2016) and noise criteria. This result is to be expected given that minimal quarry activities were occurring during the time of monitoring.

Future noise monitoring will enable a better understanding of the actual noise impacts associated with quarry operations in the new extraction cells once operations in these locations resume.

5.2.7 Changes to Environmental Procedures

Undertake noise monitoring in accordance with the Noise Management Plans.

Should quarry extraction resumes in the extraction cells approved under Modification 1, noise monitoring will revert back to 6-monthly 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 and maintenance requirements 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 one traffic related complaint associated with Haerses Road quarry during the reporting period.

On 29th January 2021, the Complainant contacted Dixon Sand's complaint line and reported that a haulage truck turned into Old Northern Road from Wisemans Ferry Road and cut his vehicle off. The Complainant was driving along Old Northern Road and provided the truck company name. The complaint was verified and subsequently the alleged haulage truck was able to be identified. The Quarry Manager spoke to the truck driver who admitted they misread the Complainant's driving and thought the Complainant was slowing down to turn into Wisemans Ferry Road from the

Old Northern Road. The truck driver admitted he made a mistake and apologised for this. The Complainant was explained of the situation. The Quarry Manager contacted the Senior Manager of the truck company to inform them of the complaint and request that they remind their drivers of their responsibility. This information was also passed onto the truck driver involved in the complaint. This verified complaint was communicated to all haulage truck drivers in order to emphasise the responsibility of all truck drivers to comply with the Traffic Management Plan.

Please note that Dixon Sand has no jurisdiction over haulage trucks outside the quarry premise as the trucks are not owned by Dixon Sand. The enforcement of truck noise compliance rests with RMS and the EPA. Dixon Sand does not operate its own truck fleet and is restricted by its legal jurisdiction in prohibiting the use of the trucks' safety features. Dixon Sand however can assist in the education campaign in the forms of truck driver induction, traffic management policies and inter-pit agreement.

A copy of the 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) 56 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	VENM/ENM importation during this reporting period is recorded in the VENM/ENM Material Transport Register. 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 direct 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

DA165-7-2005 (Mod 2)		Condition	Compliance	Comments													
<p>Table 1: Operating hours</p> <table><tr><th>Activity</th><th>Permissible Hours</th></tr><tr><td rowspan="2">Quarrying operations (excluding truck arrival, loading and dispatch)</td><td>7.00 am to 6.00 pm Monday to Saturday</td></tr><tr><td>At no time on Sundays or public holidays</td></tr><tr><td rowspan="2">Truck arrival, loading and dispatch</td><td>6.00 am to 6.00 pm Monday to Saturday</td></tr><tr><td>At no time on Sundays or public holidays</td></tr><tr><td rowspan="2">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</td></tr><tr><td>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></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
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	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																
Condition 2 of Schedule 3	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.	Yes		Condition not triggered													
Condition 20 of Schedule 3	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.	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>Notes:</p> <ul style="list-style-type: none">The Applicant must ensure that the final alignment and design of Haerses Road is approved by Council prior to the commencement of the development.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.All works are to be in accordance with Council's Design Guidelines and Work Specifications for Subdivisions and Developments.Following the reconstruction of Haerses Road, the Applicant must rehabilitate any temporary access roads that were established on site	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>													

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
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 loping 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,</p> <p>to the satisfaction of RMS.</p>	Yes	Completed
Condition 23 of Schedule 3	<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 RMS. Until the intersection works have been completed to the satisfaction of RMS, 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"> • Prior to the Construction Certificate being released the Applicant must: <ul style="list-style-type: none"> - enter into a Memorandum of Understanding with the RMS that the Type 'AUR' intersection treatment shall be fully constructed and handed over to the RMS within 12 months of the commencement of the development; and - issue a bank guarantee in favour of the RMS for the total cost of the intersection works (the cost to be determined following the approval of detailed design plans by the RMS). • The Applicant shall ensure that the intersection works comply with the RMS Road Design Guide. • The Applicant shall bear the full costs associated with the design, survey and construction of the works, including the relocation of utilities, if required. 	Yes	Completed
Condition 24 of Schedule 3	<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 RMS. The Applicant must:</p> <p>(a) submit detailed design plans to RMS 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 Austroads Guide to Road Design.</p>	Yes	Completed in May 2021

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 25 of Schedule 3	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 RMS.	Yes	Completed by Civil Contractor
Condition 26 of Schedule 3	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.	Yes	Refer to Traffic Management Plan and Truck Records
Condition 27 of Schedule 3	The Applicant must: (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

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
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 RMS 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 2020 - 2021 reporting period.

One 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. A spill kit is located on site. 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 in the workshop.

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. No additional wastes were generated at Haerses Road quarry during this reporting period. No building or putrescible wastes have been disposed of on the site.

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 20 to June 2021.

Waste Type	Disposal / Recycling / Processing	Amount of Waste Generated
Putrescible	The Hills Shire Council Waste Contractor weekly pickup (1 x 240L Red bin)	Approx. 26 m ³
Recyclables	The Hills Shire Council Waste Contractor fortnightly pickup (1 x 240L Yellow bin)	Approx. 13 m ³
General Waste – Non-putrescible	Skip bins provided by a licensed Waste Contractor	0 m ³

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 (Modification 2) permits the importation of up to 100,000 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 2020 calendar year, and
- A total of 3,702 tonnes of VENM was imported to Haerses Road Quarry during the 2020 – 2021 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. 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

BH03A	100m MTSGS Buffer – Site 3	Perched groundwater in weathered Hawkesbury sandstone
BH03B	100m MTSGS Buffer – Site 3	Perched groundwater in unweathered Hawkesbury sandstone
BH03C	100m MTSGS Buffer – Site 3	SCBGS
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

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 2020 and June 2021, in accordance with the Soil and Water Management Plan. Groundwater quality monitoring for the cluster bores in the 100mm MTSGS buffer zone 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. During the last reporting period of 2019 – 2020, only one sampling event for SW1 and SW2 was carried out. Since then 3 additional sampling events were carried out during the 2020 – 2021 reporting period. The surface water quality statistics presented in Table 22 were derived from these four 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.

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	6.3	5.7	6.4	5.7	6.6	5.8	6.7	5.9	6.7	5.9
TSS (mg/L)	5.0	5.0	6.4	10.4	8.5	15.0	10.6	27.2	12.0	44.0
Turbidity (NTU)	82.1	9.0	92.1	18.8	107.0	39.9	210.2	74.6	279.0	105.0

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 DoI.</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 19 depicts the long term recorded groundwater levels which commenced in June 2003 for H-series, BH4 and BH5. Charts 20 to 40 (inclusive) illustrate the groundwater levels for all bores during this reporting period.

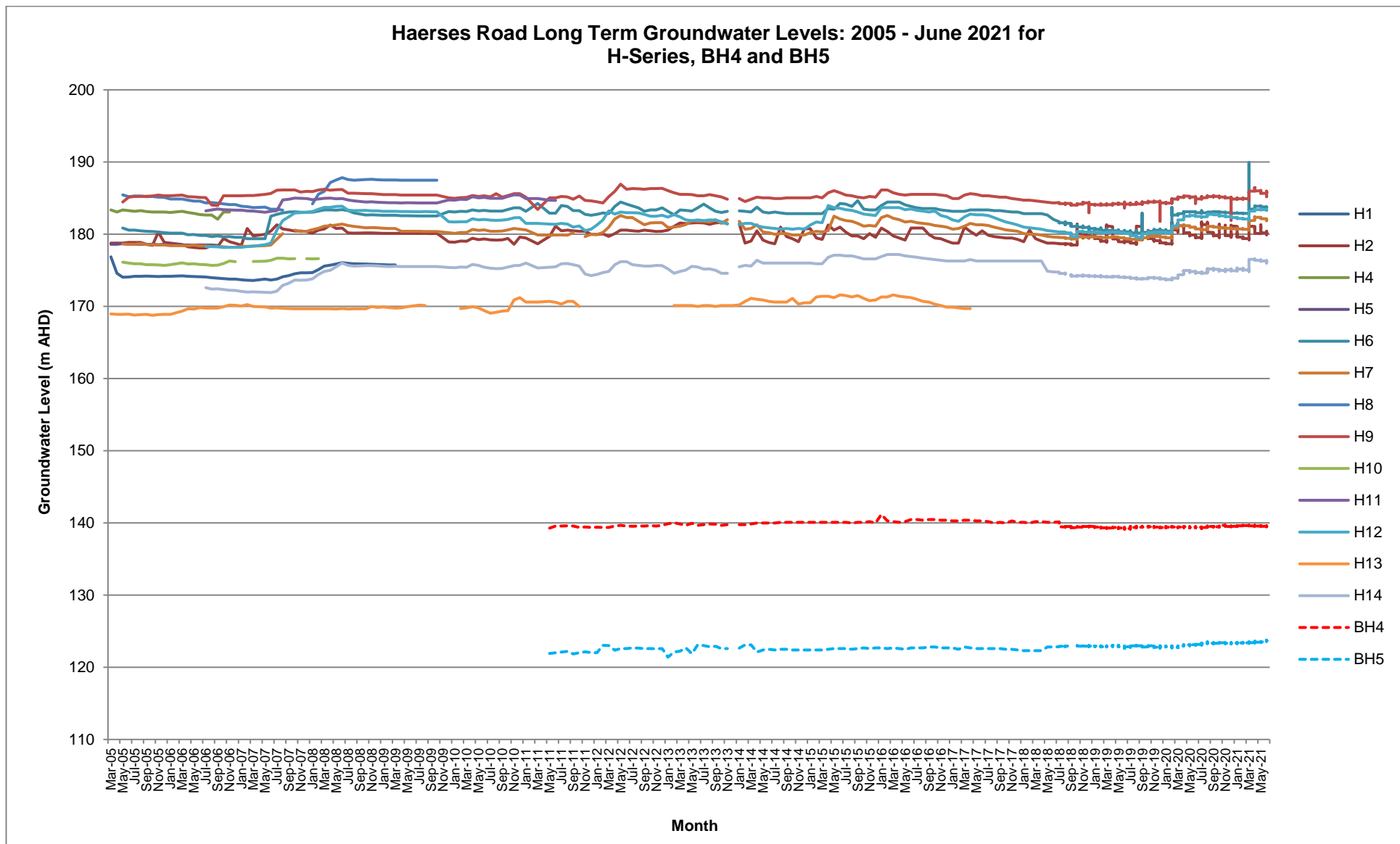
Groundwater Quality

Chart 41 depicts the long term recorded groundwater pH which commenced in June 2003. Charts 42 to 54 (inclusive) illustrate the groundwater pH across all bores during this reporting period.

Chart 55 depicts the long term recorded groundwater electrical conductivity commencing June 2003. Charts 56 to 68 (inclusive) illustrate the groundwater electrical conductivity across all bores during this reporting period.

Surface Water Quality

Table 24 contains the laboratory analyses results for water samples obtained at SW1 and SW2 in August 2020, October 2020 and January 2021.



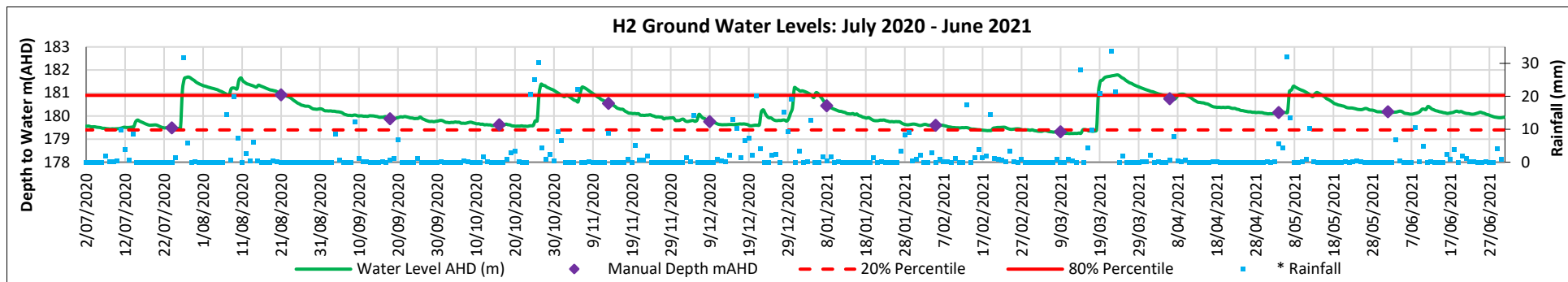


Chart 20: H2 Groundwater Levels for July 2020 – June 2021

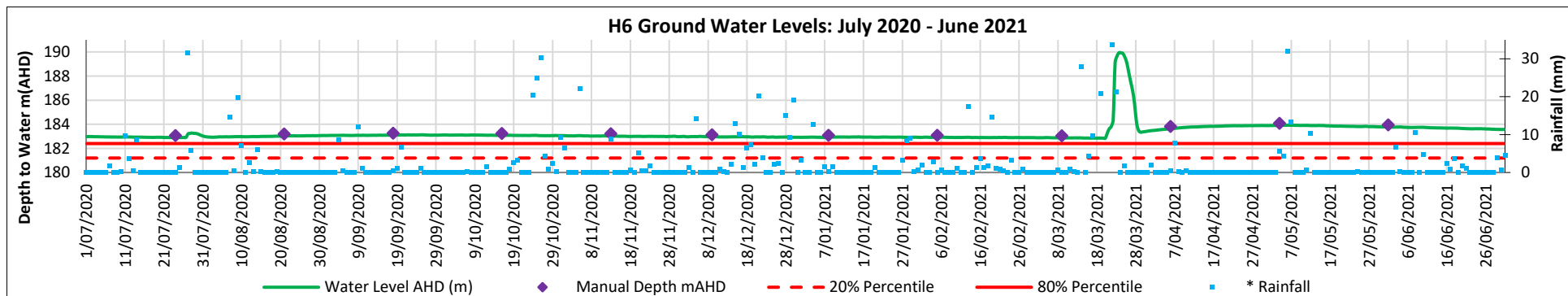


Chart 21: H6 Groundwater Levels for July 2020 – June 2021

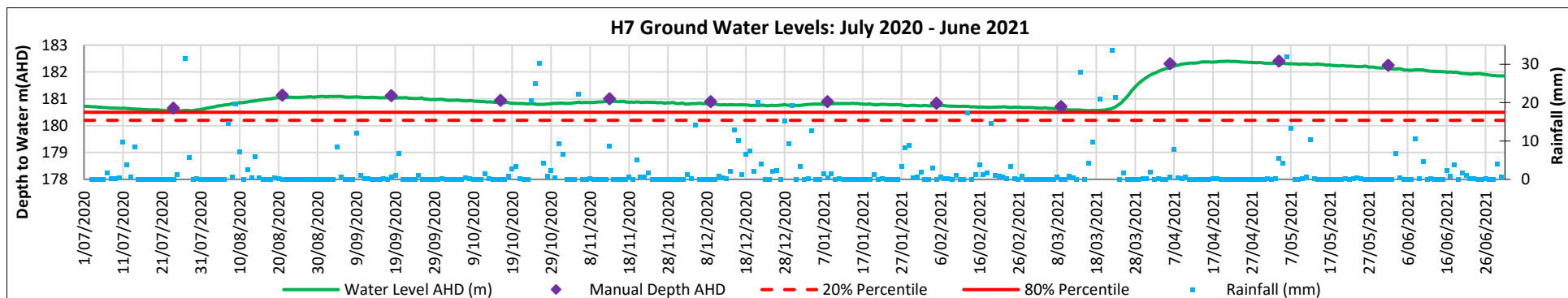


Chart 22: H7 Groundwater Levels for July 2020 – June 2021

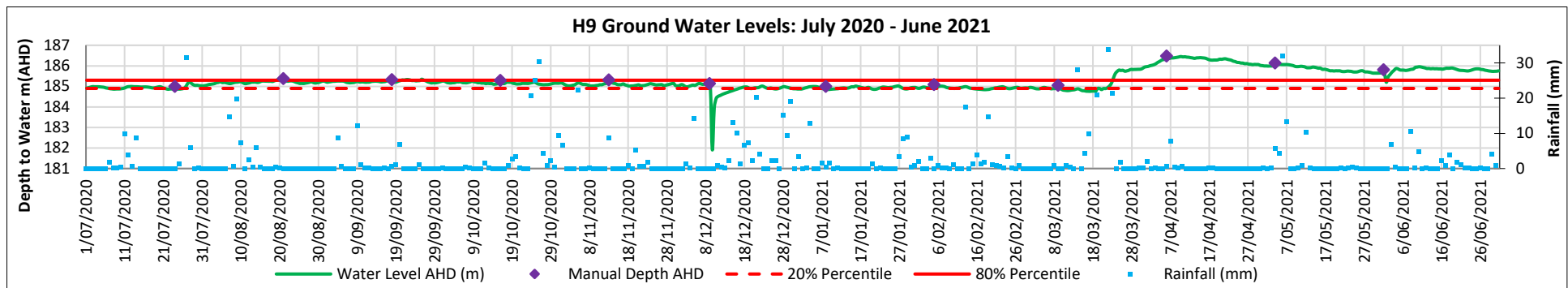


Chart 23: H9 Groundwater Levels for July 2020 – June 2021

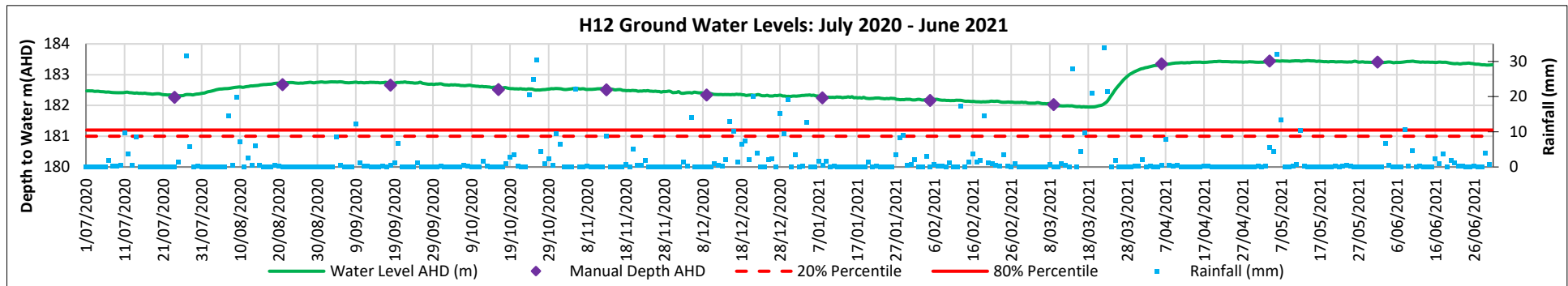


Chart 24: H12 Groundwater Levels for July 2020 – June 2021

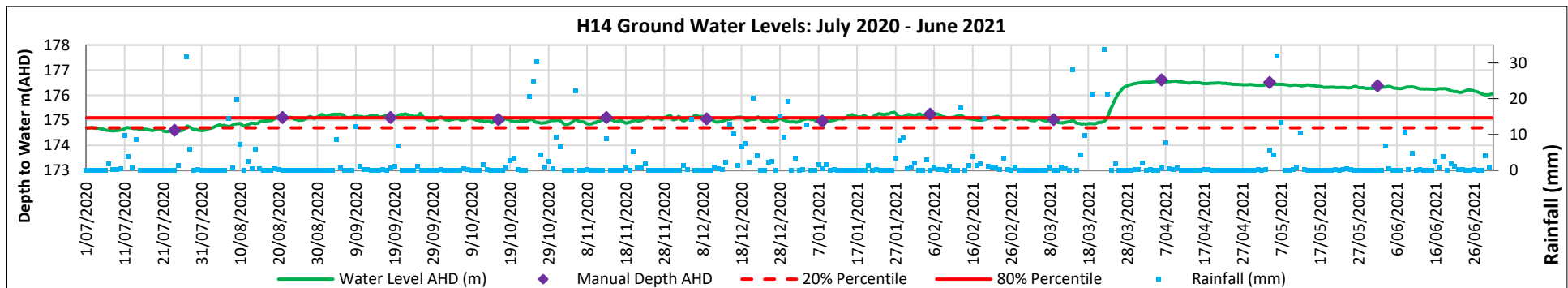


Chart 25: H14 Groundwater Levels for July 2020 – June 2021

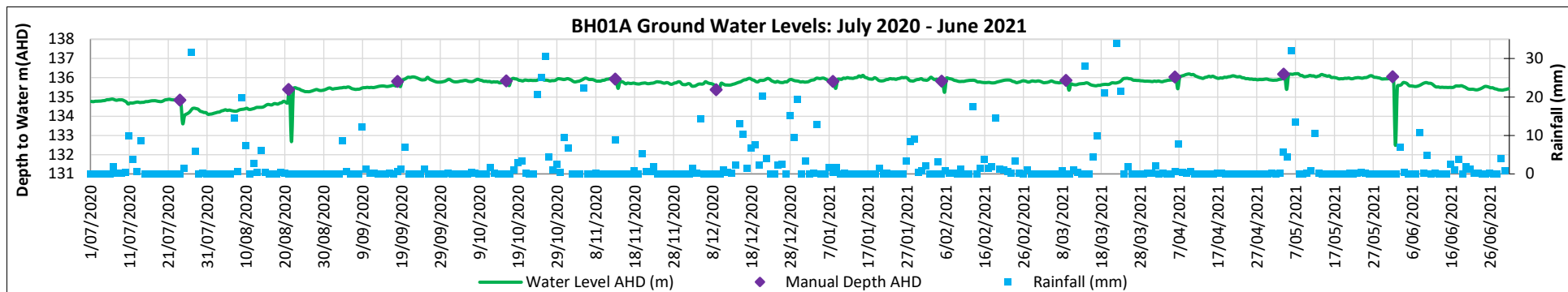


Chart 26: BH01A Groundwater Levels for July 2020 – June 2021.

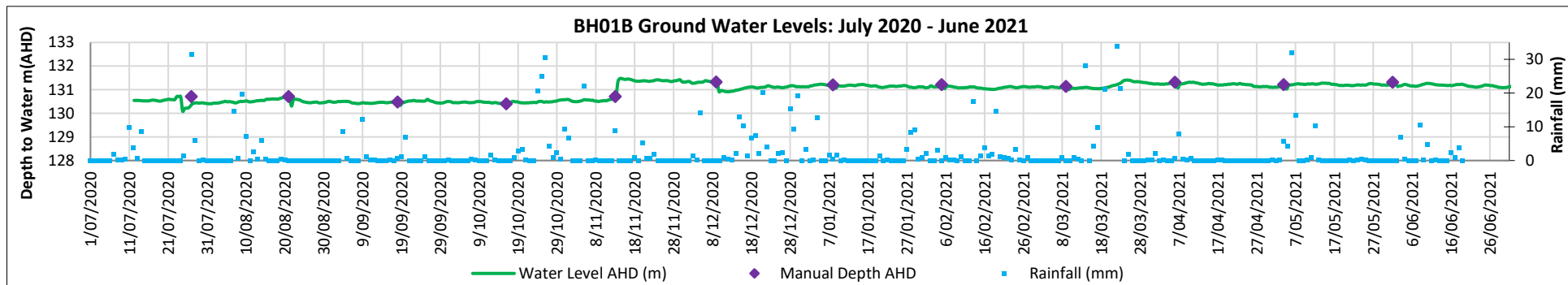


Chart 27: BH01B Groundwater Levels for July 2020 – June 2021.

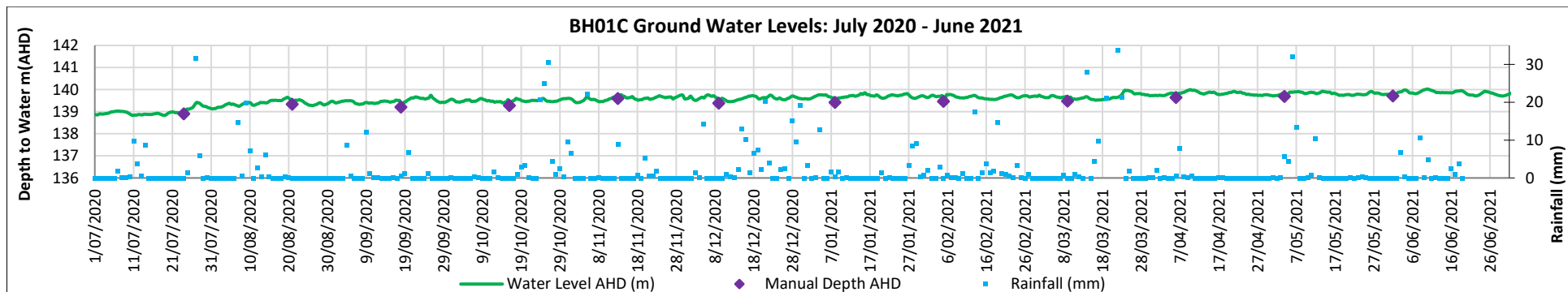


Chart 28: BH01C Groundwater Levels for July 2020 – June 2021.

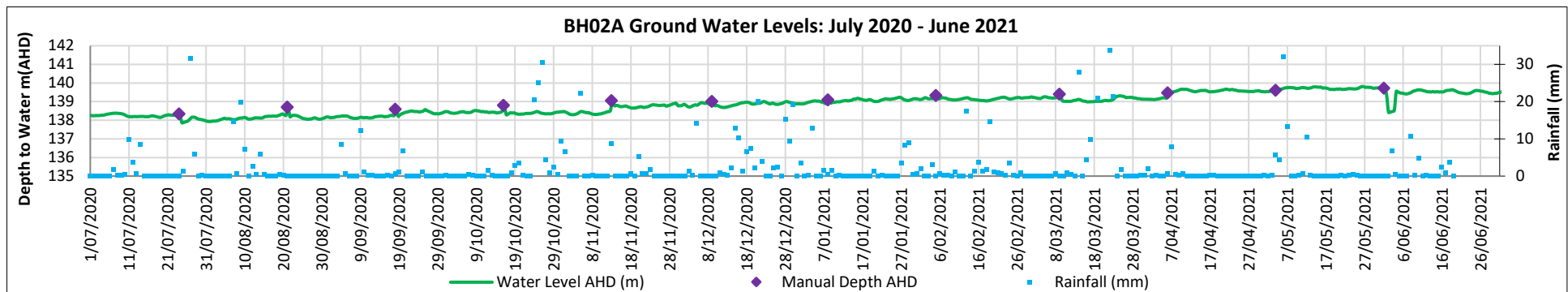


Chart 29: BH02A Groundwater Levels for July 2020 – June 2021

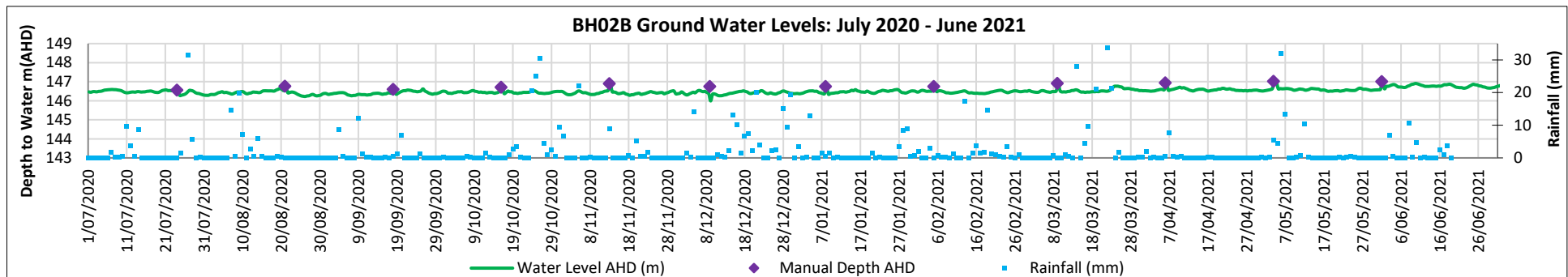


Chart 30: BH02B Groundwater Levels for July 2020 – June 2021

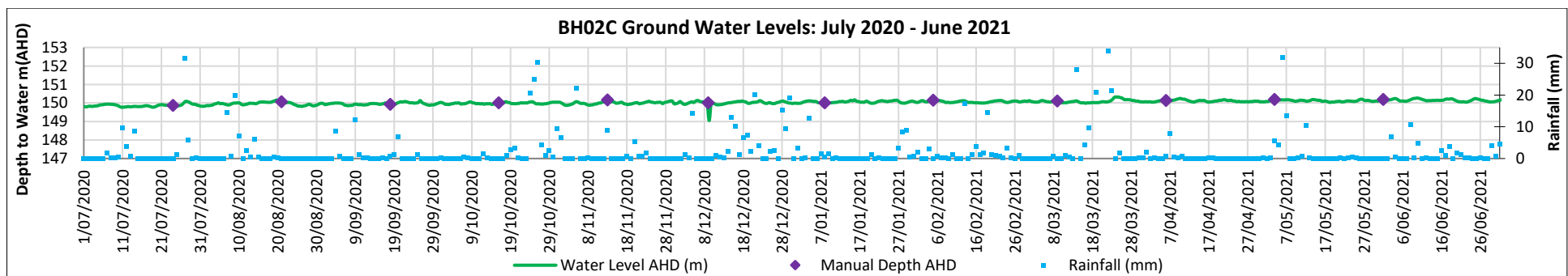


Chart 31: BH02C Groundwater Levels for July 2020 – June 2021

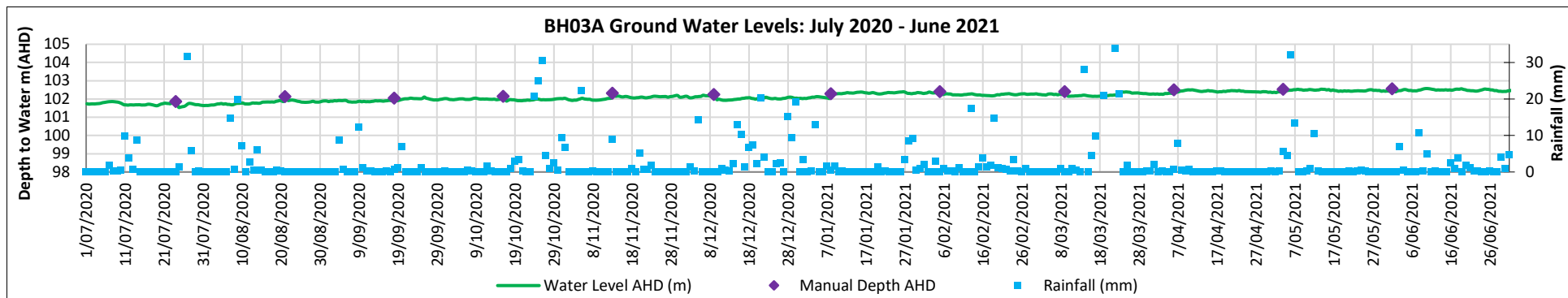


Chart 32: BH03A Groundwater Levels for July 2020 – June 2021

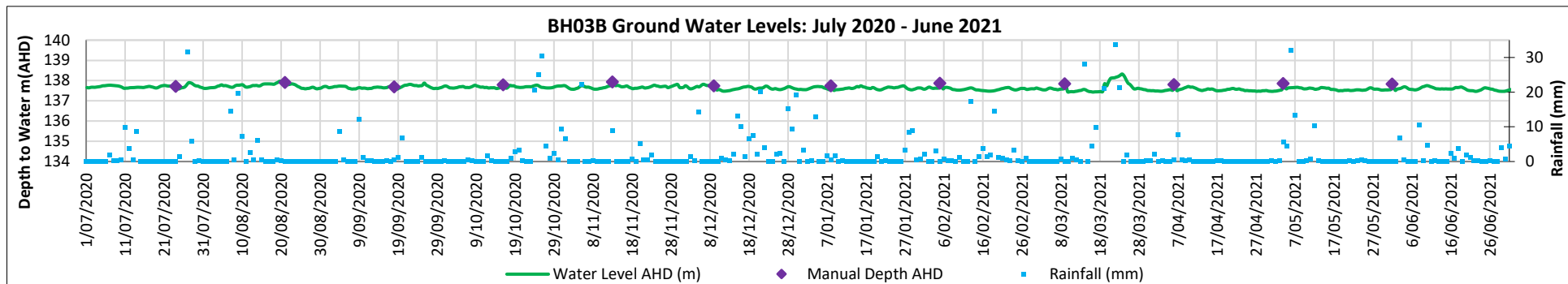


Chart 33: BH03B Groundwater Levels for July 2020 – June 2021

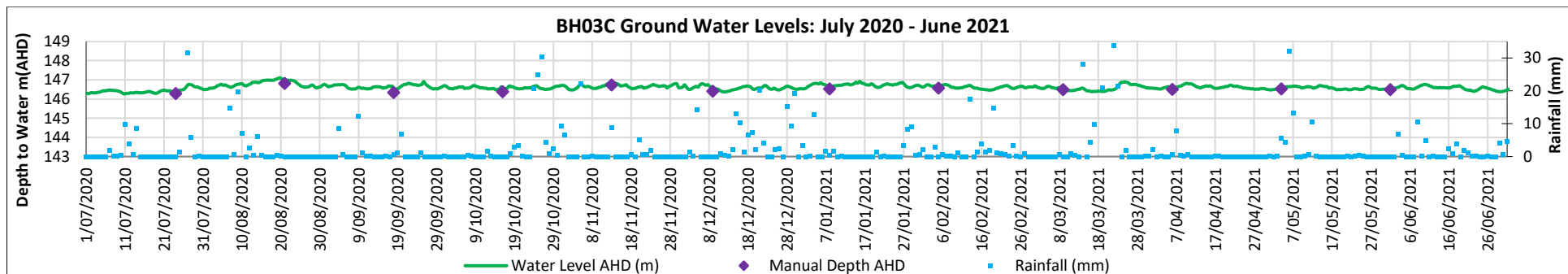


Chart 34: BH03C Groundwater Levels for July 2020 – June 2021

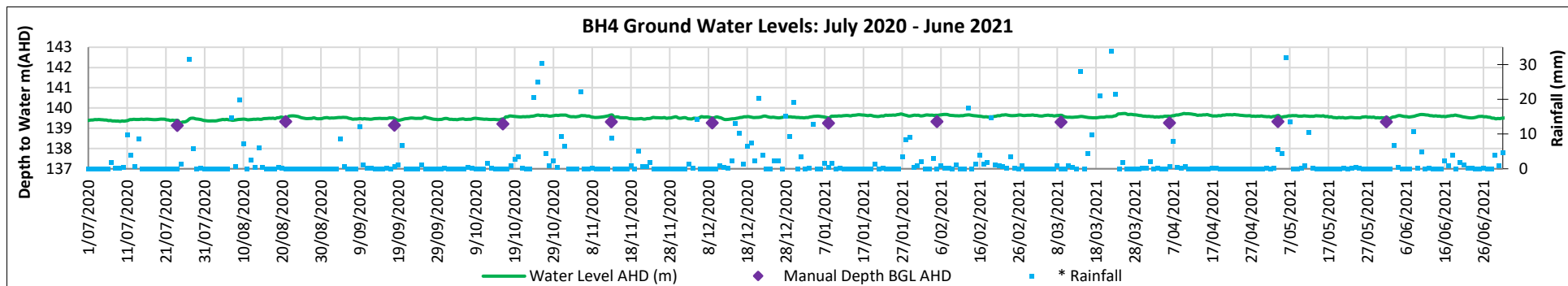


Chart 35: BH4 Groundwater Levels for July 2020 – June 2021

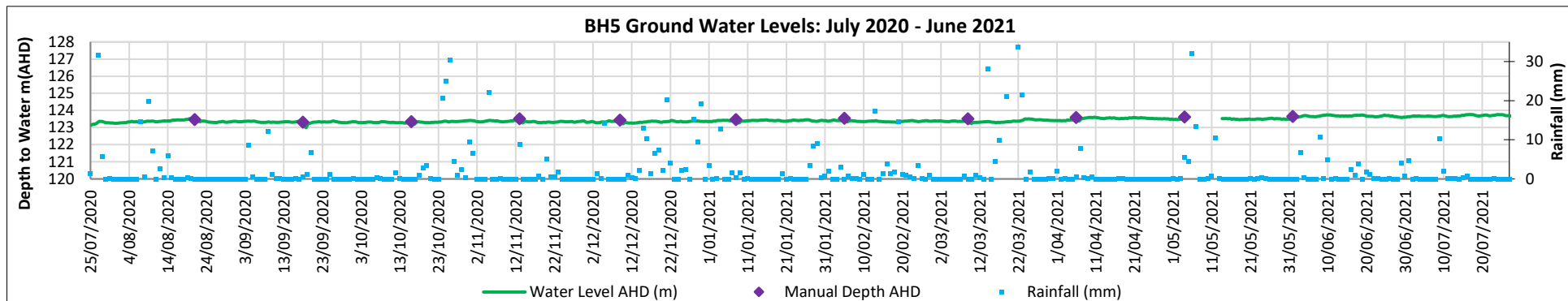


Chart 36: BH05 Groundwater Levels for July 2020 – June 2021

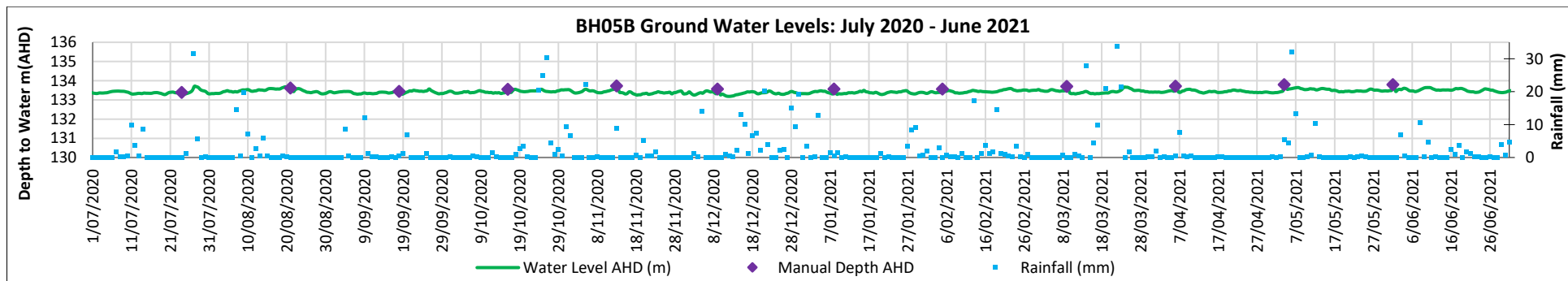


Chart 37: BH05B Groundwater Levels for July 2020 – June 2021

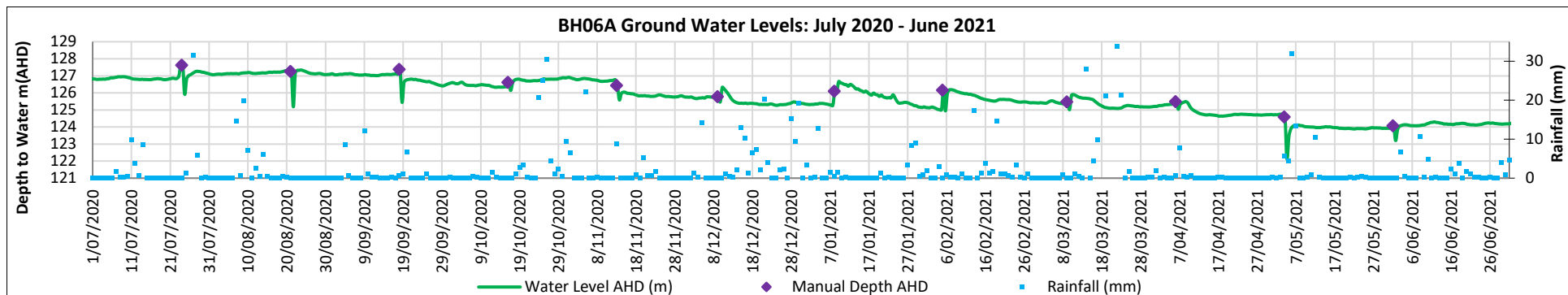


Chart 38: BH06A Groundwater Levels for July 2020 – June 2021

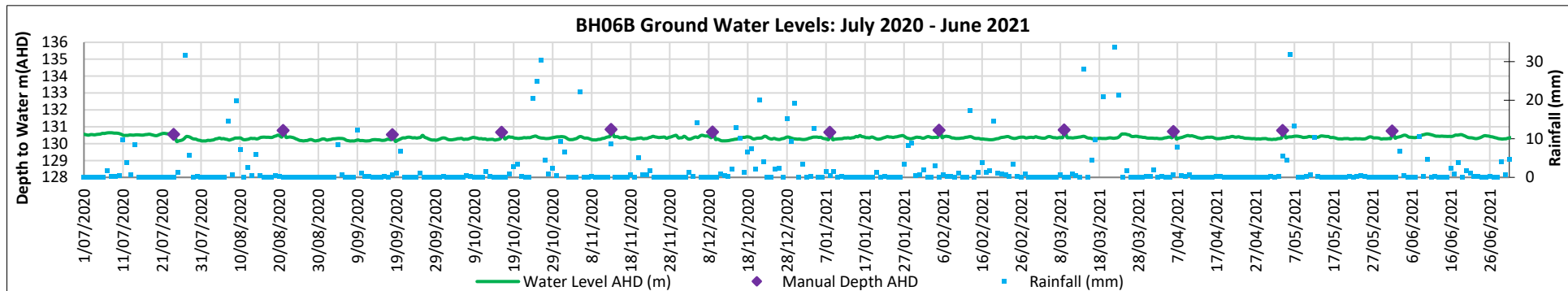


Chart 39: BH06B Groundwater Levels for July 2020 – June 2021

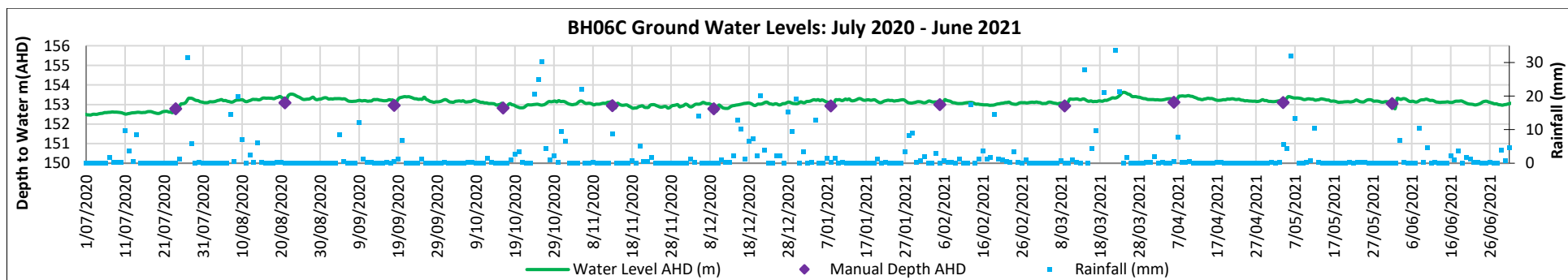


Chart 40: BH06C Groundwater Levels for July 2020 – June 2021

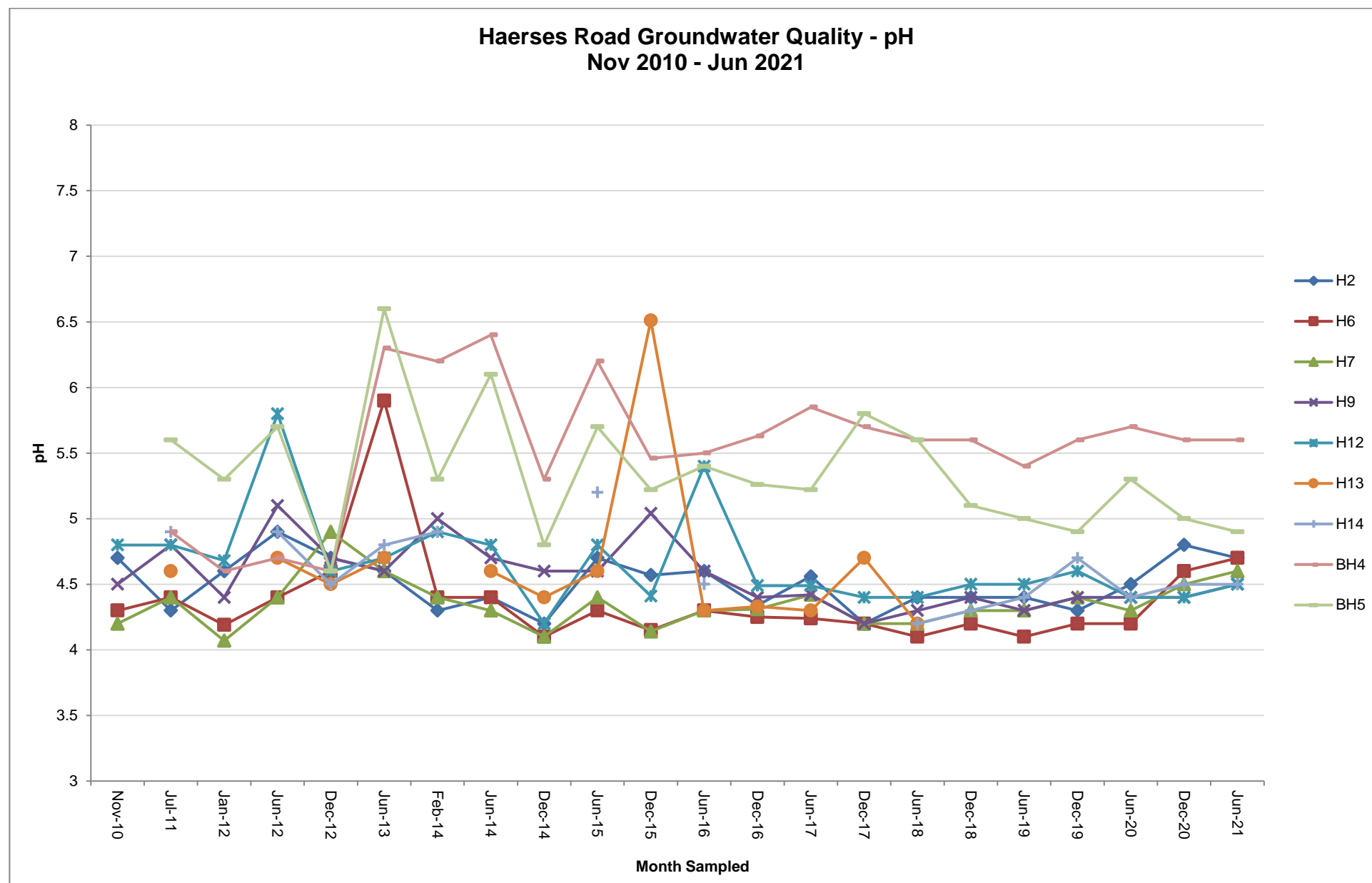


Chart 41: Haerses Road Long Term pH – H series, BH4 and BH5

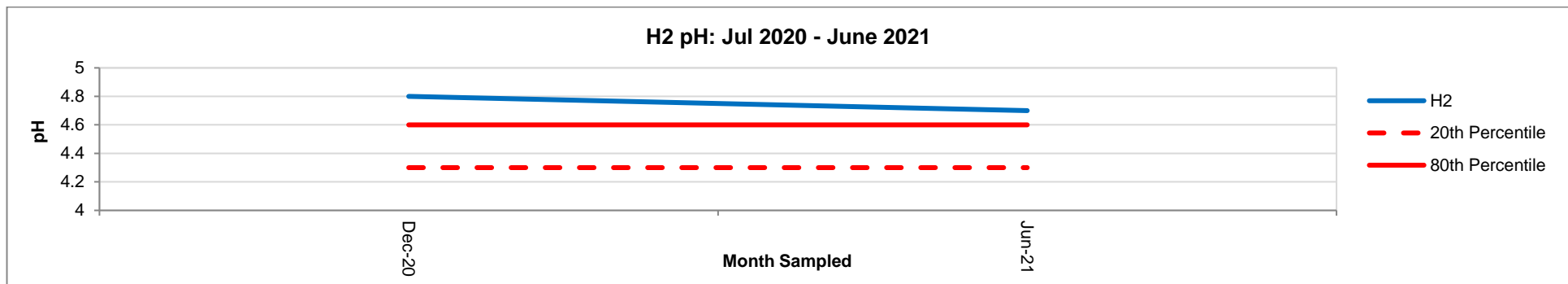


Chart 42: H2 pH Results July 2020 – June 2021.

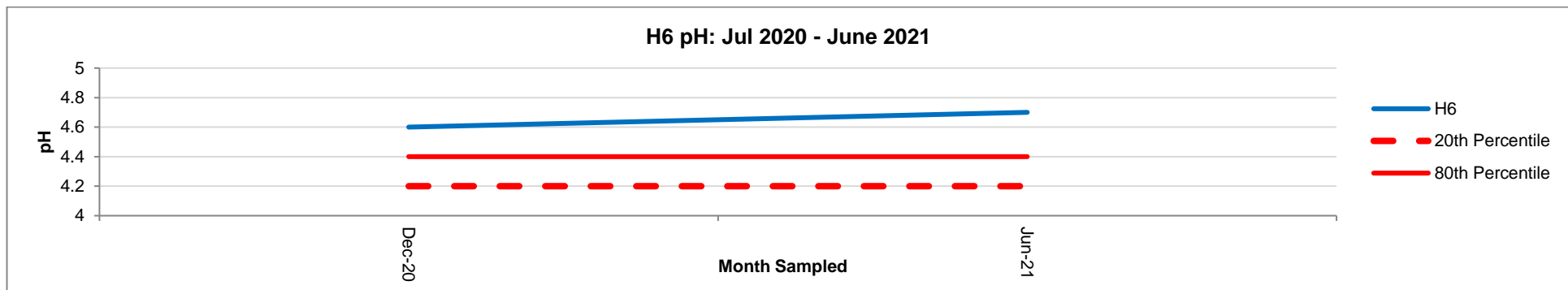


Chart 43: H6 pH Results July 2020 – June 2021.

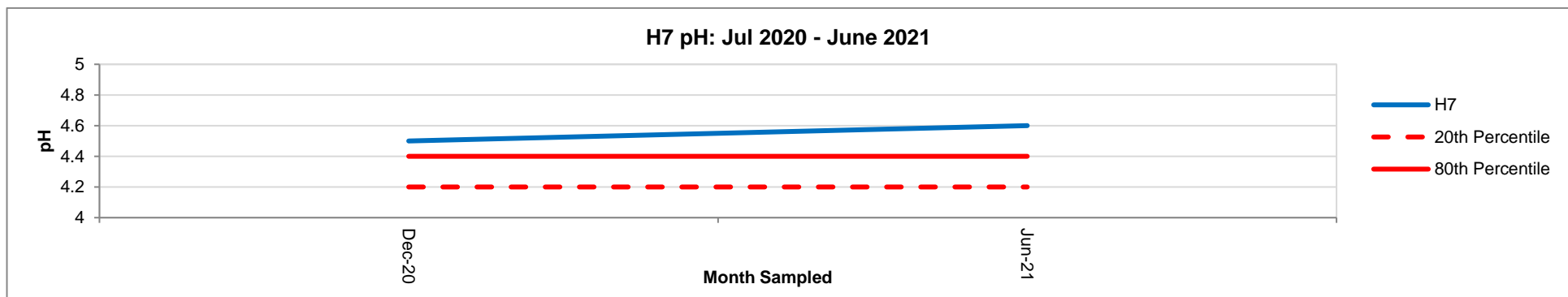


Chart 44: H7 pH Results July 2020 – June 2021.

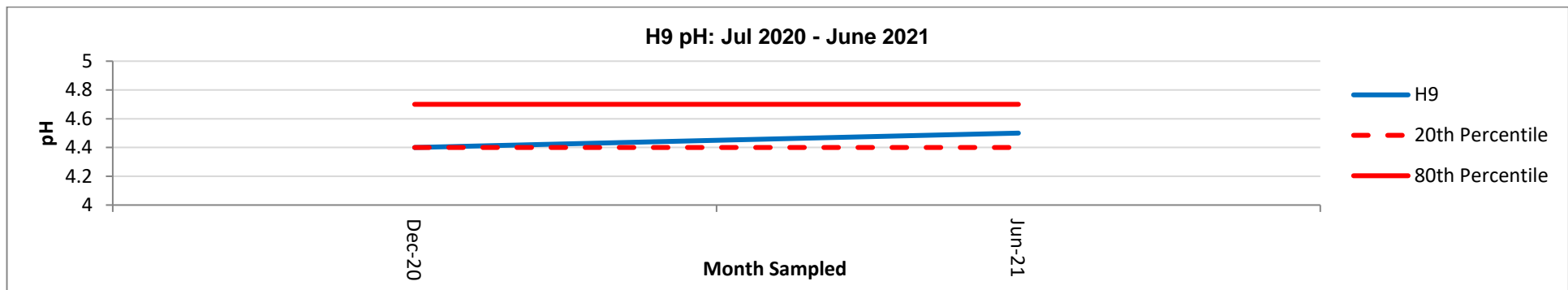


Chart 45: H9 pH Results July 2020 – June 2021.

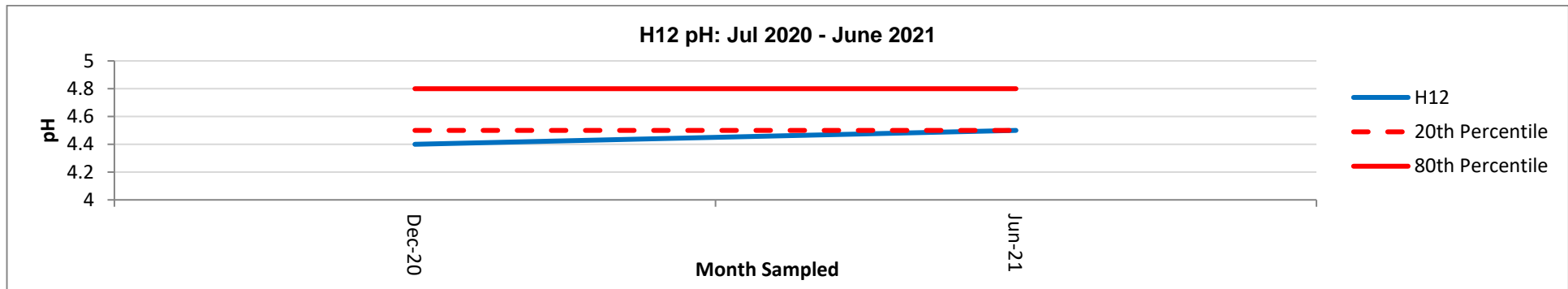


Chart 46: H12 pH Results July 2020 – June 2021.

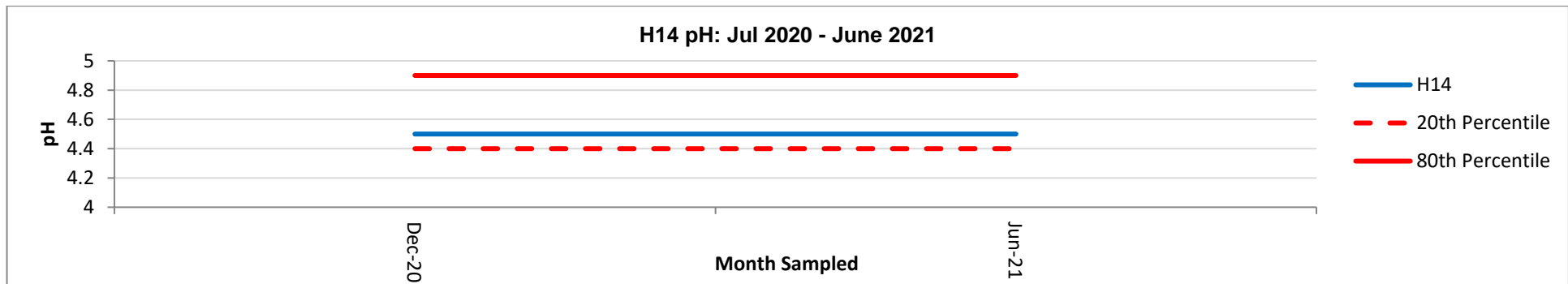


Chart 47: H14 pH Results July 2020 – June 2021.

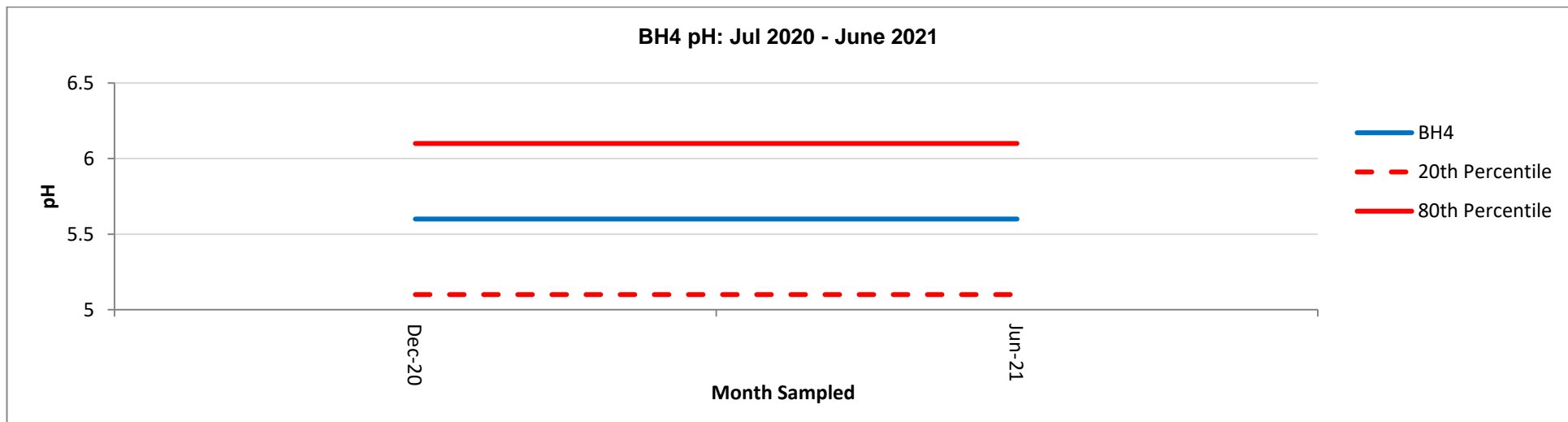


Chart 48: H14 pH Results July 2020 – June 2021.

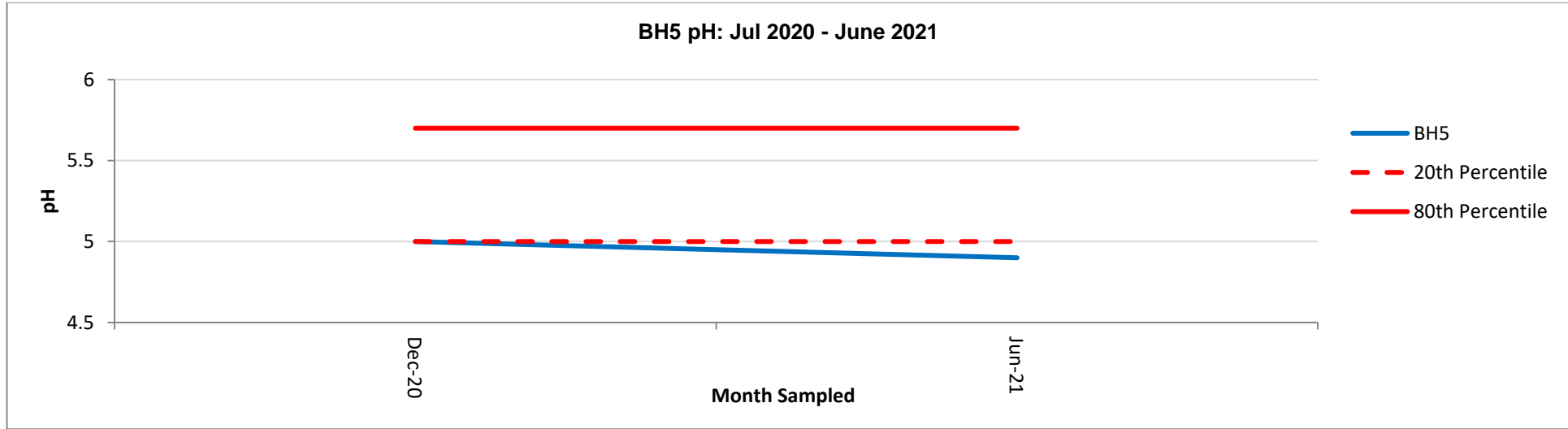


Chart 49: BH4 pH Results July 2020 – June 2021.

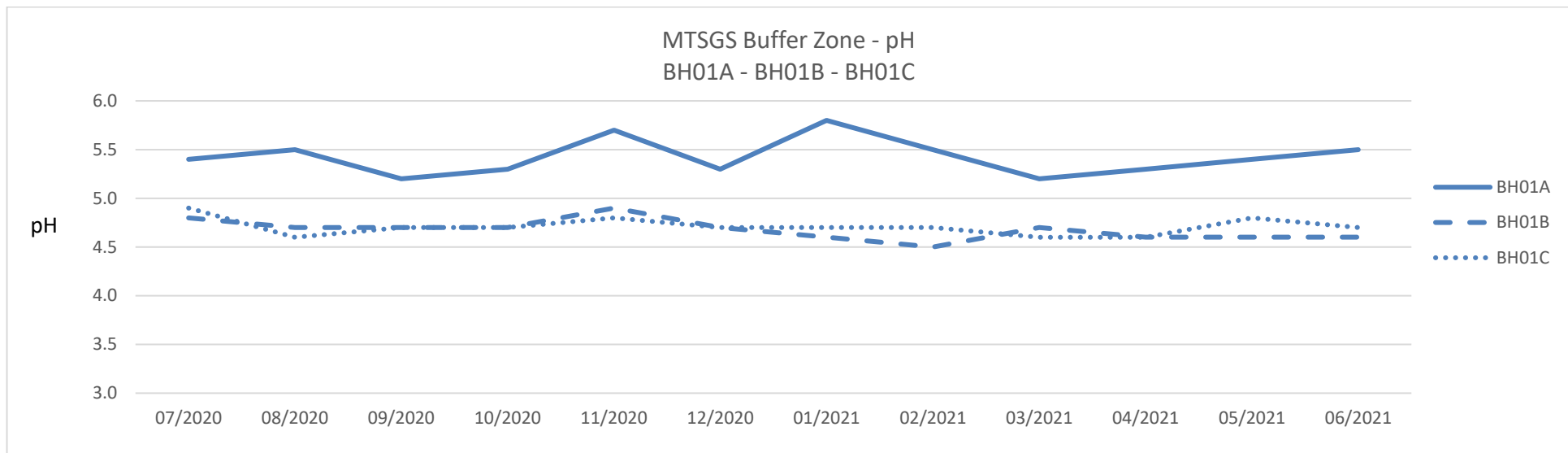


Chart 50: BH01A, BH01B and BH01C pH Results July 2020 – June 2021.

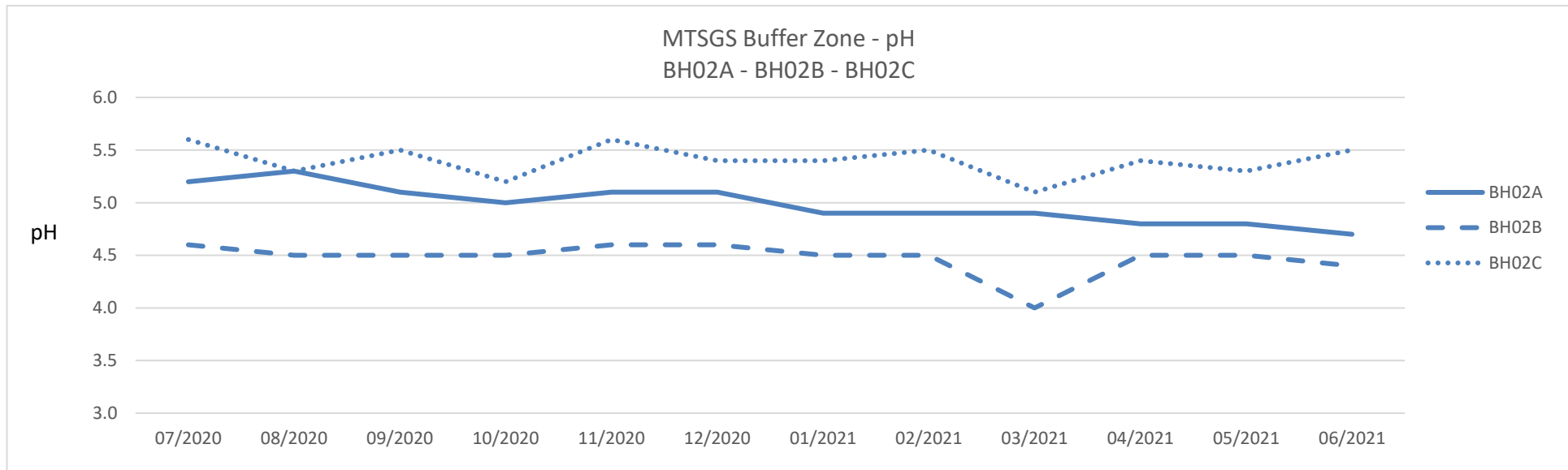


Chart 51: BH02A, BH02B and BH02C pH Results July 2020 – June 2021.

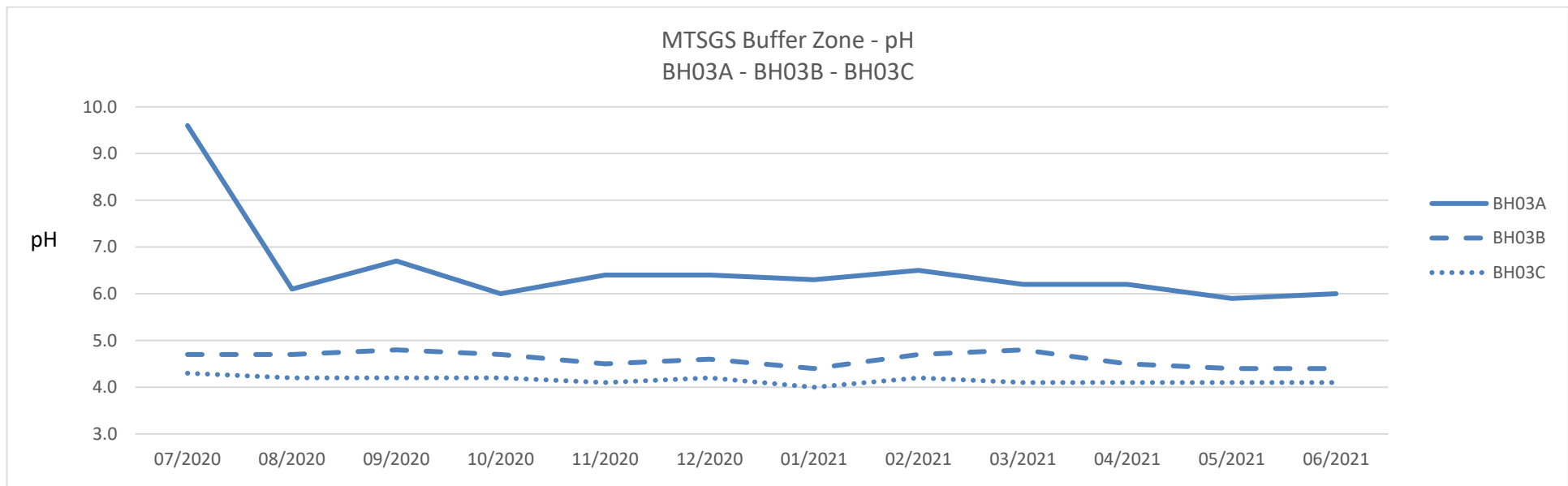


Chart 52: BH03A, BH03B and BH03C pH Results July 2020– June 2021.

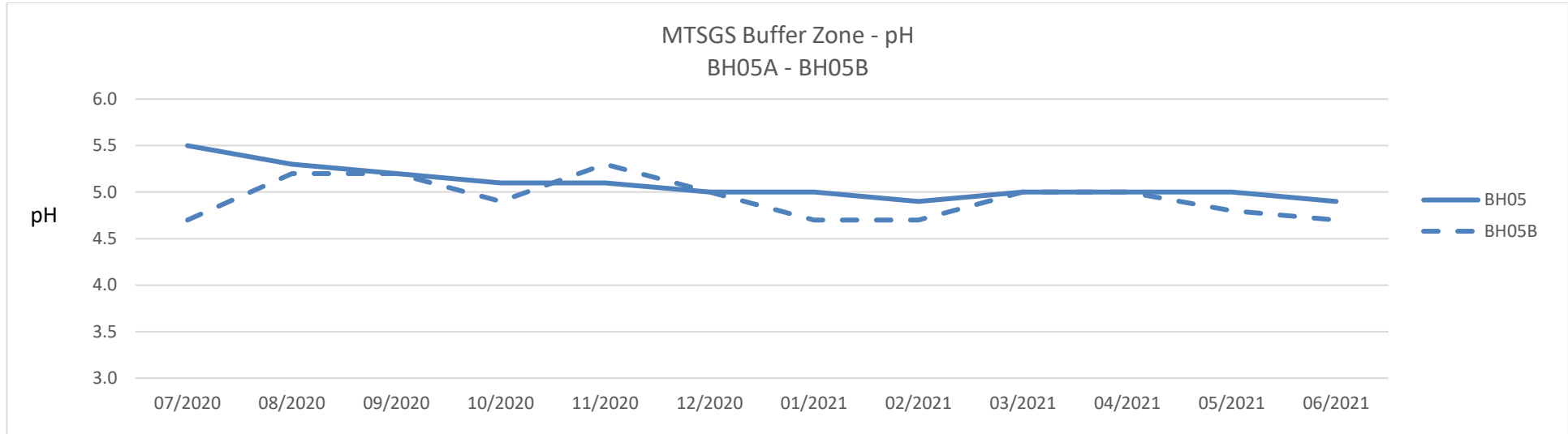


Chart 53: BH5 and BH05B pH Results July 2020 – June 2021.

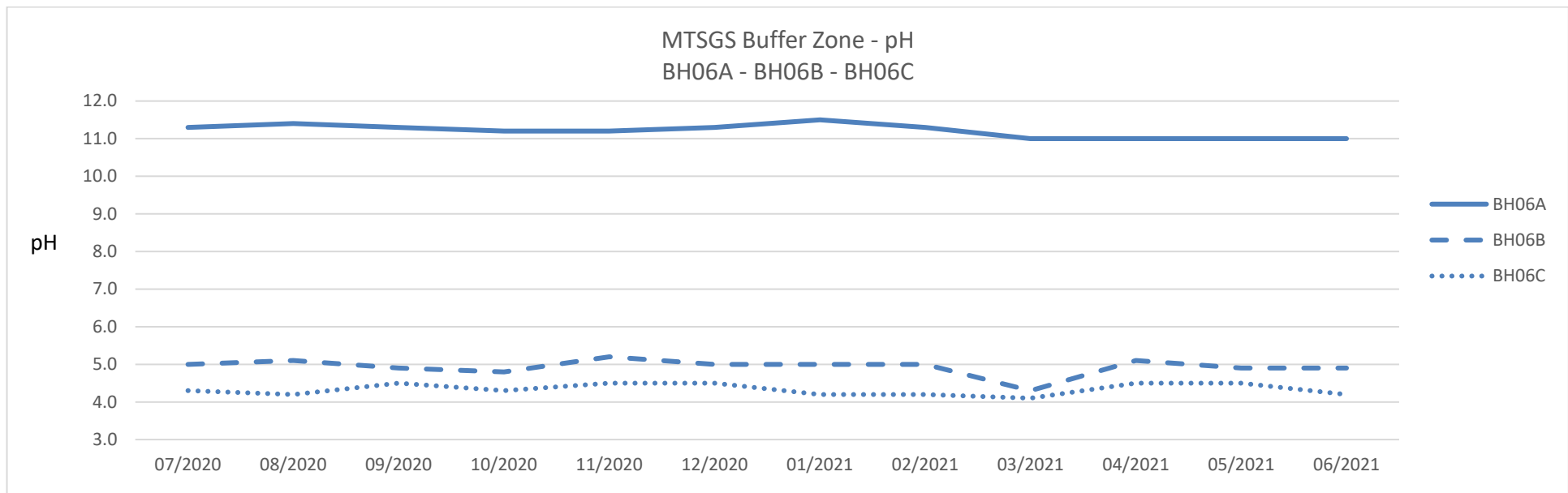


Chart 54: BH06A, BH06B and BH06C pH Results July 2020 – June 2021.

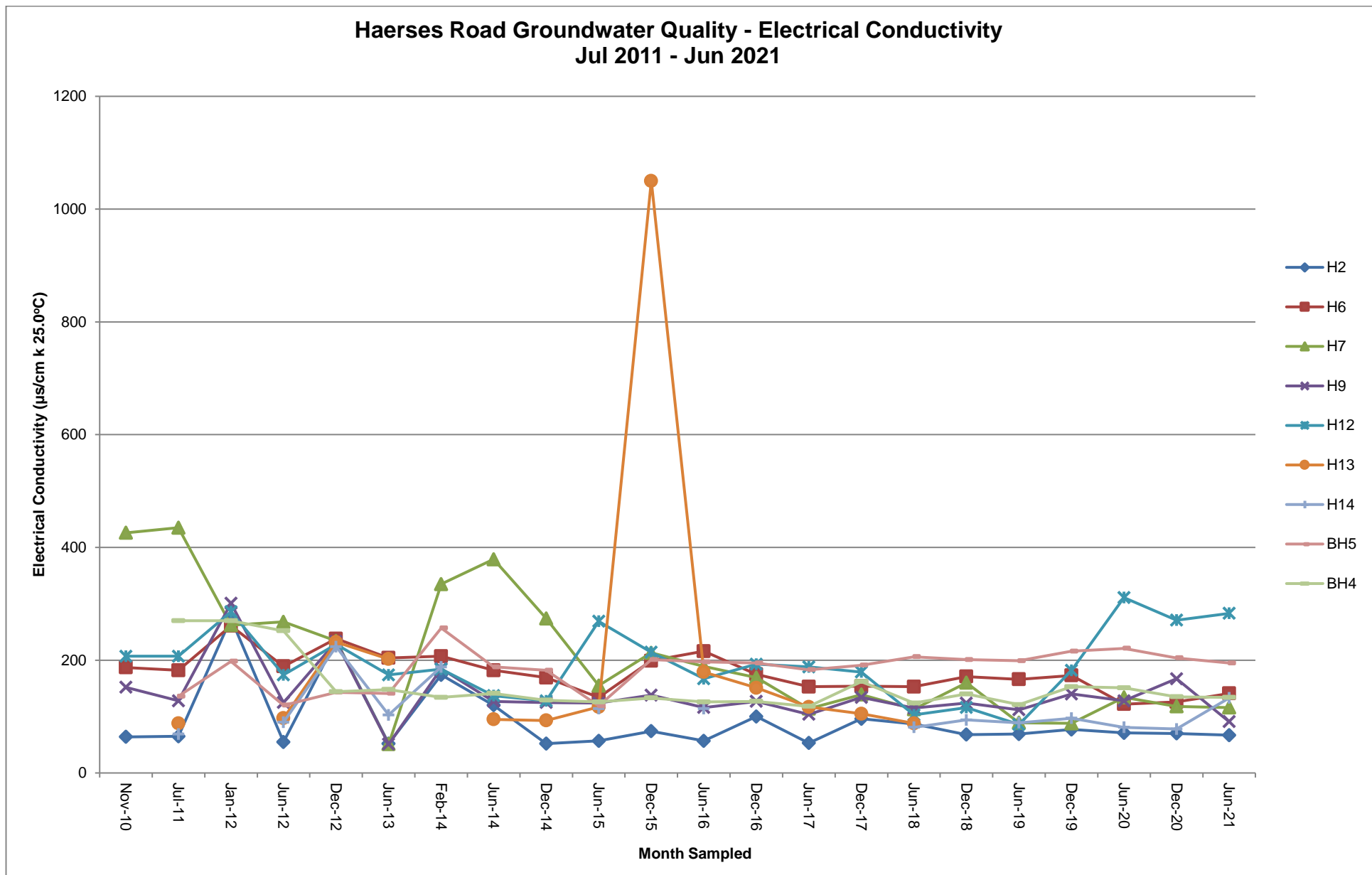


Chart 55: Haerses Road Long Term Electrical Conductivity – H series, BH4 and BH5

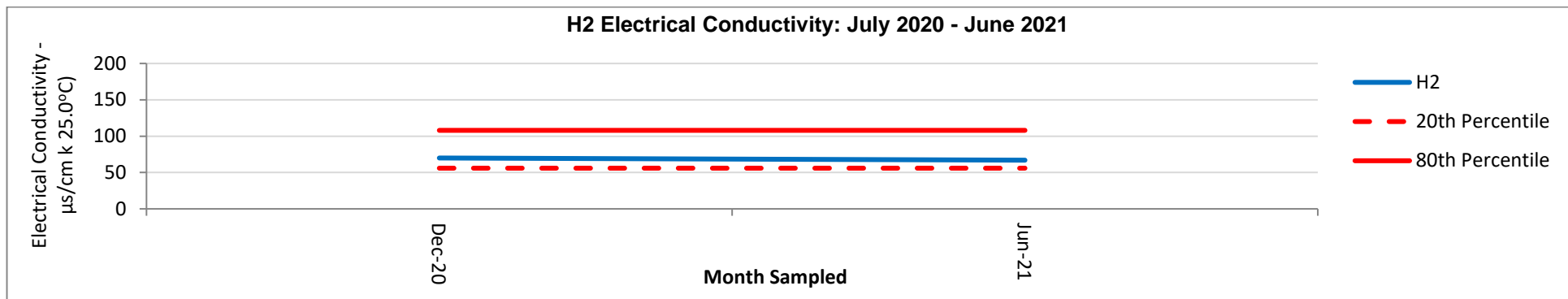


Chart 56: H2 Electrical Conductivity Results July 2020 – June 2021.

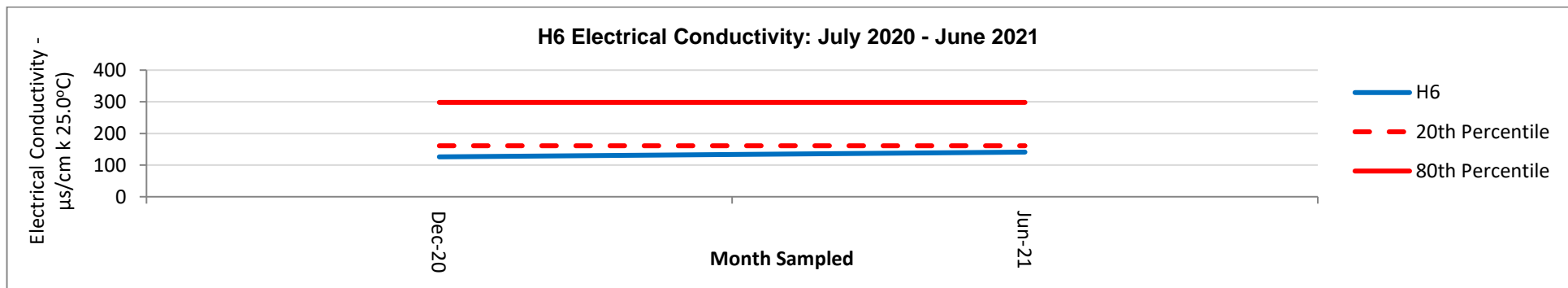


Chart 57: H6 Electrical Conductivity Results July 2020 – June 2021.

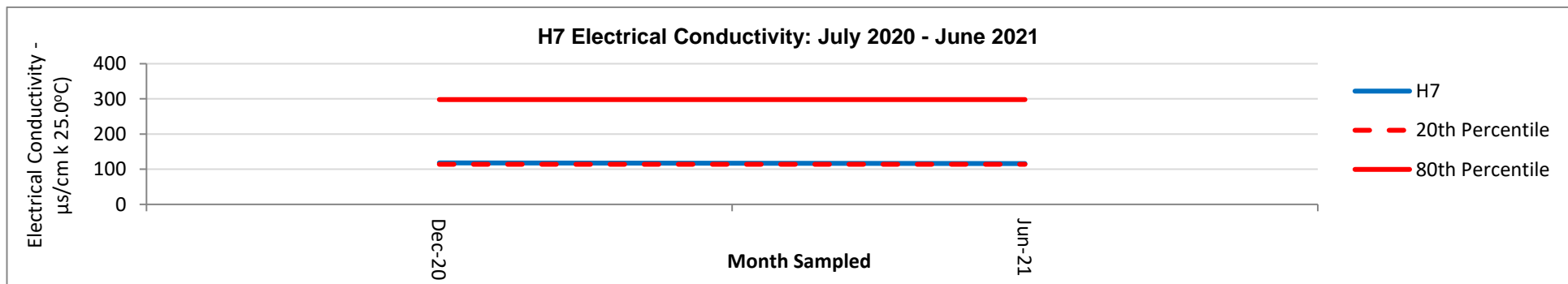


Chart 58: H7 Electrical Conductivity Results July 2020 – June 2021.

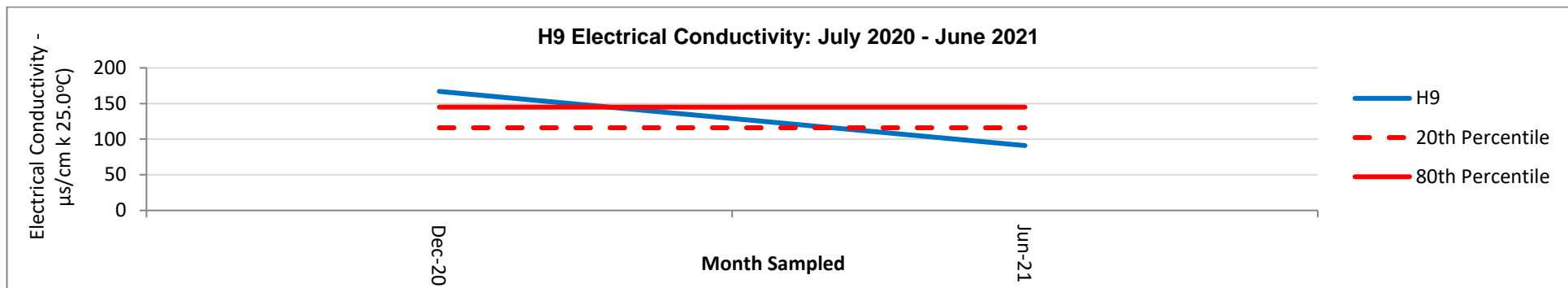


Chart 59: H9 Electrical Conductivity Results July 2020 – June 2021.

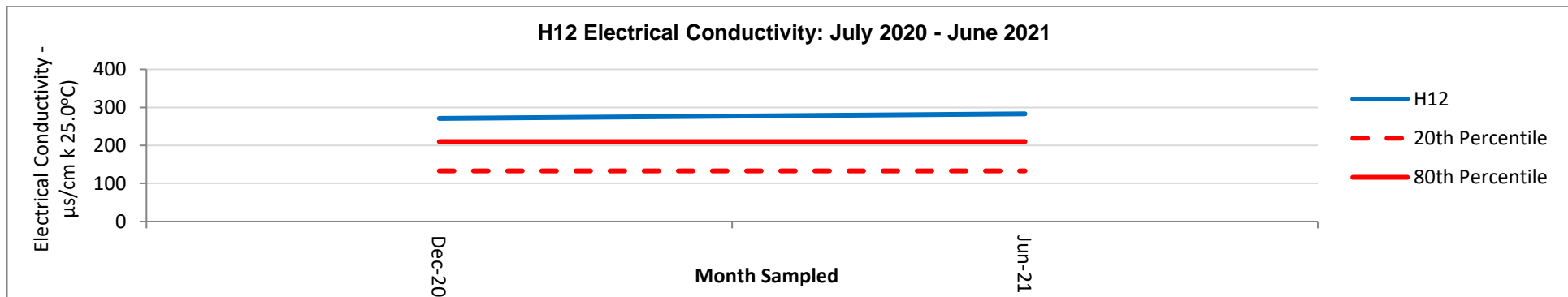


Chart 60: H12 Electrical Conductivity Results July 2020 – June 2021.

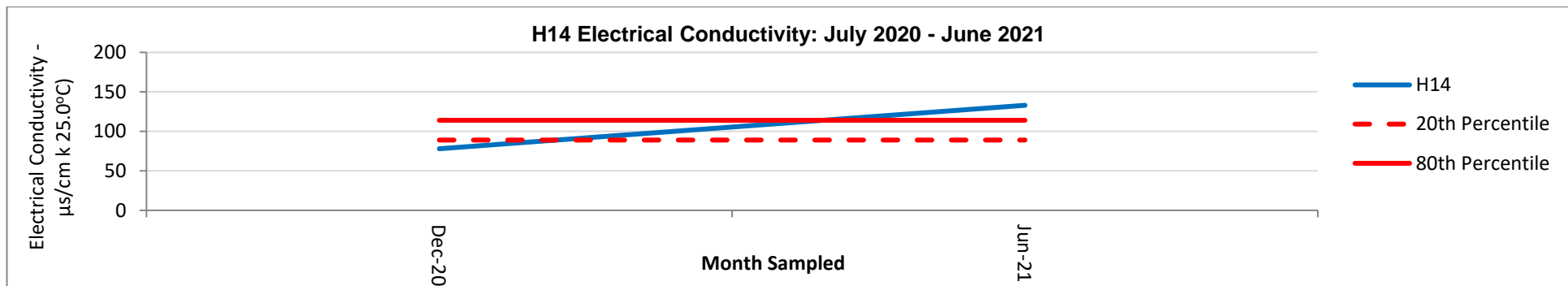


Chart 61: H14 Electrical Conductivity Results July 2020 – June 2021.

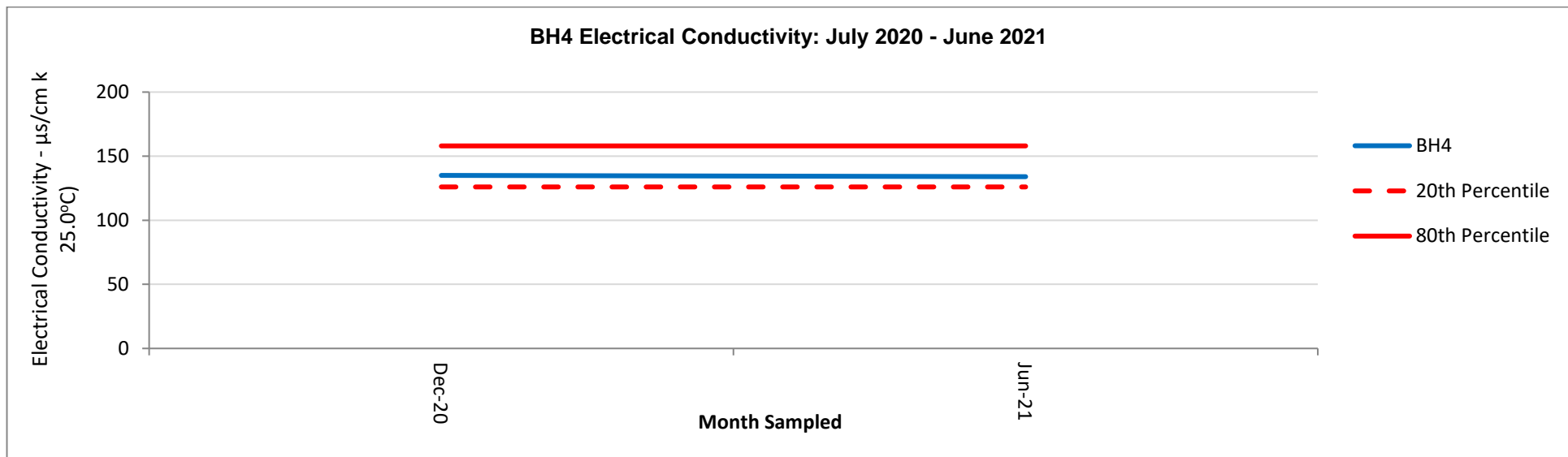


Chart 62: BH4 Electrical Conductivity Results July 2020 – June 2021.

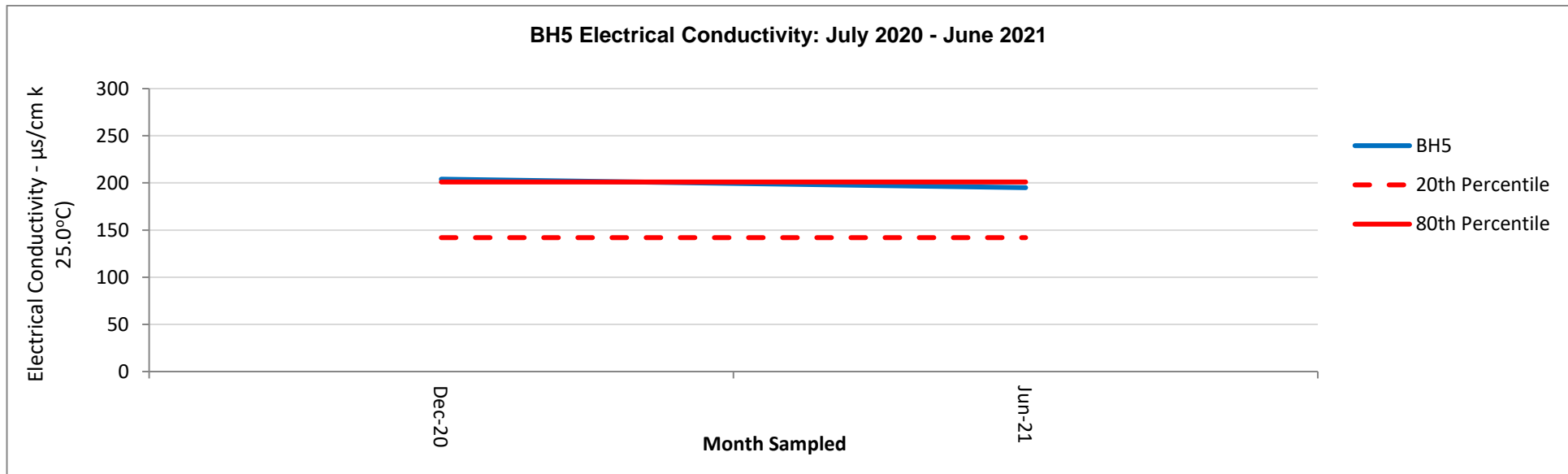


Chart 63: BH5 Electrical Conductivity Results July 2020 – June 2021.

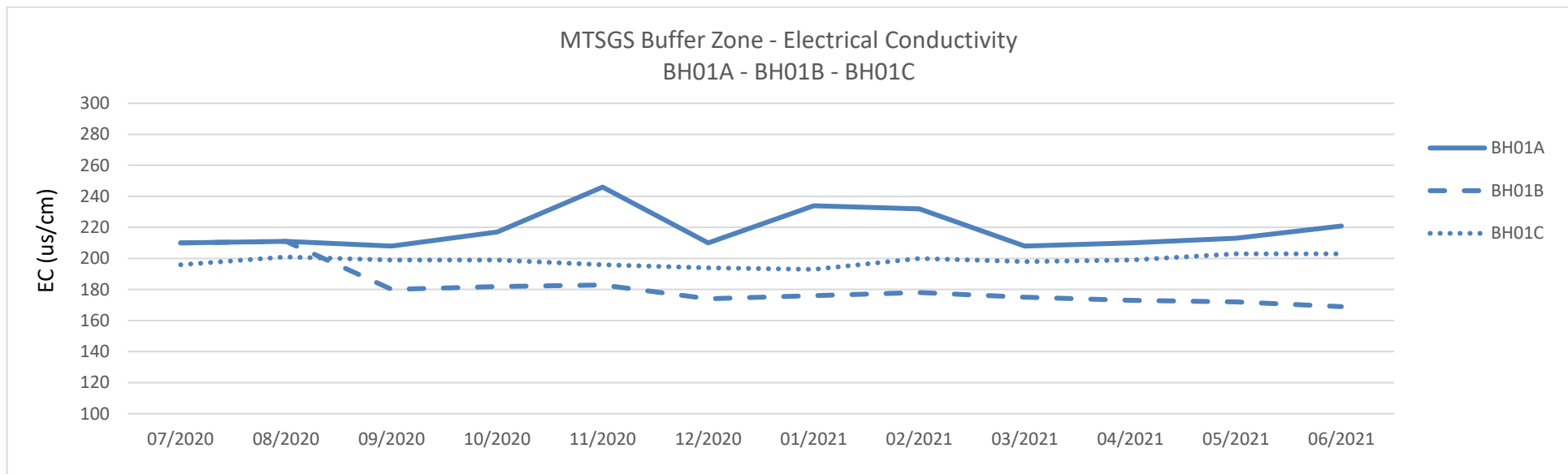


Chart 64: BH01A, BH01B and BH01C Electrical Conductivity Results July 2020 – June 2021.

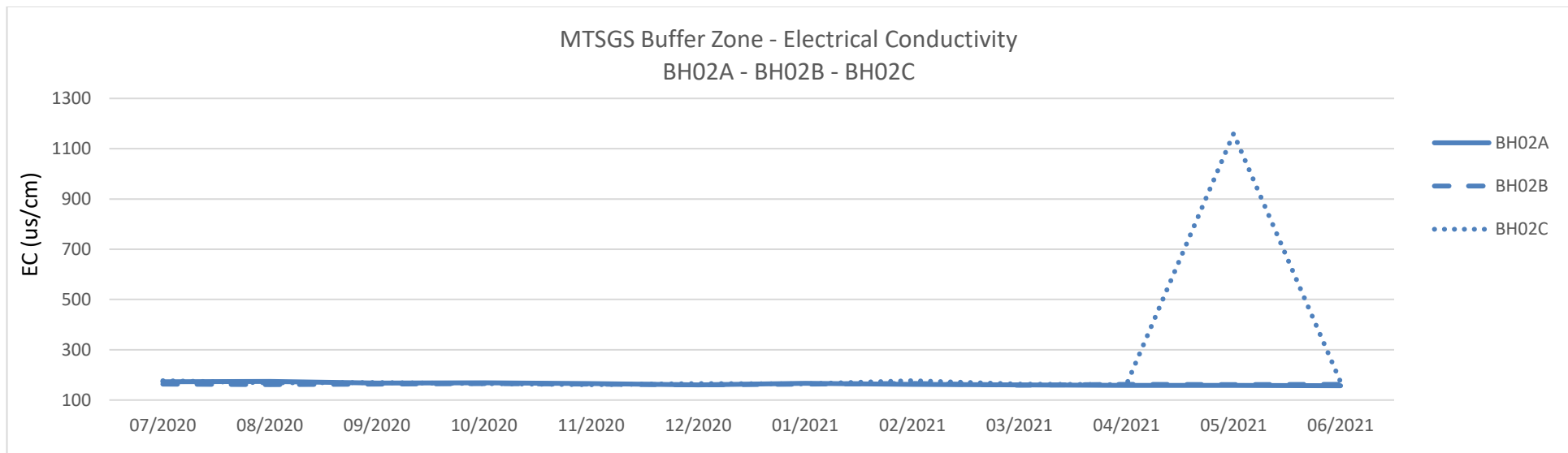


Chart 65: BH02A, BH02B and BH02C Electrical Conductivity Results July 2020 – June 2021.

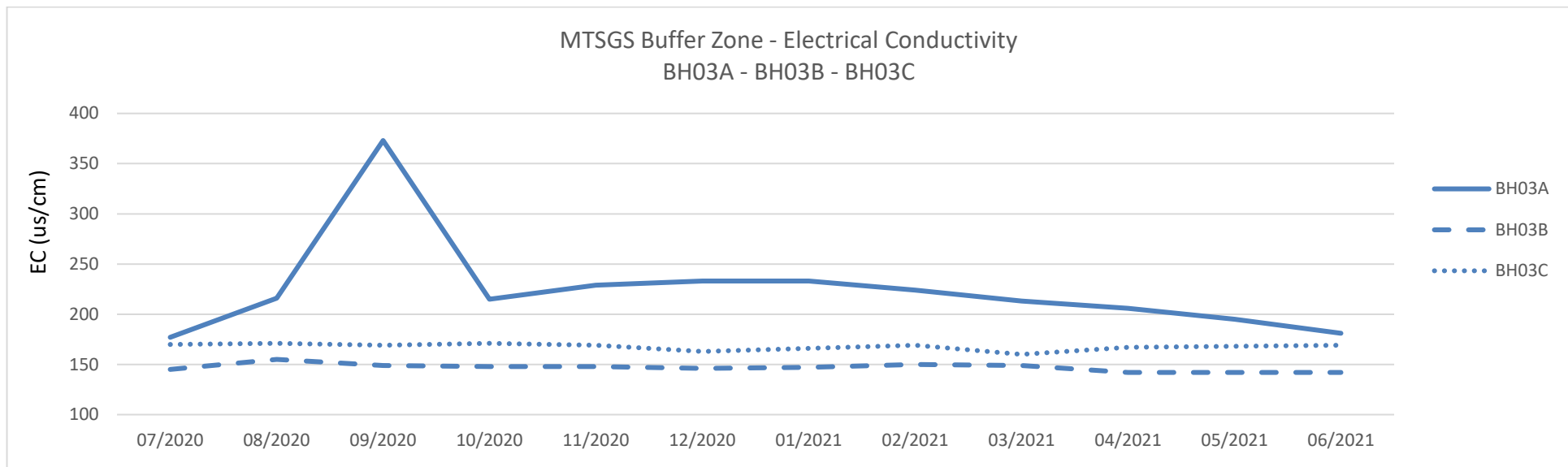


Chart 66: BH03A, BH03B and BH03C Electrical Conductivity Results July 2020 – June 2021.

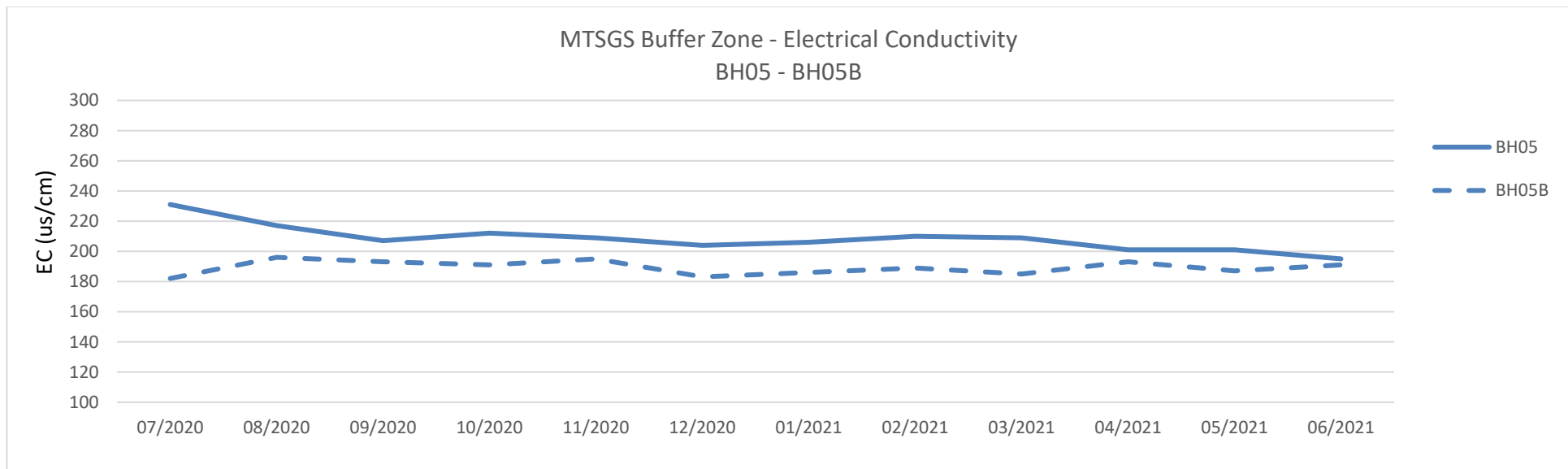


Chart 67: BH5 and BH05B Electrical Conductivity Results July 2020 – June 2021.

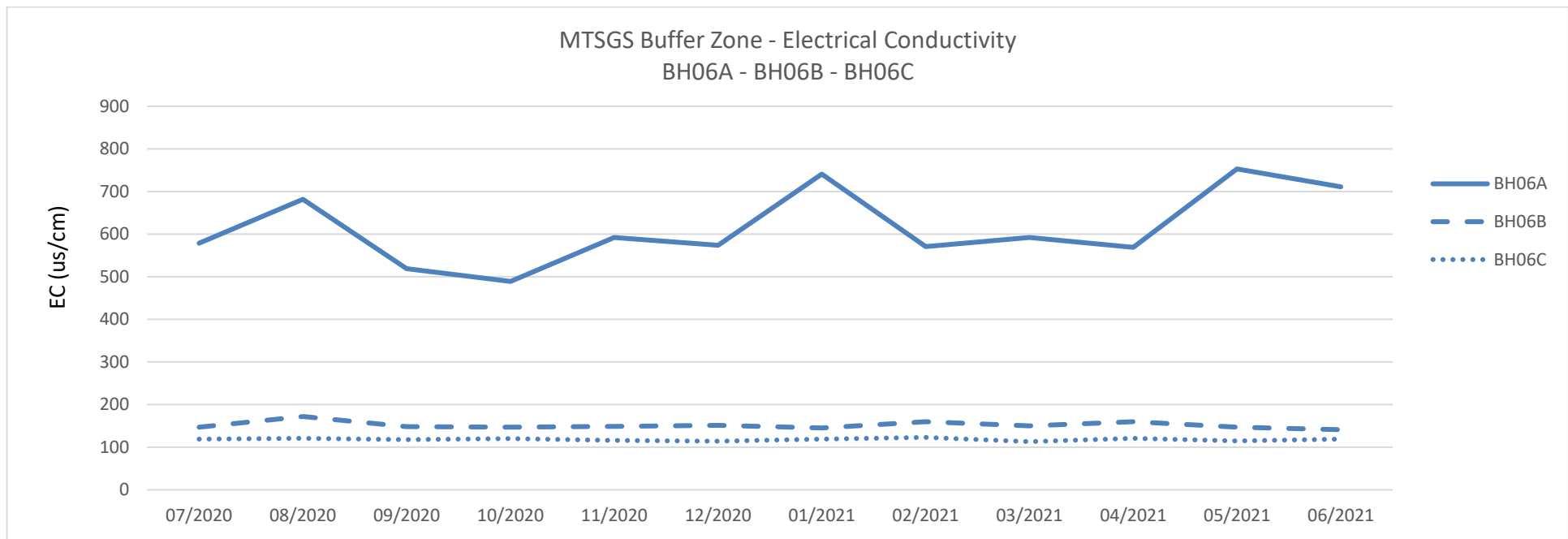


Chart 68: BH06A, BH06B and BH06C Electrical Conductivity Results July 2020 – June 2021.

Table 24: SW1 and SW2 laboratory results, relevant water criteria and compliance with trigger values

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

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 2020 – 2021 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 19. 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 August 2020, October 2020, March 2021 where rising water levels were a result of aquifer recharge after significant rainfall events (refer to Charts 20 to 25 inclusive). Lower water levels were observed over the previous 3 reporting periods due to extended drought conditions with less than average annual rainfall being evident.

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 (shown on Charts 19, 35 and 36).

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. 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 26 to 34 inclusive, 37 to 40 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 during this reporting period. 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 41 and 55). 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. One sampling event was possible during the last reporting period. Three sampling events were attempted during this reporting period, however insufficient flows were recorded at SW1 for more than one occasion. 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.

6.5 Review of Maximum Extraction Depth Map

A review of the Maximum Extraction Depth Map (MEDM) was undertaken 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 3rd April 2020. The MEDM (March 2020) was approved by the DPIE on 2 October 2020.

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 30 June 2020 by Dixon Sand as part of the Annual Review. No change was considered necessary.

The next review of the MEDM will be undertaken within 3 months of the IEA which is scheduled for late 2022.

6.6 Water Access License Usage

The Annual Returns for Water Access Licenses (WALs) 25941 and 25956 for the 2020 – 2021 reporting period were submitted to WaterNSW on 13th and 20th July 2021 respectively. The total water usage for each WAL is listed in Table 25 below.

Table 25: Water usage for Water Access Licences during the Financial Year 2020 - 2021

Water Access License Number	Annual Water Usage (Megalitres)
WAL 25941	0.1
WAL 25956	7.9

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	Nil – not required due to minimal extraction occurring during wet weather.
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 8.0 megalitres of water was utilised in accordance with the WALs by onsite farmers for crop irrigation purposes.
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.
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.

Sandstone extraction in Stage 2 west concluded in the 2018 – 2019 reporting period. Minor vegetation clearing and sand extraction commenced in Extraction Cell 1A but was suspended during the whole duration of the 2020 – 2021 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 CLWD (now DPIE – Water) 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 CLWD (now DPIE – 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 CLWD (NRAR and DPIE-Water) on 4 September 2020. Multiple correspondences were exchanged between Dixon Sand and NRAR regarding the on-going actions and requirement for the baseline monitoring program. On 24 May 2021 Dixon Sand received the following recommendations from NRAR:

- Download and review datalogger from all bores included in the monitoring program at a minimum of monthly frequency, and
- Periodic (6 monthly) review of the data to identify potential changes and submission of the groundwater monitoring data (excel) to NRAR no later than one month following the end of each reporting period.

Dixon Sand received the DPIE'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).

6.9 Changes to Environmental Procedures

Current groundwater management measures are considered adequate.

Monitoring of the extraction limit will continue in order to ensure compliance. The Maximum Extraction Depth Map will require review following the next Independent Environmental Audit scheduled in 2022.

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.

7. Ecological Monitoring and Rehabilitation

7.1 Vegetation Clearing

No vegetation clearing was carried out during this reporting period.

Any future vegetation clearing to be undertaken in accordance with the pre-clearing survey and multi-stage habitat tree clearing protocols implemented by Dixon Sand. Appropriate briefing and induction will be provided to the relevant staff prior to any vegetation being cleared.

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 222.5 hours were spent on bush regeneration works at Haerses Road Quarry, equating to approximately 31% of the time spent between Old Northern Road Quarry and Haerses Road Quarry.

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

- Perimeter edge of Haerses Road Biobanking Site under the BCT agreement,
- Original Translocation and Planting area located east of Stage 2 west (Lot 177 DP 752039), and
- Screen planting in the 30m buffer to Wisemans Ferry Road.

No bush regeneration work has been carried out at the Porters Road Biobank Site under the BCT agreement.

Bush regeneration works involved mechanical and chemical methodologies.

Figures 5, 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 2020 – 2021 reporting period is attached as Appendix G.



Figure 5: Bush regeneration and weed management works area at Haerses Road Quarry (source: BushIT 2021).

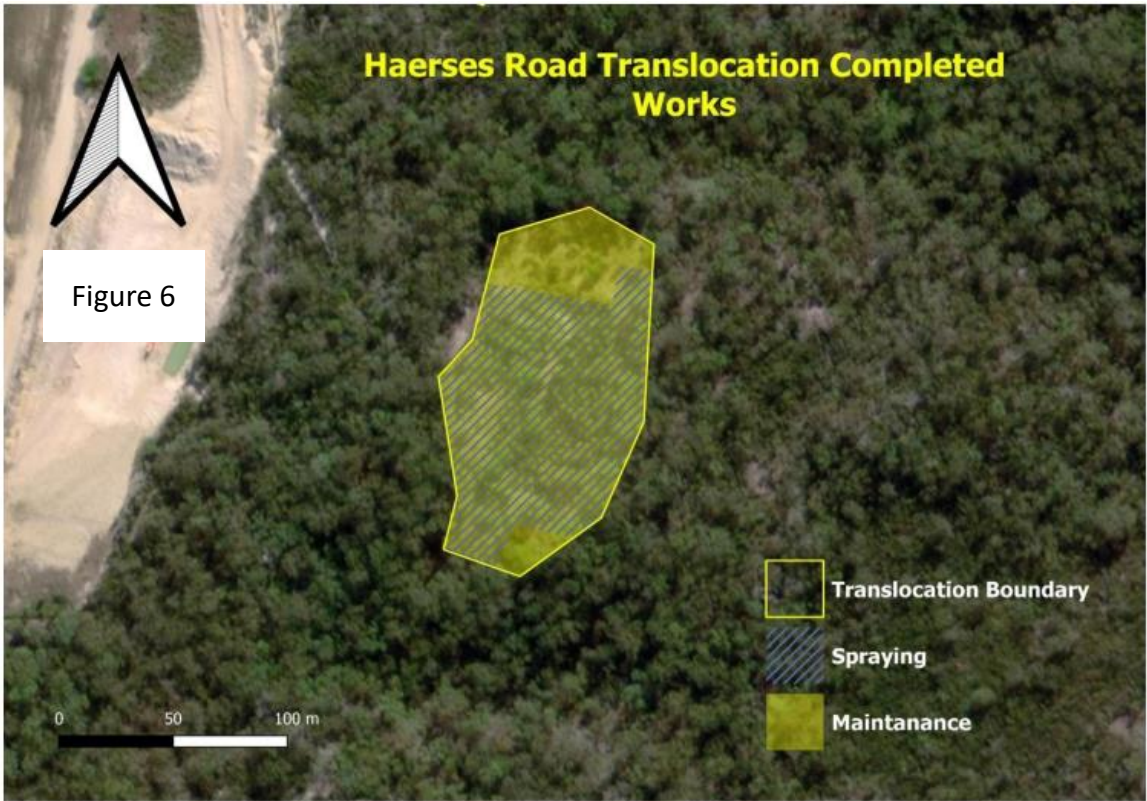


Figure 6: Bush regeneration and weed management works area at Haerses Road Translocation area (source: BushIT 2021).

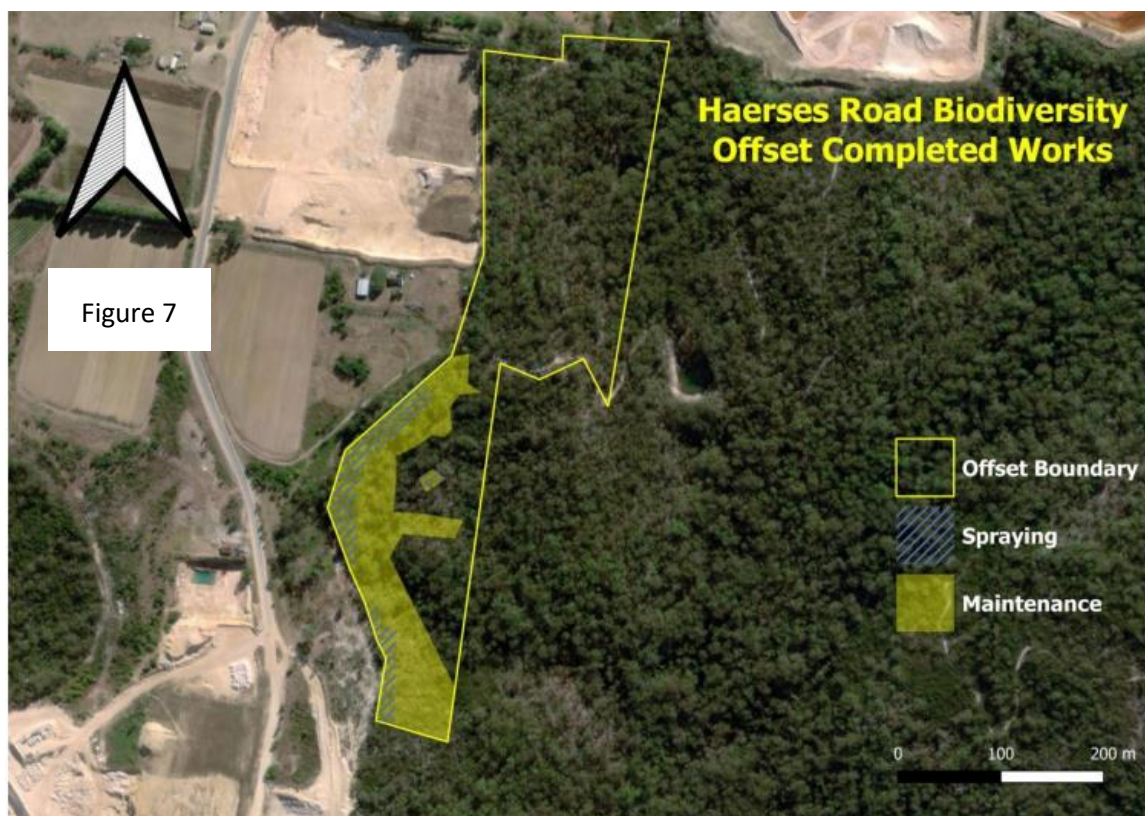


Figure 7: Bush regeneration and weed management works area at Haerses Road Biobank Site under the BCT agreement (source: BushIT 2021).

7.2.1 Translocation Site and Original Offset

Maintenance works at the areas shown on Figure 6 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 and Porters Road Biobank Sites (BSA Agreement)

Haerses Road and Porters Road Biobank Sites are currently undergoing '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 have occurred in the area highlighted in Figure 6.

No bush regeneration work was carried out at Porters Road biobank site.

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

7.2.3 Wisemans Ferry Road 30 Metre Buffer

The Haerses Road and Wisemans Ferry Road intersection upgrade works have severely impacted access for maintenance of this area during the reporting period, mainly restricting access to the northern section of the 30m buffer. On the southern section of the 30m buffer, some canopy trees (*Callistemon* sp.) continue to establish however, the area lacks native resilience and is mainly occupied by exotic grassland with thickets of blackberry and infestation of turkey rhubarb. Maintenance works in this area focused on cutting and spot spraying whiskey grass, African love grass and manual treatment of blackberry and turkey rhubarb.

7.3 Ecological Monitoring

Dixon Sand engaged South East Environmental to undertake annual biodiversity and rehabilitation monitoring and reporting for Haerses Road Quarry. Progress assessment 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, 2021) 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, 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.

The following observations and field notes were made.

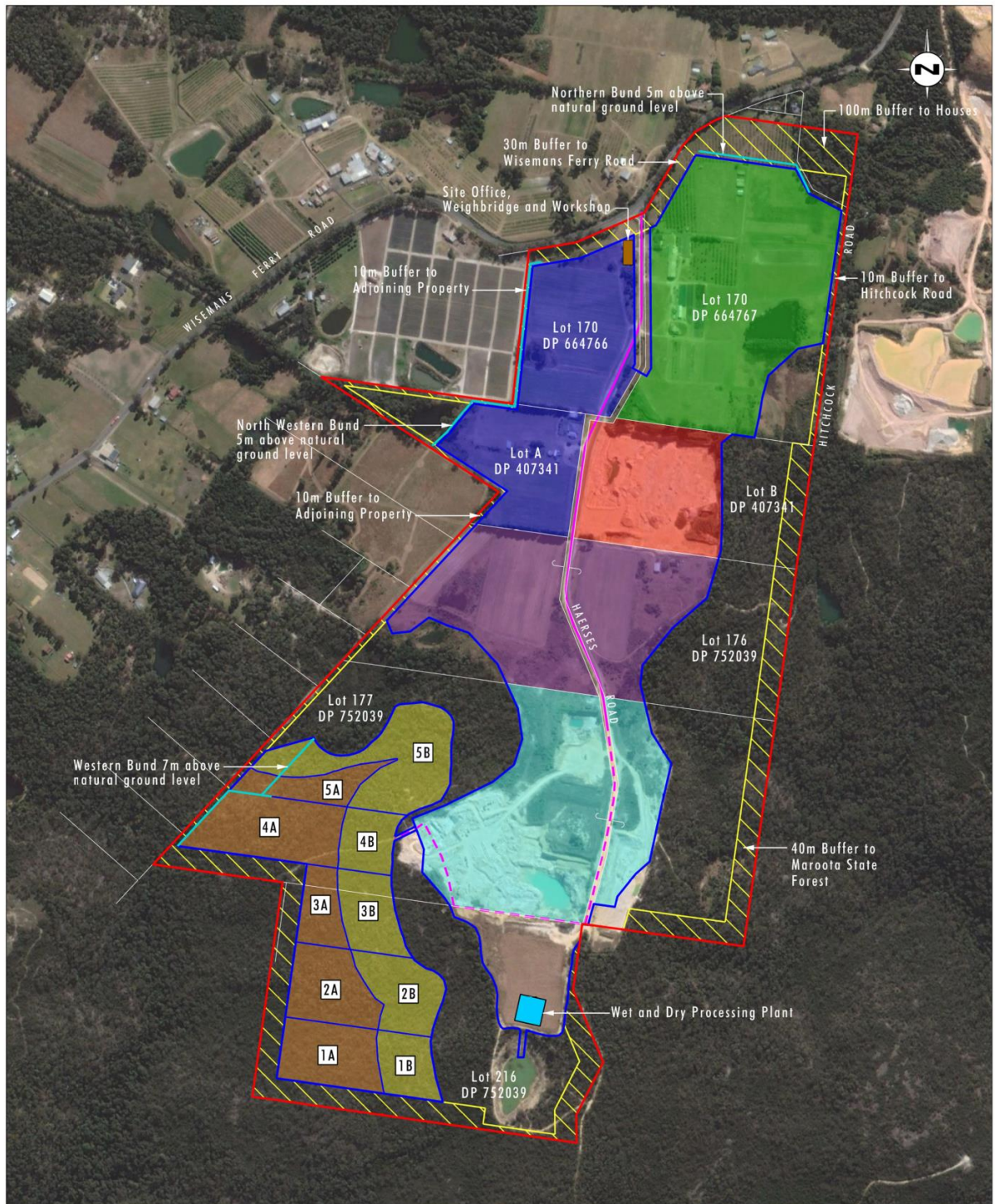


Image Source: Google Earth (Sep 2017)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

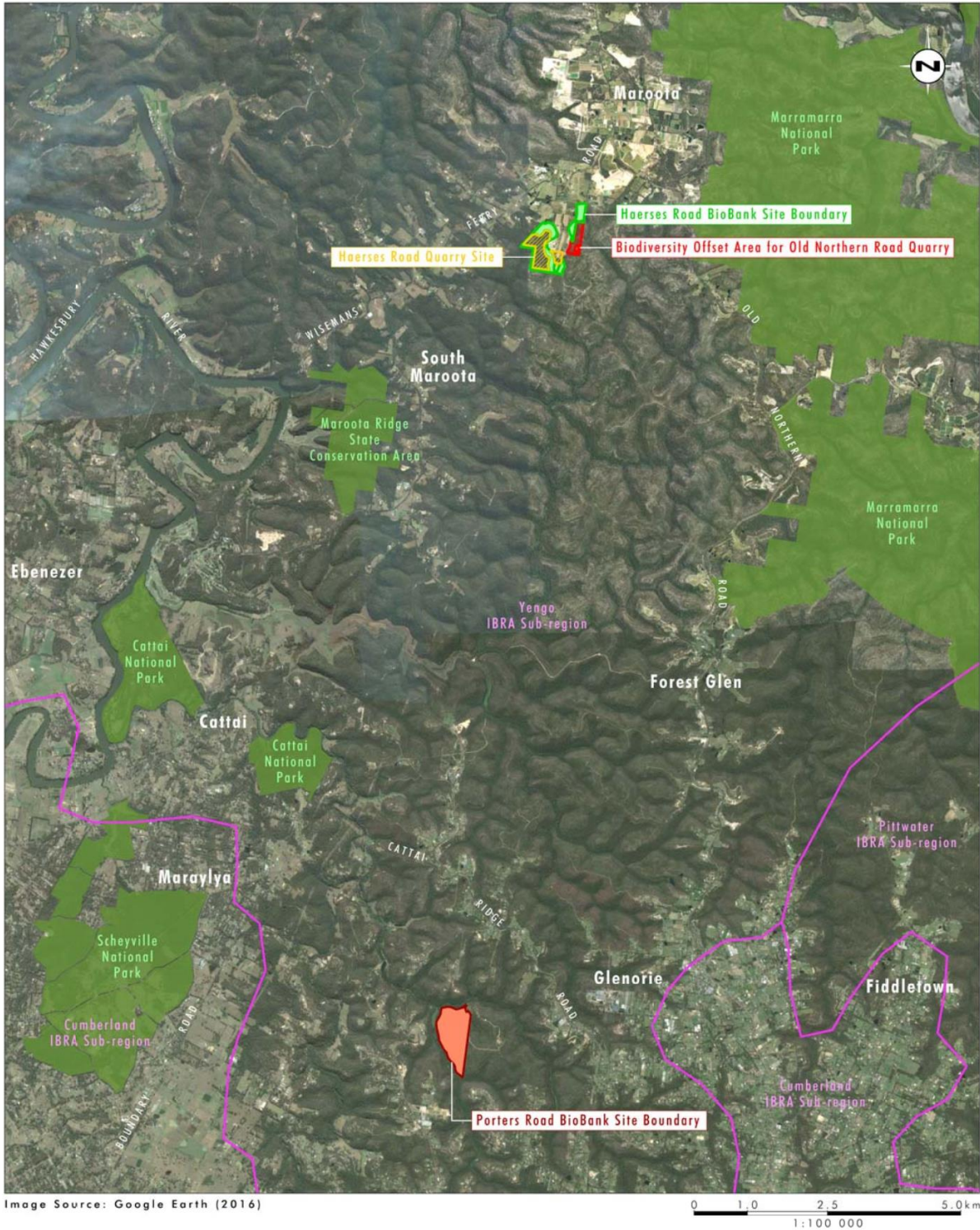
0 100 250 500m
1:10 000

Legend

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

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

Figure 8
Buffer Zones,
Haerses Road Quarry



- 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

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20180525 10:58

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

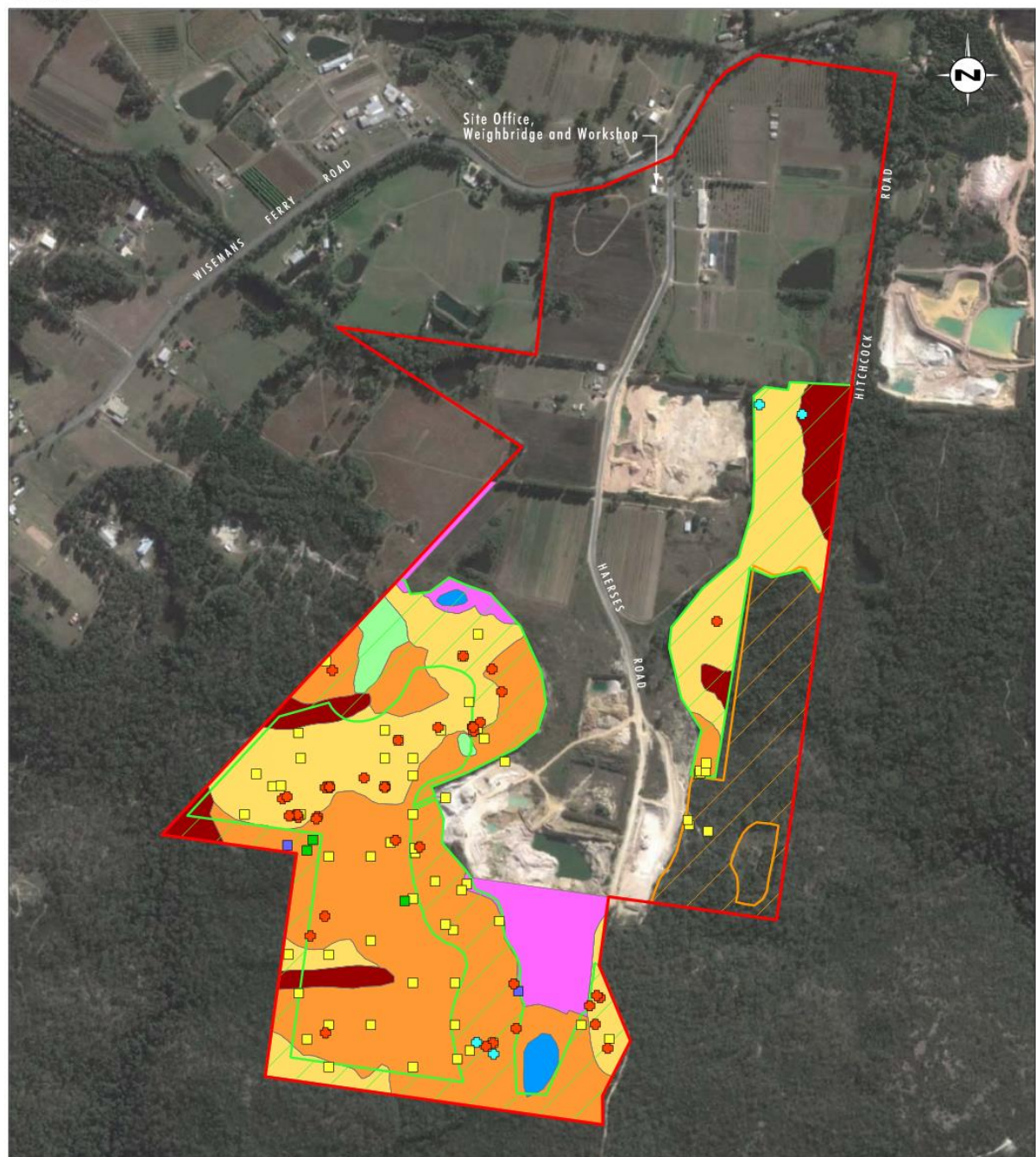


Image Source: Google Earth - DigitalGlobe (May 2016)
Data Source: Mc Kinlay Morgan & Associates Pty Ltd (2014)

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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20180525 11.10

Figure 10
Haerses Road BioBank Site
and HRBOA

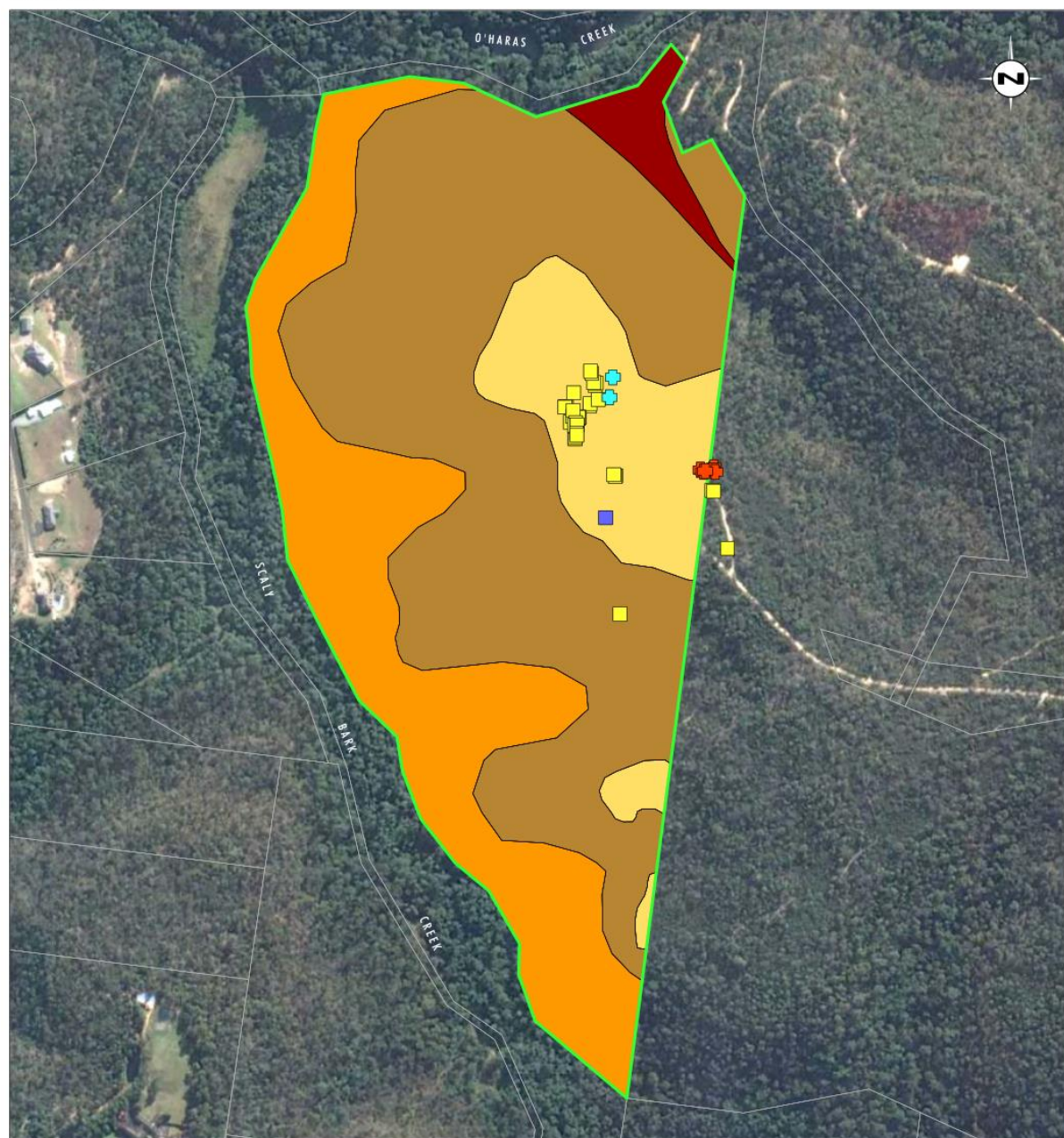


Image Source: Google Earth (2015)
 Data Source: LPI (2011), Umwelt (2017), South East Environmental (2016, 2017)
 Note: Site within Baulkham Hills Local Government Area and
 Yengo IBRA Subregion Boundary

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*
- *Tetratheca glandulosa*

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 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. The eastern area of Stage 1 is currently being utilised for material stockpile for rehabilitation.

It is proposed that over the next reporting period, these stockpiles will be screened to remove rock fragments larger than 150mm in diameter. The material will then be spread across the site to achieve final landform and to enable rehabilitation to Agriculture Class 4.

7.3.2 Stage 2 Extraction Cell

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

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 native seed bank contained in the soil is expected to result in sandstone heath vegetation over time which may also contain threatened species such as *Darwinia biflora*, *Darwinia fascicularis* subsp. *oligantha* and *Tetratheca glandulosa*.

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. No rehabilitation has taken place in extraction Cell 1A. Extraction in these cells were suspended during the 2020 – 2021 reporting period whilst awaiting the outcome of DA165-7-2005 Modification 4 application for the alteration of extraction sequence.

Baseline monitoring for extraction Cells A and B series have commenced during this reporting period.

7.3.3.1 Baseline Monitoring for Extraction Cells A and B

Four baseline monitoring sites were established for each Extraction Cells 2-5 (A and B combined). A baseline monitoring site was not able to be established in Extraction Cell 1 due to commencement of extraction and current area being subjected to disturbance. Information collected from these baseline monitoring sites was carried out in accordance with DPIE 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.

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 motorist on Wisemans Ferry Road. Intersection upgrade works at the Haerses

Road and Wisemans Ferry Road during early 2020 have caused some disturbance to 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. Works associated with the reinstatement of buffer planting in the disturbed area will commence in the next reporting period.

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. There has been no further disturbance to any areas of the buffer.

7.4 Management of Biodiversity Stewardship Sites

Two Biodiversity 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. Dixon Sand is yet to reach 80% of the Total Fund Deposit and therefore are undertaking the Passive Management of the biobanking sites.

The annual inspection for Year 2 of the Haerses Road and Porters Road biobanking sites were undertaken on 22 February 2021 for the purpose of annual reporting of passive management actions. The reports were submitted to the Biodiversity Conservation Trust (BCT) on 26 February 2021.

Inspections were carried out against a number of management actions with the following outcome:

- **management of grazing or conservation** – no stock kept or located on both properties.
- **weed control** – N/A until active management,
- **management of fire for conservation** – no fire within the BSA sites during previous 12 month period,
- **management of human disturbance** – no human activities undertaken or waste disposed of within the BSA sites. Fence installed where activities occur nearby to define boundary,
- **retention of regrowth and remnant native vegetation** – no disturbance to any native vegetation within the BSA sites,
- **replanting or supplementary planting where natural regeneration will not be sufficient** – N/A until active management,
- **retention of dead timber** – no removal of dead timber, standing or fallen, from within the BSA sites
- **erosion control** – N/A until active management,
- **retention of rocks** – no removal of rocks from within the BSA sites
- **control of feral and overabundant native herbivores** – N/A until active management,
- **nutrient control** – N/A until active management, and
- **maintenance or reintroduction of natural flow regimes** – no change to natural flow regimes within the BSA sites.

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 biobanking 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.

The full annual management reports for Year 2 (2020 - 2021) 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 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.
- Achieve final landform for active rehabilitation area
- First agricultural planting event

Stage 2 Extraction Area

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

Wisemans Ferry Road 30 metre Buffer Area

- Remediate the disturbed area resulting from roadworks utilising appropriate rehabilitation methodologies for screening vegetation

Buffer to Deerubbin LALC Property (formerly Maroota State Forest)

- Continued bush regeneration maintenance in the previously disturbed area

Extraction Cells A and B

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

Weed Management

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

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 BA reporting.

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 DP&E 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

One complaint was received by Haerses Road quarry during the 2020 - 2021 reporting period.

A copy of the complaints register (updated July 2021) is contained in Appendix L.

8.2.1 Long Term Complaints Trend

Long term complaints monitoring data commencing 2006 – 2007 is depicted in Chart 69 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 trucks 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.

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.

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. All complaints have been closed out.

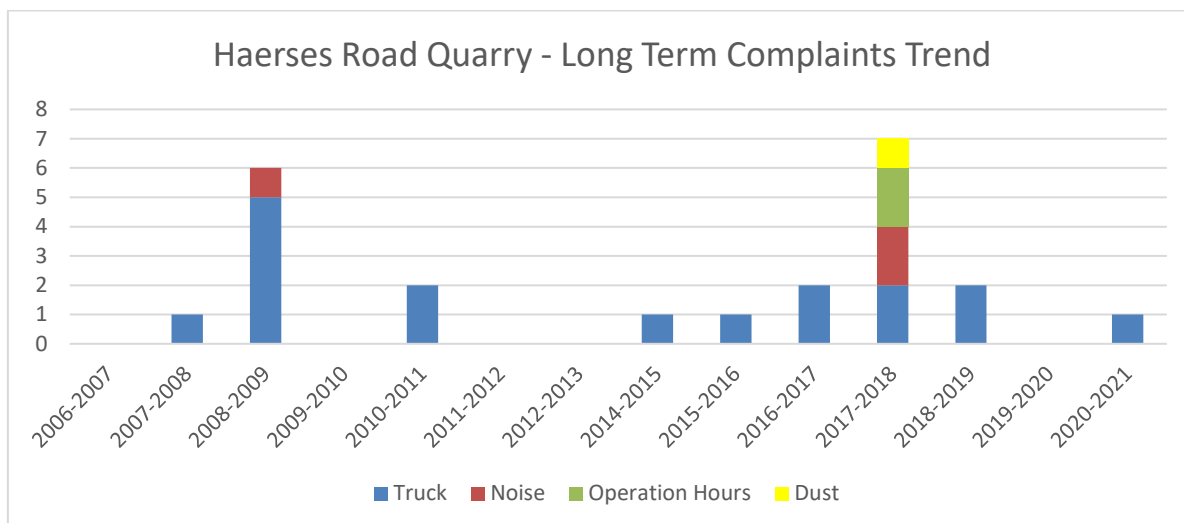


Chart 69: Long term complaints monitoring data.

8.3 Community Consultative Committee, Meetings and Guidelines

Two ordinary CCC meetings were held in the 2020 - 2021 reporting period, in accordance with the consent conditions and CCC Guidelines (2016). The CCC meetings were held on 11th November 2020 and on 12th May 2021.

This CCC meeting provided opportunity to address any issues that were brought up by the community and/or stakeholders. The meeting minutes 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:

- Liaising with the neighbouring property owners to Haerses Road quarry regarding general maintenance,
- Notifying the Maroota Public School regarding noise monitoring undertaken in June 2021,
- Seeking permission from the property owners identified as receivers for the DA165-7-2005 (Modification 2) adjacent to Haerses Road to conduct attended noise monitoring on the property in June 2021, and
- Bi-annual CCC meetings in November 2020 and May 2021.

Local Initiatives

Dixon Sand regularly contributes to a number of community initiatives including:

- monetary contribution to the Maroota Public School,
- monetary contribution to the Cattai Public School,
- monetary contribution to the Royal Flying Doctor Service, and

- publication of environmental monitoring data, and provision of all current consents and site management plans for public viewing on the Dixon Sand website.

Dixon Sand typically donates time and machine resources to the annual Maroota Muster however, the event did not take place during the 2020 – 2021 reporting period due to COVID-19 restrictions.

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 2000 as follows:

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

Haerses Road quarry continues 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 is 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.

An annual meeting between Dixon Sand and the representative of the Rural Fire Service was conducted before the start of the bushfire season on 25th August 2020 on the quarry premise to:

- review the Bushfire Management Plans,
- review risk assessment and procedures in the event of a bushfire,
- discuss key dates for the 2020-2021 bushfire season and any specific season predictions,
- discuss any planned hazard reduction burns in the area including locations, size and dates,
- discuss any changes to quarry operations which may affect bushfire risks, and
- discuss the locations of static water supplies including waters storage ponds and standpipe.

The meeting minutes are contained in Appendix N.

The outcome of the meeting was communicated to Dixon Staff in the form of a toolbox talk.

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,
- 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 28 below.

Table 28: Environmental Non-compliances and Incidents

Event No.	Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
1	30/11/2020	<ul style="list-style-type: none"> Condition M2.3 of EPL 12513 	<p>Details of Incident Dixon Sand received a notification on 30th November 2020 at 1:06 am via a text alarm, alerting that the rolling 24-hour average PM10 level has reached 43.8 µg/m3 which exceeded the 42 µg/m3 criteria. A notification alerting that the rolling 24-hour average PM10 level has fallen below the 42 µg/m3 criteria was received on the same day at 1:06 pm. The exceeded rolling 24-hour average PM10 level was reported to the EPA on 30 November 2020 (Ref: C17678-2020). No additional request for information from the EPA is received to date.</p> <p>Cause of Incident As outlined by Condition M2.3 of EPL 3916, the north-westerly prevailing wind (between 180° and 270°) is the wind blowing from the quarry in the direction towards the receivers. A review of the meteorological data indicated that the prevailing wind directions were blowing easterly to south-easterly leading up to the PM10 exceedance. Elevated PM10 levels were a result of the heat wave and windy conditions which occurred across New South Wales on the previous two days, which is considered an extraordinary event under Note d of Condition 9 of Schedule 3 of DA 25165-7-2005.</p> <p>Mitigation Measures The rolling 24-hour average PM10 exceedance was not attributed to quarry operations and therefore, quarry operations continued as normal. During this period, regular onsite dust suppression utilising the water cart was carried out.</p> <p>Non-Compliance The exceedance of rolling 24-hour average PM10 has triggered the reporting requirement of Condition M2.3 of EPL 12513, which intends to assist the site operations to control any potential dust issues. Despite the exceeded rolling 24-hour average PM10, the daily 24-hour average PM10 on the day did not exceed the EPL and NEPM criteria of 42 µg/m3 and 50 µg/m3. The incident is <u>not considered</u> a non-compliance in this instance.</p>
2	25/04/2021	<ul style="list-style-type: none"> Condition 9 of Schedule 3 of DA 165-7-2005, and Conditions M2.3 of EPL 12513 	<p>Details of Incident The 24-hour average PM10 levels have exceeded the EPL 42 µg/m3 EPL criteria and NEPM 50 µg/m3 criteria contained in Table 3 of Condition 9 of Schedule 3 of DA 165-7-2005. Dixon Sand received trigger alarm at 07:02 pm on Sunday 25/04/21 alerting that the rolling 24-hr average PM10 level has</p>

Event No.	Date of Incident	Applicable Condition(s)	Details, Cause and Mitigation of Incident
			<p>reached 43.1 µg/m³ which continued to rise and peaked at 53.6 µg/m³ between 09:05 pm and 10:00 pm. The exceeded 24-hour average PM10 level (the incident) was notified and reported to the EPA and DPIE on 26 April 2021 (EPA Ref: REF-NO-1263)</p> <p>Cause of Incident A number of RFS hazard reduction burns were carried out across Greater Sydney and the Blue Mountains from the 23/04/21 to 26/04/21, including the ones in Fiddletown, Dural, Annangrove, Maroota and Penrith. RFS issued a smoke advisory for the public the morning of 26/04/21. The PM10 exceedance was not attributed to quarry operations as no quarry work are carried out on Sundays.</p> <p>Mitigation Measures Quarry operations continued as normal on Monday 26/04/21, with regular use of water cart for dust suppression. At the time of providing this notification, the 24-hour PM10 levels continued to exceed the 50 µg/m³ criteria. Dixon Sand received a text alarm on 26/04/21 at 6:02 pm alerting that the rolling 24-hr average PM10 level has reduced to 38.2 µg/m³</p> <p>Non-Compliance The exceedance of rolling 24-hour average PM10 has triggered the reporting requirement of Condition M2.3 of EPL 12513, which intends to assist the site operations to control any potential dust issues.</p> <p>As the cause of PM10 exceedance is attributed to prescribed burns, the incident was caused by 'extraordinary events' as categorised in Note d of Table 3 of Condition 9 of Schedule 3 of DA 25009-01.</p> <p>Therefore, the PM10 exceedance (the incident) in this instance is <u>not considered</u> a non-compliance.</p>

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

11.2 Section 191 Improvement Notice

Dixon Sand did not receive any improvement notices under Section 191 Improvement Notices of the *Work Health and Safety Act* 2011 from NSW Resources Regulator during this reporting period.

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, Industry and Environment (DPIE) on 11th July 2019.

The IEA commenced on 22 October 2019 and the *Independent Environmental Audit: Haerses Road Quarry Report* (RW Corkery & Co, January 2020, Document No. 1022/01) issued on 10th January 2020.

The *Response and Action Plan for the Independent Environmental Audit 2019, 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: Old Northern Road Report* (RW Corkery & Co, January 2020, Document No. 1022/01). This Document was prepared in accordance with the *Independent Audit – Post Approval Requirements June 2018* (Department of Planning and Environment, 2018).

The IEA report and Response and Action Plan report were submitted to the DPIE on 13th January 2020. The CCC members and other Agencies were provided a link to the reports published on Dixon Sand's website.

12.2 Independent Environmental Audit Outcome and Proposed Actions

A total of 2 items were outstanding in the previous 2019 – 2020 Annual Review. The details and status of the outstanding items are outlined in Table 29. These items have been actioned and closed out.

Table 29: Proposed Action, Implementation Timeframe and Status for the Outstanding Recommendations arising from the previous Annual Review.

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
HR R10/19	<p>Ensure that inspections of water management dam walls are undertaken biennially by a suitably qualified engineer in accordance with Section 5.1.2.4 of the Soil and Water Management Plan.</p> <p><i>Section 5.1.2.4 of the Soil and Water Management Plan requires that all water management dam walls be inspected by a suitably qualified engineer every 2 years. These inspections should be undertaken or the management plan amended.</i></p>	<p>Proposed Action: A suitably qualified engineer will be engaged to inspect the water management dam walls biennially. The report will be included in the Annual Review.</p> <p>Implementation Timeframe: Inspection by a suitably qualified engineer to be undertaken by 31 December 2020.</p> <p>2019 – 2020 Status: Open – the requirement to engage a suitably qualified engineer to inspect water management dam walls have been communicated to relevant quarry staff. Inspection yet to be undertaken.</p> <p>Current Status Completed – the Soil and Water Management Plan amended detailing that: “All existing and proposed dams (i.e. farm dams, water supply, sediment retention, water quality management dams) are cut into sandstone or in-situ material. No fill constructed dams require embankment construction or structural fill material currently exist or proposed on site under the current consent or associated management plans, and therefore, no structural assessment of dams will be required.”</p>
HR R13/19	<p>Ensure that water monitoring results are reviewed against the relevant trigger and criteria values as soon as possible following receipt of results. If water quality or levels exceeds the nominated trigger values, implement measures outlined in the trigger action response plan.</p> <p><i>Exceedances of the nominated trigger values must be identified as soon as possible to permit the effective implementation of response measures outlined in the trigger action response plan (e.g. confirmation sampling, increase in sampling frequency or investigation of possible causes).</i></p>	<p>Proposed Action: Water monitoring results will be reviewed against the relevant trigger and criteria values as soon as possible following receipt of the results. Implement measures outlined in the trigger response plan where applicable.</p> <p>Implementation Timeframe: From the point this document is submitted.</p> <p>2019 – 2020 Status: Open – the revised trigger levels in the SWMP have been submitted to DPIE for approval. Dixon Sand currently awaits DPIE's comments/approval of revised EMS and Management Plans, submitted on 01/05/2020. EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request. The water monitoring results will be reviewed against the relevant trigger and criteria values pending the above action.</p> <p>Current Status Completed – the Soil and Water Management Plan (v4), containing the revised trigger levels, was approved by the DPIE on 22 November 2020.</p>

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

13.1 Noise Monitoring

- Should extraction re-commence in the extraction cells A and B (approved during DA 165-7-2006 Modification 1), noise monitoring will revert back to 6-monthly frequency.

13.2 Ground and Surface Water Management

- 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

13.3 Vegetation Clearing

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

13.4 Rehabilitation and Bush Regeneration

Stage 1 Extraction Area

- 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

Stage 2 Extraction Area

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

Wisemans Ferry Road 30 metre Buffer Area

- Remediate the disturbed area resulting from roadworks utilising appropriate rehabilitation methodologies for vegetation screening.

Buffer to Deerubbin LALC Property (formerly Maroota State Forest)

- Continued bush regeneration maintenance in the previously disturbed area

Extraction Cells A and B

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

Weed Management

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

Pest fauna species survey and management

- Continue with feral fauna species monitoring and implement any actions as required.

Haerses Road and Porters Road Biobank Sites

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

14. Audits and Improvement Notice

There are no outstanding proposed actions for the Independent Environmental Audit and DRG's Improvement Notice.

15. Conclusion

A number of recommendations and changes in environmental procedures have been proposed throughout this Annual Review of 2020 – 2021 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

Report Number:

9380



Date Issued: 30/07/2020

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


PO Box 2335 Greenhills NSW 2323
P (02) 4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 600

The following 9 samples were received on 24/07/2020 and tested at 4/30 Glenwood Dr Thornton, NSW 2322

Client Sample Reference	GPS-Easting	GPS-Northing	Date Sampled	Lab ID	Matrix	Comment or Non-compliances
D08&9 Hitchcock Rd Olive Grove	313058	6295137	24/07/2020	9380/1	Dust	
D10 Hearses Rd	312538	6294576	24/07/2020	9380/2	Dust	
D06 School	313518	6296537	24/07/2020	9380/3	Dust	Minor insects
D05 Bund	313160	6296838	24/07/2020	9380/4	Dust	Recent land clearing adjacent
D04 Rehab	312385	6296932	24/07/2020	9380/5	Dust	
D07 Mullock	312579	6296676	24/07/2020	9380/6	Dust	
D01(A) Front Gate	313290	6297176	24/07/2020	9380/7	Dust	
D11 Goldstien	312034	6294213	24/07/2020	9380/8	Dust	
D12 Ram	311750	6294159	24/07/2020	9380/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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


Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Test Report Number: 9380

Date Issued: 30/07/2020

Tested between: 24/07/20 and 30/07/20



Results

Lab ID	Client Sample Reference	Date On	Date Off	Number of Days	Insoluble Solids	Ash	Combustible Matter	Calculated Rain
				days AS 3580.10.1	g/m2/mth AS 3580.10.1 0.1	g/m2/mth AS 3580.10.1 0.1	g/m2/mth AS 3580.10.1 0.1	mm AS 3580.10.1 1
9380/1	D08&9 Hitchcock Rd Olive Grove	26/06/2020 10:52	24/07/2020 11:12	28	0.3	0.2	0.1	34
9380/2	D10 Hearses Rd	26/06/2020 13:28	24/07/2020 15:41	28	0.5	0.2	0.3	33
9380/3	D06 School	26/06/2020 10:45	24/07/2020 11:06	28	3.3	2.5	0.8	34
9380/4	D05 Bund	26/06/2020 10:37	24/07/2020 10:56	28	1.2	0.8	0.4	31
9380/5	D04 Rehab	26/06/2020 10:11	24/07/2020 10:24	28	<0.1	<0.1	<0.1	31
9380/6	D07 Mullock	26/06/2020 10:23	24/07/2020 10:36	28	0.1	0.1	<0.1	31
9380/7	D01(A) Front Gate	26/06/2020 09:49	24/07/2020 10:42	28	1.2	1.1	0.1	32
9380/8	D11 Goldstien	26/06/2020 13:15	24/07/2020 14:49	28	0.1	0.1	<0.1	30
9380/9	D12 Ram	26/06/2020 11:35	24/07/2020 15:49	28	0.1	0.1	<0.1	32

Results have been approved and report finalised on 30/07/2020

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sampling Report Number: 9380

Date Issued: 30/07/2020
Sampling Conditions: Cloudy 12°-17°C



Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment/ Preservation	Comments
9380/1	D08&9 Hitchcock Rd Olive Grove	24/07/2020 11:12	D.Walker	AS3580.10.1	CuSO4	
9380/2	D10 Hearses Rd	24/07/2020 15:41	D.Walker	AS3580.10.1	CuSO4	
9380/3	D06 School	24/07/2020 11:06	D.Walker	AS3580.10.1	CuSO4	
9380/4	D05 Bund	24/07/2020 10:56	D.Walker	AS3580.10.1	CuSO4	
9380/5	D04 Rehab	24/07/2020 10:24	D.Walker	AS3580.10.1	CuSO4	
9380/6	D07 Mullock	24/07/2020 10:36	D.Walker	AS3580.10.1	CuSO4	
9380/7	D01(A) Front Gate	24/07/2020 10:42	D.Walker	AS3580.10.1	CuSO4	
9380/8	D11 Goldstien	24/07/2020 14:49	D.Walker	AS3580.10.1	CuSO4	
9380/9	D12 Ram	24/07/2020 15:49	D.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 30/07/2020
Where method is "unknown" sampling procedures are not endorsed.

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 –
Testing. The results of the tests, calibrations and/or
measurements included in this document are
traceable to Australian/national standards.



Report Number:

9502



Date Issued: 31/08/2020

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


PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 600

The following 9 samples were received on 21/08/2020 and tested at 4/30 Glenwood Dr Thornton, NSW 2322

Client Sample Reference	GPS-Easting	GPS-Northing	Date Sampled	Lab ID	Matrix	Comment or Non-compliances
D08&9 Hitchcock Rd Olive Grove	313058	6295137	21/08/2020	9502/1	Dust	
D10 Hearses Rd	312538	6294576	21/08/2020	9502/2	Dust	
D06 School	313518	6296537	21/08/2020	9502/3	Dust	
D05 Bund	313160	6296838	21/08/2020	9502/4	Dust	
D04 Rehab	312385	6296932	21/08/2020	9502/5	Dust	
D07 Mullock	312579	6296676	21/08/2020	9502/6	Dust	
D01(A) Front Gate	313290	6297176	21/08/2020	9502/7	Dust	
D11 Goldstien	312034	6294213	21/08/2020	9502/8	Dust	
D12 Ram	311750	6294159	21/08/2020	9502/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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


Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Test Report Number: 9502

Date Issued: 31/08/2020

Tested between: 21/08/20 and 31/08/20



Results

Lab ID	Client Sample Reference	Date On	Date Off	Number of Days	Insoluble Solids	Ash	Combustible Matter	Calculated Rain
			Units Method Code PQL	days AS 3580.10.1	g/m2/mth AS 3580.10.1 0.1	g/m2/mth AS 3580.10.1 0.1	g/m2/mth AS 3580.10.1 0.1	mm AS 3580.10.1 1
9502/1	D08&9 Hitchcock Rd Olive Grove	24/07/2020 11:12	21/08/2020 11:04	28	0.5	0.4	0.1	205
9502/2	D10 Hearses Rd	24/07/2020 15:41	21/08/2020 15:30	28	0.4	0.3	0.1	213
9502/3	D06 School	24/07/2020 11:06	21/08/2020 09:58	28	1.1	0.7	0.4	215
9502/4	D05 Bund	24/07/2020 10:56	21/08/2020 10:38	28	1.6	1.0	0.6	203
9502/5	D04 Rehab	24/07/2020 10:24	21/08/2020 10:16	28	0.2	0.1	0.1	195
9502/6	D07 Mullock	24/07/2020 10:36	21/08/2020 10:24	28	0.3	0.3	<0.1	205
9502/7	D01(A) Front Gate	24/07/2020 10:42	21/08/2020 10:04	28	3.0	2.6	0.4	116
9502/8	D11 Goldstien	24/07/2020 14:49	21/08/2020 14:37	28	0.5	0.2	0.3	201
9502/9	D12 Ram	24/07/2020 15:49	21/08/2020 10:56	28	0.4	0.2	0.2	207

Results have been approved and report finalised on 31/08/2020

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sampling Report Number: 9502

Date Issued: 31/08/2020
Sampling Conditions: Cloudy 14°-17°C



Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment/ Preservation	Comments
9502/1	D08&9 Hitchcock Rd Olive Grove	21/08/2020 11:04	D.Walker	AS3580.10.1	CuSO4	
9502/2	D10 Hearses Rd	21/08/2020 15:30	D.Walker	AS3580.10.1	CuSO4	
9502/3	D06 School	21/08/2020 09:58	D.Walker	AS3580.10.1	CuSO4	
9502/4	D05 Bund	21/08/2020 10:38	D.Walker	AS3580.10.1	CuSO4	Minor vegetation, trimmed adjacent wattles
9502/5	D04 Rehab	21/08/2020 10:16	D.Walker	AS3580.10.1	CuSO4	
9502/6	D07 Mullock	21/08/2020 10:24	D.Walker	AS3580.10.1	CuSO4	
9502/7	D01(A) Front Gate	21/08/2020 10:04	D.Walker	AS3580.10.1	CuSO4	Full
9502/8	D11 Goldstien	21/08/2020 14:37	D.Walker	AS3580.10.1	CuSO4	
9502/9	D12 Ram	21/08/2020 10:56	D.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 31/08/2020
Where method is "unknown" sampling procedures are not endorsed.

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 –
Testing. The results of the tests, calibrations and/or
measurements included in this document are
traceable to Australian/national standards.



Report Number:**9656**

Date Issued: 25/09/2020

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


PO Box 2335 Greenhills NSW 2323
P (02) 4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 600

The following 9 samples were received on 18/09/2020 and tested at 4/30 Glenwood Dr Thornton, NSW 2322

Client Sample Reference	GPS-Easting	GPS-Northing	Date Sampled	Lab ID	Matrix	Comment or Non-compliances
D08&9 Hitchcock Rd Olive Grove	313058	6295137	18/09/2020	9656/1	Dust	
D10 Hearses Rd	312538	6294576	18/09/2020	9656/2	Dust	
D06 School	313518	6296537	18/09/2020	9656/3	Dust	
D05 Bund	313160	6296838	18/09/2020	9656/4	Dust	
D04 Rehab	312385	6296932	18/09/2020	9656/5	Dust	
D07 Mullock	312579	6296676	18/09/2020	9656/6	Dust	
D01(A) Front Gate	313290	6297176	18/09/2020	9656/7	Dust	
D11 Goldstien	312034	6294213	18/09/2020	9656/8	Dust	
D12 Ram	311750	6294159	18/09/2020	9656/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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


Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Test Report Number: 9656

Date Issued: 25/09/2020

Tested between: 18/09/20 and 25/09/20



Results

Lab ID	Client Sample Reference	Date On	Date Off	Number of Days	Insoluble Solids	Ash	Combustible Matter	Calculated Rain
			Units Method Code PQL	days AS 3580.10.1	g/m2/mth AS 3580.10.1 0.1	g/m2/mth AS 3580.10.1 0.1	g/m2/mth AS 3580.10.1 0.1	mm AS 3580.10.1 1
9656/1	D08&9 Hitchcock Rd Olive Grove	21/08/2020 11:04	18/09/2020 09:09	28	0.9	0.6	0.3	26
9656/2	D10 Hearses Rd	21/08/2020 15:30	18/09/2020 13:28	28	0.5	0.4	0.1	25
9656/3	D06 School	21/08/2020 09:58	18/09/2020 08:19	28	0.8	0.7	0.1	28
9656/4	D05 Bund	21/08/2020 10:38	18/09/2020 08:29	28	1.5	1.2	0.3	28
9656/5	D04 Rehab	21/08/2020 10:16	18/09/2020 08:52	28	0.3	0.3	<0.1	25
9656/6	D07 Mullock	21/08/2020 10:24	18/09/2020 09:01	28	0.4	0.3	0.1	26
9656/7	D01(A) Front Gate	21/08/2020 10:04	18/09/2020 08:37	28	2.0	1.6	0.4	29
9656/8	D11 Goldstien	21/08/2020 14:37	18/09/2020 12:48	28	0.5	0.3	0.2	26
9656/9	D12 Ram	21/08/2020 10:56	18/09/2020 13:36	28	0.4	0.2	0.2	28

Results have been approved and report finalised on 25/09/2020

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sampling Report Number: 9656

Date Issued: 25/09/2020
Sampling Conditions: Cloudy 13°-15°C



Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment/ Preservation	Comments
9656/1	D08&9 Hitchcock Rd Olive Grove	18/09/2020 09:09	D.Walker	AS3580.10.1	CuSO4	Insects
9656/2	D10 Hearses Rd	18/09/2020 13:28	D.Walker	AS3580.10.1	CuSO4	Minor insects
9656/3	D06 School	18/09/2020 08:19	D.Walker	AS3580.10.1	CuSO4	Minor insects
9656/4	D05 Bund	18/09/2020 08:29	D.Walker	AS3580.10.1	CuSO4	Minor insects
9656/5	D04 Rehab	18/09/2020 08:52	D.Walker	AS3580.10.1	CuSO4	
9656/6	D07 Mullock	18/09/2020 09:01	D.Walker	AS3580.10.1	CuSO4	
9656/7	D01(A) Front Gate	18/09/2020 08:37	D.Walker	AS3580.10.1	CuSO4	Minor insects
9656/8	D11 Goldstien	18/09/2020 12:48	D.Walker	AS3580.10.1	CuSO4	
9656/9	D12 Ram	18/09/2020 13:36	D.Walker	AS3580.10.1	CuSO4	Minor insects

Sampling procedures have been approved and report finalised on 25/09/2020
Where method is "unknown" sampling procedures are not endorsed.

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 –
Testing. The results of the tests, calibrations and/or
measurements included in this document are
traceable to Australian/national standards.



Report Number: 9786

Date Issued: 27/10/2020

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 sample(s) were received on 16/10/2020

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	18/09/2020 09:09	16/10/2020 09:03	9786/1	Dust	
D10 Hearses Rd	18/09/2020 13:28	16/10/2020 09:36	9786/2	Dust	
D06 School	18/09/2020 08:19	16/10/2020 08:58	9786/3	Dust	
D05 Bund	18/09/2020 08:29	16/10/2020 08:51	9786/4	Dust	
D04 Rehab	18/09/2020 08:52	16/10/2020 08:30	9786/5	Dust	
D07 Mullock	18/09/2020 09:01	16/10/2020 08:40	9786/6	Dust	
D01(A) Front Gate	18/09/2020 08:37	16/10/2020 08:12	9786/7	Dust	
D11 Goldstien	18/09/2020 12:48	16/10/2020 13:02	9786/8	Dust	
D12 Ram	18/09/2020 13:36	16/10/2020 09:24	9786/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 27/10/2020.

Test Report Number: 9786

Date Issued: 27/10/2020

Revision No: 00

Results

Ambient Air	Method	Units	9786/1 D08&9 Hitchcock Rd Olive Grove 16/10/2020	9786/2 D10 Hearses Rd 16/10/2020	9786/3 D06 School 16/10/2020	9786/4 D05 Bund 16/10/2020	9786/5 D04 Rehab 16/10/2020
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	0.5	0.5	3.3	0.2
Ash	AS 3580.10.1	g/m2/mth	0.5	0.4	0.5	1.5	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.1	<0.1	1.8	<0.1
Calculated Rain	AS 3580.10.1	mm	7	12	15	14	13

Ambient Air	Method	Units	9786/6 D07 Mullock 16/10/2020	9786/7 D01(A) Front Gate 16/10/2020	9786/8 D11 Goldstien 16/10/2020	9786/9 D12 Ram 16/10/2020
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	0.8	0.4	0.4
Ash	AS 3580.10.1	g/m2/mth	0.4	0.7	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.1	0.2	0.2
Calculated Rain	AS 3580.10.1	mm	13	14	12	13

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

Results in Bold indicate an exceedance of prescribed limit as set out in relevant EPL.

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

Sampling Report Number: 9786

Date Issued: 27/10/2020

Revision No: 00

Sampling Conditions: Cloudy 18°-22°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
9786/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	16/10/2020 09:03	AS3580.10.1	CuSO4
9786/2	D10 Hearses Rd		D.Walker	16/10/2020 09:36	AS3580.10.1	CuSO4
9786/3	D06 School		D.Walker	16/10/2020 08:58	AS3580.10.1	CuSO4
9786/4	D05 Bund		D.Walker	16/10/2020 08:51	AS3580.10.1	CuSO4
9786/5	D04 Rehab		D.Walker	16/10/2020 08:30	AS3580.10.1	CuSO4
9786/6	D07 Mullock		D.Walker	16/10/2020 08:40	AS3580.10.1	CuSO4
9786/7	D01(A) Front Gate		D.Walker	16/10/2020 08:12	AS3580.10.1	CuSO4
9786/8	D11 Goldstien		D.Walker	16/10/2020 13:02	AS3580.10.1	CuSO4
9786/9	D12 Ram		D.Walker	16/10/2020 09:24	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
9786/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Insects
9786/2	D10 Hearses Rd	312538	6294576	Minor insects
9786/3	D06 School	313518	6296537	Minor insects
9786/4	D05 Bund	313160	6296838	Vegetation
9786/5	D04 Rehab	312385	6296932	Minor vegetation
9786/6	D07 Mullock	312579	6296676	
9786/7	D01(A) Front Gate	313290	6297176	Insects
9786/8	D11 Goldstien	312034	6294213	Minor vegetation
9786/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 27/10/2020.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 9891

Date Issued: 24/11/2020

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 sample(s) were received on 13/11/2020

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	16/10/2020 09:03	13/11/2020 10:14	9891/1	Dust	
D10 Hearses Rd	16/10/2020 09:36	13/11/2020 15:16	9891/2	Dust	
D06 School	16/10/2020 08:58	13/11/2020 09:20	9891/3	Dust	
D05 Bund	16/10/2020 08:51	13/11/2020 10:05	9891/4	Dust	
D04 Rehab	16/10/2020 08:30	13/11/2020 09:44	9891/5	Dust	
D07 Mullock	16/10/2020 08:40	13/11/2020 09:52	9891/6	Dust	
D01(A) Front Gate	16/10/2020 08:12	13/11/2020 09:26	9891/7	Dust	
D11 Goldstien	16/10/2020 13:02	13/11/2020 15:08	9891/8	Dust	
D12 Ram	16/10/2020 09:24	13/11/2020 10:36	9891/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 24/11/2020.

Test Report Number: 9891

Date Issued: 24/11/2020

Revision No: 00

Results

Ambient Air	Method	Units	9891/1 D08&9 Hitchcock Rd Olive Grove 13/11/2020	9891/2 D10 Hearses Rd 13/11/2020	9891/3 D06 School 13/11/2020	9891/4 D05 Bund 13/11/2020	9891/5 D04 Rehab 13/11/2020
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.0	2.1	0.7	0.9	0.4
Ash	AS 3580.10.1	g/m2/mth	0.8	1.0	0.5	0.7	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	1.1	0.2	0.2	0.1
Calculated Rain	AS 3580.10.1	mm	169	162	162	159	150

Ambient Air	Method	Units	9891/6 D07 Mullock 13/11/2020	9891/7 D01(A) Front Gate 13/11/2020	9891/8 D11 Goldstien 13/11/2020	9891/9 D12 Ram 13/11/2020
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	0.7	0.4	0.4
Ash	AS 3580.10.1	g/m2/mth	0.3	0.6	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.1	0.2	0.2
Calculated Rain	AS 3580.10.1	mm	153	116	147	155

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

[NT]: Not tested

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

Results in Bold indicate an exceedance of prescribed limit as set out in relevant EPL.

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

Sampling Report Number: 9891

Date Issued: 24/11/2020

Revision No: 00

Sampling Conditions: Intermittent showers, 21°-27°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
9891/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	13/11/2020 10:14	AS3580.10.1	CuSO4
9891/2	D10 Hearses Rd		D.Walker	13/11/2020 15:16	AS3580.10.1	CuSO4
9891/3	D06 School		D.Walker	13/11/2020 09:20	AS3580.10.1	CuSO4
9891/4	D05 Bund		D.Walker	13/11/2020 10:05	AS3580.10.1	CuSO4
9891/5	D04 Rehab		D.Walker	13/11/2020 09:44	AS3580.10.1	CuSO4
9891/6	D07 Mullock		D.Walker	13/11/2020 09:52	AS3580.10.1	CuSO4
9891/7	D01(A) Front Gate		D.Walker	13/11/2020 09:26	AS3580.10.1	CuSO4
9891/8	D11 Goldstien		D.Walker	13/11/2020 15:08	AS3580.10.1	CuSO4
9891/9	D12 Ram		D.Walker	13/11/2020 10:36	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
9891/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
9891/2	D10 Hearses Rd	312538	6294576	Bird droppings, algae
9891/3	D06 School	313518	6296537	
9891/4	D05 Bund	313160	6296838	
9891/5	D04 Rehab	312385	6296932	
9891/6	D07 Mullock	312579	6296676	
9891/7	D01(A) Front Gate	313290	6297176	Full
9891/8	D11 Goldstien	312034	6294213	Minor algae
9891/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 24/11/2020.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10059

Date Issued: 18/12/2020

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 sample(s) were received on 11/12/2020

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	13/11/2020 10:14	11/12/2020 08:29	10059/1	Dust	
D10 Hearses Rd	13/11/2020 15:16	11/12/2020 08:56	10059/2	Dust	
D06 School	13/11/2020 09:20	11/12/2020 09:15	10059/3	Dust	
D05 Bund	13/11/2020 10:05	11/12/2020 10:48	10059/4	Dust	
D04 Rehab	13/11/2020 09:44	11/12/2020 9:43	10059/5	Dust	
D07 Mullock	13/11/2020 09:52	11/12/2020 10:20	10059/6	Dust	
D01(A) Front Gate	13/11/2020 09:26	11/12/2020 09:21	10059/7	Dust	
D11 Goldstien	13/11/2020 15:08	11/12/2020 08:44	10059/8	Dust	
D12 Ram	13/11/2020 10:36	11/12/2020 9:06	10059/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Lisa Thomson

Signatory

Approved by:

Results have been approved and report finalised on 18/12/2020.

Test Report Number: 10059

Date Issued: 18/12/2020

Revision No: 00

Results

Ambient Air	Method	Units	10059/1 D08&9 Hitchcock Rd Olive Grove 11/12/2020	10059/2 D10 Hearses Rd 11/12/2020	10059/3 D06 School 11/12/2020	10059/4 D05 Bund 11/12/2020	10059/5 D04 Rehab 11/12/2020
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.2	0.7	1.3	4.4	1.1
Ash	AS 3580.10.1	g/m2/mth	0.9	0.6	1.3	3.8	0.9
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.1	<0.1	0.6	0.2
Calculated Rain	AS 3580.10.1	mm	43	45	39	42	43

Ambient Air	Method	Units	10059/6 D07 Mullock 11/12/2020	10059/7 D01(A) Front Gate 11/12/2020	10059/8 D11 Goldstien 11/12/2020	10059/9 D12 Ram 11/12/2020
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.0	5.2	1.3	0.9
Ash	AS 3580.10.1	g/m2/mth	1.0	4.4	0.7	0.7
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.8	0.6	0.2
Calculated Rain	AS 3580.10.1	mm	42	44	49	45

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Results in Bold indicate an exceedance of prescribed limit as set out in relevant EPL.

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

Sampling Report Number: 10059

Date Issued: 18/12/2020

Revision No: 00

Sampling Conditions: Cloudy 16°-18°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10059/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	11/12/2020 08:29	AS3580.10.1	CuSO4
10059/2	D10 Hearses Rd		D.Walker	11/12/2020 08:56	AS3580.10.1	CuSO4
10059/3	D06 School		D.Walker	11/12/2020 09:15	AS3580.10.1	CuSO4
10059/4	D05 Bund		D.Walker	11/12/2020 10:48	AS3580.10.1	CuSO4
10059/5	D04 Rehab		D.Walker	11/12/2020 9:43	AS3580.10.1	CuSO4
10059/6	D07 Mullock		D.Walker	11/12/2020 10:20	AS3580.10.1	CuSO4
10059/7	D01(A) Front Gate		D.Walker	11/12/2020 09:21	AS3580.10.1	CuSO4
10059/8	D11 Goldstien		D.Walker	11/12/2020 08:44	AS3580.10.1	CuSO4
10059/9	D12 Ram		D.Walker	11/12/2020 9:06	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10059/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
10059/2	D10 Hearses Rd	312538	6294576	
10059/3	D06 School	313518	6296537	Minor vegetation
10059/4	D05 Bund	313160	6296838	Minor vegetation
10059/5	D04 Rehab	312385	6296932	
10059/6	D07 Mullock	312579	6296676	
10059/7	D01(A) Front Gate	313290	6297176	Minor sand
10059/8	D11 Goldstien	312034	6294213	Minor vegetation
10059/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 18/12/2020.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10204

Date Issued: 15/01/2021

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 sample(s) were received on 8/01/2021

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	11/12/2020 08:29	08/01/2021 10:14	10204/1	Dust	
D10 Hearses Rd	11/12/2020 08:56	08/01/2021 10:51	10204/2	Dust	
D06 School	11/12/2020 09:15	08/01/2021 10:07	10204/3	Dust	
D05 Bund	11/12/2020 10:48	08/01/2021 09:59	10204/4	Dust	
D04 Rehab	11/12/2020 09:43	08/01/2021 09:33	10204/5	Dust	
D07 Mullock	11/12/2020 10:20	08/01/2021 09:43	10204/6	Dust	
D01(A) Front Gate	11/12/2020 09:21	08/01/2021 09:19	10204/7	Dust	
D11 Goldstien	11/12/2020 08:44	08/01/2021 14:29	10204/8	Dust	
D12 Ram	11/12/2020 09:06	08/01/2021 10:41	10204/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 15/01/2021.

Test Report Number: 10204

Date Issued: 15/01/2021

Revision No: 00

Results

Ambient Air	Method	Units	10204/1 D08&9 Hitchcock Rd Olive Grove 8/01/2021	10204/2 D10 Hearses Rd 8/01/2021	10204/3 D06 School 8/01/2021	10204/4 D05 Bund 8/01/2021	10204/5 D04 Rehab 8/01/2021
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.4	2.9	1.0	1.3	0.5
Ash	AS 3580.10.1	g/m2/mth	0.7	1.3	0.4	0.8	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.7	1.6	0.6	0.5	0.1
Calculated Rain	AS 3580.10.1	mm	155	144	149	157	148

Ambient Air	Method	Units	10204/6 D07 Mullock 8/01/2021	10204/7 D01(A) Front Gate 8/01/2021	10204/8 D11 Goldstien 8/01/2021	10204/9 D12 Ram 8/01/2021
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	5.5	1.2	0.7
Ash	AS 3580.10.1	g/m2/mth	0.5	4.9	0.3	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.6	0.9	0.4
Calculated Rain	AS 3580.10.1	mm	150	115	142	146

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Please note: Results **bold** indicate an exceedance of the relevant guideline.

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

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

Sampling Report Number: 10204

Date Issued: 15/01/2021

Revision No: 00

Sampling Conditions: Cloudy 15°- 20°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10204/1	D08&9 Hitchcock Rd Olive Grove		T.Walker	08/01/2021 10:14	AS3580.10.1	CuSO4
10204/2	D10 Hearses Rd		T.Walker	08/01/2021 10:51	AS3580.10.1	CuSO4
10204/3	D06 School		T.Walker	08/01/2021 10:07	AS3580.10.1	CuSO4
10204/4	D05 Bund		T.Walker	08/01/2021 09:59	AS3580.10.1	CuSO4
10204/5	D04 Rehab		T.Walker	08/01/2021 09:33	AS3580.10.1	CuSO4
10204/6	D07 Mullock		T.Walker	08/01/2021 09:43	AS3580.10.1	CuSO4
10204/7	D01(A) Front Gate		T.Walker	08/01/2021 09:19	AS3580.10.1	CuSO4
10204/8	D11 Goldstien		T.Walker	08/01/2021 14:29	AS3580.10.1	CuSO4
10204/9	D12 Ram		T.Walker	08/01/2021 10:41	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10204/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Minor insects
10204/2	D10 Hearses Rd	312538	6294576	Minor algae
10204/3	D06 School	313518	6296537	Minor vegetation
10204/4	D05 Bund	313160	6296838	Minor insects
10204/5	D04 Rehab	312385	6296932	
10204/6	D07 Mullock	312579	6296676	Minor insects
10204/7	D01(A) Front Gate	313290	6297176	Full, major sand
10204/8	D11 Goldstien	312034	6294213	
10204/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 15/01/2021.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10329

Date Issued: 12/02/2021

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 sample(s) were received on 5/02/2021

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	08/01/2021 10:14	05/02/2021 10:25	10329/1	Dust	
D10 Hearses Rd	08/01/2021 10:51	05/02/2021 10:56	10329/2	Dust	
D06 School	08/01/2021 10:07	05/02/2021 09:29	10329/3	Dust	
D05 Bund	08/01/2021 09:59	05/02/2021 09:38	10329/4	Dust	
D04 Rehab	08/01/2021 09:33	05/02/2021 10:04	10329/5	Dust	
D07 Mullock	08/01/2021 09:43	05/02/2021 10:16	10329/6	Dust	
D01(A) Front Gate	08/01/2021 09:19	05/02/2021 09:47	10329/7	Dust	
D11 Goldstien	08/01/2021 14:29	05/02/2021 14:41	10329/8	Dust	
D12 Ram	08/01/2021 10:41	05/02/2021 10:46	10329/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Lisa Thomson

Signatory

Approved by:

Results have been approved and report finalised on 12/02/2021.

Test Report Number: 10329

Date Issued: 12/02/2021

Revision No: 00

Results

Ambient Air	Method	Units	10329/1 D08&9 Hitchcock Rd Olive Grove 5/02/2021	10329/2 D10 Hearses Rd 5/02/2021	10329/3 D06 School 5/02/2021	10329/4 D05 Bund 5/02/2021	10329/5 D04 Rehab 5/02/2021
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.8	5.2	1.2	3.1	1.1
Ash	AS 3580.10.1	g/m2/mth	0.5	4.4	0.5	2.3	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	0.3	0.8	0.7	0.8	0.6
Calculated Rain	AS 3580.10.1	mm	56	53	57	57	56

Ambient Air	Method	Units	10329/6 D07 Mullock 5/02/2021	10329/7 D01(A) Front Gate 5/02/2021	10329/8 D11 Goldstien 5/02/2021	10329/9 D12 Ram 5/02/2021
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	1.5	2.8	1.1	0.7
Ash	AS 3580.10.1	g/m2/mth	0.9	2.2	0.4	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.6	0.6	0.7	0.4
Calculated Rain	AS 3580.10.1	mm	57	58	50	52

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Please note: Results **bold** indicate an exceedance of the relevant guideline.

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

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

Sampling Report Number: 10329

Date Issued: 12/02/2021

Revision No: 00

Sampling Conditions: Fine 23°-31°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10329/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	05/02/2021 10:25	AS3580.10.1	CuSO4
10329/2	D10 Hearses Rd		D.Walker	05/02/2021 10:56	AS3580.10.1	CuSO4
10329/3	D06 School		D.Walker	05/02/2021 09:29	AS3580.10.1	CuSO4
10329/4	D05 Bund		D.Walker	05/02/2021 09:38	AS3580.10.1	CuSO4
10329/5	D04 Rehab		D.Walker	05/02/2021 10:04	AS3580.10.1	CuSO4
10329/6	D07 Mullock		D.Walker	05/02/2021 10:16	AS3580.10.1	CuSO4
10329/7	D01(A) Front Gate		D.Walker	05/02/2021 09:47	AS3580.10.1	CuSO4
10329/8	D11 Goldstien		D.Walker	05/02/2021 14:41	AS3580.10.1	CuSO4
10329/9	D12 Ram		D.Walker	05/02/2021 10:46	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10329/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
10329/2	D10 Hearses Rd	312538	6294576	Minor sand, vegetation, algae. Adj paddock dug up and replanted
10329/3	D06 School	313518	6296537	Insects
10329/4	D05 Bund	313160	6296838	Vegetation, minor algae
10329/5	D04 Rehab	312385	6296932	Insects
10329/6	D07 Mullock	312579	6296676	Minor insects
10329/7	D01(A) Front Gate	313290	6297176	Minor insects, sand
10329/8	D11 Goldstien	312034	6294213	Minor vegetation
10329/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 12/02/2021.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10528

Date Issued: 16/03/2021

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 sample(s) were received on 9/03/2021

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	05/02/2021 10:25	09/03/2021 11:03	10528/1	Dust	
D10 Hearses Rd	05/02/2021 10:56	09/03/2021 11:40	10528/2	Dust	
D06 School	05/02/2021 09:29	09/03/2021 09:55	10528/3	Dust	
D05 Bund	05/02/2021 09:38	09/03/2021 10:08	10528/4	Dust	
D04 Rehab	05/02/2021 10:04	09/03/2021 10:48	10528/5	Dust	
D07 Mullock	05/02/2021 10:16	09/03/2021 10:34	10528/6	Dust	
D01(A) Front Gate	05/02/2021 09:47	09/03/2021 10:21	10528/7	Dust	
D11 Goldstien	05/02/2021 14:41	09/03/2021 15:16	10528/8	Dust	
D12 Ram	05/02/2021 10:46	09/03/2021 11:29	10528/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 16/03/2021.

Test Report Number: 10528

Date Issued: 16/03/2021

Revision No: 00

Results

Ambient Air	Method	Units	10528/1 D08&9 Hitchcock Rd Olive Grove 9/03/2021	10528/2 D10 Hearses Rd 9/03/2021	10528/3 D06 School 9/03/2021	10528/4 D05 Bund 9/03/2021	10528/5 D04 Rehab 9/03/2021
Number of Days	AS 3580.10.1	days	32	32	32	32	32
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	2.2	1.8	1.0	0.5
Ash	AS 3580.10.1	g/m2/mth	0.4	1.4	1.1	0.8	0.3
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.8	0.7	0.2	0.2
Calculated Rain	AS 3580.10.1	mm	67	61	58	57	54

Ambient Air	Method	Units	10528/6 D07 Mullock 9/03/2021	10528/7 D01(A) Front Gate 9/03/2021	10528/8 D11 Goldstien 9/03/2021	10528/9 D12 Ram 9/03/2021
Number of Days	AS 3580.10.1	days	32	32	32	32
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.5	1.4	0.5	0.4
Ash	AS 3580.10.1	g/m2/mth	0.4	1.1	0.2	0.2
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.3	0.3	0.2
Calculated Rain	AS 3580.10.1	mm	55	55	63	67

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

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

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

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

Sampling Report Number: 10528

Date Issued: 16/03/2021

Revision No: 00

Sampling Conditions: Cloudy 23°-29°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10528/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	09/03/2021 11:03	AS3580.10.1	CuSO4
10528/2	D10 Hearses Rd		D.Walker	09/03/2021 11:40	AS3580.10.1	CuSO4
10528/3	D06 School		D.Walker	09/03/2021 09:55	AS3580.10.1	CuSO4
10528/4	D05 Bund		D.Walker	09/03/2021 10:08	AS3580.10.1	CuSO4
10528/5	D04 Rehab		D.Walker	09/03/2021 10:48	AS3580.10.1	CuSO4
10528/6	D07 Mullock		D.Walker	09/03/2021 10:34	AS3580.10.1	CuSO4
10528/7	D01(A) Front Gate		D.Walker	09/03/2021 10:21	AS3580.10.1	CuSO4
10528/8	D11 Goldstien		D.Walker	09/03/2021 15:16	AS3580.10.1	CuSO4
10528/9	D12 Ram		D.Walker	09/03/2021 11:29	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10528/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
10528/2	D10 Hearses Rd	312538	6294576	Insects, algae, bird droppings in funnel
10528/3	D06 School	313518	6296537	Minor sand, minor vegetation, minor insects
10528/4	D05 Bund	313160	6296838	Minor vegetation
10528/5	D04 Rehab	312385	6296932	
10528/6	D07 Mullock	312579	6296676	
10528/7	D01(A) Front Gate	313290	6297176	Minor dust, paddock being filled
10528/8	D11 Goldstien	312034	6294213	Minor vegetation
10528/9	D12 Ram	311750	6294159	Minor insects

Sampling procedures have been approved and report finalised on 16/03/2021.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10754

Date Issued: 15/04/2021

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 sample(s) were received on 6/04/2021

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	09/03/2021 11:03	06/04/2021 10:45	10754/1	Dust	
D10 Hearses Rd	09/03/2021 11:40	06/04/2021 11:09	10754/2	Dust	
D06 School	09/03/2021 09:55	06/04/2021 09:24	10754/3	Dust	
D05 Bund	09/03/2021 10:08	06/04/2021 09:36	10754/4	Dust	
D04 Rehab	09/03/2021 10:48	06/04/2021 10:04	10754/5	Dust	
D07 Mullock	09/03/2021 10:34	06/04/2021 10:18	10754/6	Dust	
D01(A) Front Gate	09/03/2021 10:21	06/04/2021 09:45	10754/7	Dust	
D11 Goldstien	09/03/2021 15:16	06/04/2021 14:17	10754/8	Dust	High foliage encroaching on capture zone
D12 Ram	09/03/2021 11:29	06/04/2021 10:35	10754/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 15/04/2021.

Test Report Number: 10754

Date Issued: 15/04/2021

Revision No: 00

Results

Ambient Air	Method	Units	10754/1 D08&9 Hitchcock Rd Olive Grove 6/04/2021	10754/2 D10 Hearses Rd 6/04/2021	10754/3 D06 School 6/04/2021	10754/4 D05 Bund 6/04/2021	10754/5 D04 Rehab 6/04/2021
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.2	0.9	1.4	1.6	0.5
Ash	AS 3580.10.1	g/m2/mth	0.2	0.4	0.5	1.3	0.5
Combustible Matter	AS 3580.10.1	g/m2/mth	<0.1	0.5	0.9	0.3	<0.1
Calculated Rain	AS 3580.10.1	mm	285	287	287	288	285

Ambient Air	Method	Units	10754/6 D07 Mullock 6/04/2021	10754/7 D01(A) Front Gate 6/04/2021	10754/8 D11 Goldstien 6/04/2021	10754/9 D12 Ram 6/04/2021
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	7.5	0.5	0.2
Ash	AS 3580.10.1	g/m2/mth	0.3	6.9	0.2	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.6	0.3	0.1
Calculated Rain	AS 3580.10.1	mm	287	117	287	288

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

When considering the pass or fail of tests against guidelines,
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: 10754

Date Issued: 15/04/2021

Revision No: 00

Sampling Conditions: Intermittent Showers 20°-23°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10754/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	06/04/2021 10:45	AS3580.10.1	CuSO4
10754/2	D10 Hearses Rd		D.Walker	06/04/2021 11:09	AS3580.10.1	CuSO4
10754/3	D06 School		D.Walker	06/04/2021 09:24	AS3580.10.1	CuSO4
10754/4	D05 Bund		D.Walker	06/04/2021 09:36	AS3580.10.1	CuSO4
10754/5	D04 Rehab		D.Walker	06/04/2021 10:04	AS3580.10.1	CuSO4
10754/6	D07 Mullock		D.Walker	06/04/2021 10:18	AS3580.10.1	CuSO4
10754/7	D01(A) Front Gate		D.Walker	06/04/2021 09:45	AS3580.10.1	CuSO4
10754/8	D11 Goldstien		D.Walker	06/04/2021 14:17	AS3580.10.1	CuSO4
10754/9	D12 Ram		D.Walker	06/04/2021 10:35	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10754/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	Full
10754/2	D10 Hearses Rd	312538	6294576	Full
10754/3	D06 School	313518	6296537	Full, insects
10754/4	D05 Bund	313160	6296838	Full
10754/5	D04 Rehab	312385	6296932	Full
10754/6	D07 Mullock	312579	6296676	Full
10754/7	D01(A) Front Gate	313290	6297176	Full, sand, minor bird droppings
10754/8	D11 Goldstien	312034	6294213	Full
10754/9	D12 Ram	311750	6294159	Full

Sampling procedures have been approved and report finalised on 15/04/2021.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10861

Date Issued: 11/05/2021

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 sample(s) were received on 4/05/2021

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	06/04/2021 10:45	04/05/2021 10:34	10861/1	Dust	
D10 Hearses Rd	06/04/2021 11:09	04/05/2021 10:50	10861/2	Dust	
D06 School	06/04/2021 09:24	04/05/2021 09:15	10861/3	Dust	
D05 Bund	06/04/2021 09:36	04/05/2021 10:08	10861/4	Dust	
D04 Rehab	06/04/2021 10:04	04/05/2021 09:45	10861/5	Dust	
D07 Mullock	06/04/2021 10:18	04/05/2021 09:55	10861/6	Dust	
D01(A) Front Gate	06/04/2021 09:45	04/05/2021 09:28	10861/7	Dust	
D11 Goldstien	06/04/2021 14:17	04/05/2021 14:41	10861/8	Dust	Concreted dust gauge stand today
D12 Ram	06/04/2021 10:35	04/05/2021 10:22	10861/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 11/05/2021.

Test Report Number: 10861

Date Issued: 11/05/2021

Revision No: 00

Results

Ambient Air	Method	Units	10861/1 D08&9 Hitchcock Rd Olive Grove 4/05/2021	10861/2 D10 Hearses Rd 4/05/2021	10861/3 D06 School 4/05/2021	10861/4 D05 Bund 4/05/2021	10861/5 D04 Rehab 4/05/2021
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	1.5	1.2	1.0
Ash	AS 3580.10.1	g/m2/mth	0.3	1.7	0.6	0.7	0.4
Combustible Matter	AS 3580.10.1	g/m2/mth	0.5	1.5	0.9	0.5	0.6
Calculated Rain	AS 3580.10.1	mm	27	24	16	13	11

Ambient Air	Method	Units	10861/6 D07 Mullock 4/05/2021	10861/7 D01(A) Front Gate 4/05/2021	10861/8 D11 Goldstien 4/05/2021	10861/9 D12 Ram 4/05/2021
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.9	1.9	1.3	0.2
Ash	AS 3580.10.1	g/m2/mth	0.5	1.5	0.8	<0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.4	0.4	0.5	0.2
Calculated Rain	AS 3580.10.1	mm	12	13	20	23

Equipment Costs & Activities	Method	Units	10861/8 D11 Goldstien 4/05/2021
Relocate Dust Gauge			1

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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: 10861

Date Issued: 11/05/2021

Revision No: 00

Sampling Conditions: Raining 15°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10861/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	04/05/2021 10:34	AS3580.10.1	CuSO4
10861/2	D10 Hearses Rd		D.Walker	04/05/2021 10:50	AS3580.10.1	CuSO4
10861/3	D06 School		D.Walker	04/05/2021 09:15	AS3580.10.1	CuSO4
10861/4	D05 Bund		D.Walker	04/05/2021 10:08	AS3580.10.1	CuSO4
10861/5	D04 Rehab		D.Walker	04/05/2021 09:45	AS3580.10.1	CuSO4
10861/6	D07 Mullock		D.Walker	04/05/2021 09:55	AS3580.10.1	CuSO4
10861/7	D01(A) Front Gate		D.Walker	04/05/2021 09:28	AS3580.10.1	CuSO4
10861/8	D11 Goldstien		D.Walker	04/05/2021 14:41	AS3580.10.1	CuSO4
10861/9	D12 Ram		D.Walker	04/05/2021 10:22	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10861/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
10861/2	D10 Hearses Rd	312538	6294576	Bird droppings, algae
10861/3	D06 School	313518	6296537	Insects
10861/4	D05 Bund	313160	6296838	
10861/5	D04 Rehab	312385	6296932	
10861/6	D07 Mullock	312579	6296676	
10861/7	D01(A) Front Gate	313290	6297176	
10861/8	D11 Goldstien	312034	6294213	Minor insects
10861/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 11/05/2021.

Where method is "unknown" sampling procedures are not endorsed

Report Number: 10957

Date Issued: 8/06/2021

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 sample(s) were received on 1/06/2021

Client Sample Reference	Date On	Date Off	Lab ID	Matrix	Comments or Non-Compliances
D08&9 Hitchcock Rd Olive Grove	04/05/2021 10:34	01/06/2021 11:47	10957/1	Dust	
D10 Hearses Rd	04/05/2021 10:50	01/06/2021 11:24	10957/2	Dust	
D06 School	04/05/2021 09:15	01/06/2021 10:37	10957/3	Dust	
D05 Bund	04/05/2021 10:08	01/06/2021 10:49	10957/4	Dust	
D04 Rehab	04/05/2021 09:45	01/06/2021 11:13	10957/5	Dust	
D07 Mullock	04/05/2021 09:55	01/06/2021 11:23	10957/6	Dust	
D01(A) Front Gate	04/05/2021 09:28	01/06/2021 10:57	10957/7	Dust	
D11 Goldstien	04/05/2021 14:41	01/06/2021 16:28	10957/8	Dust	
D12 Ram	04/05/2021 10:22	01/06/2021 11:39	10957/9	Dust	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 8/06/2021.

Test Report Number: 10957

Date Issued: 8/06/2021

Revision No: 00

Results

Ambient Air	Method	Units	10957/1 D08&9 Hitchcock Rd Olive Grove 1/06/2021	10957/2 D10 Hearses Rd 1/06/2021	10957/3 D06 School 1/06/2021	10957/4 D05 Bund 1/06/2021	10957/5 D04 Rehab 1/06/2021
Number of Days	AS 3580.10.1	days	28	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.4	2.7	0.5	0.5	2.4
Ash	AS 3580.10.1	g/m2/mth	0.2	1.8	0.3	0.4	1.6
Combustible Matter	AS 3580.10.1	g/m2/mth	0.2	0.9	0.2	0.1	0.8
Calculated Rain	AS 3580.10.1	mm	73	75	77	76	77

Ambient Air	Method	Units	10957/6 D07 Mullock 1/06/2021	10957/7 D01(A) Front Gate 1/06/2021	10957/8 D11 Goldstien 1/06/2021	10957/9 D12 Ram 1/06/2021
Number of Days	AS 3580.10.1	days	28	28	28	28
Insoluble Solids	AS 3580.10.1	g/m2/mth	0.3	4.3	0.8	0.3
Ash	AS 3580.10.1	g/m2/mth	0.2	4.1	0.2	0.1
Combustible Matter	AS 3580.10.1	g/m2/mth	0.1	0.2	0.6	0.2
Calculated Rain	AS 3580.10.1	mm	74	85	69	73

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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: 10957

Date Issued: 8/06/2021

Revision No: 00

Sampling Conditions: Cloudy 13°-17°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10957/1	D08&9 Hitchcock Rd Olive Grove		D.Walker	01/06/2021 11:47	AS3580.10.1	CuSO4
10957/2	D10 Hearses Rd		D.Walker	01/06/2021 11:24	AS3580.10.1	CuSO4
10957/3	D06 School		D.Walker	01/06/2021 10:37	AS3580.10.1	CuSO4
10957/4	D05 Bund		D.Walker	01/06/2021 10:49	AS3580.10.1	CuSO4
10957/5	D04 Rehab		D.Walker	01/06/2021 11:13	AS3580.10.1	CuSO4
10957/6	D07 Mullock		D.Walker	01/06/2021 11:23	AS3580.10.1	CuSO4
10957/7	D01(A) Front Gate		D.Walker	01/06/2021 10:57	AS3580.10.1	CuSO4
10957/8	D11 Goldstien		D.Walker	01/06/2021 16:28	AS3580.10.1	CuSO4
10957/9	D12 Ram		D.Walker	01/06/2021 11:39	AS3580.10.1	CuSO4

Lab ID	Client Sample Reference	GPS-Easting	GPS-Northing	Sampling Observations
10957/1	D08&9 Hitchcock Rd Olive Grove	313058	6295137	
10957/2	D10 Hearses Rd	312538	6294576	Bird droppings, minor vegetation
10957/3	D06 School	313518	6296537	Minor insects
10957/4	D05 Bund	313160	6296838	
10957/5	D04 Rehab	312385	6296932	Algae
10957/6	D07 Mullock	312579	6296676	
10957/7	D01(A) Front Gate	313290	6297176	Minor sand
10957/8	D11 Goldstien	312034	6294213	Minor vegetation
10957/9	D12 Ram	311750	6294159	

Sampling procedures have been approved and report finalised on 8/06/2021.

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 2020

Amendment 1

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 4 August 2021

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 2020 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 the 1st July 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for July 2020.

Approximately 100% of TEOM data was recovered for July 2020.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in May 2020 and the next calibration is scheduled for August 2020. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for June 2020 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/07/2020	9.7	9.7	24.3	24.3
2/07/2020	14.1	11.9	35.3	29.8
3/07/2020	15.5	13.1	38.8	32.8
4/07/2020	15.5	13.1	38.8	32.8
5/07/2020	15.5	13.1	38.8	32.8
6/07/2020	15.5	13.1	38.8	32.8
7/07/2020	15.5	13.1	38.8	32.8
8/07/2020	15.5	13.1	38.8	32.8
9/07/2020	15.5	13.1	38.8	32.8
10/07/2020	15.5	13.1	38.8	32.8
11/07/2020	15.5	13.1	38.8	32.8
12/07/2020	15.5	13.1	38.8	32.8
13/07/2020	15.5	13.1	38.8	32.8
14/07/2020	15.5	13.1	38.8	32.8
15/07/2020	15.5	13.1	38.8	32.8
16/07/2020	15.5	13.1	38.8	32.8
17/07/2020	15.5	13.1	38.8	32.8
18/07/2020	15.5	13.1	38.8	32.8
19/07/2020	15.5	13.1	38.8	32.8
20/07/2020	15.5	13.1	38.8	32.8
21/07/2020	15.5	13.1	38.8	32.8
22/07/2020	15.5	13.1	38.8	32.8
23/07/2020	15.5	13.1	38.8	32.8
24/07/2020	15.5	13.1	38.8	32.8
25/07/2020	15.5	13.1	38.8	32.8
26/07/2020	15.5	13.1	38.8	32.8
27/07/2020	15.5	13.1	38.8	32.8
28/07/2020	15.5	13.1	38.8	32.8
29/07/2020	15.5	13.1	38.8	32.8
30/07/2020	15.5	13.1	38.8	32.8
31/07/2020	15.5	13.1	38.8	32.8

*Calculated from PM10

**Calculated from PM10 Annual Average

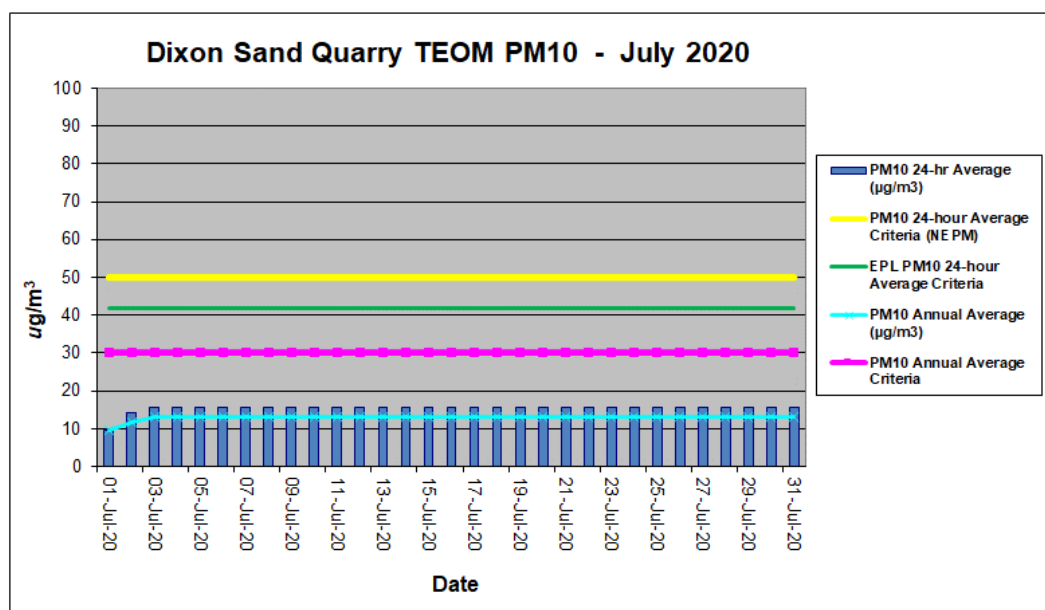


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for July 2020

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
1/07/2020	9.3	13.9	19.4	0.0	0.7	6.0	12.8	46.2	76.6	100.0	996.4	999.1	1001.5
2/07/2020	12.1	16.5	21.1	0.0	0.9	8.4	28.0	42.3	96.1	100.0	993.4	995.3	996.5
3/07/2020	9.2	12.8	16.8	0.0	0.0	3.4	12.6	35.8	57.7	100.0	996.4	997.7	999.8
4/07/2020	6.2	9.6	15.1	0.0	0.2	3.7	17.8	32.4	56.6	90.4	995.6	997.9	999.7
5/07/2020	7.0	11.0	16.6	0.0	0.1	2.9	15.1	39.1	58.0	75.8	998.7	1000.7	1004.1
6/07/2020	6.4	10.7	17.1	0.0	0.0	2.4	9.1	44.9	70.8	92.6	1003.8	1005.5	1007.4
7/07/2020	8.4	11.2	14.6	1.8	0.0	3.4	11.0	51.1	78.8	100.0	1006.3	1007.8	1009.1
8/07/2020	8.9	11.0	13.7	0.2	0.2	2.3	8.3	81.4	99.6	100.0	1007.5	1008.6	1010.2
9/07/2020	7.0	11.7	16.9	0.2	0.0	2.5	11.1	72.8	99.4	100.0	1006.1	1007.7	1009.9
10/07/2020	9.0	11.9	15.0	0.4	0.1	2.2	7.1	86.2	99.8	100.0	1000.2	1003.9	1006.9
11/07/2020	10.7	12.1	14.6	9.8	0.2	2.8	9.2	99.8	100.0	100.0	992.7	995.6	1000.1
12/07/2020	8.1	10.8	16.4	3.8	0.3	2.9	11.8	90.1	99.9	100.0	993.4	994.6	996.4
13/07/2020	6.1	10.0	15.0	0.6	0.0	2.3	16.0	99.2	100.0	100.0	995.3	996.3	997.7
14/07/2020	8.4	11.0	13.9	8.6	0.4	10.1	32.2	81.1	96.2	100.0	993.8	996.1	998.3
15/07/2020	8.5	11.7	14.0	0.0	0.2	8.9	25.1	73.3	89.2	99.2	994.9	996.4	997.4
16/07/2020	7.7	11.2	14.1	0.0	1.0	6.8	18.2	57.1	70.2	99.2	994.7	996.0	997.5
17/07/2020	9.9	11.8	14.4	0.0	0.4	5.6	24.8	65.1	74.6	100.0	996.9	998.9	1000.9
18/07/2020	9.0	11.7	15.7	0.0	0.2	3.3	8.7	59.3	92.0	100.0	998.0	999.5	1001.3
19/07/2020	8.9	13.2	18.4	0.0	0.3	5.1	15.8	51.3	85.7	99.9	992.7	995.0	998.0
20/07/2020	8.0	12.2	17.4	0.0	0.1	3.8	13.7	41.6	66.1	86.1	992.9	997.1	1001.6
21/07/2020	6.0	10.2	16.1	0.0	0.1	3.3	15.9	47.0	77.6	99.3	1001.1	1004.5	1006.9
22/07/2020	6.7	11.0	16.0	0.0	0.2	2.7	9.0	51.7	82.1	99.4	1002.8	1004.8	1006.6
23/07/2020	5.5	11.1	17.9	0.0	0.0	2.1	8.0	99.2	99.9	100.0	1002.4	1003.8	1005.3
24/07/2020	7.3	11.1	16.7	0.0	0.0	2.7	10.2	100.0	100.0	100.0	1003.5	1004.9	1006.5
25/07/2020	7.8	11.6	16.4	1.4	0.0	2.1	10.4	99.9	100.0	100.0	1001.3	1003.2	1005.2
26/07/2020	10.9	11.9	13.5	97.4	0.0	5.5	32.8	100.0	100.0	100.0	980.5	992.8	1001.2
27/07/2020	10.8	12.4	15.8	31.6	0.4	7.2	26.2	99.6	100.0	100.0	977.7	979.5	982.4
28/07/2020	10.9	13.6	16.9	5.8	0.2	5.3	18.0	100.0	100.0	100.0	981.8	988.3	994.1
29/07/2020	9.8	13.4	18.6	0.0	0.0	2.5	10.1	100.0	100.0	100.0	992.9	995.4	998.5
30/07/2020	8.0	11.9	16.8	0.2	0.0	3.4	16.0	100.0	100.0	100.0	998.0	1002.1	1006.4
31/07/2020	8.0	11.3	16.2	0.0	0.2	3.9	15.8	99.5	100.0	100.0	1005.0	1006.1	1008.0
Monthly	5.5	11.8	21.1	161.8	0.0	4.2	32.8	32.4	88.0	100.0	977.7	999.2	1010.2

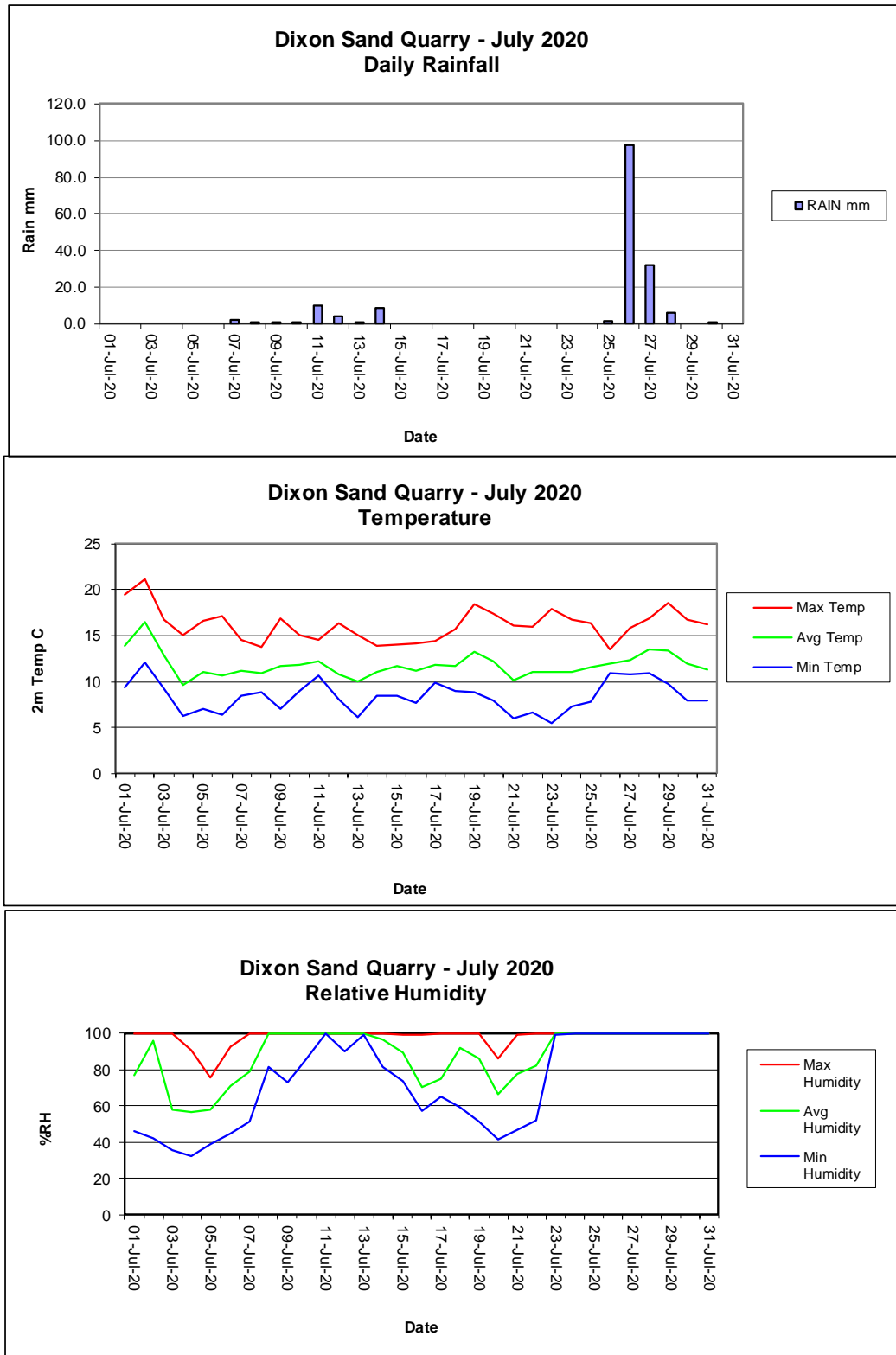


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

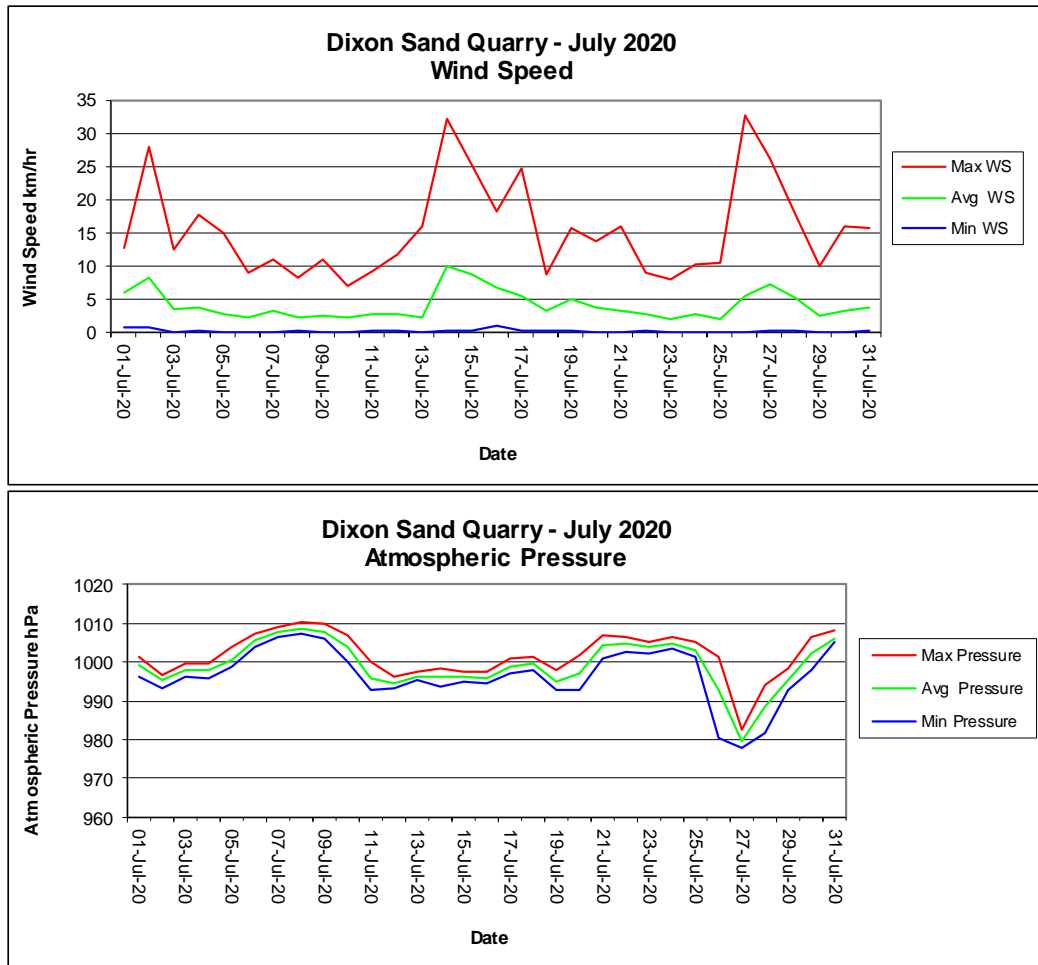
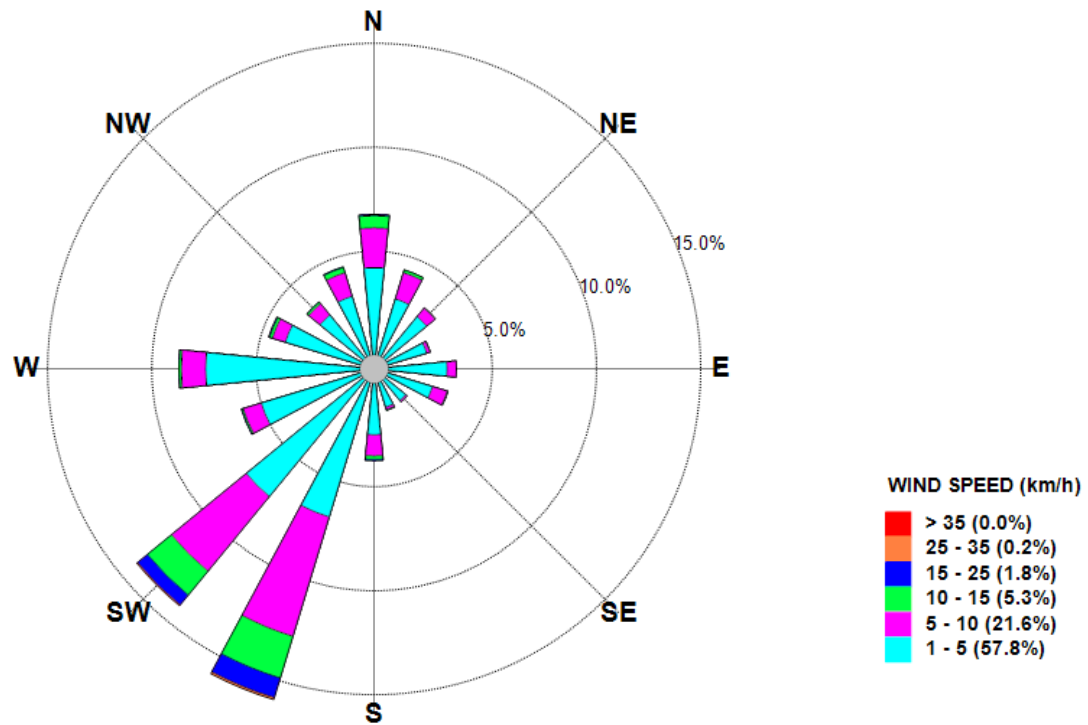


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

July 2020

Calms %: 13.4
Average Windspeed (km/h): 4.1
Maximum Windspeed (km/h): 32.8
Prevailing Wind Direction: 202.5



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 2020
Amendment 1

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 4 August 2021

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 2020 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 the 1st July 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for August 2020.

Approximately 100% of TEOM data was recovered for August 2020.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken on 31 August 2020 and the next calibration is scheduled for October 2020. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for August 2020 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/08/2020	12.8	10.0	32.0	25.0
2/08/2020	13.5	10.1	33.8	25.3
3/08/2020	8.1	10.1	20.3	25.1
4/08/2020	12.6	10.1	31.5	25.3
5/08/2020	11.0	10.2	27.5	25.4
6/08/2020	11.7	10.2	29.3	25.5
7/08/2020	18.3	10.4	45.8	26.0
8/08/2020	6.2	10.3	15.5	25.8
9/08/2020	5.5	10.2	13.8	25.5
10/08/2020	11.5	10.2	28.8	25.5
11/08/2020	9.1	10.2	22.8	25.5
12/08/2020	10.7	10.2	26.8	25.5
13/08/2020	7.8	10.1	19.5	25.4
14/08/2020	14.0	10.2	35.0	25.6
15/08/2020	3.7	10.1	9.3	25.2
16/08/2020	4.7	10.0	11.8	24.9
17/08/2020	6.8	9.9	17.0	24.8
18/08/2020	6.2	9.8	15.5	24.6
19/08/2020	24.0	10.1	60.0	25.3
20/08/2020	11.8	10.1	29.5	25.4
21/08/2020	14.2	10.2	35.5	25.6
22/08/2020	8.3	10.2	20.8	25.5
23/08/2020	5.7	10.1	14.3	25.3
24/08/2020	11.8	10.1	29.5	25.3
25/08/2020	14.1	10.2	35.3	25.5
26/08/2020	13.5	10.3	33.8	25.7
27/08/2020	10.5	10.3	26.3	25.7
28/08/2020	13.3	10.3	33.3	25.8
29/08/2020	16.7	10.4	41.8	26.1
30/08/2020	16.0	10.5	40.0	26.3
31/08/2020	21.9	10.7	54.8	26.8

*Calculated from PM10

**Calculated from PM10 Annual Average

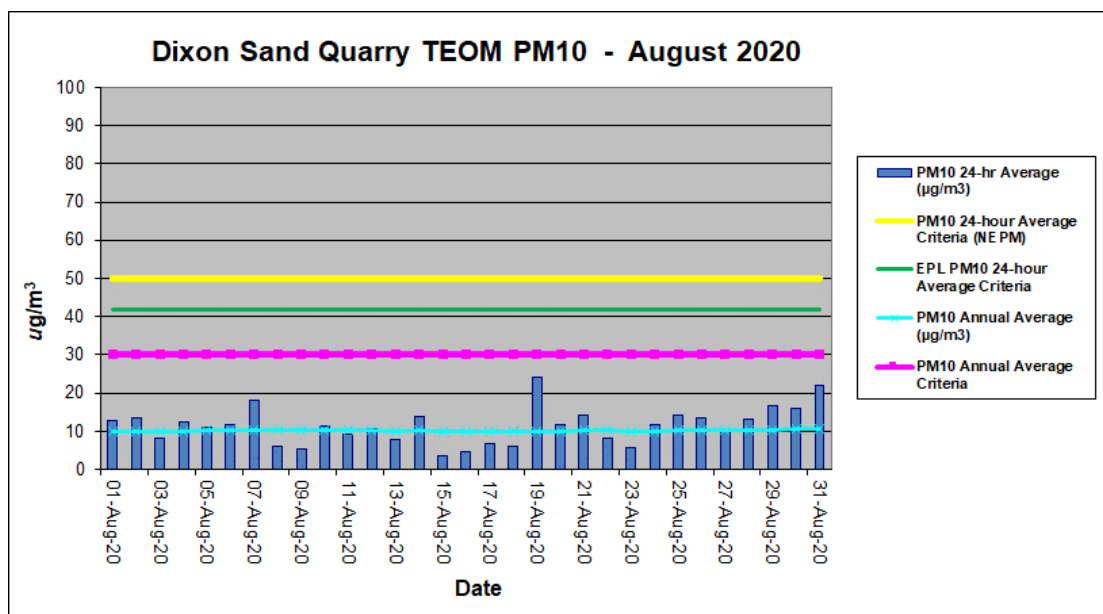


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for August 2020

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
1/08/2020	6.2	11.6	17.6	0.0	0.2	4.0	14.9	99.5	100.0	100.0	1001.6	1003.9	1006.1
2/08/2020	7.3	12.5	19.3	0.0	0.1	2.4	8.5	66.1	99.5	100.0	1000.7	1002.3	1004.4
3/08/2020	7.1	13.7	20.2	0.0	0.2	3.7	11.8	49.3	88.4	100.0	993.8	996.7	1000.7
4/08/2020	8.2	14.1	20.3	0.0	0.1	5.3	19.6	50.3	83.2	99.5	987.3	990.7	993.8
5/08/2020	3.9	9.4	15.9	0.0	0.2	4.5	16.4	28.3	46.8	73.8	990.9	992.5	995.0
6/08/2020	4.4	8.8	14.5	0.0	0.2	3.5	13.6	52.0	79.0	99.5	994.3	997.3	1001.4
7/08/2020	7.1	8.3	9.3	14.6	0.2	2.6	13.3	80.4	99.8	100.0	993.7	998.2	1001.0
8/08/2020	9.3	11.3	15.2	0.6	0.0	3.3	12.2	100.0	100.0	100.0	989.4	992.0	994.1
9/08/2020	7.1	9.7	15.0	19.8	0.2	5.5	23.1	100.0	100.0	100.0	981.7	988.2	991.0
10/08/2020	8.7	11.1	14.6	7.2	0.6	6.4	22.4	99.2	100.0	100.0	988.1	995.0	999.9
11/08/2020	8.6	11.6	16.7	0.0	0.1	4.0	11.3	88.3	99.1	100.0	996.7	998.7	1000.7
12/08/2020	9.9	12.3	16.4	2.6	0.1	3.3	10.1	99.4	100.0	100.0	990.8	993.7	997.4
13/08/2020	9.7	15.5	21.4	0.4	0.1	2.9	8.7	85.8	99.7	100.0	990.9	992.9	995.5
14/08/2020	10.0	12.3	14.5	6.0	0.1	2.0	8.4	93.4	99.4	100.0	988.5	993.0	995.6
15/08/2020	11.2	13.7	18.2	0.4	0.3	3.9	14.8	100.0	100.0	100.0	984.4	986.4	988.3
16/08/2020	11.0	13.7	17.8	0.0	0.3	5.7	21.8	100.0	100.0	100.0	984.6	985.9	987.2
17/08/2020	9.8	13.3	18.3	0.0	0.2	4.3	19.5	61.1	97.6	100.0	985.5	987.1	988.7
18/08/2020	10.2	14.0	19.0	0.0	0.5	5.8	18.7	59.7	95.9	100.0	980.2	984.0	987.6
19/08/2020	9.3	14.1	19.2	0.4	0.7	8.0	50.4	27.4	80.6	100.0	971.5	976.4	980.3
20/08/2020	8.7	12.1	16.2	0.2	0.4	6.2	25.4	39.5	77.8	100.0	976.6	981.8	986.8
21/08/2020	8.8	12.1	16.1	0.0	0.2	6.5	28.0	36.5	83.2	100.0	983.4	985.5	987.3
22/08/2020	7.1	9.8	13.0	0.0	0.4	6.4	33.1	35.0	91.8	100.0	982.1	984.4	985.7
23/08/2020	8.0	10.8	15.1	0.0	0.5	6.6	21.2	33.6	64.3	99.6	983.1	987.3	992.8
24/08/2020	6.9	10.9	16.7	0.0	0.1	3.7	11.9	26.8	76.5	100.0	992.7	997.5	1002.6
25/08/2020	4.0	9.1	14.8	0.0	0.0	3.4	12.6	34.0	72.8	100.0	1002.5	1004.7	1007.3
26/08/2020	5.4	10.7	17.2	0.0	0.0	2.9	13.1	31.4	71.5	100.0	1004.7	1006.6	1009.0
27/08/2020	6.2	12.6	20.4	0.0	0.2	2.9	15.3	15.9	54.9	99.3	998.6	1002.5	1005.4
28/08/2020	9.3	13.3	18.1	0.0	0.2	4.5	15.2	22.2	48.9	100.0	997.5	1002.8	1007.5
29/08/2020	7.6	13.5	20.5	0.0	0.1	3.2	10.7	24.6	92.8	100.0	1005.2	1007.1	1009.4
30/08/2020	9.0	16.8	23.8	0.0	0.6	5.6	16.6	27.5	61.5	100.0	996.9	1001.1	1006.0
31/08/2020	11.3	15.9	22.8	0.0	0.2	4.7	26.4	19.1	56.6	75.8	994.3	997.5	1002.5
Monthly	3.9	12.2	23.8	52.2	0.0	4.5	50.4	15.9	84.6	100.0	971.5	994.0	1009.4

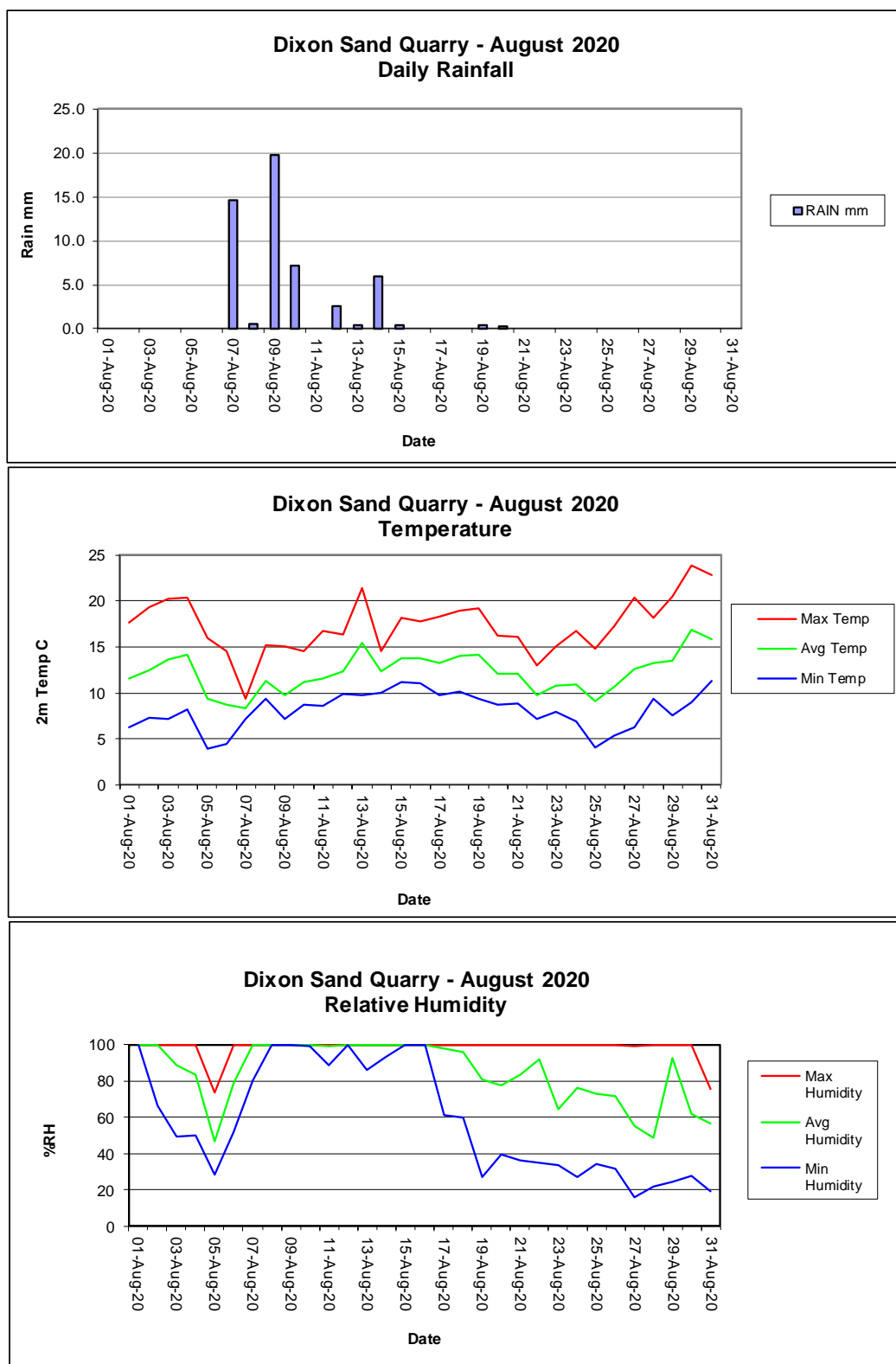


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

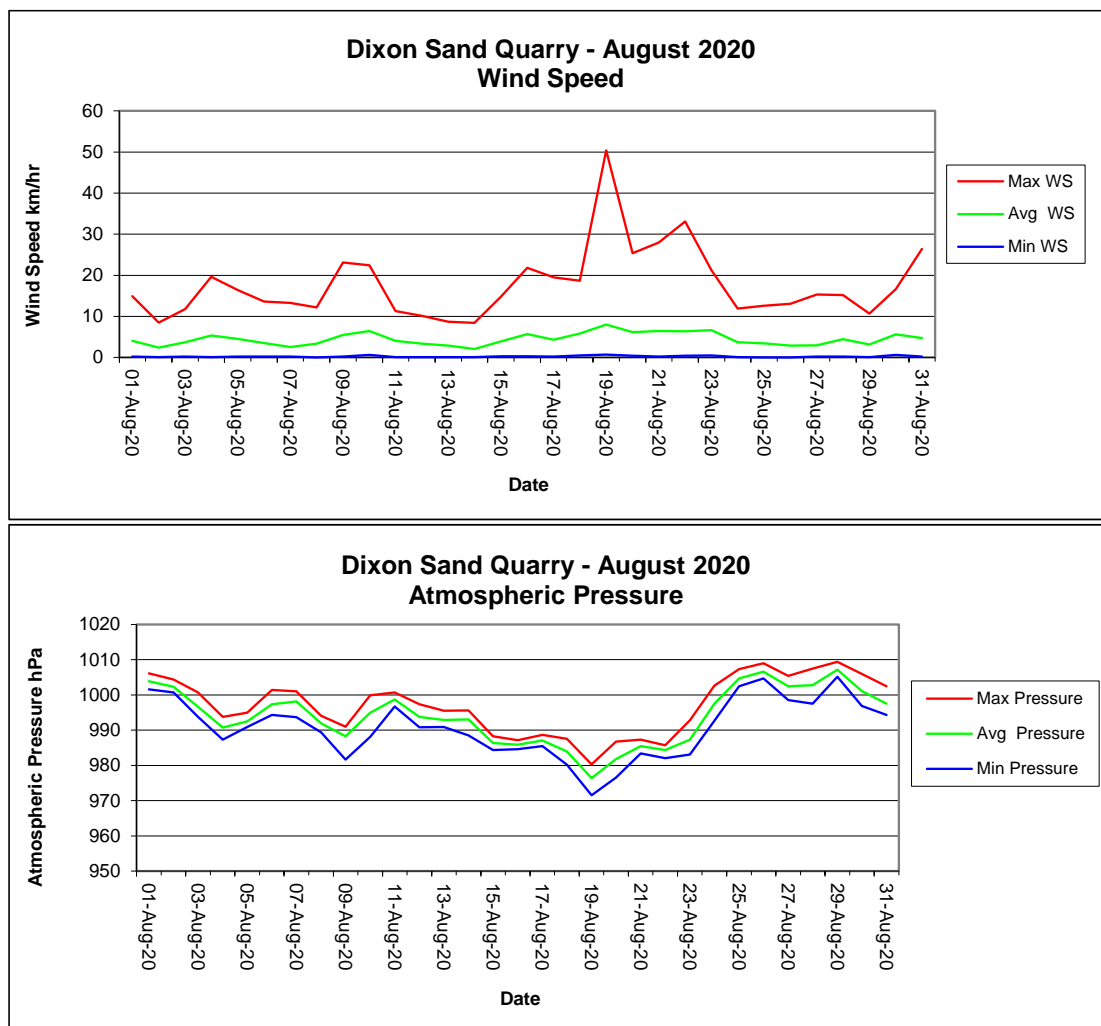
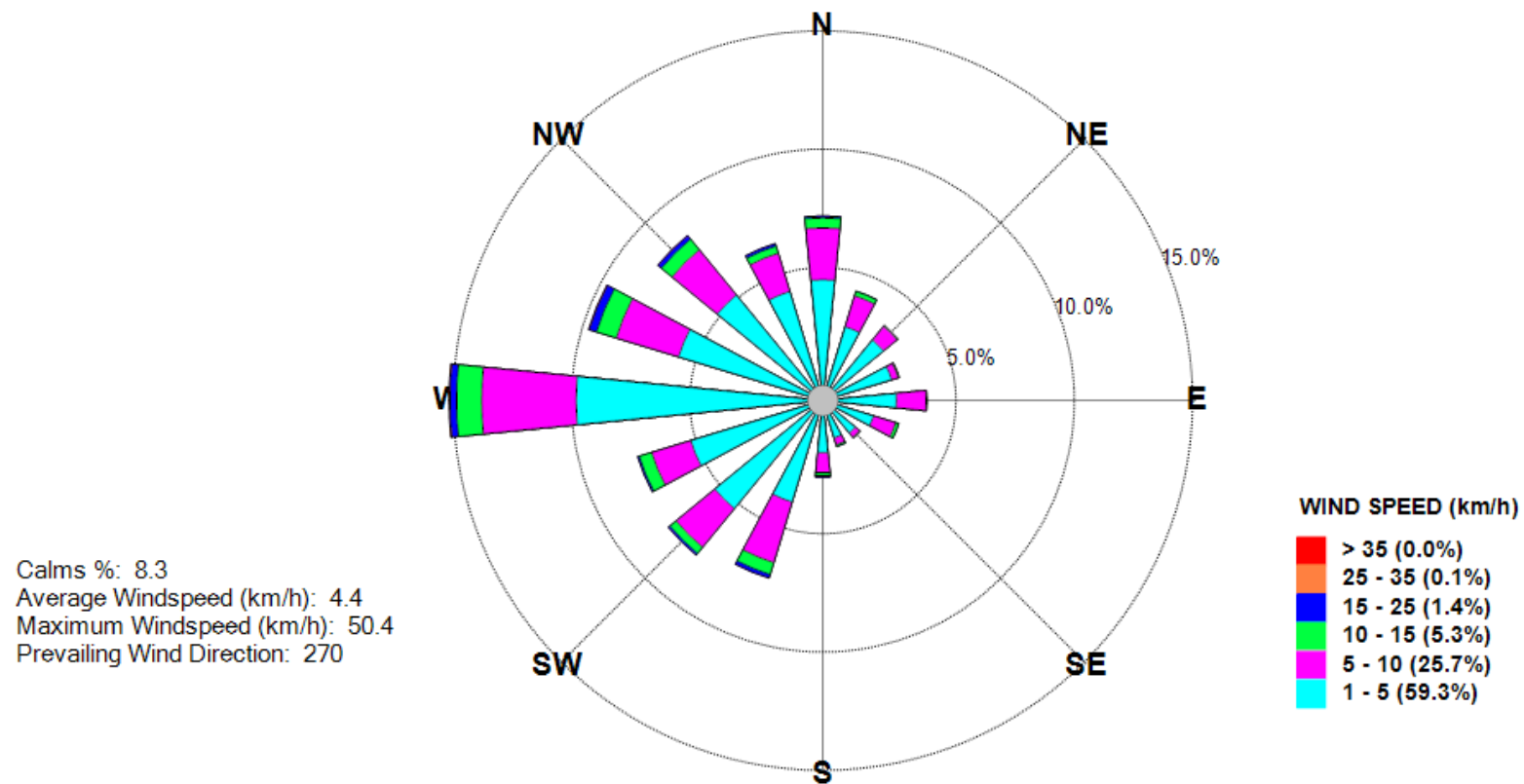


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose AUGUST 2020



Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixon Sandi / TEOM 1Date: 31.8.20.**1. TEOM Data Screen**SERIAL No: 25570Firmware: N/A

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>4 ✓ OK</u>	Green - Normal	<u>✓</u>	
Date/time	TEOM: <u>31-8-20</u> <u>11:37</u> Actual: <u>31-8-20</u> <u>11:40</u>	Current Date/time correct within 5 minutes	<u>✓</u>	
PM-10 24hr av	<u>18.9</u>	Positive values	<u>✓</u>	
Filter loading PM10	<u>63</u>	<80 %	<u>✓</u>	
Frequency PM-10	<u>252.9731</u>	200-300 Hz	<u>✓</u>	
Noise PM-10	<u>0.043</u>	<0.100ug	<u>✓</u>	

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>N/A</u>	<0.50 atm	<u>—</u>	<u>—</u>
Warnings	<u>NIL</u>	No Warnings	<u>✓</u>	
If any warnings list:				

Comments:Data Downloaded: YES/NO (circle)Technician Name : COLIN DAVIES Signed Colin

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	20.6	-10 to 50 C	✓	
Ambient Dew Point	6.2	-10 to 50 C	✓	
Ambient Pressure	0.996	0.9-1.1 atm	✓	
Ambient Relative Humidity	38.3	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					

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 2.95 Error % 1.7 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.48 Error % 1.4 (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 0.05 < Limit 0.15

Bypass actual 0.21 < 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: 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

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 = _____ 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

Dixon Sand Quarry

**Environmental Monitoring
Air Quality**

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

September 2020
Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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 2020 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 the 1st July 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for September 2020.

Approximately 100% of TEOM data was recovered for September 2020.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in August 2020 and the next calibration (annual) is scheduled for November 2020. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for September 2020 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/09/2020	15.8	10.8	39.5	27.0
2/09/2020	17.0	10.9	42.5	27.2
3/09/2020	28.3	11.1	70.8	27.9
4/09/2020	22.8	11.3	57.0	28.3
5/09/2020	12.2	11.3	30.5	28.3
6/09/2020	17.9	11.4	44.8	28.6
7/09/2020	18.1	11.5	45.3	28.8
8/09/2020	15.6	11.6	39.0	29.0
9/09/2020	13.4	11.6	33.5	29.0
10/09/2020	9.7	11.6	24.3	29.0
11/09/2020	12.2	11.6	30.5	29.0
12/09/2020	7.2	11.5	18.0	28.8
13/09/2020	9.4	11.5	23.5	28.8
14/09/2020	13.2	11.5	33.0	28.8
15/09/2020	17.8	11.6	44.5	29.0
16/09/2020	23.3	11.8	58.3	29.4
17/09/2020	30.6	12.0	76.5	30.0
18/09/2020	15.9	12.1	39.8	30.1
19/09/2020	12.7	12.1	31.8	30.1
20/09/2020	6.8	12.0	17.0	30.0
21/09/2020	9.4	12.0	23.5	29.9
22/09/2020	22.4	12.1	56.0	30.2
23/09/2020	23.9	12.2	59.8	30.6
24/09/2020	15.9	12.3	39.8	30.7
25/09/2020	14.0	12.3	35.0	30.7
26/09/2020	8.3	12.2	20.8	30.6
27/09/2020	9.7	12.2	24.3	30.5
28/09/2020	17.7	12.3	44.3	30.7
29/09/2020	16.1	12.3	40.3	30.8
30/09/2020	18.5	12.4	46.3	31.0

*Calculated from PM10

**Calculated from PM10 Annual Average

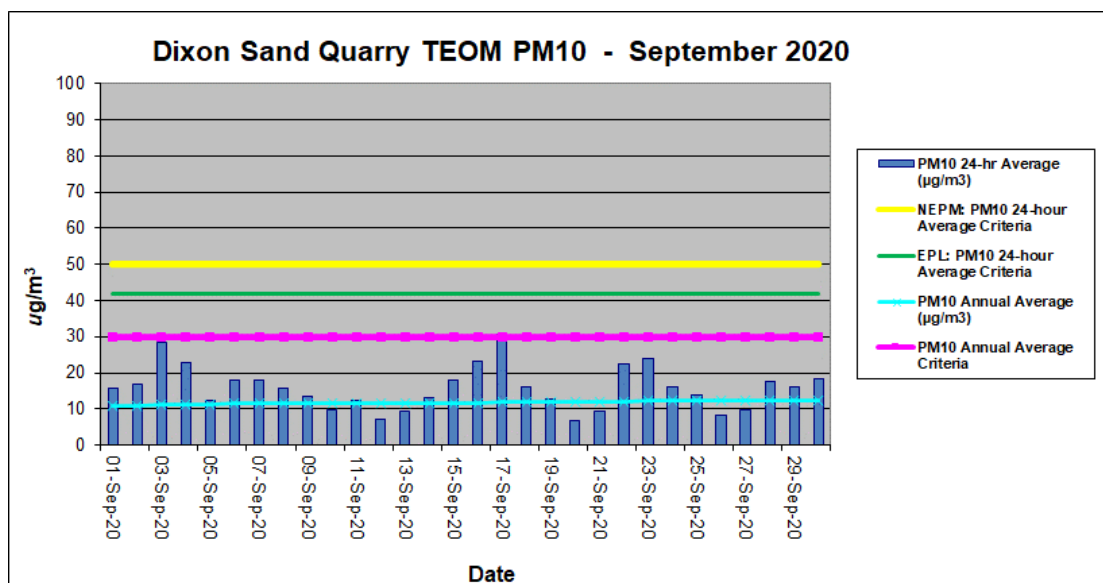


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for September 2020

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
1/09/2020	8.2	12.1	16.9	0.0	0.0	3.5	16.9	48.2	81.8	99.7	999.7	1001.6	1003.9
2/09/2020	8.4	15.5	23.1	0.0	0.2	4.7	17.9	47.7	96.0	100.0	995.7	998.3	1000.4
3/09/2020	16.6	21.9	28.1	0.0	0.8	7.2	21.7	26.2	98.5	100.0	993.3	995.3	997.4
4/09/2020	14.5	18.4	21.3	8.6	0.2	4.5	16.7	85.1	99.9	100.0	992.9	994.7	997.5
5/09/2020	11.9	15.5	21.0	0.6	0.0	3.3	12.5	49.9	87.4	100.0	993.0	996.7	1002.8
6/09/2020	8.9	13.4	17.4	0.0	0.0	4.0	24.2	65.6	92.6	100.0	1002.8	1006.0	1008.8
7/09/2020	9.9	15.0	21.7	0.0	0.1	3.5	14.7	77.6	97.6	100.0	1007.3	1009.0	1010.7
8/09/2020	10.6	17.4	24.1	0.0	0.1	4.3	14.4	57.1	90.5	99.5	1003.5	1006.1	1009.2
9/09/2020	10.5	13.7	18.9	12.2	0.1	3.9	11.2	83.9	98.1	100.0	1002.2	1005.4	1007.2
10/09/2020	9.8	12.5	17.2	1.2	0.3	4.2	13.1	72.9	98.2	100.0	1004.9	1006.9	1008.9
11/09/2020	9.1	12.7	16.7	0.2	0.0	3.8	15.9	64.5	96.5	100.0	1007.1	1008.6	1010.8
12/09/2020	8.5	15.4	21.9	0.2	0.4	4.2	16.6	47.0	98.3	100.0	1002.0	1004.9	1008.2
13/09/2020	12.3	17.4	23.8	0.0	0.4	4.7	15.0	99.3	99.5	99.8	999.9	1001.6	1003.3
14/09/2020	13.2	16.6	22.7	0.0	0.2	4.6	18.6	69.9	99.2	100.0	1000.8	1003.0	1006.3
15/09/2020	13.0	16.5	22.7	0.0	0.1	3.3	13.0	52.9	94.3	100.0	1003.5	1005.6	1008.0
16/09/2020	12.0	19.3	26.4	0.2	0.2	4.9	20.3	32.1	99.3	100.0	997.6	1001.1	1005.0
17/09/2020	14.2	20.5	28.8	0.0	0.1	5.6	29.2	48.3	96.4	100.0	998.7	1001.9	1009.0
18/09/2020	12.9	14.3	15.9	0.6	0.1	3.4	14.3	84.2	99.8	100.0	1007.5	1008.9	1010.8
19/09/2020	13.7	16.8	22.0	1.2	0.2	4.3	17.8	100.0	100.0	100.0	997.6	1002.8	1007.7
20/09/2020	14.4	16.8	21.1	6.8	0.1	4.8	22.7	99.6	100.0	100.0	990.4	993.6	997.6
21/09/2020	15.7	21.4	27.2	0.0	0.2	6.9	20.2	90.6	100.0	100.0	985.4	989.2	992.4
22/09/2020	17.3	20.9	25.5	0.0	0.1	5.4	19.7	16.6	72.9	100.0	985.7	989.1	991.9
23/09/2020	12.2	17.0	21.7	0.0	0.2	4.8	21.4	24.9	41.8	80.6	989.3	991.5	993.8
24/09/2020	10.3	14.9	20.0	0.0	0.0	4.5	21.1	23.5	50.2	92.0	990.2	992.1	993.4
25/09/2020	7.4	14.2	21.6	1.2	0.2	7.4	30.3	30.1	69.1	100.0	977.6	985.3	991.6
26/09/2020	7.6	11.1	15.6	0.0	0.7	5.9	30.2	28.9	58.3	100.0	985.4	990.2	996.3
27/09/2020	7.6	11.9	19.3	0.0	0.1	4.0	19.3	31.9	69.3	100.0	996.0	1000.4	1005.3
28/09/2020	7.6	12.6	19.4	0.0	0.0	3.1	17.4	34.6	95.1	100.0	1002.1	1004.5	1006.7
29/09/2020	8.7	13.1	19.5	0.0	0.0	3.4	17.4	36.0	83.3	100.0	1000.8	1003.5	1006.5
30/09/2020	10.1	14.5	19.0	0.0	0.1	4.7	20.6	52.0	86.3	100.0	991.8	996.0	1000.7
Monthly	7.4	15.8	28.8	33.0	0.0	4.6	30.3	16.6	88.3	100.0	977.6	999.8	1010.8

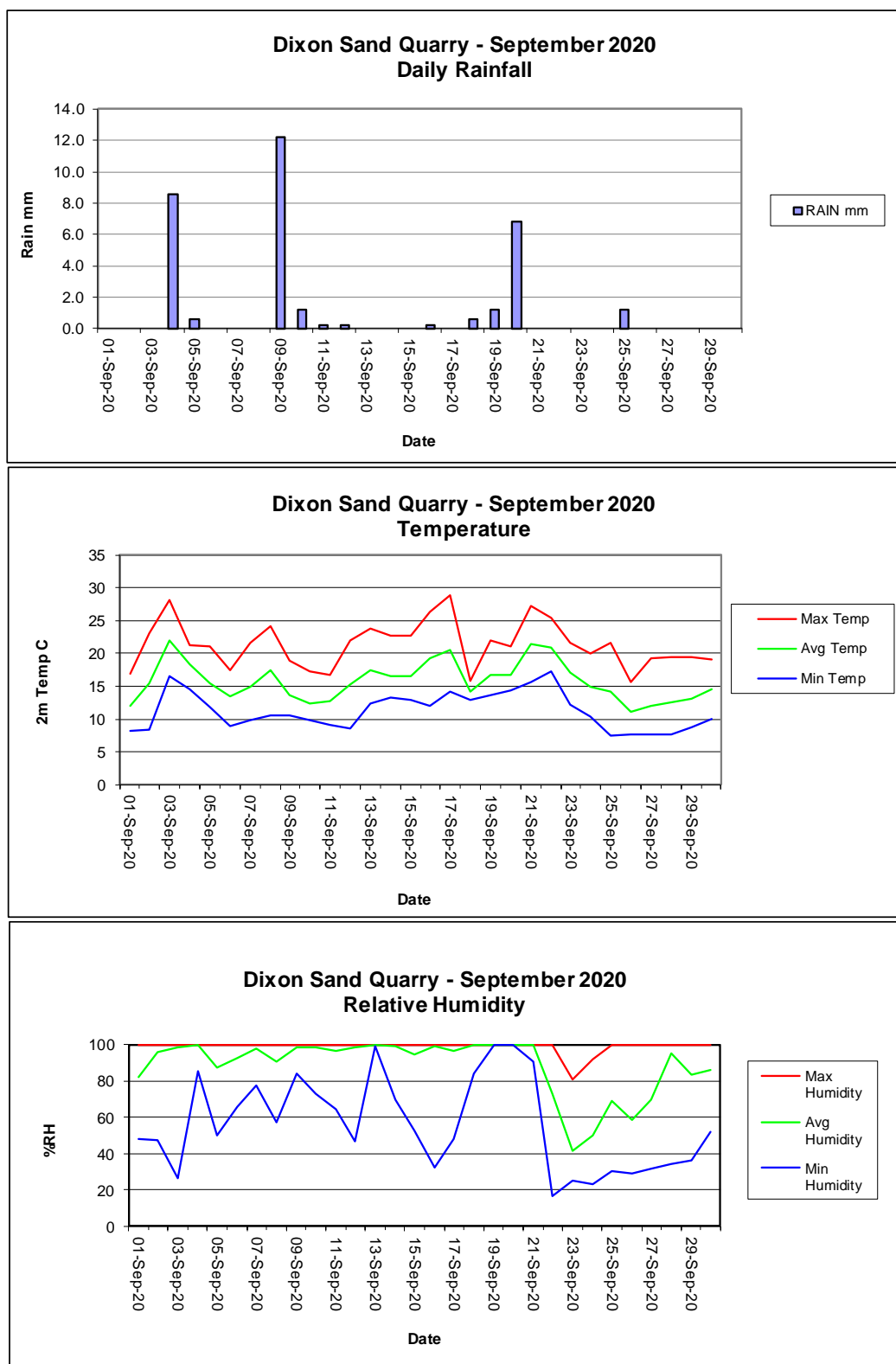


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

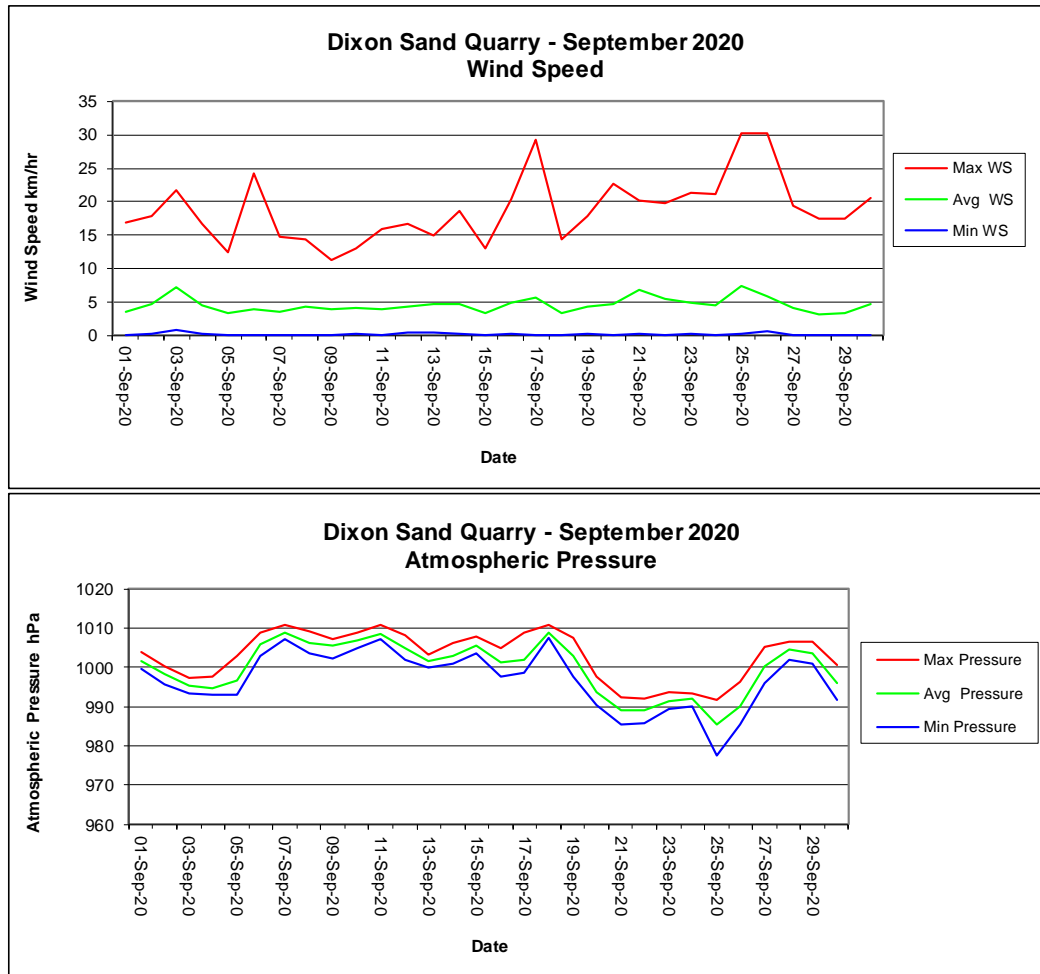
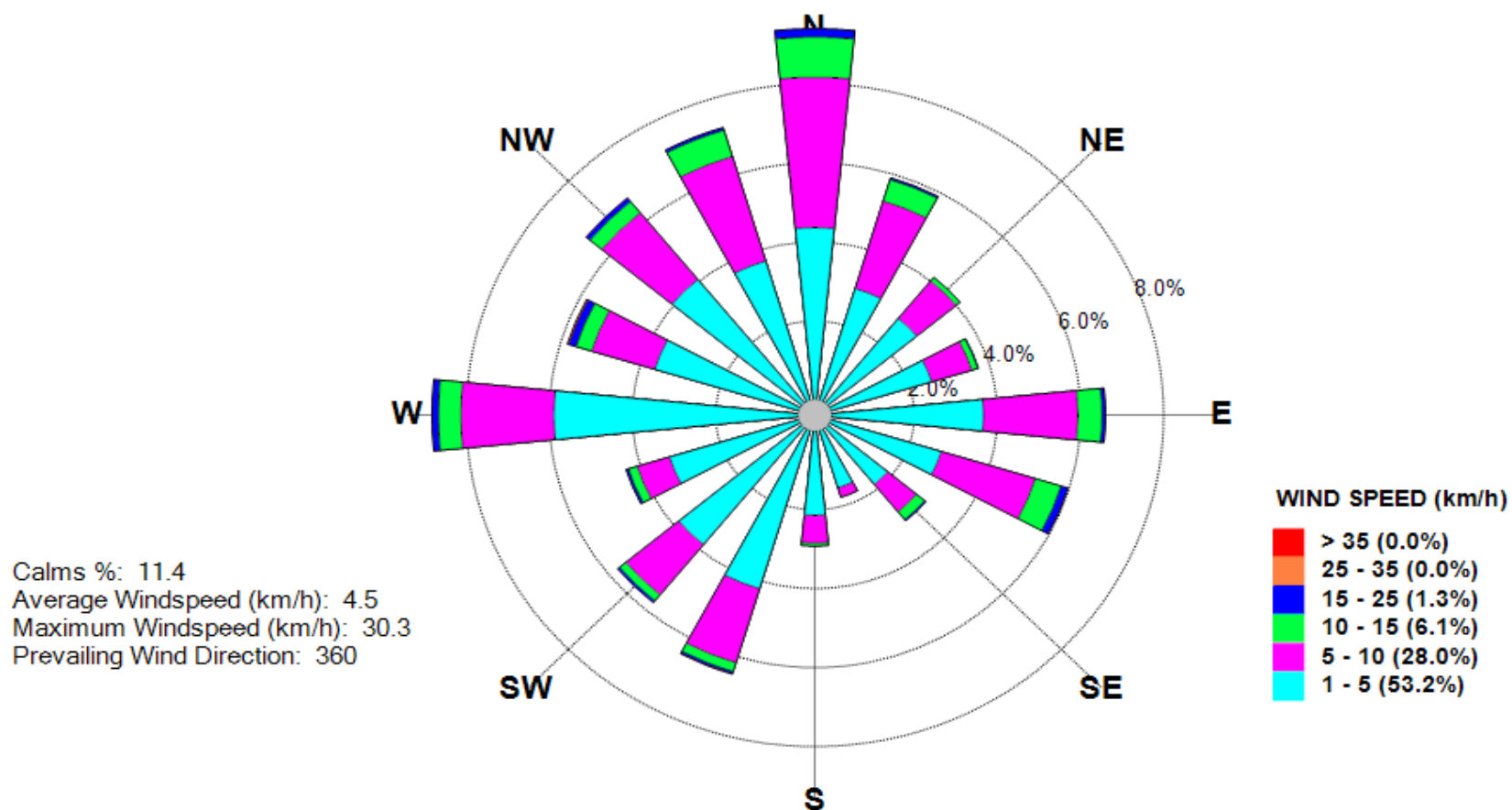


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose SEPTEMBER 2020



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

October 2020
Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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

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

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- 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for October 2020.

Approximately 100% of TEOM data was recovered for October 2020.

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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.

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 2020 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in August 2020 and the next calibration (annual) is scheduled for November 2020. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for October 2020 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/10/2020	12.2	12.4	30.5	31.0
2/10/2020	16.6	12.4	41.5	31.1
3/10/2020	27.4	12.6	68.5	31.5
4/10/2020	16.8	12.6	42.0	31.6
5/10/2020	16.4	12.7	41.0	31.7
6/10/2020	14.2	12.7	35.5	31.7
7/10/2020	15.5	12.7	38.8	31.8
8/10/2020	15.5	12.7	38.8	31.9
9/10/2020	13.1	12.7	32.8	31.9
10/10/2020	9.0	12.7	22.5	31.8
11/10/2020	10.7	12.7	26.8	31.7
12/10/2020	18.7	12.7	46.8	31.9
13/10/2020	18.2	12.8	45.5	32.0
14/10/2020	22.3	12.9	55.8	32.2
15/10/2020	17.3	12.9	43.3	32.3
16/10/2020	17.3	13.0	43.3	32.4
17/10/2020	19.4	13.0	48.5	32.6
18/10/2020	8.8	13.0	22.0	32.5
19/10/2020	12.8	13.0	32.0	32.5
20/10/2020	10.2	13.0	25.5	32.4
21/10/2020	12.3	13.0	30.8	32.4
22/10/2020	16.0	13.0	40.0	32.5
23/10/2020	12.8	13.0	31.9	32.5
24/10/2020	8.4	12.9	21.0	32.4
25/10/2020	4.5	12.9	11.3	32.2
26/10/2020	6.1	12.8	15.3	32.0
27/10/2020	7.2	12.8	18.0	31.9
28/10/2020	8.9	12.7	22.3	31.8
29/10/2020	6.8	12.7	17.0	31.7
30/10/2020	8.5	12.6	21.3	31.6
31/10/2020	11.1	12.6	27.8	31.6

*Calculated from PM10

**Calculated from PM10 Annual Average

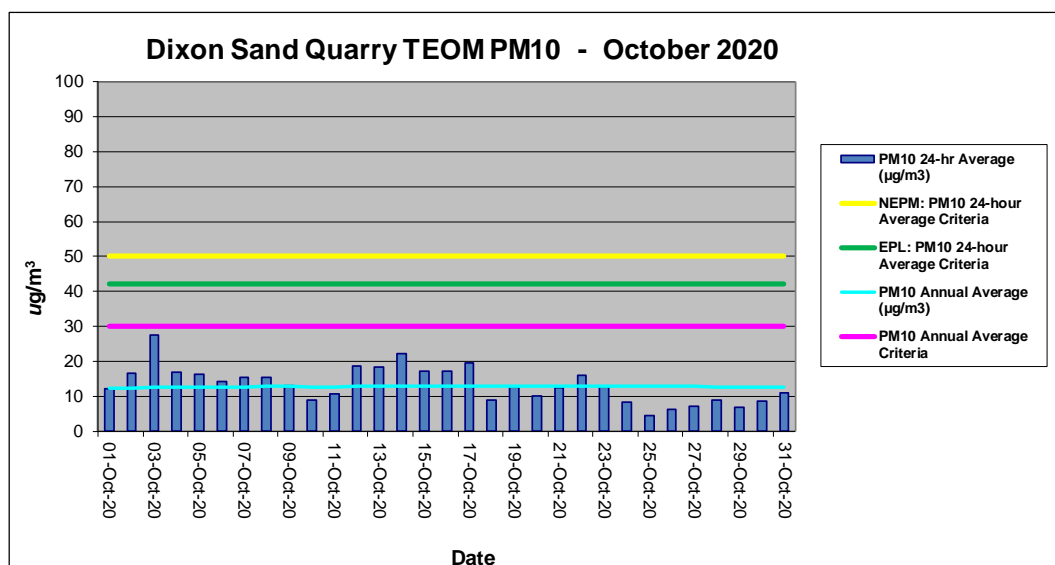


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for October 2020

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
1/10/2020	12.6	17.6	24.1	0.2	0.1	5.5	37.4	17.7	69.4	100.0	990.8	994.9	1001.3
2/10/2020	10.7	18.1	26.9	0.0	0.0	3.7	10.4	19.8	61.3	100.0	1000.4	1002.3	1003.8
3/10/2020	14.8	21.1	29.0	0.0	0.0	5.0	17.0	14.9	47.1	100.0	999.6	1002.5	1006.0
4/10/2020	14.0	22.2	30.8	0.0	0.4	4.8	14.4	19.2	57.9	100.0	995.0	998.2	1000.9
5/10/2020	15.8	24.5	31.1	0.0	0.4	6.6	27.8	22.6	40.4	97.6	993.9	996.1	998.9
6/10/2020	14.9	16.4	20.0	0.0	0.4	4.2	14.2	65.6	89.0	99.3	998.5	1000.0	1001.7
7/10/2020	14.7	17.1	21.4	0.4	0.2	3.2	24.8	69.3	93.1	100.0	995.4	998.4	1001.2
8/10/2020	15.4	20.4	27.3	0.2	0.3	5.7	29.9	38.7	79.4	100.0	987.8	990.9	996.6
9/10/2020	11.8	16.6	21.2	0.0	0.2	4.5	17.7	29.9	51.2	72.2	991.1	993.5	996.5
10/10/2020	11.5	17.7	24.8	0.0	0.2	3.2	13.5	18.0	39.5	61.7	995.2	997.3	999.4
11/10/2020	14.1	19.6	26.1	0.0	0.2	3.7	10.6	27.8	43.7	99.6	997.1	999.3	1001.6
12/10/2020	14.7	18.1	24.9	1.6	0.1	4.7	19.8	46.7	82.5	99.9	998.4	1001.2	1003.4
13/10/2020	12.9	19.9	29.1	0.2	0.0	4.1	21.4	17.3	64.8	100.0	998.7	1001.1	1005.6
14/10/2020	13.8	16.8	21.0	0.0	0.2	5.1	14.4	54.7	83.7	100.0	1002.2	1004.3	1006.6
15/10/2020	14.3	20.5	28.8	0.0	0.0	4.6	16.8	30.7	66.4	100.0	992.7	997.5	1003.4
16/10/2020	14.6	18.5	22.7	0.0	0.2	4.1	15.4	40.3	67.9	94.4	991.9	996.6	999.5
17/10/2020	13.9	20.7	30.6	0.0	0.3	4.1	16.1	34.4	69.1	99.2	986.4	991.8	998.6
18/10/2020	14.2	19.3	23.6	1.0	0.2	4.2	19.3	49.5	71.8	99.4	987.7	990.1	994.5
19/10/2020	12.6	15.4	20.7	2.8	0.3	4.9	21.1	56.0	94.9	100.0	993.6	995.6	998.1
20/10/2020	13.4	15.5	19.9	3.4	0.2	3.8	21.4	67.1	94.7	100.0	995.3	997.2	998.9
21/10/2020	12.4	17.5	25.0	0.2	0.2	4.1	16.2	44.4	79.7	99.7	991.8	994.6	997.0
22/10/2020	14.3	18.5	25.9	0.0	0.1	4.1	24.1	44.1	86.2	100.0	991.3	993.4	995.1
23/10/2020	14.4	19.9	27.8	0.0	0.4	4.8	18.5	36.9	82.9	100.0	987.2	990.9	994.2
24/10/2020	16.6	18.7	21.6	20.6	0.2	5.7	18.8	85.4	98.4	100.0	982.7	984.9	987.3
25/10/2020	10.8	12.2	17.2	25.0	0.3	5.9	19.2	99.3	99.9	100.0	984.7	991.8	995.6
26/10/2020	10.7	12.1	14.0	30.4	0.9	7.5	26.7	99.3	100.0	100.0	993.3	996.3	999.5
27/10/2020	10.6	13.2	17.3	4.4	0.0	4.9	14.9	99.3	99.9	100.0	996.5	998.4	1000.2
28/10/2020	12.5	14.5	19.1	1.0	0.3	3.1	12.7	99.6	100.0	100.0	993.6	996.9	999.3
29/10/2020	13.0	15.6	22.0	2.4	0.1	4.2	16.8	100.0	100.0	100.0	988.6	991.3	994.8
30/10/2020	11.1	15.9	21.6	0.4	0.1	4.1	18.7	99.4	100.0	100.0	987.4	989.4	991.5
31/10/2020	12.7	17.1	24.9	9.4	0.1	4.7	31.0	61.8	99.4	100.0	985.6	987.9	991.6
Monthly	10.6	17.8	31.1	103.6	0.0	4.6	37.4	14.9	77.9	100.0	982.7	995.6	1006.6

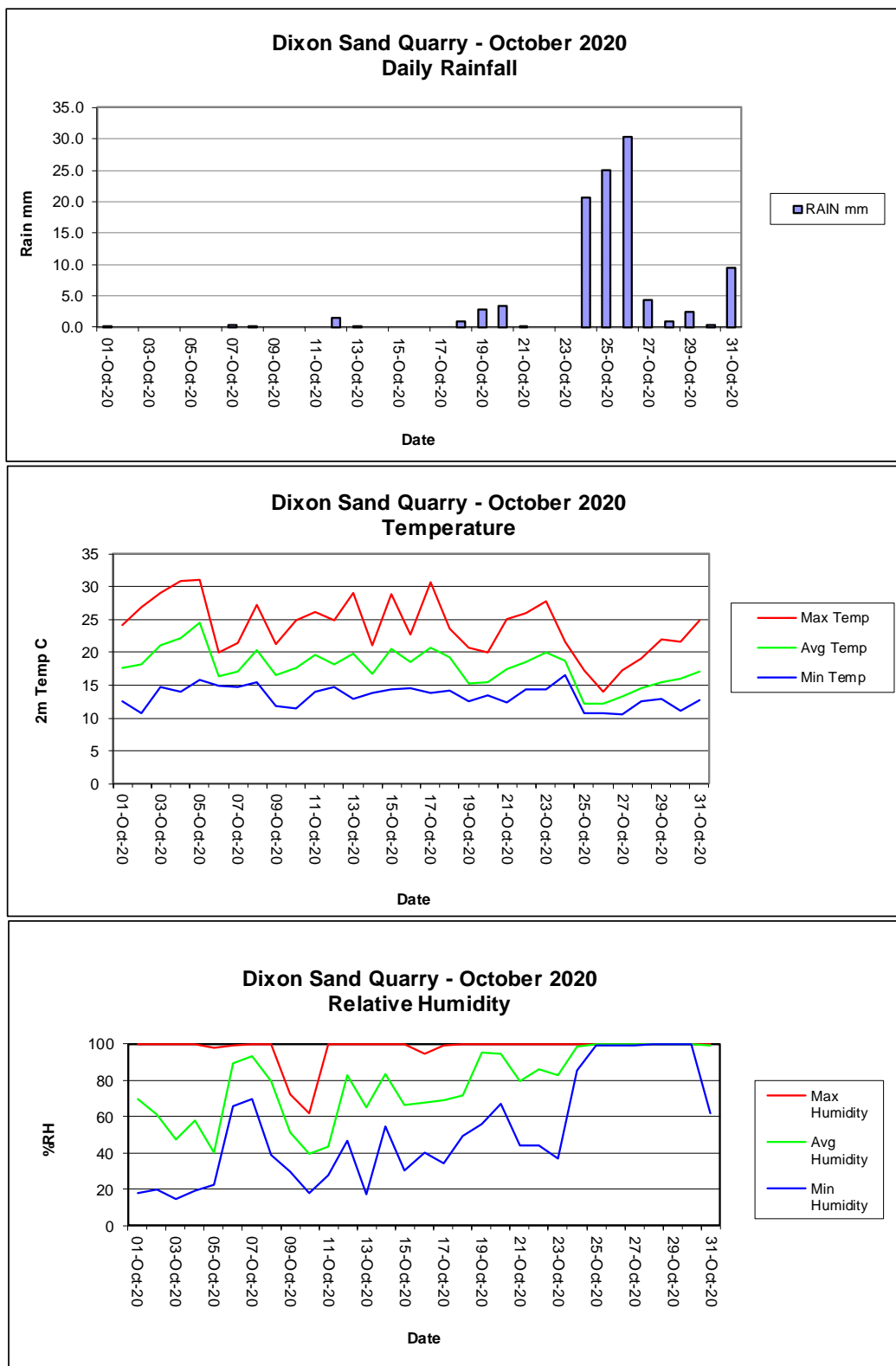


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*

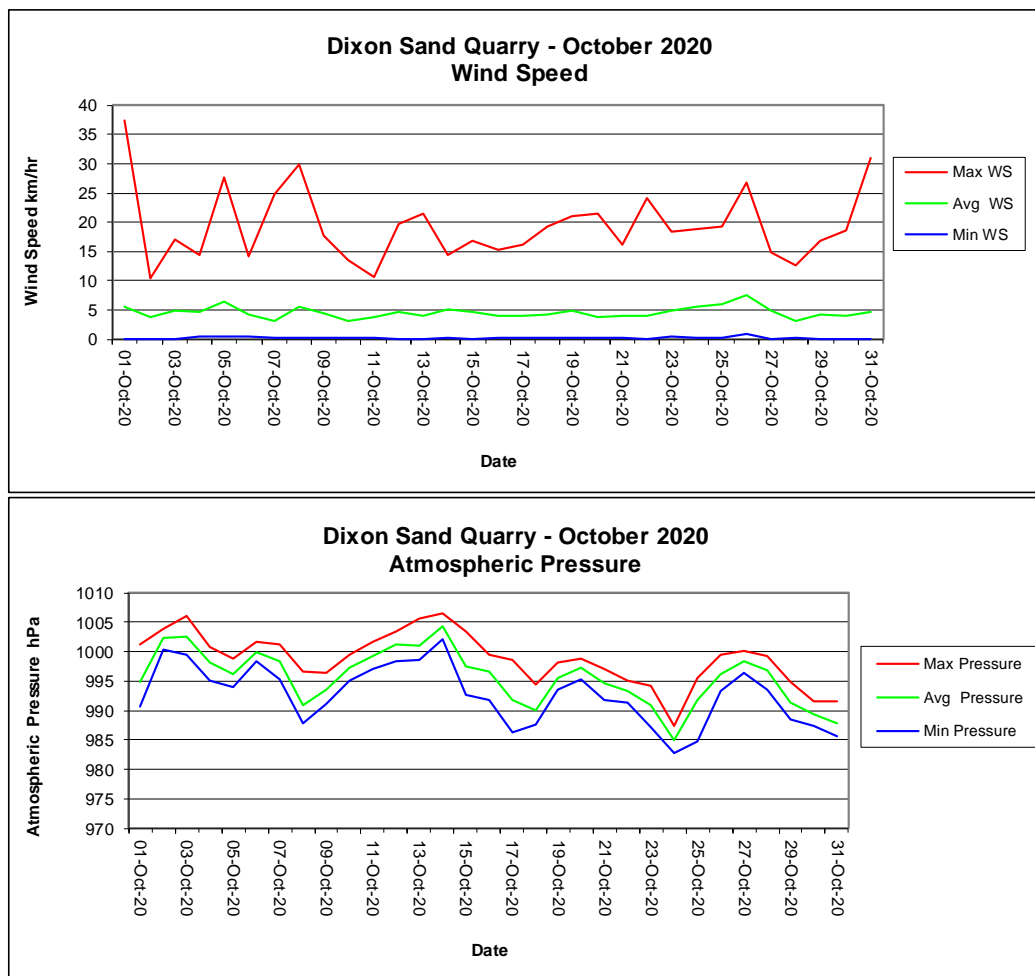
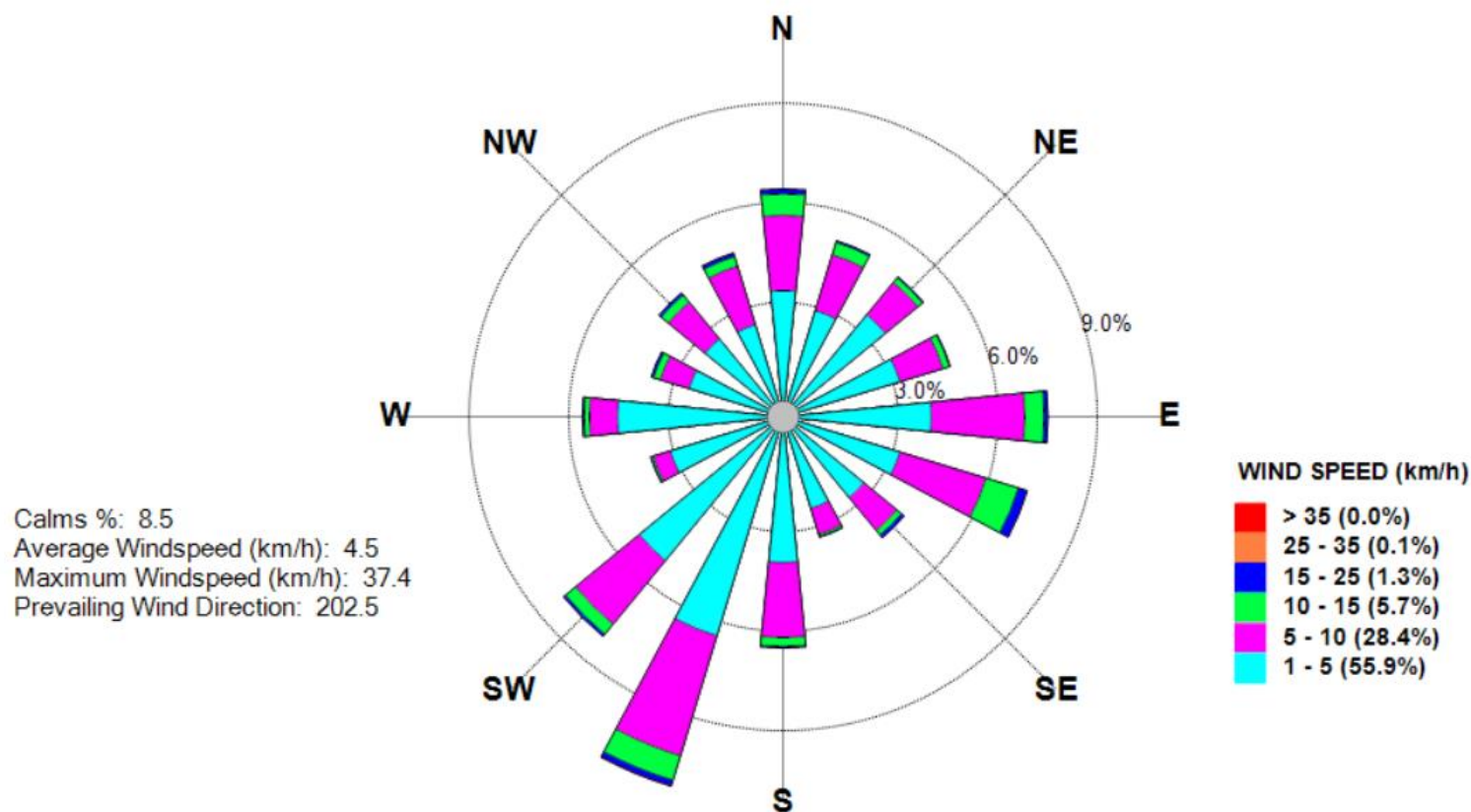


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose OCTOBER 2020



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 2020
Amendment 1

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 4 August 2021

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 2020 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for November 2020.

Approximately 100% of TEOM data was recovered for November 2020.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration, originally scheduled for November, was conducted on 10-11 December 2020 and the next calibration (annual) is scheduled for February 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for November 2020 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/11/2020	7.4	12.6	18.5	31.5
2/11/2020	12.8	12.6	32.0	31.5
3/11/2020	10.8	12.6	27.0	31.5
4/11/2020	11.3	12.6	28.3	31.4
5/11/2020	10.7	12.6	26.8	31.4
6/11/2020	10.3	12.5	25.8	31.4
7/11/2020	15.4	12.6	38.5	31.4
8/11/2020	12.6	12.6	31.5	31.4
9/11/2020	9.1	12.5	22.8	31.3
10/11/2020	11.5	12.5	28.8	31.3
11/11/2020	14.0	12.5	35.0	31.3
12/11/2020	18.2	12.6	45.5	31.5
13/11/2020	12.8	12.6	32.0	31.5
14/11/2020	10.7	12.6	26.8	31.4
15/11/2020	14.1	12.6	35.3	31.5
16/11/2020	22.8	12.7	57.0	31.6
17/11/2020	36.0	12.8	90.0	32.1
18/11/2020	19.2	12.9	48.0	32.2
19/11/2020	17.9	12.9	44.8	32.3
20/11/2020	25.1	13.0	62.7	32.5
21/11/2020	26.4	13.1	66.0	32.7
22/11/2020	15.1	13.1	37.8	32.7
23/11/2020	13.5	13.1	33.7	32.7
24/11/2020	11.9	13.1	29.8	32.7
25/11/2020	13.0	13.1	32.5	32.7
26/11/2020	23.8	13.2	59.5	32.9
27/11/2020	31.0	13.3	77.5	33.2
28/11/2020	26.1	13.4	65.3	33.4
29/11/2020	41.2	13.5	103.0	33.9
30/11/2020	26.3	13.6	65.8	34.1

*Calculated from PM10

**Calculated from PM10 Annual Average

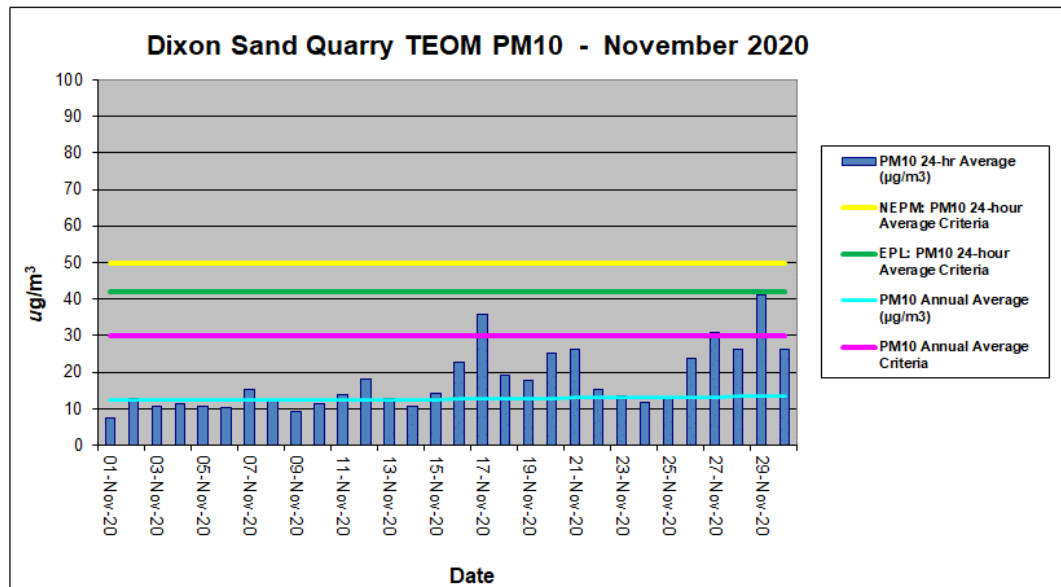


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for November 2020

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
1/11/2020	11.8	14.5	17.7	6.6	0.0	5.2	20.4	82.8	97.9	100.0	990.6	996.2	1003.8
2/11/2020	12.3	15.8	21.2	0.0	0.2	4.6	11.6	55.5	89.9	100.0	1002.9	1005.1	1006.8
3/11/2020	11.1	16.1	23.1	0.0	0.0	4.0	15.3	46.4	79.5	100.0	1000.6	1003.3	1006.4
4/11/2020	12.5	20.4	28.9	0.0	0.0	4.8	20.1	22.0	60.3	99.3	988.5	994.0	1001.0
5/11/2020	10.8	15.1	23.8	22.2	0.3	4.6	19.5	35.7	85.6	100.0	986.4	990.0	995.7
6/11/2020	11.4	14.9	21.6	0.0	0.1	6.2	22.0	37.5	73.7	100.0	994.5	996.3	997.9
7/11/2020	10.5	14.9	20.6	0.0	0.1	3.2	26.0	46.0	81.4	100.0	996.4	1000.5	1006.3
8/11/2020	11.8	15.0	20.0	0.2	0.1	4.6	22.2	44.9	74.2	99.2	1005.3	1006.6	1007.9
9/11/2020	12.5	15.6	21.1	0.0	0.0	3.7	18.7	47.5	73.5	99.3	1002.3	1005.0	1007.3
10/11/2020	11.4	16.5	23.3	0.0	0.2	3.9	24.3	37.8	70.2	99.2	997.6	1001.2	1004.1
11/11/2020	13.2	19.9	28.2	0.0	0.1	4.7	20.2	30.6	71.8	99.4	991.8	995.8	1000.0
12/11/2020	16.4	22.8	28.8	0.0	0.5	5.4	19.8	32.7	61.8	99.2	985.3	988.6	993.1
13/11/2020	15.8	19.5	26.8	8.8	0.4	5.2	19.8	45.1	82.6	99.3	980.8	984.6	987.5
14/11/2020	15.6	19.8	27.5	0.0	0.0	4.0	19.4	31.6	66.4	94.0	984.9	988.5	993.8
15/11/2020	13.9	22.4	32.6	0.0	0.1	4.4	21.1	20.5	61.3	99.3	992.6	994.1	995.7
16/11/2020	19.0	27.8	36.9	0.0	0.2	4.9	18.5	16.0	40.9	72.0	987.5	990.8	994.5
17/11/2020	15.8	19.2	23.0	0.0	0.2	6.4	25.5	54.4	74.1	99.2	992.9	998.0	1003.1
18/11/2020	15.1	17.9	22.6	0.8	0.3	4.9	19.3	53.8	80.1	99.9	1000.3	1002.3	1004.1
19/11/2020	14.5	19.9	27.1	0.0	0.2	4.0	19.7	44.1	75.7	99.2	996.3	999.9	1002.8
20/11/2020	16.5	24.2	32.8	5.2	0.2	5.2	24.9	26.9	66.4	99.3	992.8	996.0	1000.0
21/11/2020	16.1	19.4	24.9	0.6	0.1	4.5	20.4	57.0	77.6	99.5	997.4	999.9	1002.1
22/11/2020	15.8	21.6	28.6	0.6	0.1	3.6	12.0	53.7	81.6	100.0	990.7	995.0	999.9
23/11/2020	17.6	21.7	23.6	1.8	0.1	4.2	19.5	57.6	77.3	99.2	984.7	987.6	990.7
24/11/2020	15.3	18.4	22.9	0.0	0.2	4.3	22.5	50.8	78.3	99.3	988.0	990.6	994.0
25/11/2020	15.5	18.9	23.9	0.0	0.1	2.9	11.6	52.4	77.7	99.4	990.3	992.7	994.8
26/11/2020	16.1	23.6	34.0	0.0	0.0	4.6	17.6	27.3	59.8	87.9	989.1	991.3	997.2
27/11/2020	17.2	22.0	29.8	0.0	0.2	5.6	22.0	44.0	69.1	87.8	991.3	995.3	998.7
28/11/2020	23.0	31.3	38.4	0.0	0.4	6.7	20.5	15.4	40.7	79.2	984.6	988.0	992.1
29/11/2020	18.5	30.0	38.8	0.0	0.3	8.5	58.2	17.1	36.0	69.7	978.9	983.9	994.4
30/11/2020	17.0	19.0	21.9	0.0	0.3	4.9	23.2	45.8	65.6	75.0	994.1	995.4	997.2
Monthly	10.5	19.9	38.8	46.8	0.0	4.8	58.2	15.4	71.0	100.0	978.9	995.2	1007.9

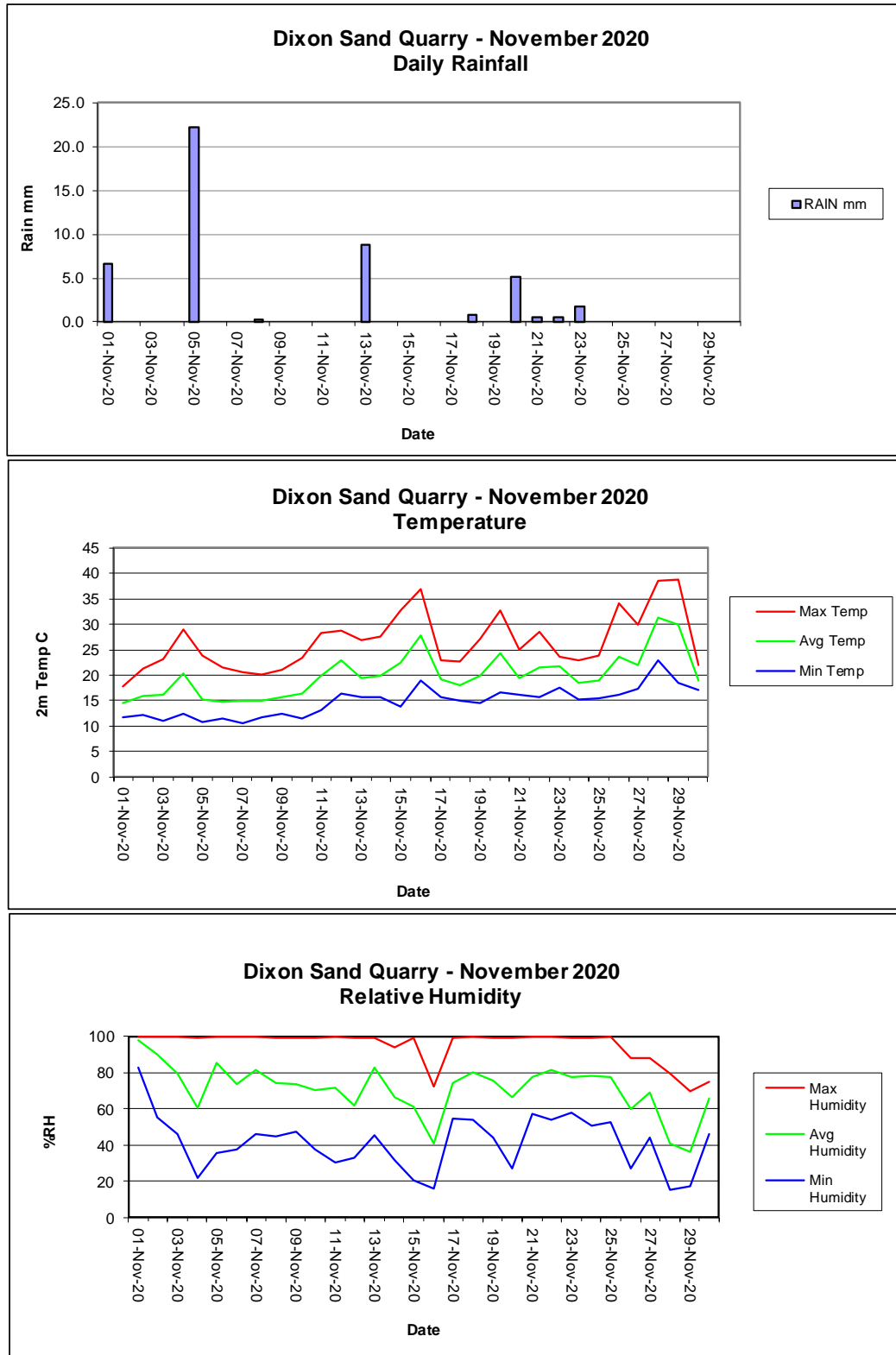


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

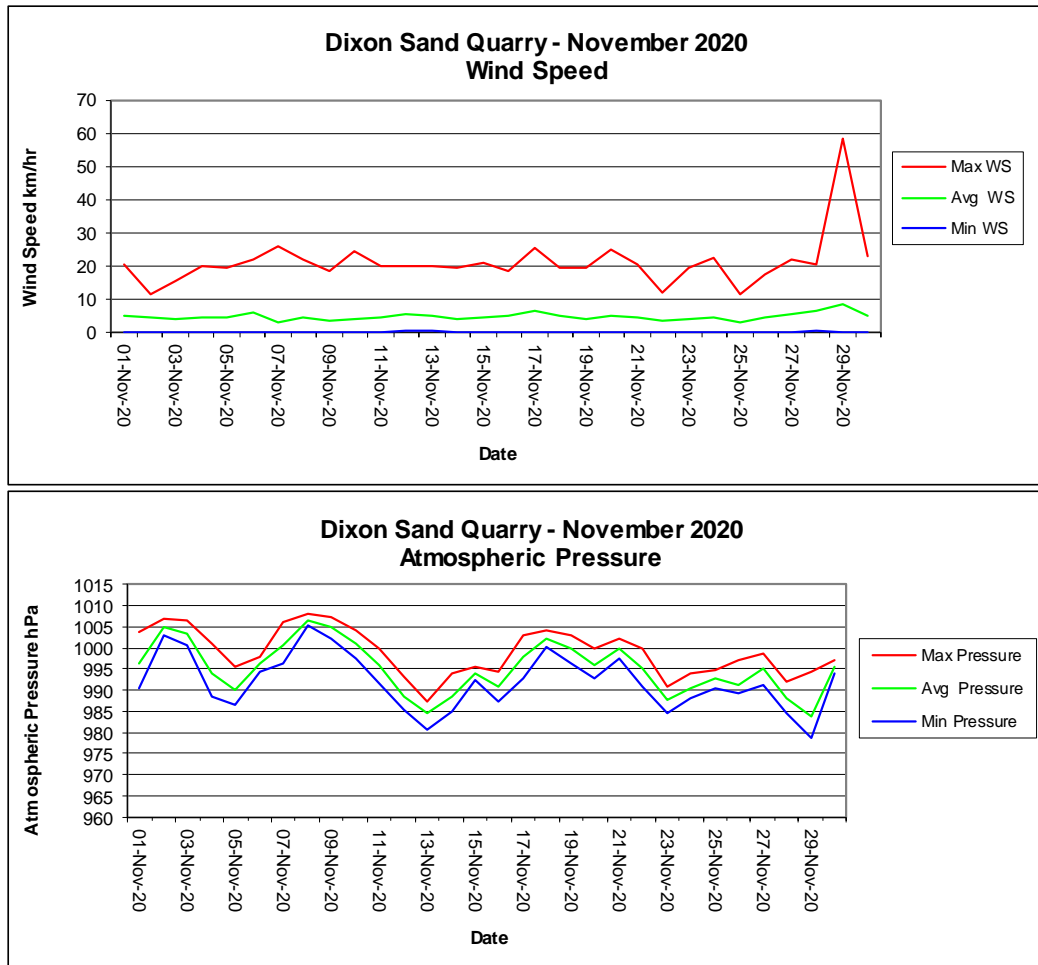
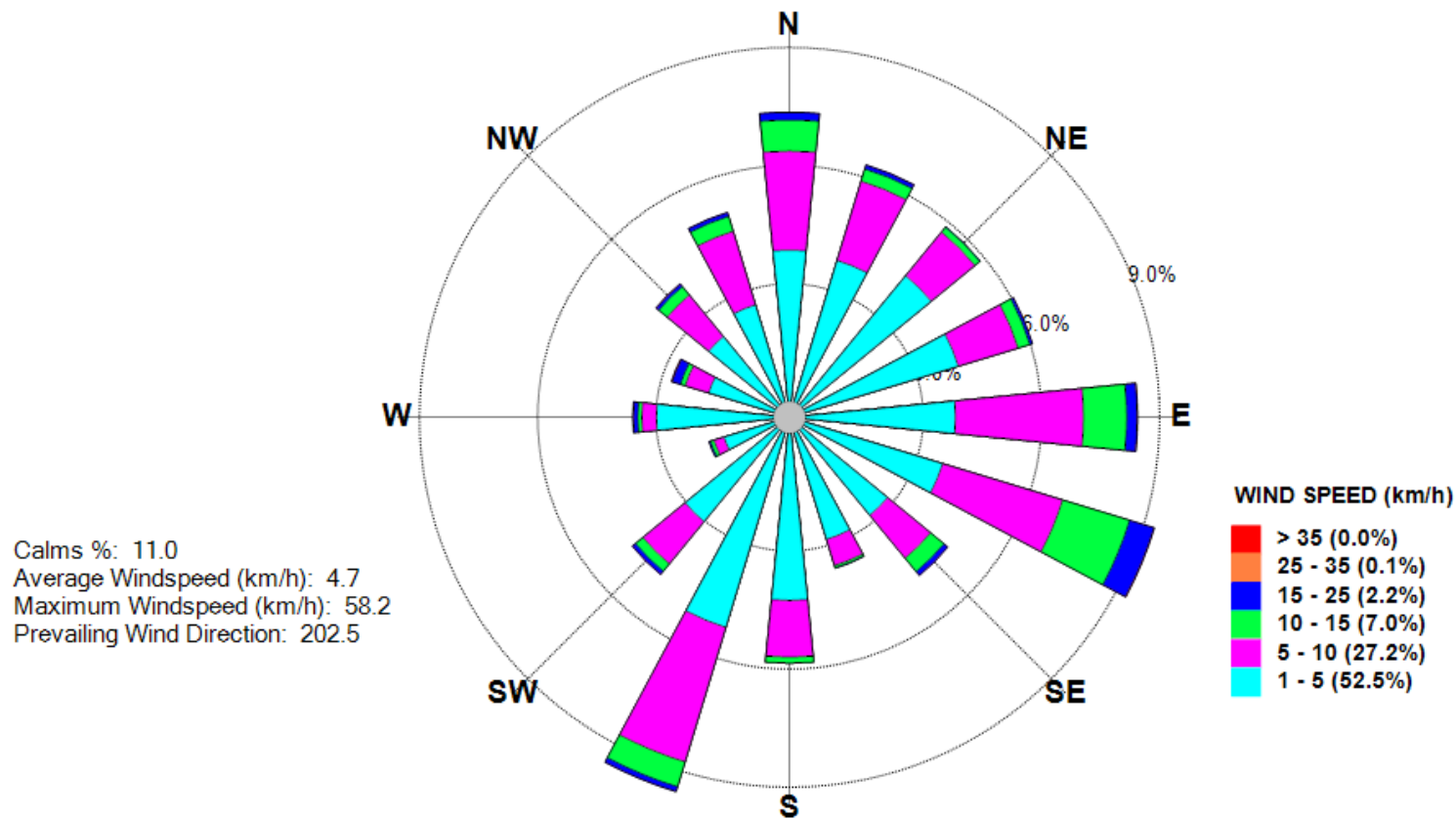


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose NOVEMBER 2020



Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixons-16/ TEOMDate: 10.12.20 / 11/12/20.**1. TEOM Data Screen**SERIAL No: 25570Firmware: AB

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OK	Green - Normal	✓	
Date/time	TEOM: 6-23 8/12/20 Actual: 10/11/20 14-22	Current Date/time correct within 5 minutes		✓
PM-10 24hr av	26.0	Positive values	✓	
Filter loading PM10	39%	<80 %		
Frequency PM-10	252.06903	200-300 Hz		
Noise PM-10	0.022	<0.100ug		

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

Comments: smokey, fire nearby, reset time OK ✓**2. System Status**

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

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DAVIESSigned Colin Davies

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	26.7	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	
Ambient Pressure	0.976	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	<u>31</u>	<u>254.99139</u>	<u>254.99140</u>	<u>254.99142</u>	<u>254.99143</u>

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: changed time/date OK.

Total Mass 0.67
mass cone 13-0
falling...

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 ✓ 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 3.00 Error % 0.0 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 12.65 Error % 0.0 (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:** good flows ✓

2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.55 < Limit 0.60

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

Comments: Just pass - leak in mass transducer but cannot fix onsite OK for now.



Annual Calibration/Maintenance**1. Temperature and Pressure Calibration – Conducted YES/NO**

Reference Temperature: 27.1 C TEOM Temperature 26.7 C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: 0.977 atm TEOM Pressure 0.975 atm
if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

Note: TetraCal measures Atmospheric Pressure in mm Hg or mb or hPa
For mb or hPa divide tetraCal result by 1013.25 to change units to atm.
For mmHg divide tetraCal 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 = 13915 TEOM stated K0 13748 Error %: 12

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: 10/12 16:00 Finish date/time: 11/12 11:00

Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³

Noise was less than 5ug/m³ YES/NO

FAILED zero noise check → unstable
noise very, repeat next quarterly cal
→ New filter results look good.?

5. Maintenance

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:

Ref
P = 742.5 mmHg
T = 27.0 °C
P = 0.977 atm
initial - final same.
Fadj Man 1.050
Fadj byp. 1.020
Avg. ✓ good





**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 2020
Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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 2020 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for December 2020.

Approximately 100% of TEOM data was recovered for December 2020.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration, originally scheduled for November, was actually conducted on 10-11 December 2020 and the next calibration (annual) is scheduled for February 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for December 2020 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/12/2020	27.8	13.7	69.6	34.3
2/12/2020	No Valid Data	13.7	No Valid Data	34.3
3/12/2020	10.4	13.7	26.1	34.3
4/12/2020	15.4	13.7	38.5	34.3
5/12/2020	25.2	13.8	63.0	34.5
6/12/2020	11.6	13.8	29.0	34.4
7/12/2020	20.6	13.8	51.5	34.5
8/12/2020	11.5	13.8	28.8	34.5
9/12/2020	19.3	13.8	48.3	34.6
10/12/2020	No Valid Data	13.8	No Valid Data	34.6
11/12/2020	No Valid Data	13.8	No Valid Data	34.6
12/12/2020	8.4	13.8	21.0	34.5
13/12/2020	10.4	13.8	26.0	34.4
14/12/2020	11.5	13.8	28.8	34.4
15/12/2020	6.2	13.7	15.5	34.3
16/12/2020	9.3	13.7	23.3	34.2
17/12/2020	11.0	13.7	27.5	34.2
18/12/2020	12.8	13.7	32.0	34.2
19/12/2020	10.8	13.7	27.0	34.1
20/12/2020	7.4	13.6	18.5	34.0
21/12/2020	8.2	13.6	20.5	34.0
22/12/2020	6.8	13.5	17.0	33.9
23/12/2020	11.4	13.5	28.5	33.8
24/12/2020	15.3	13.5	38.3	33.9
25/12/2020	15.8	13.6	39.5	33.9
26/12/2020	9.6	13.5	24.0	33.8
27/12/2020	10.3	13.5	25.8	33.8
28/12/2020	16.0	13.5	40.0	33.8
29/12/2020	9.4	13.5	23.5	33.8
30/12/2020	9.9	13.5	24.8	33.7
31/12/2020	15.9	13.5	39.8	33.8

*Calculated from PM10

**Calculated from PM10 Annual Average

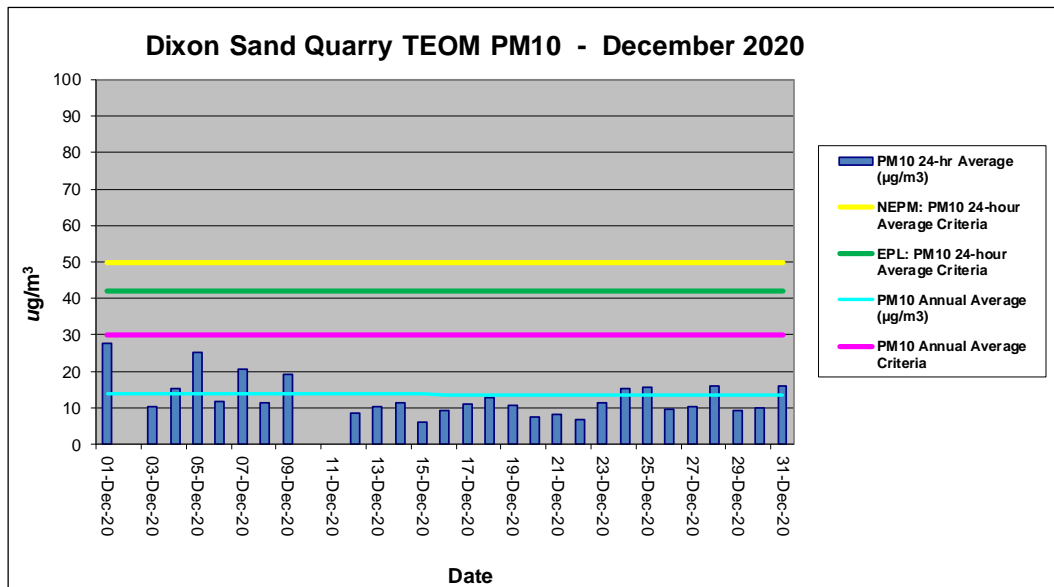


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for December 2020

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
1/12/2020	16.1	23.7	36.6	0.0	0.0	4.8	40.5	32.9	66.8	94.4	983.3	990.7	995.8
2/12/2020	16.0	18.6	22.9	0.0	0.5	6.2	18.5	62.9	84.9	100.0	997.7	1000.4	1004.0
3/12/2020	15.7	17.6	19.2	1.4	0.4	3.6	11.5	83.0	97.2	100.0	996.3	999.9	1004.4
4/12/2020	17.2	23.3	34.2	0.2	0.1	3.7	17.6	11.5	65.4	100.0	989.2	992.7	996.5
5/12/2020	16.7	20.0	23.5	14.2	0.0	3.6	16.4	71.8	90.1	100.0	979.6	988.5	994.2
6/12/2020	18.8	23.4	29.0	0.0	0.1	4.9	23.9	22.8	52.0	99.3	978.8	982.1	986.7
7/12/2020	16.9	22.4	28.5	0.0	0.2	4.2	28.9	25.1	38.0	49.9	981.7	984.3	986.2
8/12/2020	13.1	17.3	23.7	0.0	0.1	5.7	28.0	21.8	49.8	73.7	985.7	991.8	997.9
9/12/2020	11.8	18.4	26.0	0.0	0.1	3.6	19.8	31.0	60.5	91.8	994.1	996.9	999.5
10/12/2020	14.3	19.1	28.6	0.0	0.2	4.8	22.6	29.5	73.4	99.0	994.7	998.2	1004.8
11/12/2020	13.5	16.2	19.6	1.0	0.5	4.2	20.5	48.2	76.2	100.0	1004.0	1006.2	1008.3
12/12/2020	14.2	17.4	21.9	0.4	0.6	6.3	28.2	42.2	67.2	92.5	1005.3	1007.0	1009.1
13/12/2020	13.2	17.4	22.2	0.2	0.1	4.9	21.1	51.4	82.2	100.0	1000.8	1003.3	1006.0
14/12/2020	16.1	18.8	22.4	2.2	0.1	4.6	22.4	64.9	89.7	100.0	997.2	998.9	1001.6
15/12/2020	17.4	19.7	22.1	13.0	0.2	5.0	23.6	99.2	100.0	100.0	991.6	994.5	997.7
16/12/2020	20.8	22.7	28.3	10.2	0.0	4.3	20.1	63.9	97.5	100.0	986.8	989.8	992.4
17/12/2020	19.6	24.6	31.1	1.4	0.2	4.6	18.0	51.6	84.2	100.0	983.6	986.0	988.0
18/12/2020	19.3	23.8	28.8	6.6	0.4	4.9	12.8	59.2	88.0	100.0	984.3	987.1	992.6
19/12/2020	16.5	17.2	19.3	7.4	0.1	3.9	13.0	100.0	100.0	100.0	992.6	995.3	997.0
20/12/2020	16.1	18.0	21.7	2.2	0.1	3.9	10.6	93.1	99.7	100.0	990.4	992.3	994.8
21/12/2020	16.9	18.2	21.1	20.2	0.1	2.4	10.8	99.2	99.8	100.0	984.3	989.8	992.6
22/12/2020	16.7	20.9	26.2	4.0	0.3	3.8	18.4	32.5	70.2	100.0	980.1	983.2	988.3
23/12/2020	13.1	19.1	25.0	0.0	0.0	4.3	23.1	43.5	80.9	100.0	987.8	993.1	997.7
24/12/2020	16.0	21.1	27.6	0.0	0.2	4.5	17.8	42.2	75.9	100.0	990.8	994.5	997.5
25/12/2020	15.4	17.8	20.4	2.2	0.2	4.5	17.4	77.3	95.7	100.0	994.3	998.0	1000.7
26/12/2020	14.5	17.7	22.9	2.4	0.3	4.2	22.2	66.3	91.7	100.0	994.0	997.4	1000.3
27/12/2020	15.5	22.9	32.2	0.0	0.3	4.2	18.7	24.6	74.4	100.0	986.6	990.5	994.8
28/12/2020	15.5	22.8	32.1	15.2	0.6	7.2	25.9	34.7	70.0	100.0	984.4	987.9	993.4
29/12/2020	14.9	16.3	18.4	9.4	0.2	3.5	12.5	99.2	99.9	100.0	989.9	993.6	996.9
30/12/2020	15.3	17.3	20.4	19.2	0.1	4.6	16.0	82.6	97.9	100.0	995.4	997.6	999.1
31/12/2020	16.5	18.6	21.8	0.0	0.2	3.6	17.1	71.0	93.1	100.0	996.7	998.8	1000.4
Monthly	11.8	19.7	36.6	133.0	0.0	4.5	40.5	11.5	81.0	100.0	978.8	993.9	1009.1

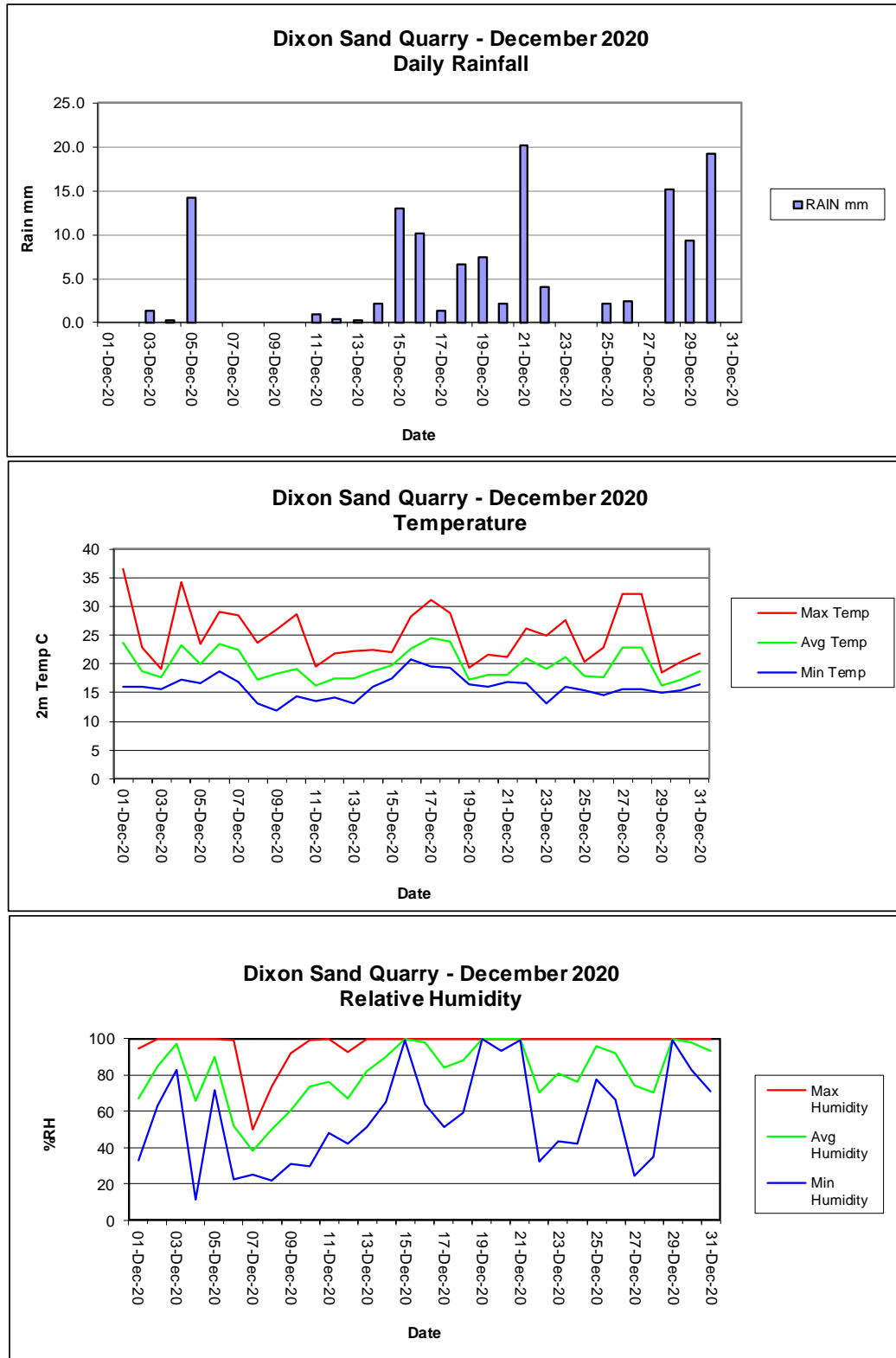


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

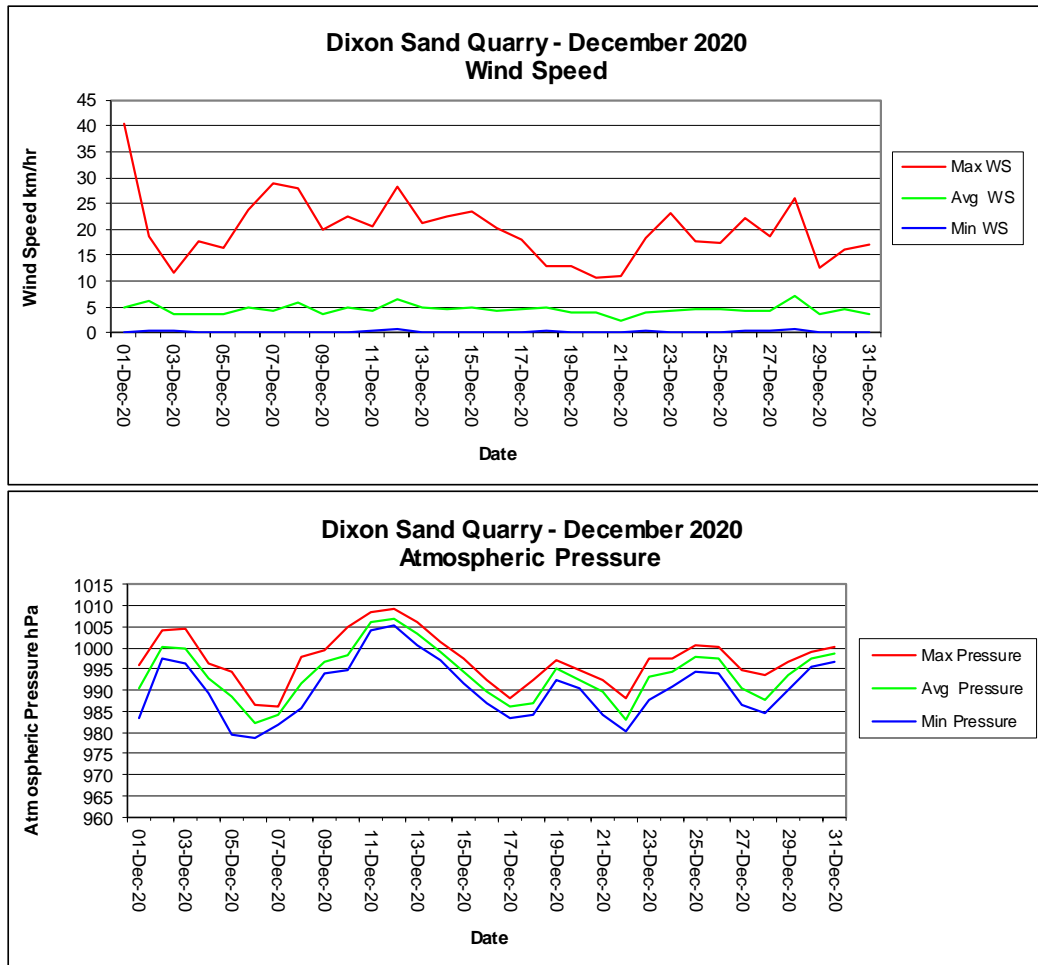
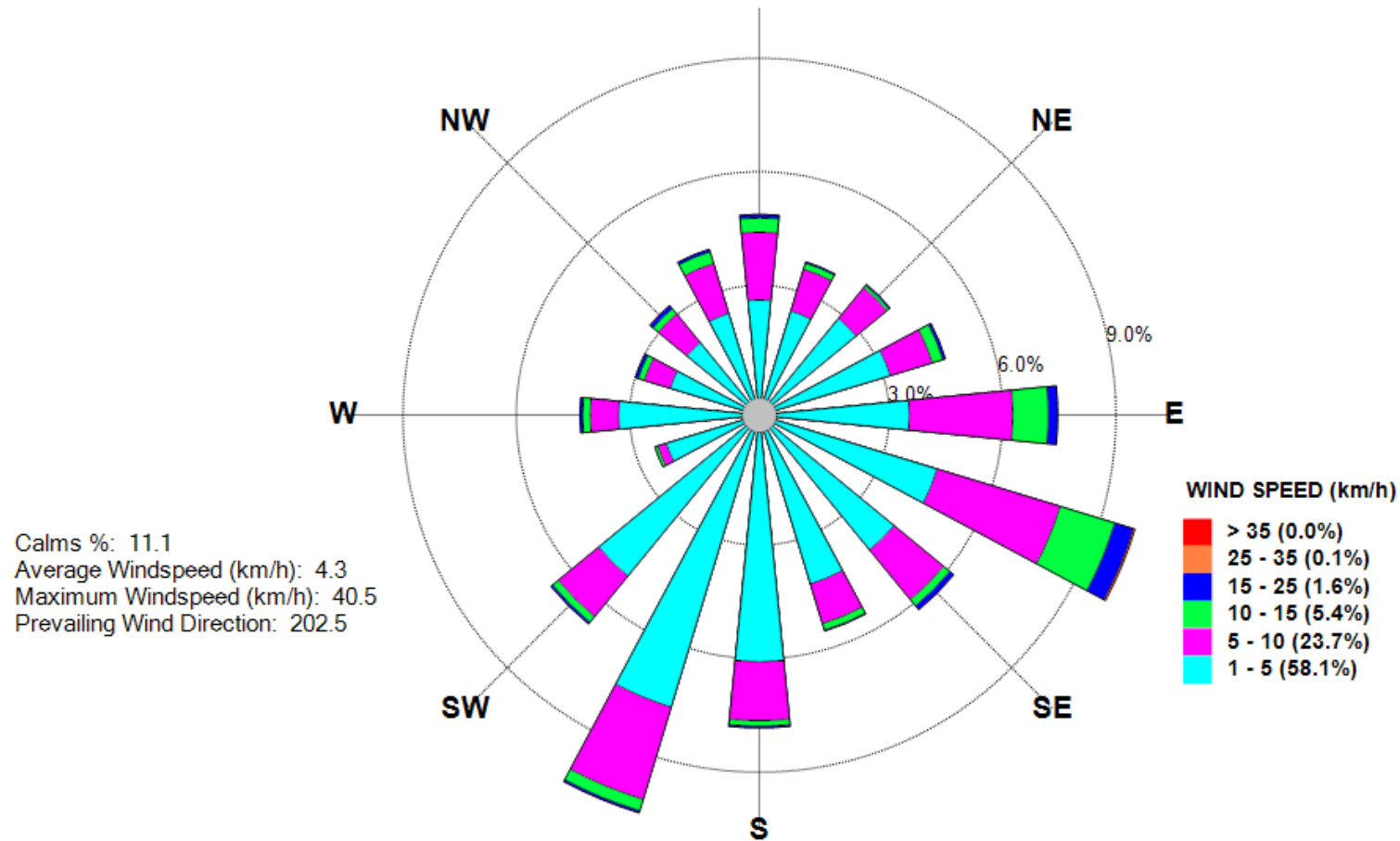


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose DECEMBER 2020



Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixons-16/ TEOMDate: 10.12.20 / 11/12/20.**1. TEOM Data Screen**SERIAL No: 25570Firmware: AB

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OK	Green - Normal	✓	
Date/time	TEOM: 6-23 8/12/20 Actual: 10/11/20 14-22	Current Date/time correct within 5 minutes		✓
PM-10 24hr av	26.0	Positive values	✓	
Filter loading PM10	39%	<80 %		
Frequency PM-10	252.06903	200-300 Hz		
Noise PM-10	0.022	<0.100ug		

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

Comments: smokey, fire nearby, reset time OK ✓**2. System Status**

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

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DAVIESSigned Colin Davies

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	26.7	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	✓	
Ambient Pressure	0.976	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	31	254.99139	254.99140	254.99142	254.99143

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: changed time/date OK.

Total Mass 0.67
 mass cone B-v
 falling...

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 ✓ 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 3.00 Error % 0.0 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 12.65 Error % 0.0 (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: good flows ✓

2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.55 < Limit 0.60

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

Comments: Just pass - leak in mass transducer but cannot fix onsite OK for now.



Annual Calibration/Maintenance**1. Temperature and Pressure Calibration – Conducted YES/NO**

Reference Temperature: 27.1 C TEOM Temperature 26.7 C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: 0.977 atm TEOM Pressure 0.975 atm
if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO

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

2. Flow Calibration – Conducted YES/NO**PM10**

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

BYPASS

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

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

Actual measured K0 = 13915 TEOM stated K0 13748 Error %: 12

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: 10/12 16:00 Finish date/time: 11/12 11:00

Standard deviation of all recorded data (min 30 min averages) = _____ ug/m³

Noise was less than 5ug/m³ YES/NO

*FAILED zero noise check → unstable
noise very, repeat next quarterly cal
→ New filter results look good.?*

5. Maintenance

Air Inlet system cleaned YES/NO

Pump Reconditioned YES/NO

Check Waterproofing YES/NO

Comments:

Ref
 $P = 742.5 \text{ mmHg}$
 $T = 27.0^\circ \text{C}$
 $P = 0.977 \text{ atm}$
initial & final same.
Fadj Man 1.050
Fadj byp. 1.020
Avx.
✓ good





**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 2021
Amendment 1

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 4 August 2021

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

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- 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
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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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

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- AS3580.9.8 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration, originally scheduled for November, was actually conducted in December 2020 with the next calibration (annual) scheduled for February 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for January 2021 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/01/2021	11.6	13.5	29.0	33.7
2/01/2021	11.5	13.5	28.8	33.7
3/01/2021	10.8	13.5	27.0	33.7
4/01/2021	10.3	13.4	25.6	33.6
5/01/2021	14.4	13.5	36.0	33.6
6/01/2021	12.1	13.4	30.3	33.6
7/01/2021	9.6	13.4	24.0	33.6
8/01/2021	12.5	13.4	31.3	33.6
9/01/2021	10.3	13.4	25.8	33.5
10/01/2021	7.0	13.4	17.5	33.4
11/01/2021	12.0	13.4	30.0	33.4
12/01/2021	18.0	13.4	45.0	33.5
13/01/2021	12.2	13.4	30.5	33.5
14/01/2021	21.6	13.4	54.0	33.6
15/01/2021	32.4	13.5	80.9	33.8
16/01/2021	17.2	13.5	43.0	33.8
17/01/2021	16.0	13.6	40.0	33.9
18/01/2021	28.0	13.6	70.0	34.1
19/01/2021	28.6	13.7	71.5	34.2
20/01/2021	14.3	13.7	35.8	34.3
21/01/2021	27.5	13.8	68.8	34.4
22/01/2021	19.7	13.8	49.3	34.5
23/01/2021	24.8	13.9	62.0	34.6
24/01/2021	19.4	13.9	48.5	34.7
25/01/2021	29.6	14.0	74.0	34.9
26/01/2021	16.2	14.0	40.5	34.9
27/01/2021	19.2	14.0	48.0	35.0
28/01/2021	8.4	14.0	21.0	34.9
29/01/2021	6.5	13.9	16.3	34.8
30/01/2021	10.3	13.9	25.8	34.8
31/01/2021	15.1	13.9	37.8	34.8

*Calculated from PM10

**Calculated from PM10 Annual Average

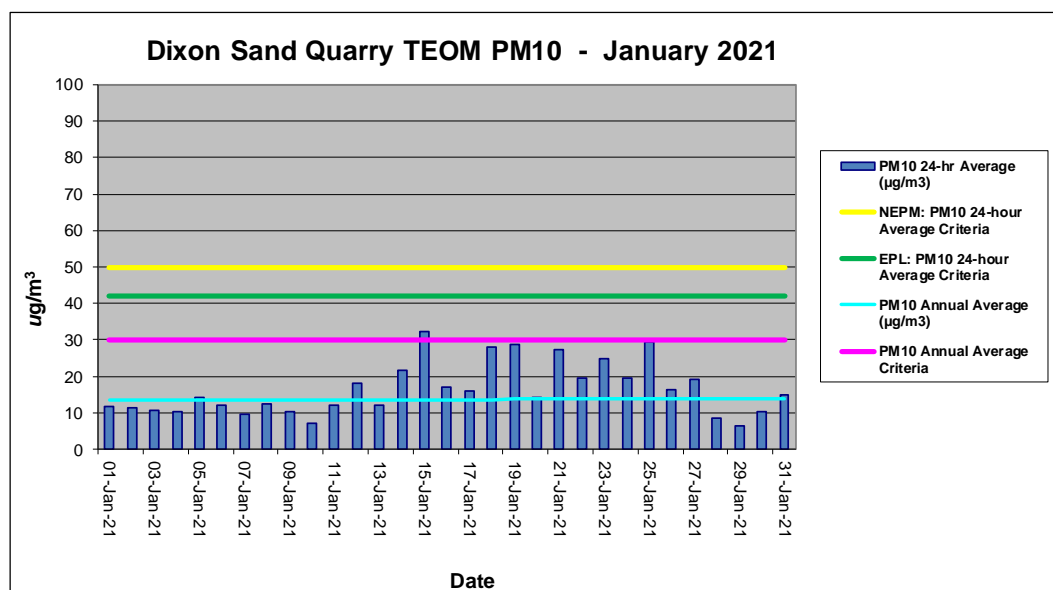


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for January 2021

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
1/01/2021	15.0	16.7	18.2	3.4	0.3	3.5	12.0	84.0	97.8	100.0	997.9	999.5	1001.1
2/01/2021	14.5	16.8	19.5	0.0	0.4	3.8	9.7	90.9	99.5	100.0	991.0	994.2	997.9
3/01/2021	17.9	21.0	25.2	0.2	0.0	3.0	14.1	70.0	93.9	100.0	985.5	988.4	991.4
4/01/2021	17.6	20.5	26.8	12.8	0.2	3.8	15.6	88.4	99.8	100.0	984.6	986.4	987.7
5/01/2021	17.2	22.3	29.8	0.0	0.0	4.3	18.0	52.7	88.5	100.0	985.6	987.6	990.1
6/01/2021	16.9	19.9	24.6	0.0	0.3	4.4	19.3	65.6	92.7	100.0	990.0	993.9	997.7
7/01/2021	15.1	17.8	22.5	1.6	0.3	4.4	14.9	58.4	90.7	100.0	996.9	999.7	1002.4
8/01/2021	13.9	16.9	20.8	0.4	0.2	3.6	11.6	62.1	96.4	100.0	1000.4	1002.0	1003.0
9/01/2021	14.1	18.2	23.7	1.6	0.2	4.5	18.9	50.6	83.3	100.0	999.3	1000.9	1002.3
10/01/2021	15.2	20.6	27.0	0.0	0.1	3.7	21.4	47.4	77.3	99.6	997.3	999.3	1000.9
11/01/2021	17.0	21.8	28.4	0.2	0.2	4.4	17.4	36.4	71.8	99.5	993.7	996.8	999.1
12/01/2021	17.0	23.6	32.8	0.0	0.3	4.6	14.8	26.4	70.3	99.2	991.9	993.9	995.5
13/01/2021	17.9	22.9	29.1	0.0	0.1	4.5	18.6	40.1	74.6	100.0	992.9	995.3	997.7
14/01/2021	18.7	25.0	37.1	0.0	0.1	4.3	18.4	21.4	72.9	99.4	984.5	989.0	993.6
15/01/2021	19.4	23.5	30.2	0.0	0.2	4.8	19.2	24.6	74.1	99.2	980.0	984.9	989.3
16/01/2021	15.4	20.4	27.4	0.0	0.5	4.4	17.2	16.2	32.8	62.2	983.9	987.9	991.0
17/01/2021	14.3	19.6	26.8	0.0	0.1	4.3	23.5	29.7	57.9	87.5	991.0	992.9	995.2
18/01/2021	16.6	22.8	30.9	0.0	0.0	4.1	20.6	28.5	67.0	97.0	987.4	991.8	994.9
19/01/2021	15.4	19.2	23.0	0.0	0.0	2.9	11.8	57.4	78.7	99.4	989.9	995.8	1001.4
20/01/2021	14.7	16.9	21.0	1.4	0.0	3.0	11.5	60.8	83.7	100.0	1000.1	1001.2	1003.2
21/01/2021	13.9	20.1	27.3	0.0	0.0	4.1	23.2	33.8	67.2	99.2	991.8	996.3	1000.1
22/01/2021	16.9	24.8	34.3	0.2	0.4	4.9	18.3	24.2	62.0	99.2	986.8	989.7	992.7
23/01/2021	20.4	27.2	33.7	0.0	0.1	5.5	17.8	36.2	56.1	71.2	988.3	990.7	992.8
24/01/2021	20.2	28.2	37.6	0.0	0.1	3.8	23.5	18.6	54.7	99.4	988.0	990.8	992.9
25/01/2021	20.6	27.2	36.1	0.0	0.1	5.6	18.6	20.4	49.8	81.1	983.3	986.7	989.8
26/01/2021	22.3	29.6	37.8	0.0	0.3	5.7	24.3	19.0	47.9	87.4	979.7	982.3	984.9
27/01/2021	17.5	20.4	25.2	3.4	0.1	4.1	12.5	64.6	93.4	100.0	984.7	991.7	997.5
28/01/2021	16.9	17.8	19.4	8.4	0.2	3.6	13.6	90.7	99.5	100.0	996.9	998.8	1000.3
29/01/2021	17.2	19.0	20.4	9.0	0.0	5.5	20.9	99.8	100.0	100.0	992.7	995.7	999.1
30/01/2021	20.2	22.6	26.5	0.4	0.2	3.3	16.7	84.0	99.5	100.0	989.0	991.1	992.8
31/01/2021	18.8	20.5	22.5	0.8	0.0	3.1	12.1	93.5	99.6	100.0	990.6	994.7	997.5
Monthly	13.9	21.4	37.8	43.8	0.0	4.2	24.3	16.2	78.5	100.0	979.7	993.2	1003.2

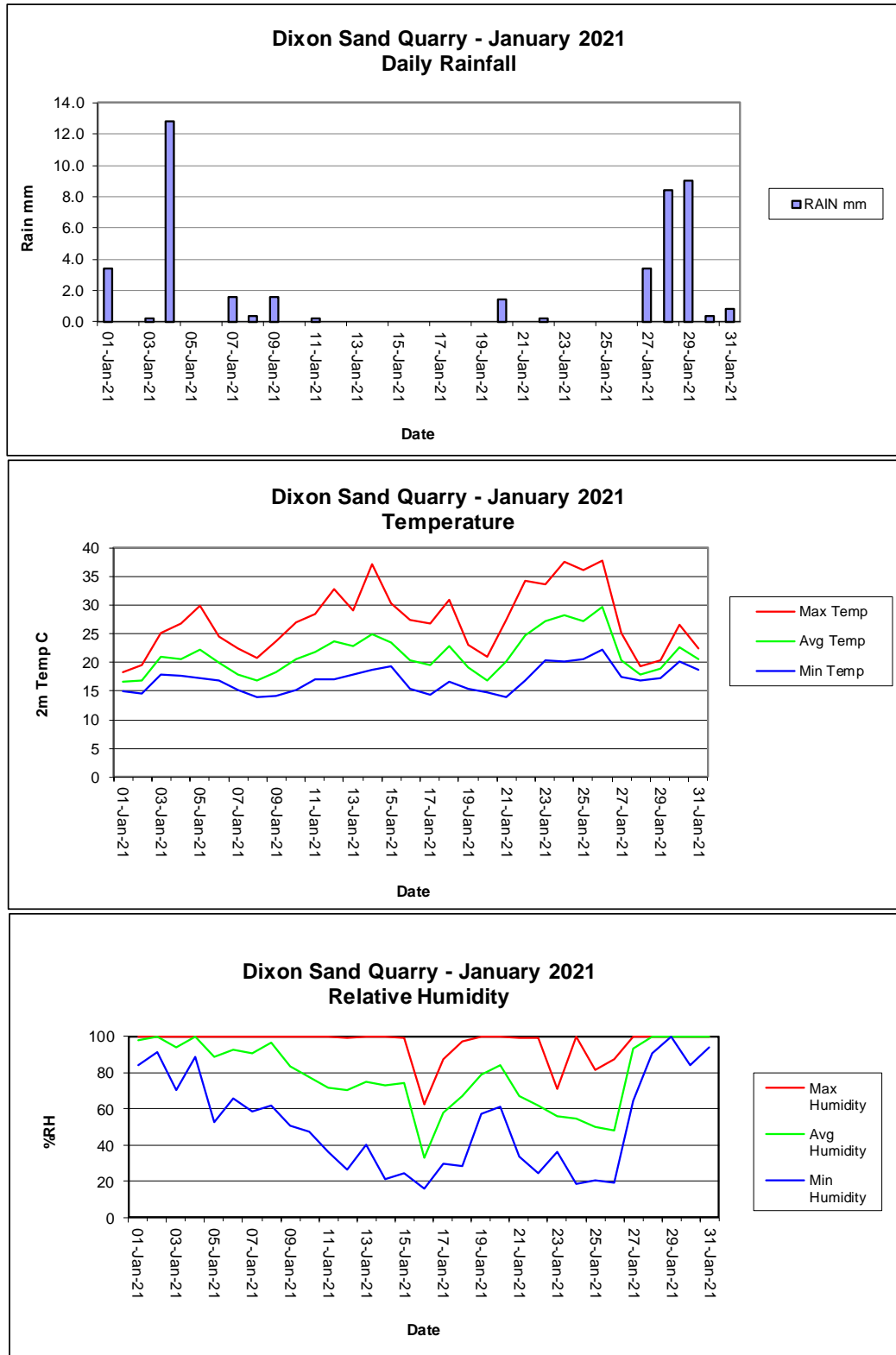


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

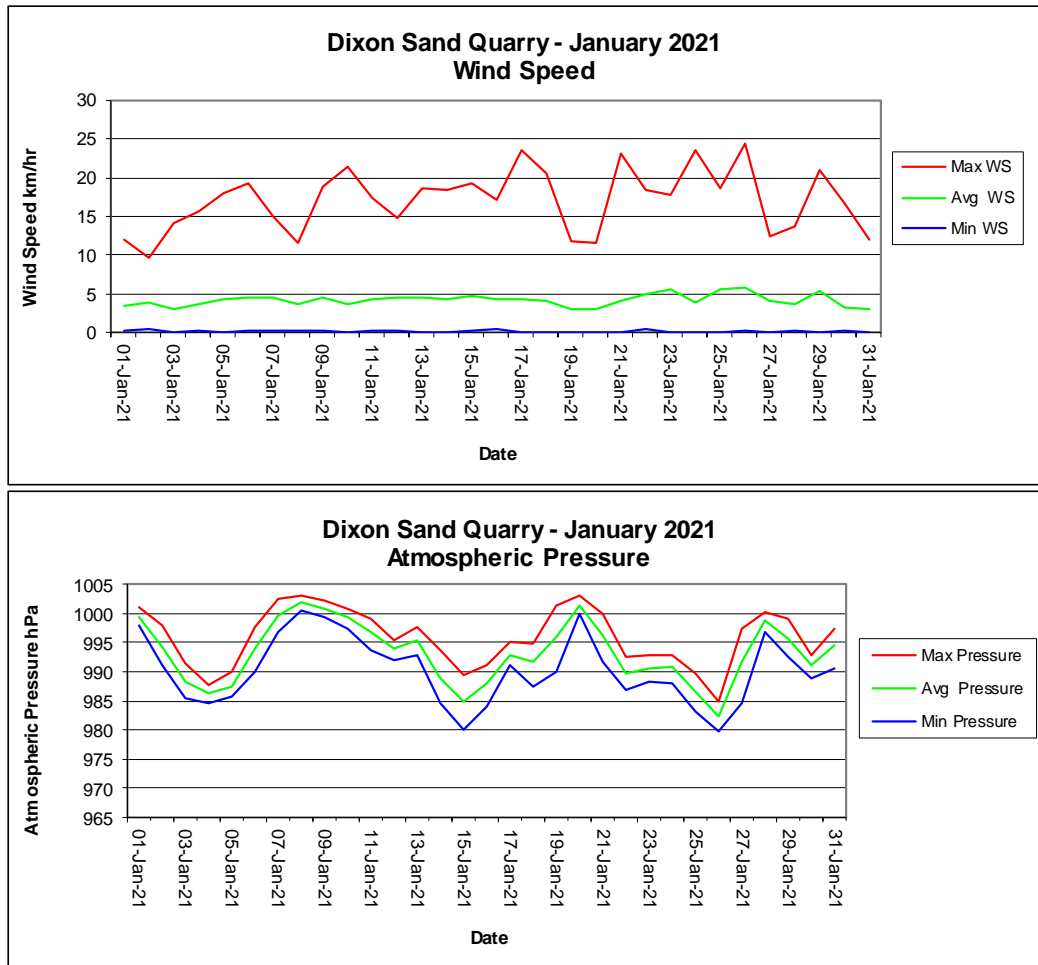
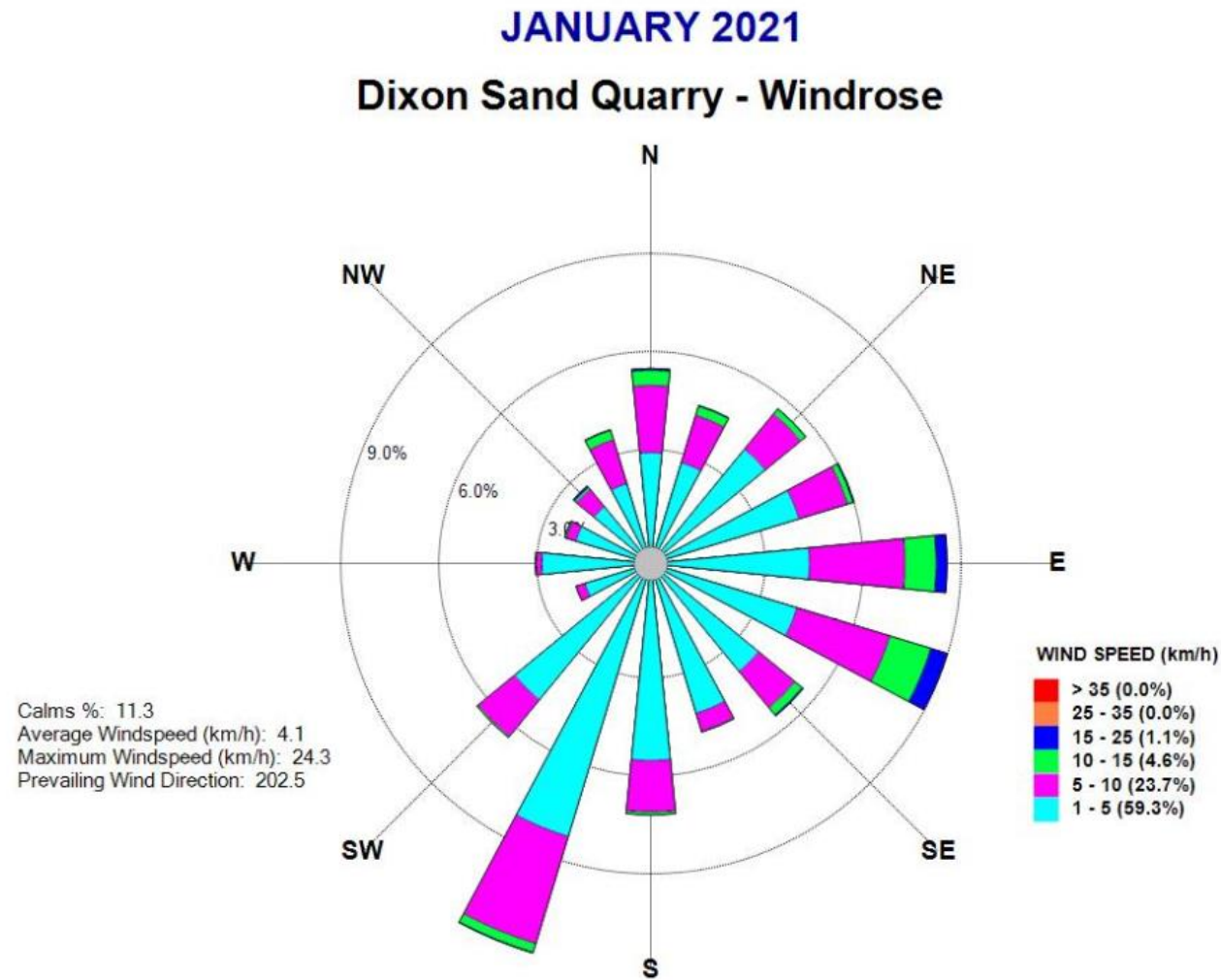


Figure 3: Wind Speed and Atmospheric Pressure Charts



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**

February 2021

Amendment 1

Colin Davies BSc MEIA CEnvP
Environmental Scientist
Date: 4 August 2021

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 2021 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for February 2021.

Approximately 100% of TEOM data was recovered for February 2021.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration was conducted in December 2020 with the next calibration scheduled for March 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for February 2021 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/02/2021	19.1	13.9	47.8	34.9
2/02/2021	11.1	13.9	27.8	34.8
3/02/2021	17.2	13.9	43.0	34.9
4/02/2021	20.7	14.0	51.8	34.9
5/02/2021	23.5	14.0	58.8	35.1
6/02/2021	12.3	14.0	30.8	35.0
7/02/2021	11.4	14.0	28.5	35.0
8/02/2021	17.0	14.0	42.5	35.0
9/02/2021	15.1	14.0	37.8	35.0
10/02/2021	12.4	14.0	31.0	35.0
11/02/2021	15.0	14.0	37.5	35.0
12/02/2021	17.2	14.0	43.0	35.1
13/02/2021	11.2	14.0	28.0	35.0
14/02/2021	15.3	14.0	38.3	35.1
15/02/2021	15.0	14.0	37.5	35.1
16/02/2021	9.6	14.0	24.0	35.0
17/02/2021	11.1	14.0	27.8	35.0
18/02/2021	16.0	14.0	40.0	35.0
19/02/2021	11.5	14.0	28.8	35.0
20/02/2021	8.8	14.0	22.0	34.9
21/02/2021	8.1	13.9	20.3	34.9
22/02/2021	11.2	13.9	28.0	34.8
23/02/2021	19.0	14.0	47.5	34.9
24/02/2021	14.4	14.0	36.0	34.9
25/02/2021	10.6	13.9	26.5	34.9
26/02/2021	19.8	14.0	49.5	34.9
27/02/2021	18.1	14.0	45.3	35.0
28/02/2021	17.6	14.0	44.0	35.0

*Calculated from PM10

**Calculated from PM10 Annual Average

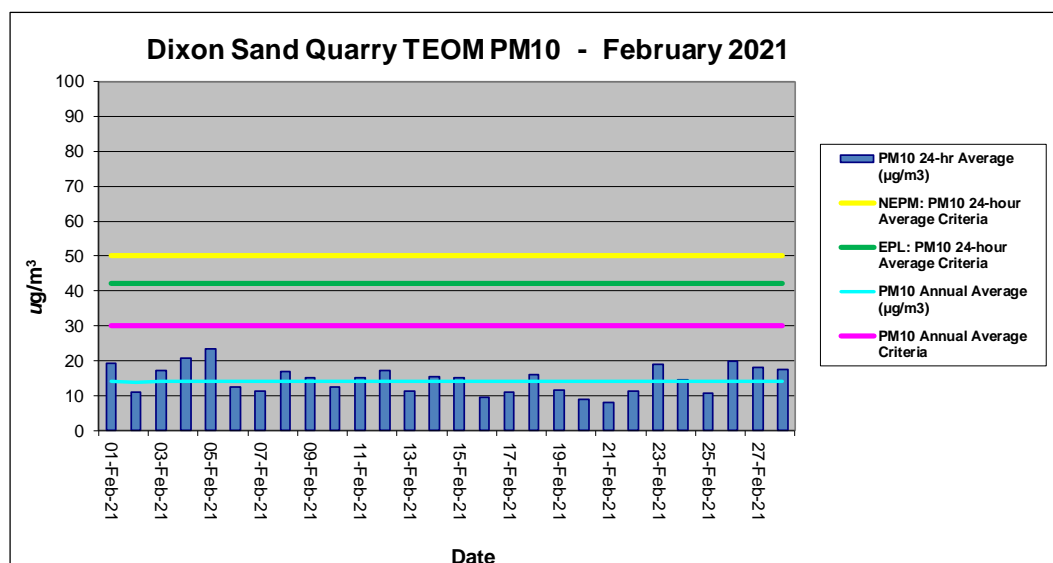


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in February 2020 and is next due in March 2021. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for February 2021

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
1/02/2021	17.9	21.3	27.1	2.0	0.1	3.7	23.3	60.7	91.6	100.0	987.8	992.9	997.1
2/02/2021	16.4	18.8	23.5	0.0	0.3	4.3	27.6	55.8	85.6	100.0	986.3	990.2	993.7
3/02/2021	15.8	18.9	23.5	0.0	0.0	4.0	15.2	52.9	78.5	100.0	990.6	992.4	993.8
4/02/2021	15.9	21.0	28.3	3.0	0.2	3.9	14.3	53.7	87.9	100.0	988.7	991.0	993.2
5/02/2021	18.0	22.9	28.8	0.0	0.1	5.4	18.2	57.5	88.9	100.0	985.3	989.0	992.0
6/02/2021	19.7	21.8	25.2	0.8	0.0	4.6	18.0	72.9	96.1	99.4	982.1	984.1	987.1
7/02/2021	17.9	22.0	28.8	0.2	0.0	3.8	30.0	35.1	78.6	100.0	983.7	986.5	991.4
8/02/2021	17.0	19.3	23.2	0.2	0.1	3.5	18.6	63.4	85.8	99.3	991.3	993.0	995.3
9/02/2021	16.1	19.1	22.9	0.0	0.0	3.2	19.2	50.0	77.4	100.0	994.1	995.9	997.7
10/02/2021	14.8	18.4	23.5	1.2	0.1	4.5	23.4	56.5	81.9	100.0	993.4	995.5	997.5
11/02/2021	16.4	21.2	28.1	0.0	0.1	4.7	18.1	38.4	66.9	92.2	989.0	992.5	995.3
12/02/2021	16.6	23.1	32.4	0.0	0.3	5.3	22.4	36.9	66.9	100.0	984.6	987.6	990.6
13/02/2021	16.1	19.7	23.4	17.4	0.0	3.7	12.8	85.7	99.3	100.0	985.3	988.9	994.9
14/02/2021	15.1	18.8	24.9	0.0	0.2	3.9	13.2	48.8	78.9	100.0	994.3	995.3	997.2
15/02/2021	14.7	17.9	21.9	1.4	0.1	5.5	21.4	54.0	82.2	100.0	996.2	998.2	1000.1
16/02/2021	16.1	19.5	25.0	3.8	0.4	6.1	24.3	62.0	90.4	100.0	998.6	1000.5	1002.2
17/02/2021	16.4	18.6	22.6	1.4	0.0	5.4	24.4	59.5	87.0	100.0	1001.0	1002.7	1004.0
18/02/2021	16.2	19.1	22.8	1.8	0.0	4.1	20.2	60.9	88.8	100.0	1001.8	1003.1	1004.4
19/02/2021	17.7	21.2	25.6	14.6	0.1	4.6	17.9	66.8	91.0	100.0	996.6	999.3	1002.4
20/02/2021	19.0	21.9	27.3	1.2	0.0	3.3	21.3	64.2	92.5	100.0	992.0	994.7	997.3
21/02/2021	19.3	22.3	28.3	1.0	0.0	3.3	16.9	60.2	90.3	100.0	987.5	990.0	993.1
22/02/2021	18.2	22.3	30.2	0.6	0.0	3.6	15.8	48.3	87.9	100.0	984.1	986.7	989.9
23/02/2021	15.7	17.8	19.6	0.2	0.0	3.6	14.8	62.3	80.7	99.2	989.2	992.9	997.2
24/02/2021	14.2	17.3	21.3	3.4	0.2	3.4	9.3	80.5	95.1	100.0	993.9	996.1	998.2
25/02/2021	16.7	20.3	26.8	0.2	0.0	2.8	15.8	59.3	92.4	100.0	988.0	990.4	993.8
26/02/2021	18.3	22.2	30.1	0.0	0.0	5.0	20.9	38.4	72.3	96.0	987.5	989.8	994.4
27/02/2021	18.2	19.6	22.0	1.0	0.0	2.8	12.1	90.0	98.7	100.0	990.6	992.7	994.4
28/02/2021	18.5	22.1	27.9	0.0	0.0	3.8	17.1	49.2	87.6	100.0	988.9	991.1	993.3
Monthly	14.2	20.3	32.4	55.4	0.0	4.1	30.0	35.1	85.8	100.0	982.1	993.0	1004.4

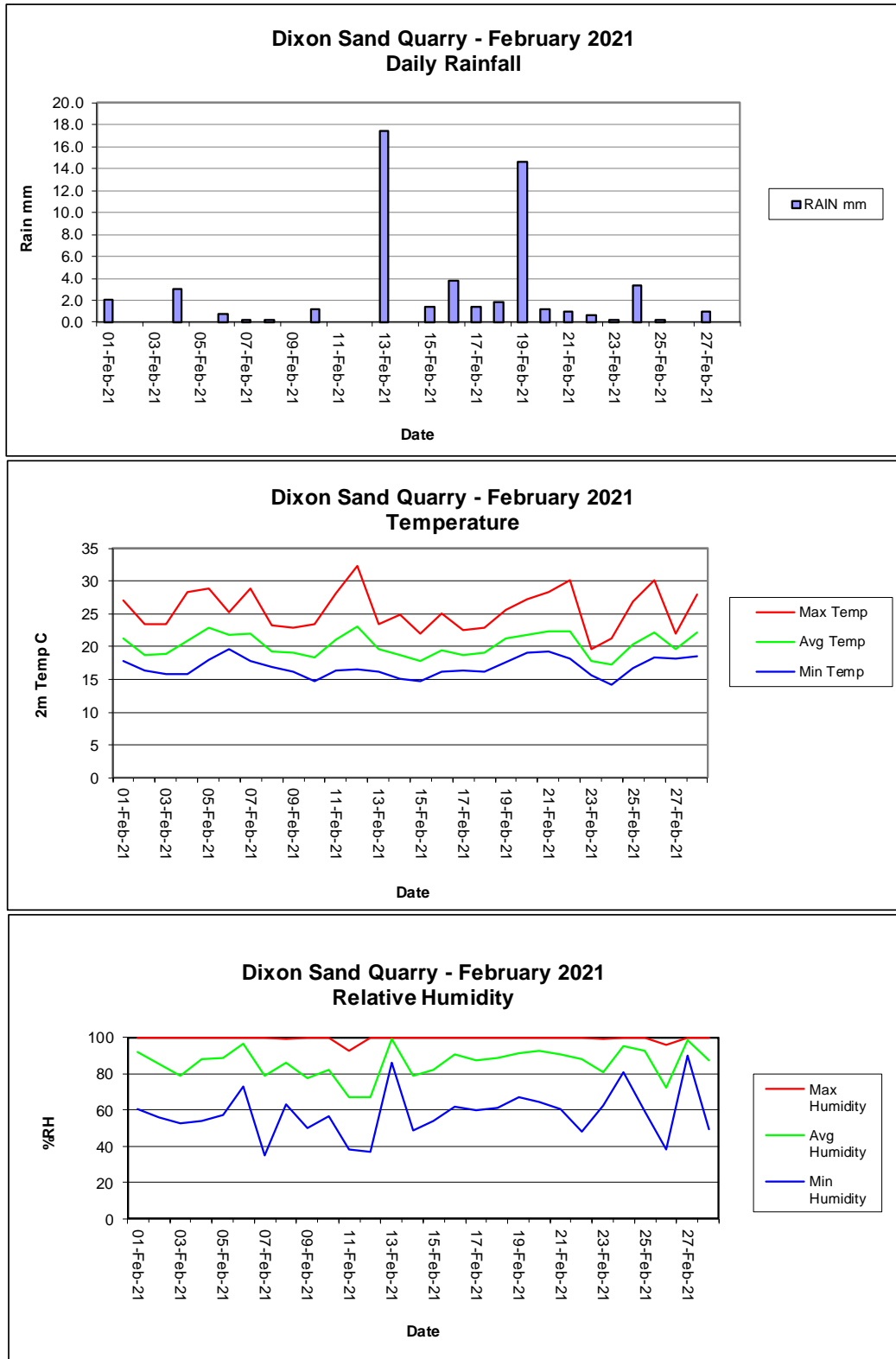


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

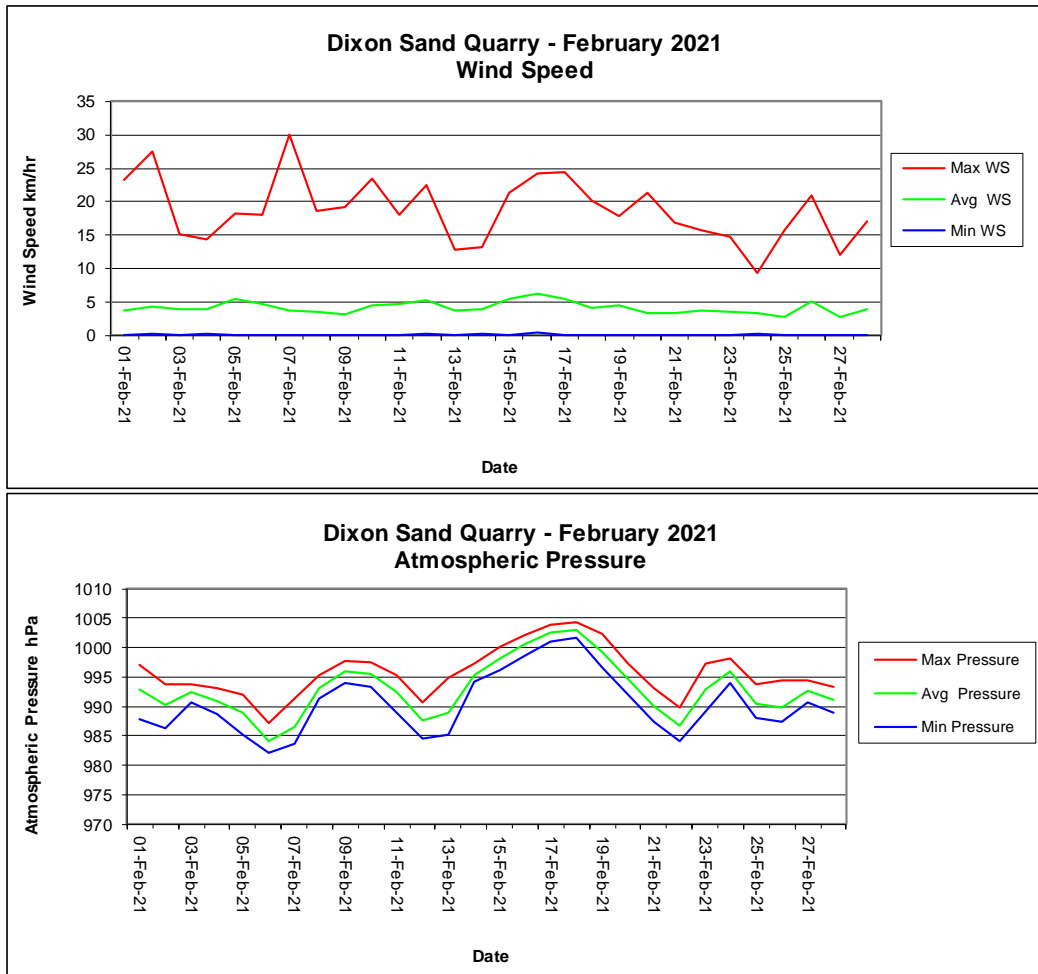
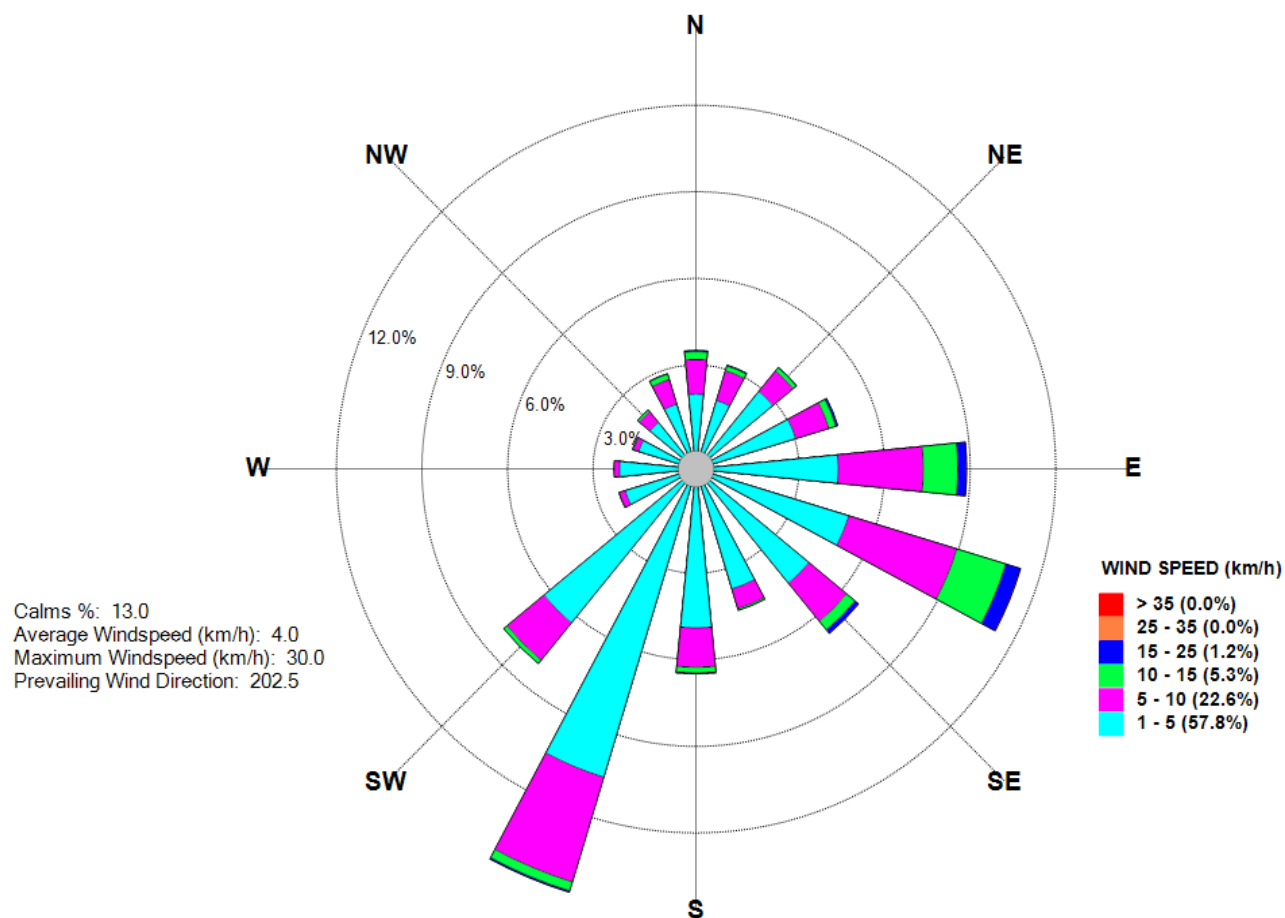


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose FEBRUARY 2021



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 2021

Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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 2021 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for March 2021.

Approximately 100% of TEOM data was recovered for March 2021.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration was conducted in on 8 March 2021 with the next calibration scheduled for June 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for March 2021 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/03/2021	15.7	14.0	39.4	35.0
2/03/2021	29.9	14.1	74.8	35.2
3/03/2021	20.2	14.1	50.5	35.2
4/03/2021	17.7	14.1	44.3	35.3
5/03/2021	21.9	14.1	54.8	35.4
6/03/2021	21.7	14.2	54.3	35.4
7/03/2021	19.1	14.2	47.8	35.5
8/03/2021	No Valid Data	14.2	0.0	35.5
9/03/2021	No Valid Data	14.2	0.0	35.5
10/03/2021	18.8	14.2	47.0	35.5
11/03/2021	15.6	14.2	39.0	35.5
12/03/2021	12.4	14.2	31.0	35.5
13/03/2021	9.2	14.2	23.0	35.5
14/03/2021	7.3	14.2	18.3	35.4
15/03/2021	13.3	14.2	33.3	35.4
16/03/2021	12.1	14.2	30.3	35.4
17/03/2021	11.6	14.1	29.0	35.4
18/03/2021	6.3	14.1	15.8	35.3
19/03/2021	13.3	14.1	33.3	35.3
20/03/2021	6.9	14.1	17.3	35.2
21/03/2021	8.3	14.1	20.8	35.1
22/03/2021	5.6	14.0	14.0	35.1
23/03/2021	4.2	14.0	10.5	35.0
24/03/2021	7.5	14.0	18.8	34.9
25/03/2021	10.4	14.0	26.0	34.9
26/03/2021	9.4	13.9	23.5	34.8
27/03/2021	9.4	13.9	23.5	34.8
28/03/2021	10.4	13.9	26.0	34.8
29/03/2021	11.9	13.9	29.8	34.7
30/03/2021	16.2	13.9	40.5	34.8
31/03/2021	16.1	13.9	40.3	34.8

*Calculated from PM10

**Calculated from PM10 Annual Average

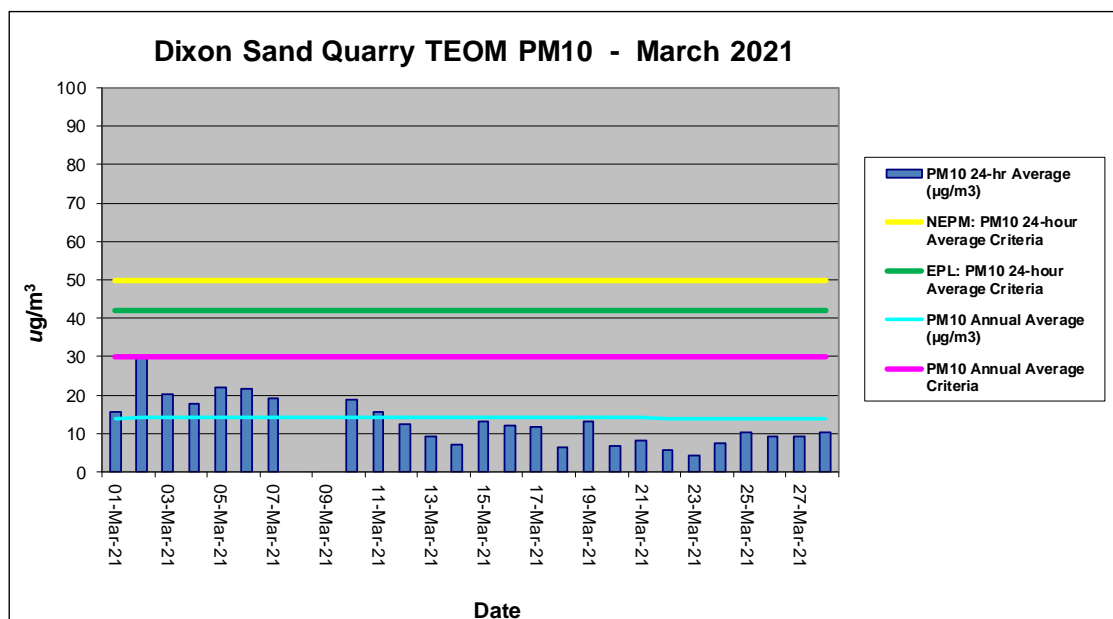


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted on 8 March 2021 and is next due in February 2022. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for March 2021

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
1/03/2021	19.5	25.2	32.4	0.0	0.0	3.7	15.3	19.8	66.1	100.0	984.7	988.5	992.1
2/03/2021	17.3	20.0	26.0	0.0	0.0	3.8	23.0	24.1	74.1	99.3	987.2	991.0	994.7
3/03/2021	14.7	17.4	21.7	0.0	0.2	3.4	20.7	54.4	78.0	99.2	993.2	994.5	996.0
4/03/2021	13.2	19.6	26.7	0.0	0.0	3.2	17.8	37.7	68.2	98.0	987.0	991.5	995.4
5/03/2021	17.3	20.1	24.4	0.0	0.2	3.2	16.8	40.2	54.9	67.3	985.2	987.6	991.0
6/03/2021	15.8	18.4	22.4	0.0	0.1	4.2	15.0	48.8	65.7	81.0	990.1	992.0	994.6
7/03/2021	14.4	19.5	25.8	0.0	0.0	3.7	15.6	46.4	70.0	94.4	990.4	993.2	995.4
8/03/2021	16.9	21.3	28.3	0.8	0.6	4.6	21.4	52.0	81.2	99.3	987.8	990.4	992.8
9/03/2021	19.6	23.0	31.1	0.0	0.1	6.2	28.4	29.4	68.7	87.6	988.8	992.0	997.6
10/03/2021	18.5	20.8	24.7	0.0	0.0	4.9	26.5	63.6	81.1	99.4	997.4	999.2	1001.1
11/03/2021	18.1	20.9	25.3	1.0	0.0	3.9	16.4	65.9	82.7	99.3	997.3	999.8	1002.0
12/03/2021	18.5	21.3	25.7	0.4	0.2	2.9	13.6	65.5	90.0	100.0	994.3	996.8	998.8
13/03/2021	18.5	24.1	30.8	0.0	0.2	4.0	15.6	44.7	78.7	100.0	989.4	992.5	995.5
14/03/2021	12.5	17.1	24.2	28.0	0.0	4.8	22.6	72.8	96.5	100.0	988.6	994.1	1000.4
15/03/2021	11.8	16.1	21.7	0.0	0.3	4.8	13.8	49.1	76.3	100.0	999.5	1001.1	1003.6
16/03/2021	12.8	16.5	20.6	4.4	0.1	3.8	16.1	69.4	86.4	100.0	1002.5	1003.6	1005.5
17/03/2021	15.3	17.3	20.4	9.8	0.2	4.6	30.8	70.2	93.9	100.0	1001.6	1003.3	1004.9
18/03/2021	16.2	17.2	18.5	53.6	0.1	3.6	15.5	100.0	100.0	100.0	1001.6	1002.9	1004.4
19/03/2021	16.8	19.1	22.7	21.0	0.1	4.7	22.5	71.0	94.1	100.0	1002.4	1003.7	1005.3
20/03/2021	17.7	18.6	19.7	92.8	0.1	6.2	31.1	99.3	100.0	100.0	999.1	1000.8	1002.8
21/03/2021	16.6	17.8	19.1	72.4	0.0	9.6	31.3	99.2	99.9	100.0	1000.6	1002.3	1003.7
22/03/2021	16.4	17.1	18.6	33.8	0.2	4.4	13.6	99.4	100.0	100.0	996.2	1000.1	1003.0
23/03/2021	16.7	18.3	20.4	21.4	0.1	5.2	15.2	99.2	99.8	100.0	978.9	985.3	996.1
24/03/2021	18.2	22.0	26.8	0.0	0.4	4.5	18.2	39.3	69.7	99.2	978.8	980.0	982.8
25/03/2021	16.9	20.7	26.5	1.8	0.1	3.6	14.5	40.7	59.3	83.8	981.4	984.4	990.4
26/03/2021	13.9	18.2	24.0	0.0	0.0	2.8	10.6	32.3	68.0	99.3	990.4	992.3	994.6
27/03/2021	14.8	19.7	26.4	0.0	0.1	2.3	7.4	35.0	68.8	99.5	990.8	992.5	994.2
28/03/2021	14.8	19.1	25.5	0.0	0.1	3.1	21.7	38.4	65.4	93.6	993.7	995.7	998.3
29/03/2021	14.5	18.5	24.5	0.0	0.0	3.3	17.0	39.0	78.8	100.0	997.2	998.9	1001.8
30/03/2021	13.7	16.6	21.6	0.2	0.3	3.2	11.2	46.9	77.1	99.4	1001.0	1002.2	1003.7
31/03/2021	13.0	17.0	22.6	0.2	0.2	2.7	12.0	41.4	73.1	99.5	1001.6	1002.9	1004.3
Monthly	11.8	19.3	32.4	341.6	0.0	4.2	31.3	19.8	79.6	100.0	978.8	995.3	1005.5

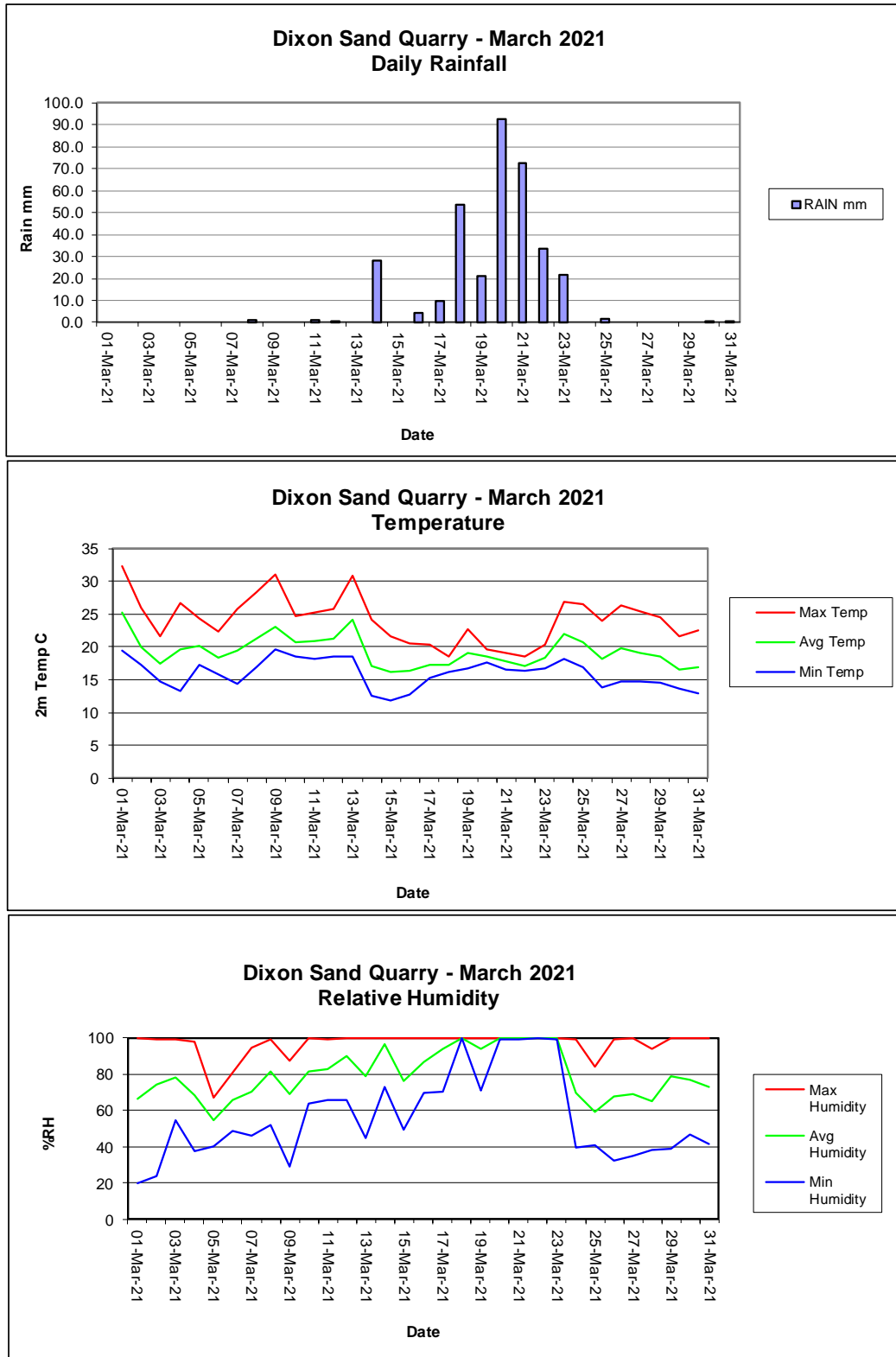
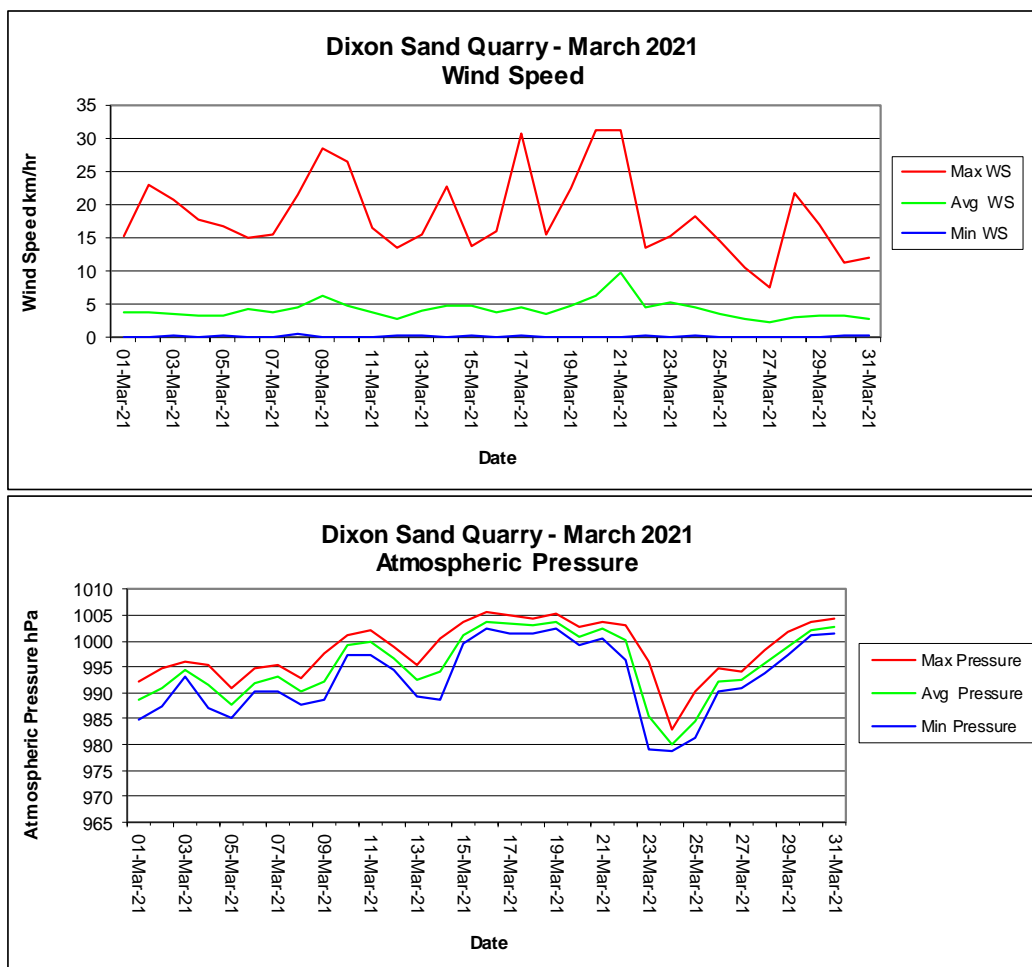
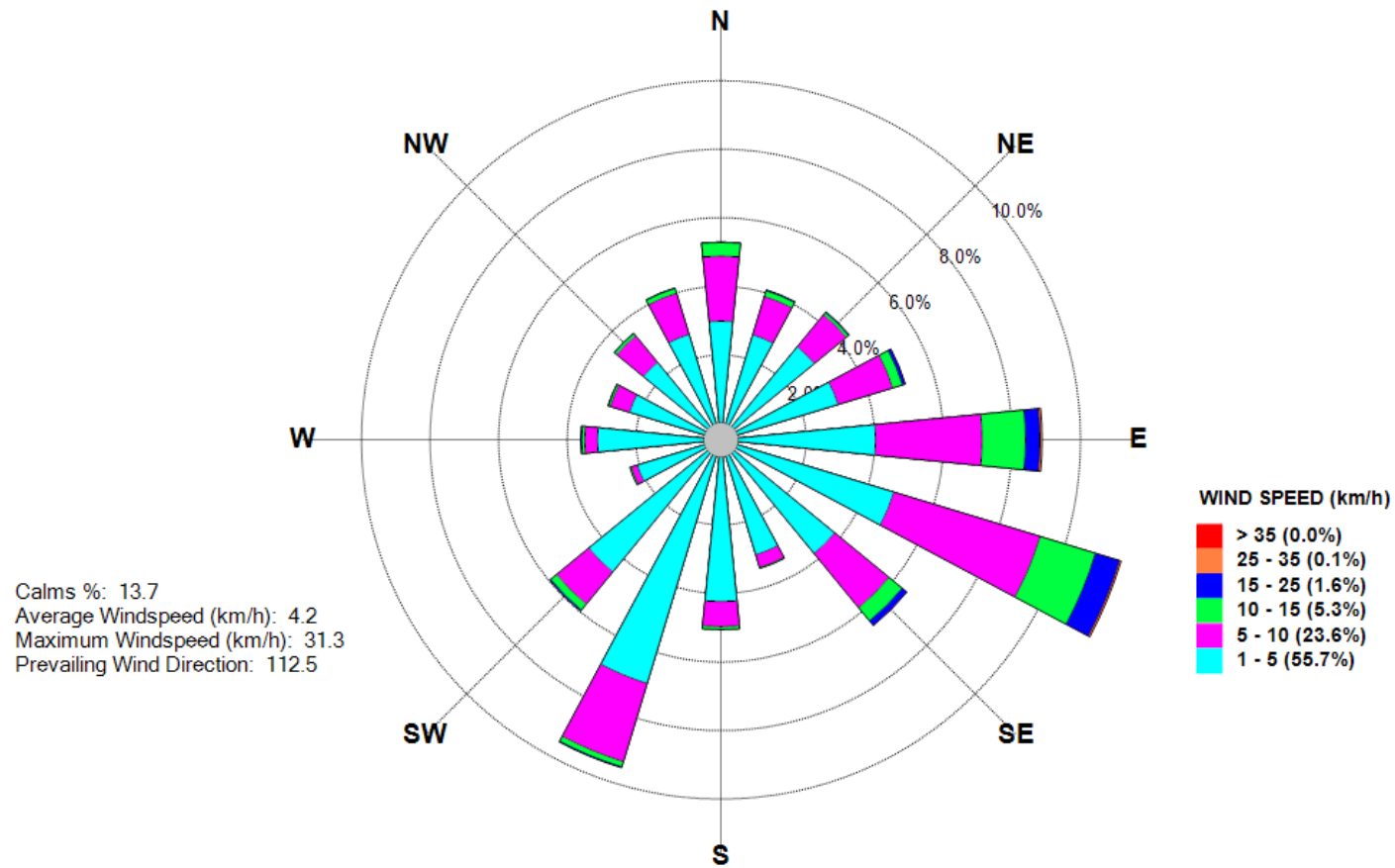


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

Figure 3: Wind Speed and Atmospheric Pressure Charts



Dixon Sand Quarry - Windrose MARCH 2021



Appendix 1

Calibration Documents (when required)



Continuous Air Quality

Monthly/Quarterly/Six Monthly/Annual

TEOM Maintenance and Calibration – 1400AB

TEOM Client/Site: Dixan Sadi / TEOMDate: 8-3-21**1. TEOM Data Screen**SERIAL No: 25570Firmware: N/A

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	<u>fully op OK</u>	Green - Normal	<input checked="" type="checkbox"/>	
Date/time	TEOM: <u>11-38</u> Actual: <u>11-38</u>	Current Date/time correct within 5 minutes		<input checked="" type="checkbox"/> <u>reset time</u>
PM-10 24hr av	<u>21-8</u>	Positive values	<input checked="" type="checkbox"/>	
Filter loading PM10	<u>41%</u>	<80 %	<input checked="" type="checkbox"/>	
Frequency PM-10	<u>251-11584</u>	200-300 Hz	<input checked="" type="checkbox"/>	
Noise PM-10	<u>0.077</u>	<0.100ug	<input checked="" type="checkbox"/>	

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

Comments:reset time OK ✓**2. System Status**

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	<u>-</u>	<0.50 atm	<input checked="" type="checkbox"/>	
Warnings	<u>NIL</u>	No Warnings	<input checked="" type="checkbox"/>	
If any warnings list:				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DUNN Signed Colin

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	30.4	-10 to 50 C	✓	
Ambient Dew Point	—	-10 to 50 C	N/A	N/A.
Ambient Pressure	0.968	0.9-1.1 atm	✓	
Ambient Relative Humidity	—	10-100 %RH	N/A	N/A.
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:F_{adj} Main = 1.050F_{adj} Byp = 1.020 ✓ left as it is.**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	31%*	255.10316	255.10317	255.10314	255.10317

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.

* zero filter on

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

Tetracal Flow/Temp/Pressure Calibrator Serial No: 172357 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 2.97 Error % 1.0 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.72 Error % 0.4 (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 0.41 < Limit 0.60

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

Comments:

Slight leak on mass transducer.
 If gets worse will need to send for repairs.
 M



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: 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

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 = _____ 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: 8/3/21 17:00 Finish date/time: 9/3/21 08:00
 Standard deviation of all recorded data (min 30 min averages) = 2.2 ug/m³ ✓ PAC1
 Noise was less than 5ug/m³ YES/NO ✓

Total Av 4.8 ug/m³
Not high but ok

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 Physical Screening Field Check

Client DIXON SANDS

Site Name: DIXON SANDS

Date: 8-3-21

Time: 12:00

	Yes (Pass)	No (Fail)	Comments
Grass / Vegetation Impacts			
Compound Grass height <10cm	✓		recently mowed
No objects within impact area (10 x height of object)		✓	trees (house near Met)
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		Pole (fixed)
Top Guy wires tensioned (correct tension = 60-75mm deflection, with only moderate hand force at 1.5 metres up the guy wire)	NA		Pole (fixed)
Mast Vertical and in good condition	✓		
Ground anchors/star pickets tight in ground	NA		Pole fixed
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		✓	mount raises up pole + can't fix cable
Insignificant corrosion to plugs/connectors	✓		
No water ingress in logger/battery cabinet	✓		Equipment in TERN enclosure
Wiring/plugs in cabinet OK, Logger OK	✓		
Battery terminals and condition OK	NA		240V System
Battery volts (charging >13V, not charging >12V)	NA		" "
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: 350 degrees
Rain gauge cleaned, working OK (1 tip check)	✓		checked 100ml OK. 3.0mm
Rain gauge level OK	✓		
Anemometer/wind vane moving freely (analogue sensors)	NA		kill ultrasonic sensor
Other sensors visually checked and OK	✓		
Last months data checked and OK / Logging data OK	✓		

Checked By: Name COLIN DAVIES 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

Weather Station Field CheckSite: Dixon SandsDate/Time: 8/03/2021 12:30 -13:30**Measured Against Certified Sensors**

Parameter	Units	Measured	Reference	Difference	Pass/Fail	Reference Description
Temperature 10m	°C	27.3	27.5	-0.2	Pass	Ref Thermometer
Humidity	%RH	55	53	2.0	Pass	Ref RH sensor
Rainfall	mm	3.0	3.2	-0.2	Pass	Glass Pipette
Wind Speed	km/hr	5.6	6.0	-0.4	Pass	Ref Anemometer
Wind Direction	Degrees	309	311	-2.0	Pass	Sighting compass

Reference Instruments Specifications: *Calibration expires: 18/12/2021

Sensor	Serial Number	Specifications	Accuracy
*Temperature	200115N01	-40 to 65°C	+/- 0.3°C
*Barometer	BF201110036	20 to 30" Hg	+/- 1.1hPa
*Humidity	200115N01	10 to 90%RH	+/- 2%RH
*Anemometer	200115N03	0 to 64km/hr	+/- 0.9m/s
**Rainfall	Standard number of tips	3.2mm	+/- 0.2mm
Compass	Sighting Compass	0 to 360 degrees	+/- 5 Deg

** 100mL Glass pipette 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. The indicated rain between 12:30 and 1:30pm should be deleted from site records on the 8/3/2021.

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:

Feb-22

Checked by: Colin Davies

9/03/2021



**CBased Environmental
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Dixon Sand Quarry

**Environmental Monitoring
Air Quality**

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

April 2021

Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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- 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 with the exception of 1 occurrence;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m³ with the exception of 1 occurrence;
- 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

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Approximately 100% of TEOM data was recovered for April 2021.

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 (2001) “*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
- 3580.1.1 (2007) “*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 with the exception of one occurrence (25/04/2021) highlighted yellow in **Table 2**. Average windspeed on 25 April 2021 was 2.3 km/h from the west-north-west with a maximum windspeed of 11.1 km/h from the south-south-west.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration was conducted in March 2021 with the next calibration scheduled for June 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for April 2021 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/04/2021	12.5	13.9	31.3	34.8
2/04/2021	8.9	13.9	22.3	34.7
3/04/2021	8.4	13.9	21.0	34.7
4/04/2021	8.9	13.9	22.3	34.6
5/04/2021	17.1	13.9	42.8	34.7
6/04/2021	17.3	13.9	43.3	34.7
7/04/2021	7.6	13.9	19.0	34.6
8/04/2021	7.1	13.8	17.8	34.6
9/04/2021	13.9	13.8	34.8	34.6
10/04/2021	12.4	13.8	31.0	34.6
11/04/2021	10.7	13.8	26.8	34.5
12/04/2021	17.2	13.8	43.0	34.6
13/04/2021	17.2	13.8	43.0	34.6
14/04/2021	18.1	13.9	45.3	34.6
15/04/2021	34.6	13.9	86.5	34.8
16/04/2021	28.4	14.0	71.0	34.9
17/04/2021	14.2	14.0	35.5	34.9
18/04/2021	8.7	14.0	21.8	34.9
19/04/2021	15.9	14.0	39.8	34.9
20/04/2021	22.3	14.0	55.8	35.0
21/04/2021	19.8	14.0	49.5	35.0
22/04/2021	15.2	14.0	38.0	35.0
23/04/2021	18.6	14.0	46.5	35.1
24/04/2021	22.4	14.1	56.0	35.2
25/04/2021	57.0	14.2	142.5	35.5
26/04/2021	16.3	14.2	40.8	35.5
27/04/2021	23.8	14.2	59.5	35.6
28/04/2021	23.7	14.3	59.3	35.7
29/04/2021	17.6	14.3	44.0	35.7
30/04/2021	22.6	14.3	56.5	35.8

*Calculated from PM10

**Calculated from PM10 Annual Average

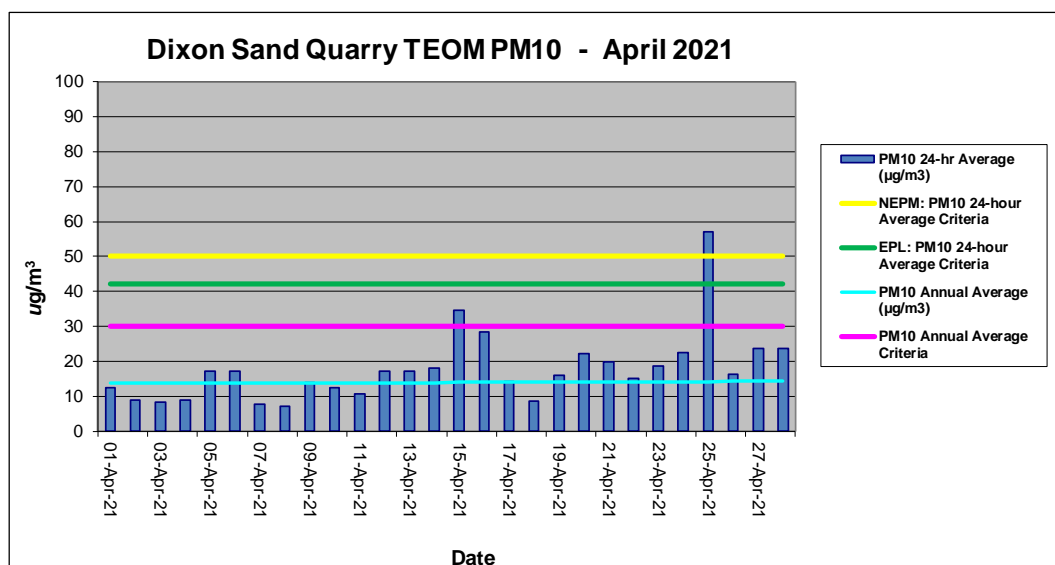


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in March 2021 and is next due in February 2022. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for April 2021

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
1/04/2021	13.2	17.7	23.3	2.0	0.0	2.8	12.9	55.2	85.3	100.0	1002.2	1003.7	1005.2
2/04/2021	14.7	18.9	24.4	0.0	0.0	2.8	11.6	49.7	84.9	100.0	1003.9	1005.3	1006.8
3/04/2021	14.9	19.1	24.7	0.2	0.1	2.9	12.2	55.3	89.2	100.0	1000.8	1003.3	1006.1
4/04/2021	15.5	20.9	27.0	0.0	0.2	3.1	11.1	41.4	76.8	100.0	995.7	998.2	1001.5
5/04/2021	15.3	20.5	26.7	0.0	0.0	3.1	14.5	51.8	84.8	100.0	995.8	998.2	1000.9
6/04/2021	17.7	19.4	23.4	0.6	0.0	2.5	16.2	82.8	98.7	100.0	998.9	1000.1	1001.9
7/04/2021	17.0	18.8	22.0	7.8	0.1	2.5	9.8	87.2	99.6	100.0	994.6	997.1	999.4
8/04/2021	17.3	19.2	23.6	0.4	0.0	2.3	13.5	65.8	94.3	100.0	988.5	991.7	994.6
9/04/2021	16.3	20.5	26.7	0.2	0.2	4.0	13.0	35.6	79.2	99.5	982.4	985.3	988.5
10/04/2021	12.7	17.3	22.4	0.6	0.0	3.0	16.9	32.3	68.4	100.0	983.9	986.1	988.4
11/04/2021	8.9	13.6	17.4	0.0	0.3	4.2	23.1	27.3	46.0	72.7	987.0	990.3	995.2
12/04/2021	7.5	12.7	18.5	0.0	0.0	2.5	14.9	31.1	51.8	68.9	994.6	997.7	1000.7
13/04/2021	8.1	15.2	20.8	0.0	0.0	3.7	16.6	35.7	59.4	85.9	996.8	999.2	1002.2
14/04/2021	13.5	20.0	26.5	0.0	0.2	4.9	20.8	18.3	37.2	72.9	991.8	994.1	997.1
15/04/2021	15.0	19.3	25.3	0.0	0.2	2.7	14.6	31.9	41.0	53.8	991.6	993.9	996.1
16/04/2021	13.1	16.4	21.0	0.0	0.0	4.1	18.7	39.2	57.7	75.9	994.8	999.5	1003.2
17/04/2021	10.9	13.7	15.4	0.2	0.0	1.7	8.5	73.3	92.5	99.4	1000.8	1001.9	1003.1
18/04/2021	8.7	14.1	20.8	0.2	0.0	2.5	7.3	35.4	80.3	100.0	997.7	999.8	1001.6
19/04/2021	9.9	16.1	23.0	0.0	0.1	2.5	10.0	27.3	67.6	99.6	994.0	996.4	998.7
20/04/2021	12.0	16.8	21.0	0.0	0.2	3.7	13.0	36.4	46.8	59.1	989.4	992.7	995.8
21/04/2021	11.2	15.2	19.2	0.0	0.0	3.8	19.9	30.6	50.1	73.9	988.7	992.0	995.0
22/04/2021	8.5	12.9	19.2	0.0	0.0	2.7	16.0	28.4	54.0	86.0	989.7	992.7	995.3
23/04/2021	9.4	14.3	21.1	0.0	0.2	2.9	11.0	36.0	53.3	77.1	994.7	996.6	999.9
24/04/2021	9.9	15.1	21.0	0.0	0.0	2.7	13.9	38.4	64.0	99.2	998.6	1000.2	1001.9
25/04/2021	8.9	14.1	20.5	0.0	0.0	2.3	11.1	39.1	80.7	100.0	1000.6	1002.2	1003.8
26/04/2021	11.5	15.5	21.7	0.0	0.0	2.2	9.9	38.8	81.7	100.0	1002.0	1003.6	1005.0
27/04/2021	11.1	15.5	21.7	0.0	0.0	2.6	13.2	47.1	84.5	100.0	1003.5	1005.2	1007.1
28/04/2021	12.6	15.9	20.3	0.0	0.0	2.4	8.0	54.7	86.0	100.0	1002.2	1004.2	1005.9
29/04/2021	11.9	16.1	21.8	0.0	0.1	3.1	11.9	44.3	83.5	99.6	1001.9	1003.4	1005.3
30/04/2021	11.1	15.7	22.6	0.0	0.0	2.7	14.2	54.8	90.4	100.0	1005.1	1006.8	1008.6
Monthly	7.5	16.7	27.0	12.2	0.0	3.0	23.1	18.3	72.3	100.0	982.4	998.1	1008.6

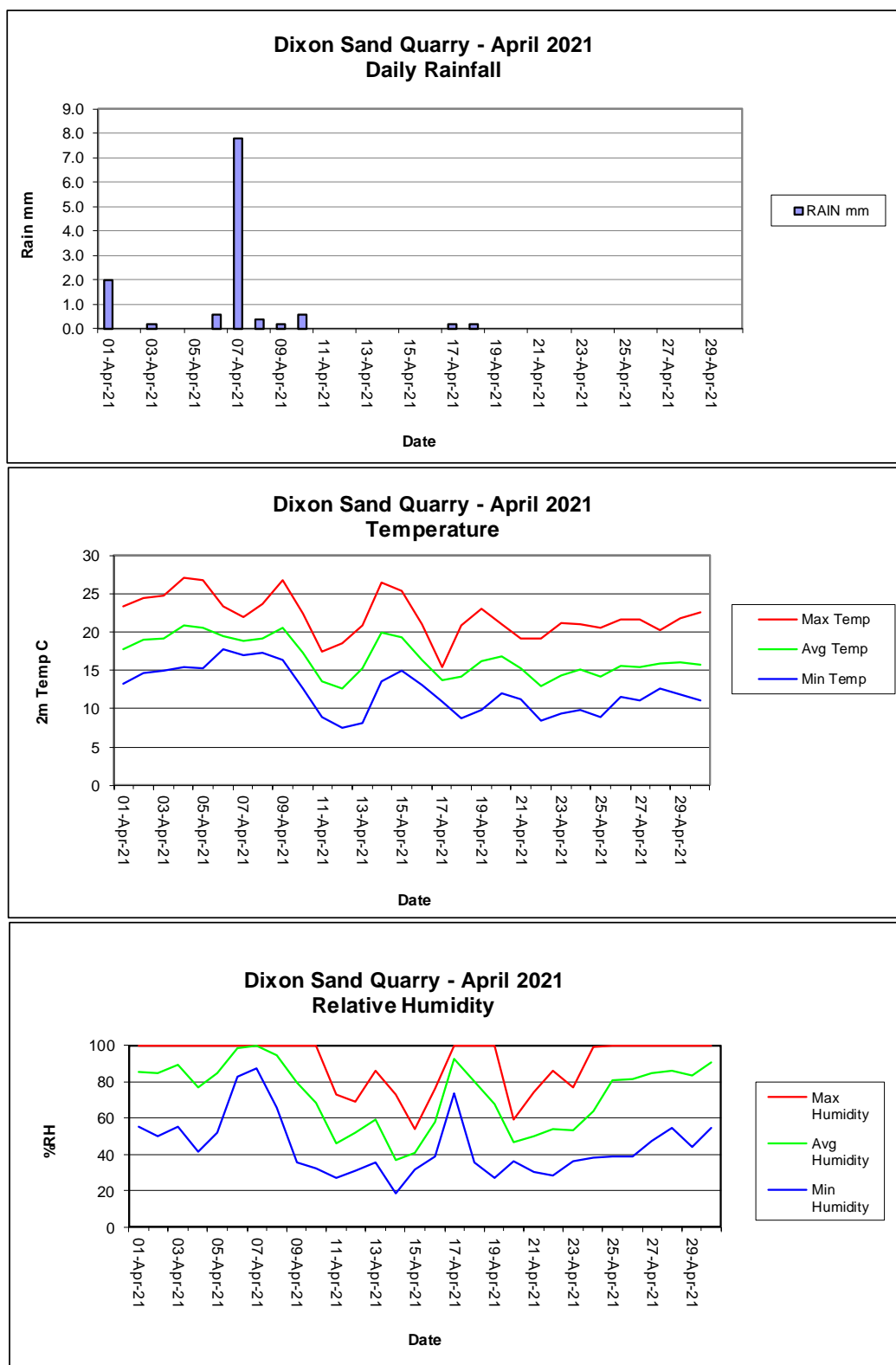


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

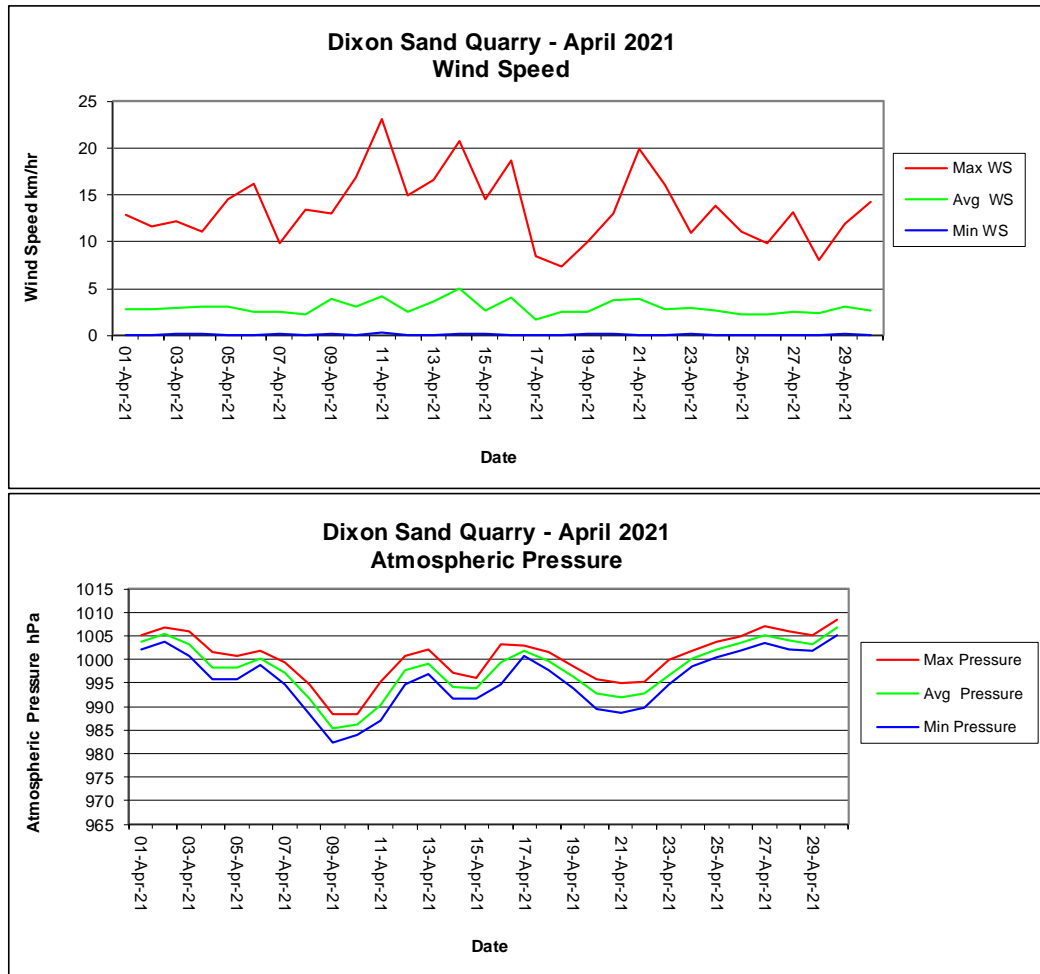
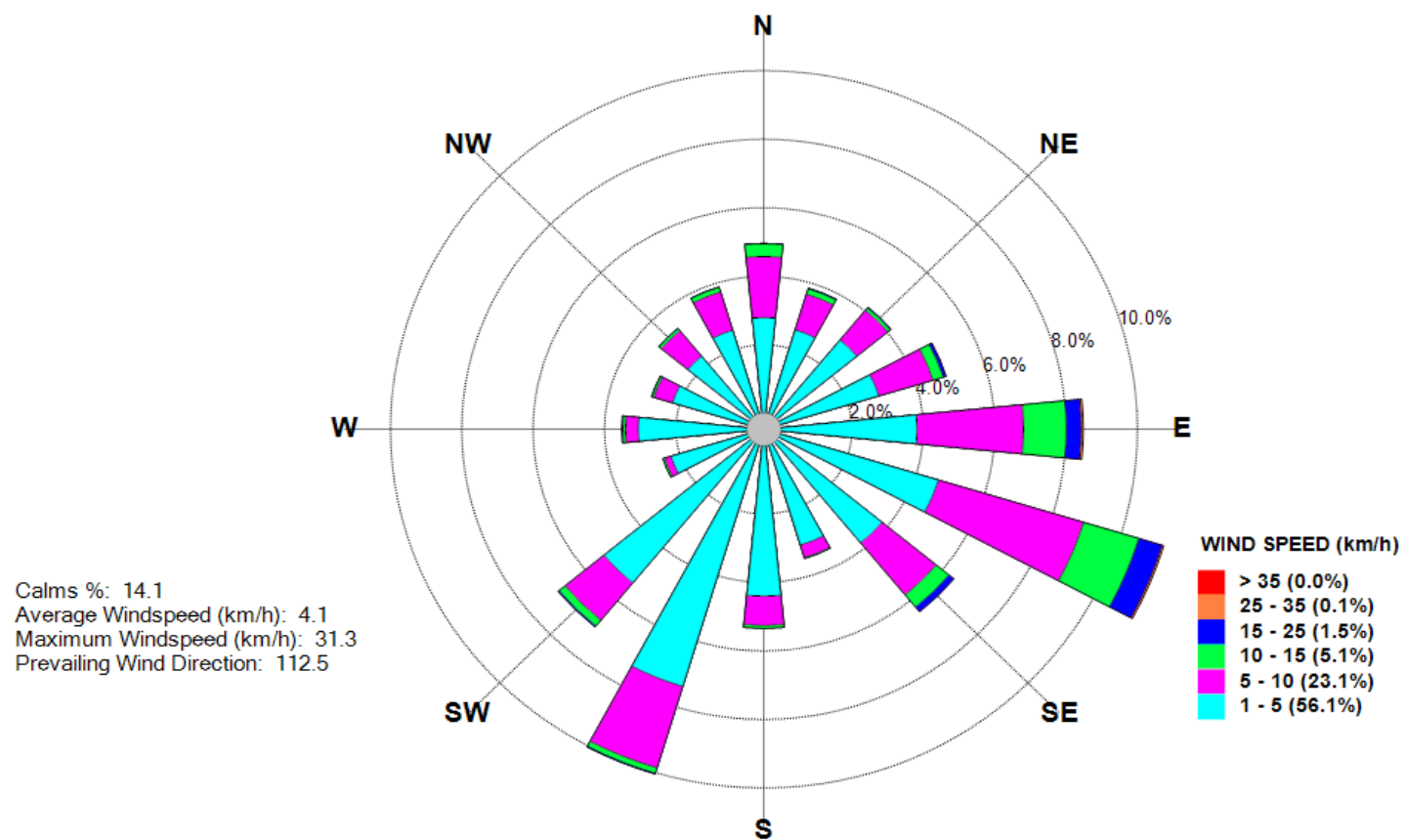


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose APRIL 2021



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 2021

Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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 2021 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

Approximately 100% of meteorological data was recovered for May 2021.

Approximately 100% of TEOM data was recovered for May 2021.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has not yet been collected.

The quarterly calibration was conducted in March 2021 with the next calibration scheduled for June 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for May 2021 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/05/2021	16.7	14.3	41.8	35.8
2/05/2021	6.7	14.3	16.8	35.7
3/05/2021	10.1	14.3	25.3	35.7
4/05/2021	33.6	14.3	84.0	35.9
5/05/2021	16.4	14.4	41.0	35.9
6/05/2021	7.2	14.3	18.0	35.8
7/05/2021	7.7	14.3	19.3	35.8
8/05/2021	7.6	14.3	19.0	35.7
9/05/2021	9.7	14.3	24.3	35.7
10/05/2021	10.1	14.3	25.3	35.7
11/05/2021	9.6	14.2	24.0	35.6
12/05/2021	14.2	14.2	35.4	35.6
13/05/2021	10.3	14.2	25.8	35.6
14/05/2021	8.8	14.2	22.0	35.5
15/05/2021	7.1	14.2	17.8	35.5
16/05/2021	6.4	14.2	16.0	35.4
17/05/2021	15.3	14.2	38.3	35.4
18/05/2021	17.7	14.2	44.3	35.5
19/05/2021	12.0	14.2	30.0	35.4
20/05/2021	15.9	14.2	39.8	35.5
21/05/2021	18.4	14.2	46.0	35.5
22/05/2021	13.2	14.2	33.0	35.5
23/05/2021	12.3	14.2	30.8	35.5
24/05/2021	9.5	14.2	23.8	35.4
25/05/2021	9.6	14.2	24.0	35.4
26/05/2021	9.4	14.1	23.5	35.4
27/05/2021	11.0	14.1	27.5	35.3
28/05/2021	11.1	14.1	27.8	35.3
29/05/2021	11.2	14.1	28.0	35.3
30/05/2021	9.4	14.1	23.5	35.3
31/05/2021	21.8	14.1	54.5	35.3

*Calculated from PM10

**Calculated from PM10 Annual Average

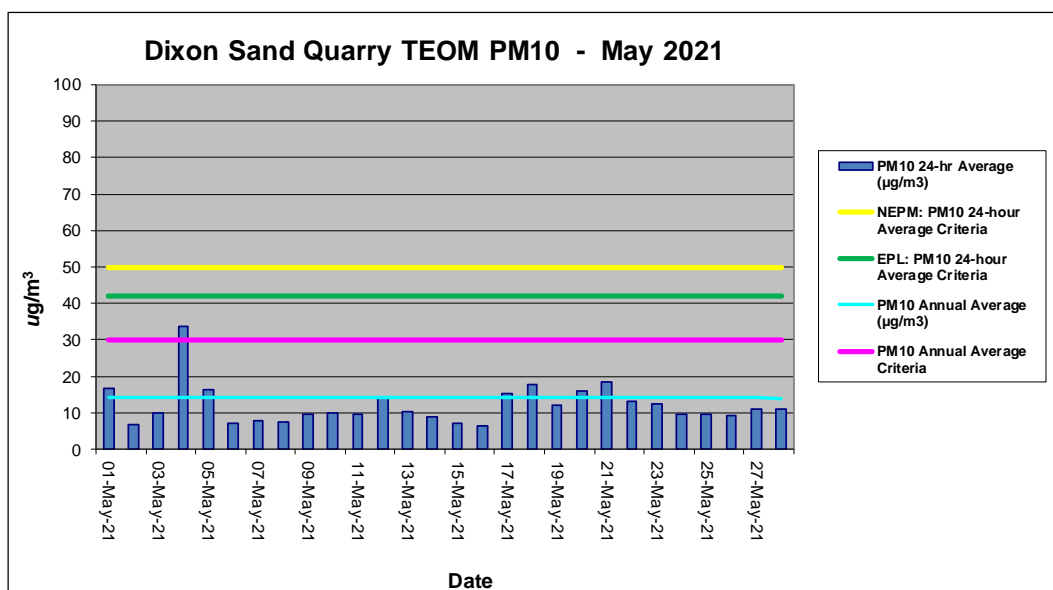


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in March 2021 and is next due in February 2022. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for May 2021

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
1/05/2021	13.0	16.6	21.6	0.2	0.0	2.8	11.8	68.5	95.4	100.0	1006.5	1008.1	1009.7
2/05/2021	11.8	16.6	22.5	0.0	0.1	2.6	11.0	58.7	91.8	100.0	1003.4	1005.6	1007.9
3/05/2021	12.0	17.3	23.7	0.2	0.0	2.5	9.3	43.7	78.9	100.0	996.6	999.8	1003.5
4/05/2021	13.0	14.6	18.3	5.6	0.1	2.2	16.7	64.9	93.5	100.0	994.4	995.5	996.6
5/05/2021	12.6	14.3	15.8	4.4	0.0	3.2	11.2	99.4	100.0	100.0	992.2	993.7	995.1
6/05/2021	14.5	17.2	20.4	32.0	0.4	5.5	18.2	99.2	99.8	100.0	989.5	991.3	993.0
7/05/2021	15.8	17.4	20.1	13.4	0.0	4.0	16.7	99.2	100.0	100.0	989.1	990.5	992.0
8/05/2021	14.2	18.4	23.6	0.0	0.1	2.8	9.7	58.1	89.4	100.0	990.8	993.2	996.9
9/05/2021	13.8	16.0	18.1	0.0	0.1	2.4	8.9	59.3	91.4	100.0	996.3	997.5	999.2
10/05/2021	14.2	18.0	23.0	0.2	0.1	3.3	10.7	43.5	70.1	99.2	991.8	994.0	996.4
11/05/2021	12.6	16.1	20.1	0.8	0.1	4.0	14.8	57.4	81.3	100.0	992.3	994.8	998.5
12/05/2021	11.5	15.1	19.8	10.4	0.2	3.0	10.8	72.9	92.4	100.0	996.1	997.9	999.9
13/05/2021	11.7	15.6	22.3	0.2	0.1	2.2	9.8	75.5	99.2	100.0	989.1	992.2	996.0
14/05/2021	10.3	14.1	18.9	0.0	0.2	3.3	27.1	28.6	72.1	100.0	989.7	991.9	995.0
15/05/2021	6.8	11.3	16.1	0.0	0.0	3.2	17.9	55.0	99.1	100.0	990.2	993.5	997.9
16/05/2021	5.1	10.2	17.3	0.0	0.1	2.4	13.0	35.4	88.4	100.0	997.1	998.8	1000.9
17/05/2021	6.8	11.8	17.6	0.0	0.1	2.9	14.0	41.2	63.8	100.0	998.2	1001.8	1006.0
18/05/2021	7.5	12.4	18.3	0.0	0.1	2.6	12.0	100.0	100.0	100.0	1005.2	1006.5	1008.0
19/05/2021	7.7	13.2	19.1	0.0	0.0	2.7	12.4	38.9	76.5	100.0	1004.5	1006.2	1008.2
20/05/2021	9.8	14.3	20.9	0.0	0.1	2.7	8.8	37.2	55.7	77.0	1003.8	1005.4	1007.4
21/05/2021	7.5	11.3	14.1	0.2	0.0	2.0	8.3	59.2	93.6	100.0	1007.1	1008.1	1009.7
22/05/2021	7.7	12.6	18.7	0.0	0.1	2.3	8.3	55.0	87.2	100.0	1003.4	1005.5	1007.5
23/05/2021	8.3	12.9	18.4	0.2	0.0	2.2	10.5	65.7	91.8	100.0	1003.9	1005.8	1008.1
24/05/2021	12.1	14.4	19.3	0.4	0.2	2.8	10.0	68.9	96.1	100.0	1006.7	1007.8	1010.1
25/05/2021	9.8	15.3	20.0	0.2	0.3	3.6	16.1	56.6	84.4	100.0	997.1	1002.6	1006.7
26/05/2021	9.8	15.6	20.7	0.0	0.1	4.9	17.8	31.1	55.2	88.8	994.9	997.1	1000.8
27/05/2021	7.9	11.8	17.1	0.0	0.1	2.5	12.6	36.0	56.3	69.8	1000.1	1001.6	1003.7
28/05/2021	7.3	10.9	15.3	0.0	0.0	4.3	21.2	32.6	53.6	72.4	1000.4	1003.4	1007.0
29/05/2021	6.7	10.4	14.2	0.0	1.3	7.9	20.4	48.8	57.0	64.2	1005.8	1006.7	1008.0
30/05/2021	8.9	11.5	14.6	0.0	0.1	6.0	16.7	57.8	68.3	97.9	1005.2	1005.9	1007.8
31/05/2021	8.2	12.0	18.6	0.0	0.1	2.4	9.2	49.3	78.8	99.2	1001.8	1003.7	1005.4
Monthly	5.1	14.2	23.7	68.4	0.0	3.3	27.1	28.6	82.6	100.0	989.1	1000.2	1010.1

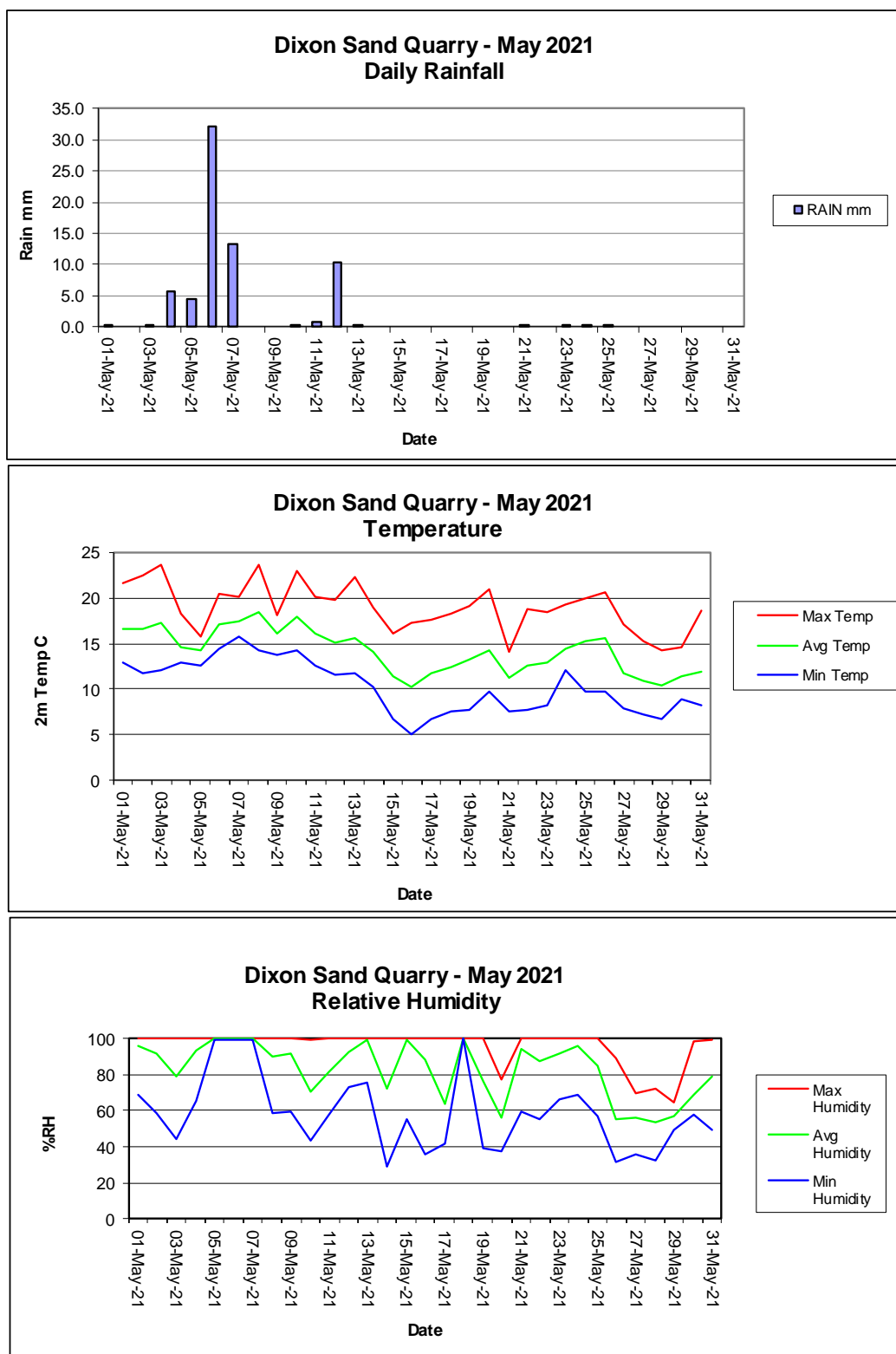


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

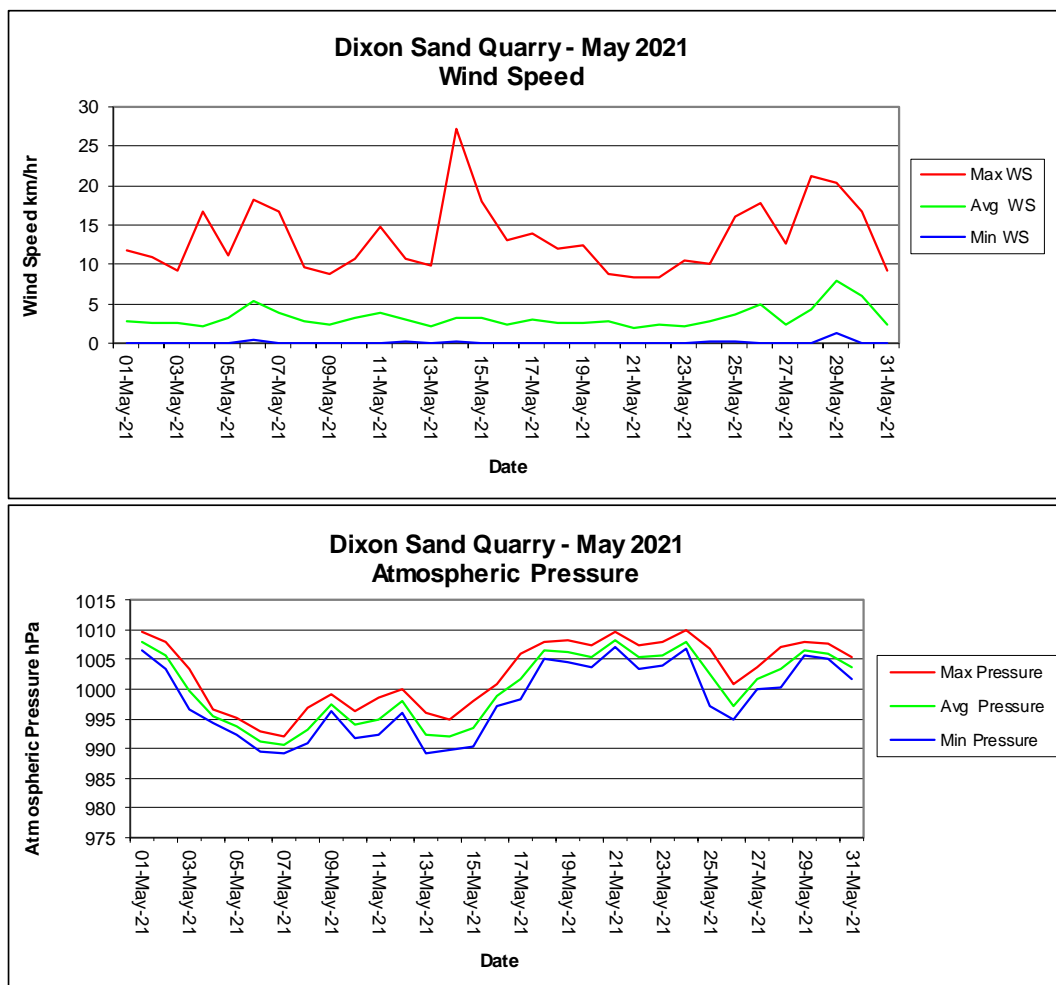
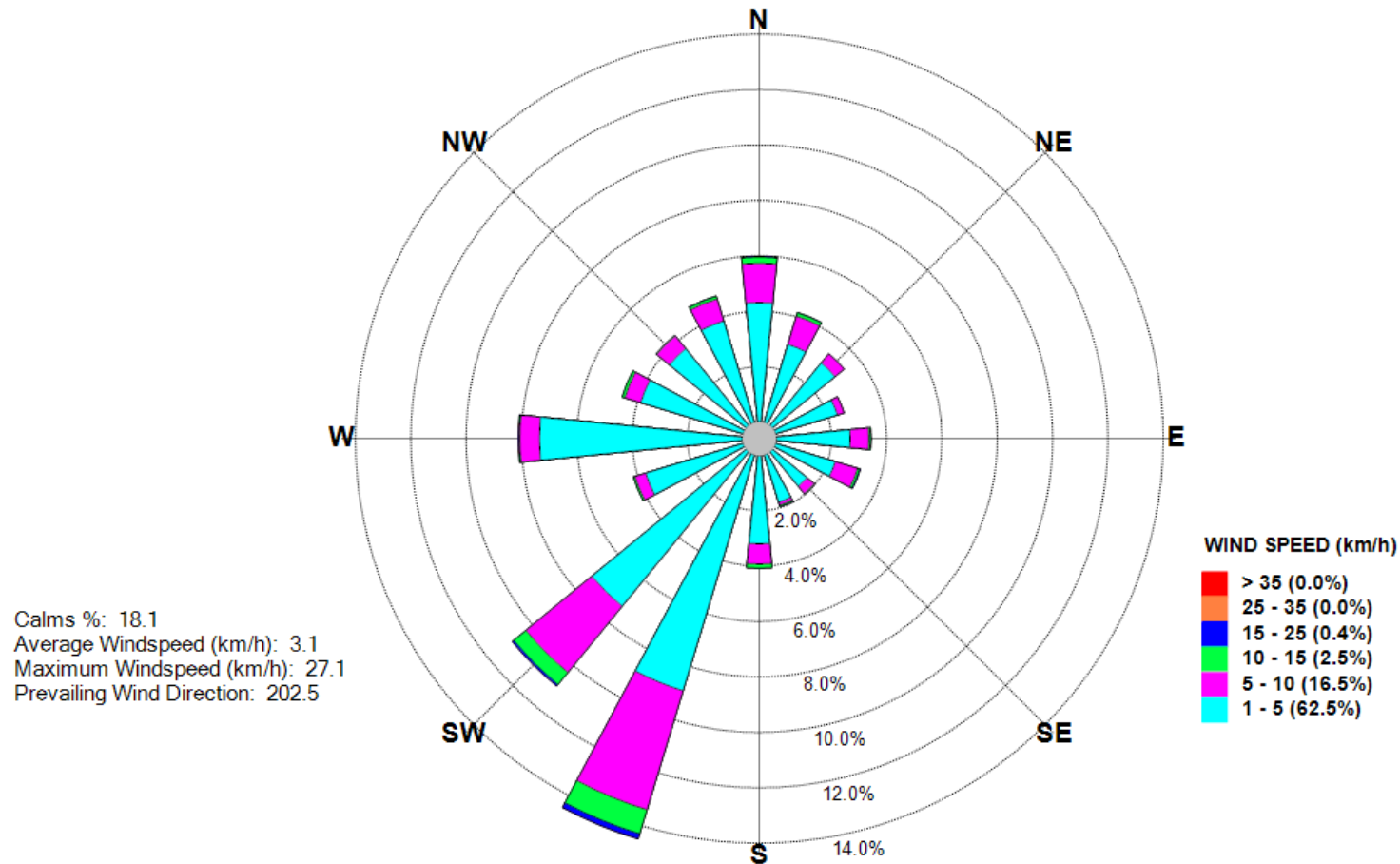


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose

MAY 2021



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

June 2021

Amendment 1

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 4 August 2021

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 2021 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 2020 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has now been collected.

Approximately 100% of meteorological data was recovered for June 2021.

Approximately 100% of TEOM data was recovered for June 2021.

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 (2001) “*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
- 3580.1.1 (2007) “*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.

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 2020 and therefore an annual amount of data has now been collected.

The quarterly calibration, normally scheduled for June 2021, had to be rescheduled and was conducted on 20 July 2021 with the next calibration due in September 2021. The calibration certificate is provided in **Appendix 1** (when required).

Table 2: Average Daily 24-hr TEOM PM₁₀ and TSP Results for June 2021 from AQMS and Annual Average PM₁₀ calculated from the 1 July 2020.

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)
1/06/2021	9.5	14.1	23.8	35.3
2/06/2021	16.0	14.1	40.0	35.3
3/06/2021	13.1	14.1	32.8	35.3
4/06/2021	12.9	14.1	32.3	35.3
5/06/2021	7.2	14.1	18.0	35.2
6/06/2021	7.5	14.1	18.8	35.2
7/06/2021	8.6	14.1	21.5	35.1
8/06/2021	10.3	14.0	25.8	35.1
9/06/2021	5.3	14.0	13.3	35.0
10/06/2021	5.7	14.0	14.3	35.0
11/06/2021	6.8	14.0	17.0	34.9
12/06/2021	4.4	13.9	11.0	34.9
13/06/2021	5.9	13.9	14.8	34.8
14/06/2021	8.0	13.9	20.0	34.8
15/06/2021	14.8	13.9	37.0	34.8
16/06/2021	12.6	13.9	31.5	34.8
17/06/2021	10.0	13.9	25.0	34.7
18/06/2021	8.7	13.9	21.8	34.7
19/06/2021	6.8	13.9	17.0	34.6
20/06/2021	8.4	13.8	21.0	34.6
21/06/2021	10.1	13.8	25.3	34.6
22/06/2021	14.2	13.8	35.5	34.6
23/06/2021	6.5	13.8	16.3	34.5
24/06/2021	8.8	13.8	22.0	34.5
25/06/2021	6.3	13.8	15.8	34.4
26/06/2021	4.9	13.7	12.3	34.4
27/06/2021	6.4	13.7	16.0	34.3
28/06/2021	12.5	13.7	31.3	34.3
29/06/2021	10.4	13.7	26.0	34.3
30/06/2021	9.7	13.7	24.3	34.3

*Calculated from PM10

**Calculated from PM10 Annual Average

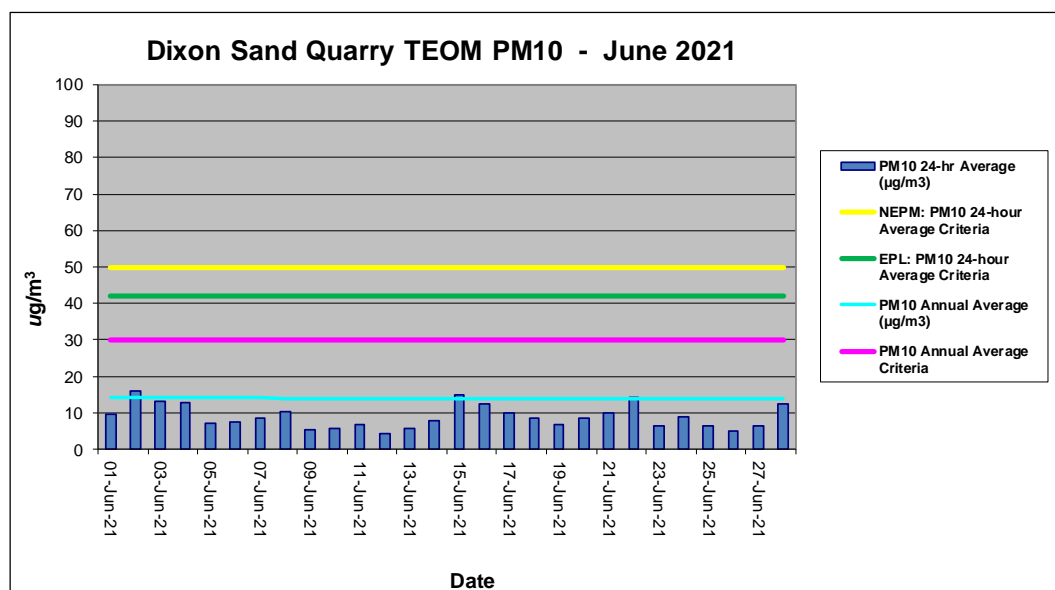


Figure 1: *TEOM PM₁₀ 24 hr, Annual Average and Criteria*

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.

An annual physical screening and system check of the meteorological station was conducted in March 2021 and is next due in February 2022. The screening and system check certificates are provided in **Appendix 1** (when required).

Table 3: Meteorological Data Summary for June 2021

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
1/06/2021	7.5	12.6	17.4	0.0	0.3	3.6	13.3	53.1	75.5	99.5	999.7	1001.3	1002.8
2/06/2021	9.7	14.4	20.5	0.0	0.1	2.8	9.8	42.7	63.2	88.0	996.8	998.8	1000.8
3/06/2021	10.6	11.9	14.9	6.8	0.1	2.2	8.2	64.4	94.7	100.0	988.0	992.2	996.9
4/06/2021	9.6	13.0	18.7	0.4	0.4	2.9	12.1	47.7	74.5	100.0	987.5	991.2	997.3
5/06/2021	6.8	11.2	15.0	0.0	0.1	3.0	12.2	50.3	69.6	99.4	997.1	999.9	1002.1
6/06/2021	7.0	11.8	17.4	0.0	0.2	2.4	8.7	46.2	57.6	99.4	999.8	1002.2	1004.0
7/06/2021	6.8	12.6	17.8	0.0	0.6	4.8	13.0	44.6	67.9	99.2	996.0	1000.0	1003.1
8/06/2021	10.3	12.7	17.5	10.6	0.0	5.1	19.4	55.8	82.7	100.0	986.6	990.9	995.9
9/06/2021	5.9	9.2	12.3	0.2	0.2	5.6	25.5	53.0	78.0	100.0	981.7	983.8	987.0
10/06/2021	5.4	6.6	8.2	4.8	0.3	3.6	12.6	91.2	98.4	99.7	982.1	984.4	987.1
11/06/2021	5.0	9.2	14.9	0.0	0.5	4.4	18.5	53.4	80.6	100.0	987.0	990.4	994.7
12/06/2021	8.3	11.4	15.8	0.2	0.4	5.3	17.9	44.8	63.8	82.7	993.6	995.0	996.3
13/06/2021	8.3	11.4	17.3	0.0	0.1	3.0	12.2	42.4	60.3	69.2	993.8	995.5	997.0
14/06/2021	6.9	11.4	17.3	0.0	0.1	2.1	8.3	53.8	68.3	86.5	994.2	995.3	996.2
15/06/2021	9.2	12.2	15.7	0.0	0.0	2.0	8.2	69.2	87.9	99.3	995.0	996.2	997.6
16/06/2021	6.8	12.6	18.3	2.4	0.2	4.0	13.0	49.7	80.1	100.0	987.7	993.7	997.0
17/06/2021	7.8	11.4	15.1	1.0	0.2	5.4	21.4	44.2	66.1	100.0	987.4	988.8	990.3
18/06/2021	9.0	12.0	16.3	3.8	0.2	4.5	16.1	45.6	68.5	99.4	984.8	987.0	988.5
19/06/2021	9.7	12.2	14.1	0.0	1.7	10.1	32.5	55.4	65.4	96.8	988.1	993.2	999.1
20/06/2021	9.0	11.0	12.8	1.8	1.7	8.3	23.7	66.2	84.7	100.0	998.7	1001.9	1004.4
21/06/2021	8.9	11.0	14.8	1.2	0.2	4.3	14.4	78.0	92.2	99.6	1003.7	1005.7	1007.8
22/06/2021	8.0	11.2	16.6	0.2	0.2	2.1	7.1	69.5	94.8	100.0	1007.5	1009.0	1011.2
23/06/2021	8.9	12.8	16.2	0.2	0.0	3.8	15.4	67.7	84.8	100.0	998.4	1004.1	1008.8
24/06/2021	13.1	15.7	19.6	0.0	0.1	7.8	25.3	53.8	71.3	88.8	990.8	993.9	998.3
25/06/2021	11.1	13.9	17.3	0.0	0.1	4.2	24.0	45.4	67.9	99.2	992.2	994.7	997.6
26/06/2021	9.1	11.8	16.4	0.2	0.4	4.1	12.6	40.9	67.1	93.2	997.1	998.9	1002.1
27/06/2021	8.0	11.4	16.3	0.0	0.1	3.3	8.4	37.5	58.9	74.5	1001.9	1004.6	1008.6
28/06/2021	5.9	10.1	14.6	0.0	0.3	3.7	10.2	72.8	90.5	99.3	1008.2	1009.9	1011.4
29/06/2021	8.9	10.8	12.9	4.0	0.0	3.7	10.2	95.6	99.0	100.0	1010.5	1011.5	1013.0
30/06/2021	9.7	11.9	15.1	0.8	0.0	2.0	5.5	97.9	99.9	100.0	1006.1	1008.5	1011.2
Monthly	5.0	11.7	20.5	38.6	0.0	4.1	32.5	37.5	77.1	100.0	981.7	997.4	1013.0

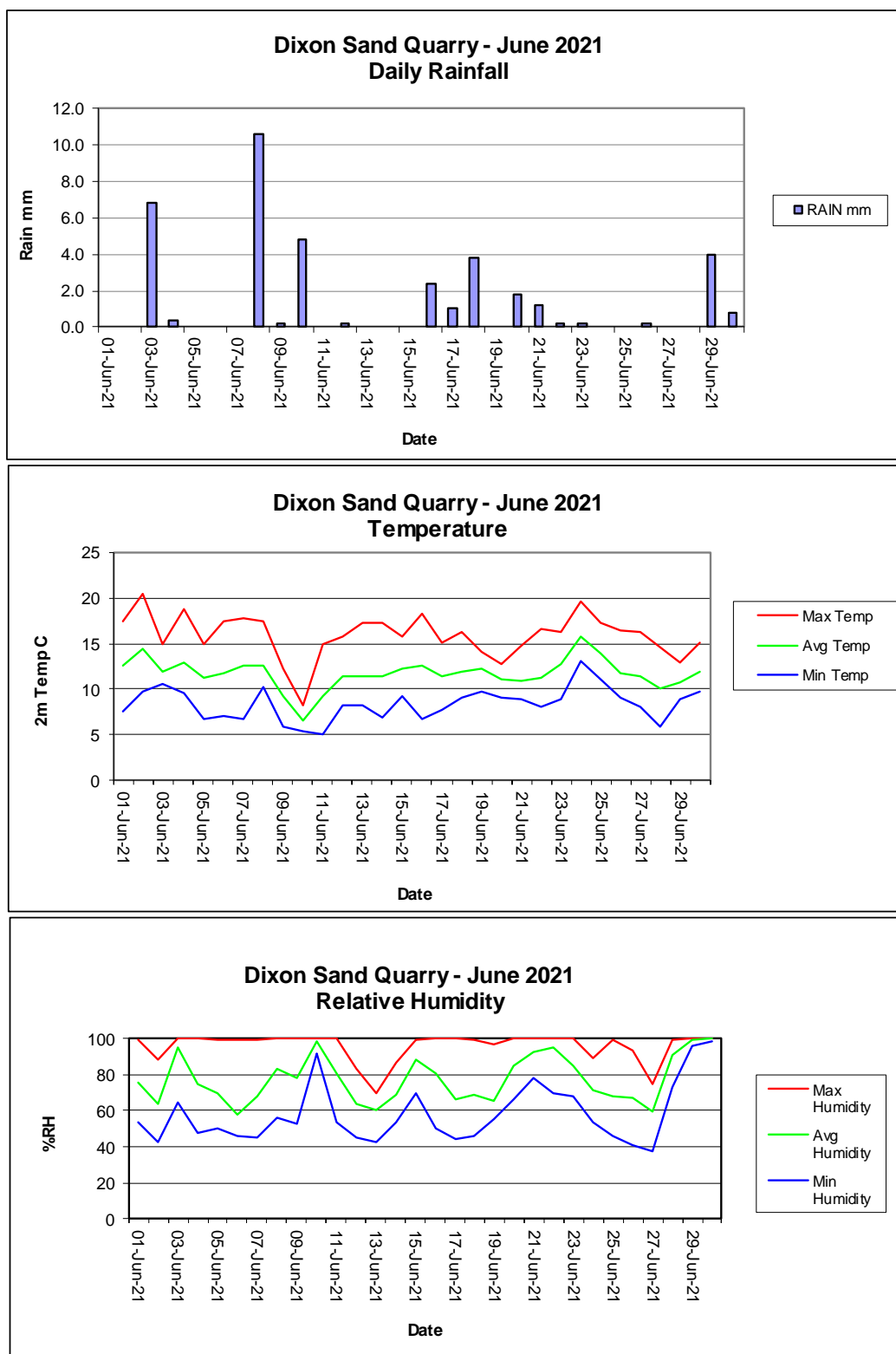


Figure 2: Daily Rainfall, Temperature and Relative Humidity Charts

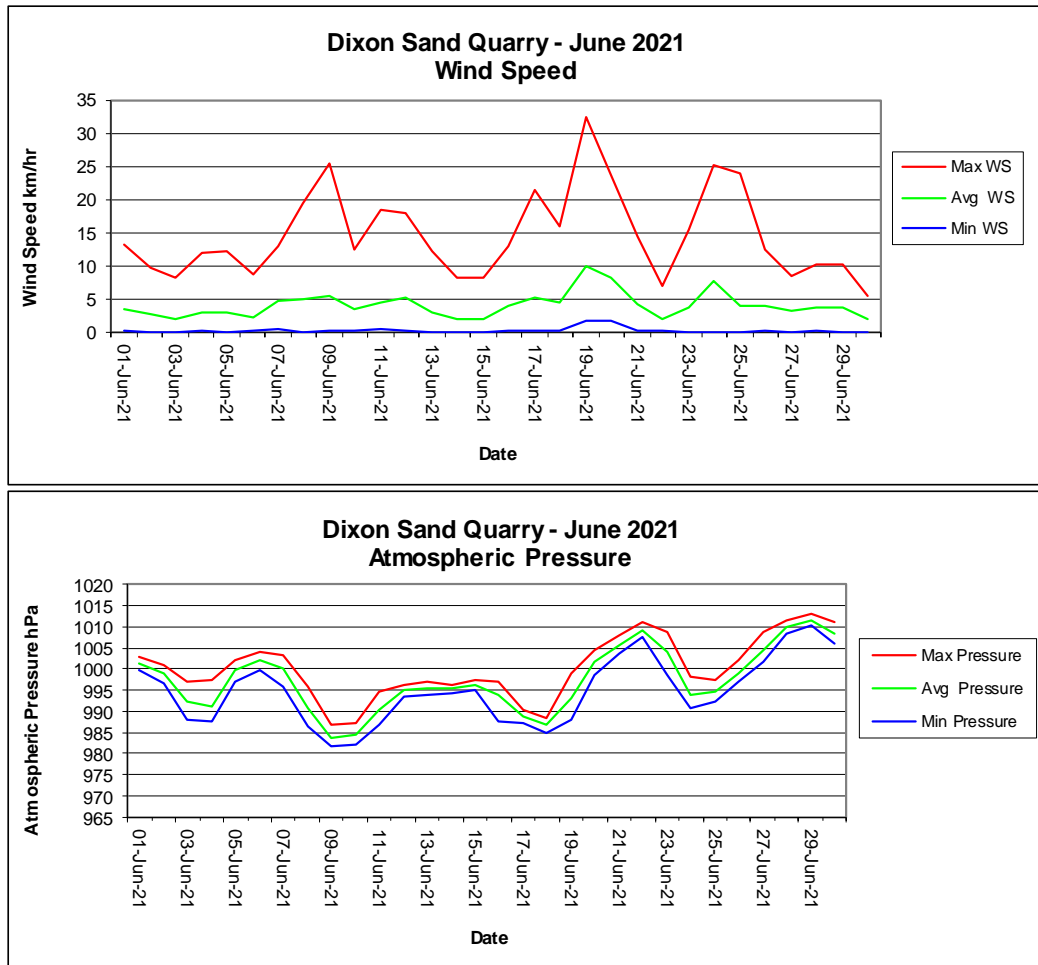
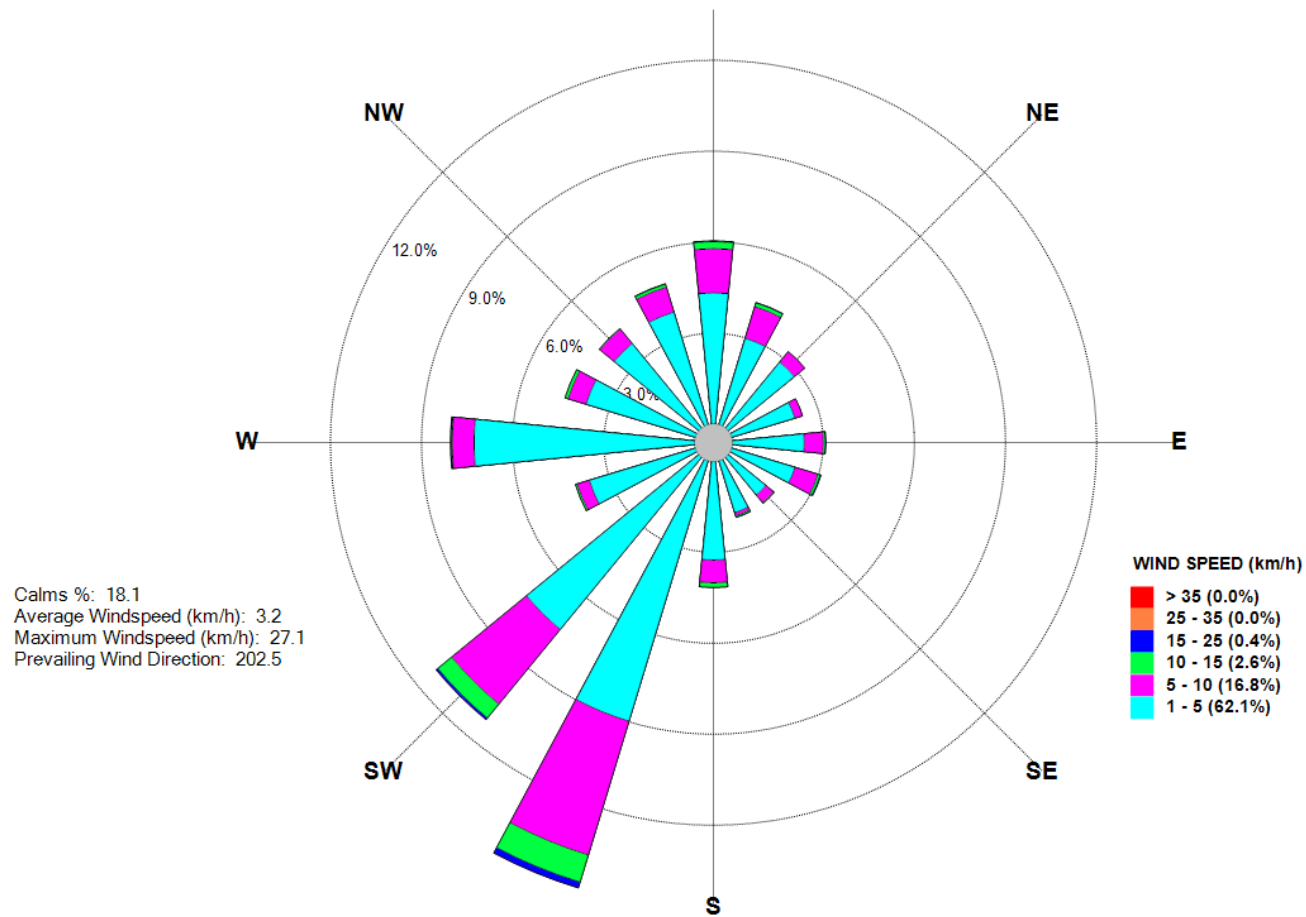


Figure 3: Wind Speed and Atmospheric Pressure Charts

Dixon Sand Quarry - Windrose JUNE 2021



Appendix 1

Calibration Documents (when required)

ABN 36 099 046 376

www.learsiegler.com.au

Unit 5A / 2 Resolution Drive

Caringbah 2229 NSW Australia

Telephone : (02) 9531 5444

Fax : (02) 9531 5411

P.O. Box 2735 Taren Point NSW 2229

Booking No: SS34275

Order No:

Client: Cbased

Date: 20-Jul-21

Tel:

Fax:

Email:

Pages:

DATE	20-Jul-21	PERSONNEL	C. Thomas	LOCATION / ID	Maroota NSW
TIME		MODEL	1400	SERIAL No	

1.Monthly		Equipment Required: Soft Cleaning Brush & lint free cloth, Philips Screwdriver.			
Before		After		Reference	Notes
1a) F (Flow Warning)		1g) OK		Sect 7 O/M	Main flow only 2.71 upon arrival. B
1b) 4		1h) 4		Sect 4.2.1 O/M	
1c) Filter Load	74%	1i) Filter Load	17%	Sect 3.1 O/M	
1d) Noise	0.046	1j) Noise	0.058	Sect 3.1.1 O/M	
1e) Frequency	252.43005	1k) Frequency	254.78155	Sect 3.1.1 O/M	
1f) Inlet cleaned upon filter change		Y		Appendix G O/M	

Change the sample filter if above 85%. Clean PM10 Inlet every filter change.

2.Qaurtley		Equipment required: Flow audit adaptor, Flow cap splitter, flow Calibrator, Temperature probe, Barometer			
1) Complete Monthly	Completed	Y	As Above	Remove Main flow filter & replace with new one install with arrow facing down or against the flow.	
2a) Check or change filters	Completed	Y	Sect 12.1.1 O/M	Replace Aux (bypass) filter with one from main flow. Figure 12-1 O/M	
2c) Flow Audit	Completed	Y	Sect 5.3.3 O/M	Figures 5-11,12,13 O/M	
2d) Leak Check	Completed	Y	Sect 3.4 O/M	Figures 3-31,32,33,34	
2e) Pump Check	Completed	N	Sect 3.1.5 S/M	pump vacuum advised as ok by cu	

2c. Flow Audit	Measured	Tolerance	2d.Leak Check	Pump On	Flow	Pump Off	Flow
Total Flow	17.96	16.67 +/- 1 l/m	Main Flow	0.35	< 0.15	0.06	< 0.15
Main flow	2.98	3 +/- 0.2 l/m	Aux Flow	0.35	< 0.60	0.08	< 0.60

2e. Pump check

Filter loading %		Filter loading must be > 140%, if not rebuild or replace pump					
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Client: Cbased

Date: 20-Jul-21

Tel:

Fax:

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Pages:

3.Bi Annual	Equipment Required: Flow calibrator, Temperature probe, Barometer			
1) Complete Monthly	Completed	Y / N / NA	As above	Notes
2) Complete Quartley	Completed	Y / N / NA	As above	
3a) Change Large DFU's	Completed	Y / N / NA	As above	
3b) Verify Amb Temp & Pres	Completed	Y / N / NA	Sect 5.3.1 O/M	Figure 5-10 O/M
3c) Flow Controller Software Calibration	Completed	Y / N / NA	Sect 3.5.1 S/M	

3b. Verification	Measured	Displayed	Range	Adjusted
Amb Temp °C			./- 2°C	Y / N / NA
Amb Pres Atm			./- 13.4	Y / N / NA

3c.	Settings	Ambient	
T A/S Left Side °C			Settings on left side must be changed to ambient conditions
P A/S Left Side Atm			

3c. Software Cal	F Adj Before	Flow Before l/m	F Adj After	Flow After l/m	Adjust flow to 2% of set point But no more than 10% of F Adj default of 1.000. Failure requires hardware Calibration (annual as below)
Main Flow 3 l/m					
Aux Flow 13.67 l/m					

NOTE : Change T A/S & P A/S BACK TO 99 & 9

4.Annual	Equipment required: Flow calibrator, temperature probe, barometer, Oscilloscope, digital multimeter, jumper lead, KO verification kit, cleaning equipment, large filter.			
1) Complete Monthly	Completed	Y / N / NA	As above	Notes
2) Complete 3 Monthly	Completed	Y / N / NA	As above	
2a) Change Large DFU's	Completed	Y / N / NA	As above	
4a) Amplifier Board tuning	Completed	Y / N / NA	Sect 3.2.2 S/M	

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4. Annual	Equipment required: Flow calibrator, temperature probe, barometer, Oscilloscope, digital multimeter, jumper lead, KO verification kit, cleaning equipment, large filter.			
4b) Analogue Output Calibration	Completed	Y / N / NA	Sect 3.2.1 S/M	
4c) Analogue Input Calibration	Completed	Y / N / NA	Sect 3.2.1 S/M	
4d) Amb Temp & Amb Pres Calibration	Completed	Y / N / NA	Sect 3.2.3-4 S/M	
4e) Flow Controller Hardware Calibration	Completed	Y / N / NA	Sect 3.5.2 S/M	
4f) Mass Transducer Calibration Verification	Completed	Y / N / NA	Sect 3.2.5 S/M	
4g) 24 hr zero check	Completed	Y / N / NA	N/A	
4h) Clean sample tube	Completed	Y / N / NA	Sect 12.1.2 O/M	
4i) Check memory battery	Completed	Y / N / NA	Sect 12.1.2 O/M	

4a. Amplifier board	TP0	TP0	TP1	TP2	TP3	TP4	TP5
Reading							
Reading							
Reading							
Expected	-.4.2v	0.5vpp	9vpp	20vpp	0.6-1.5vpp	-.1.000v	16vpp

NOTE: Repeat Steps above until all parameters are in range.

4b. Analogue outputs	0	1	2	3	4	5	
Reading VDC							
Set Point VDC	9.000v	9.000v	9.000v	9.000v	9.000v	9.000v	

4c. Analogue Inputs							
1	2	3	4	5	6	7	9
90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00

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4d. Temp & Press cal	Measured	Displayed		Measured	Displayed
Amb Temp °C			Adjust Input 8		
Amb Pres Atm			Adjust R509		

4e.	Settings	Ambient	
T A/S Left Side °C			
P A/S Left Side Atm			If settings on the left were changed set back to 99 & 9

4e.Flow Calibration	Measured	Adjust Pots	Adjusted	Adjust zero pot for 3 l/m	Measured
Main Flow 0.5 l/m		Zero (R119)	N	Main Flow 3 l/m +/- 0.3	2.98
Main Flow 4.5 l/m		Span (R126)	N	Adjust zero pot for 13.67 l/m	
Aux Flow 2.0 l/m		Zero (R119)	Y	Aux Flow 13.67 l/m +/- 0.2	
Aux Flow 18.0 l/m		Span (R126)			

NOTE: Change T A/S Back 99 & P A/S back to 9.

4f. KO Verification KO	Audit filter weight	Frequency with no filter	Frequency with audit filter	Audit KO	Difference < 2.5%	If Difference is +/- 2.4% Re do step 4f.

4g. 24 Hr Zero				Notes
START DATE		START TIME		Remove Inlet & Install flow audit adaptor on Inlet. Install a large DFU Filter with some flexible hose onto the flow audit adaptor.
END DATE		FINISH TIME		

Engineer's Name: C. Thomas

Engineer's Signature: 

Date:

Appendix C – Groundwater and Surface Water Monitoring Data

Groundwater Monitoring Data

Report Number: 10052

Date Issued: 21/12/2020

Revision Number: 00

Site/Job: Haerses Road 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 sample(s) were received on 9/12/2020

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
H6	9/12/2020	10052/1	Water	
H7	9/12/2020	10052/2	Water	
H9	9/12/2020	10052/3	Water	
H12	9/12/2020	10052/4	Water	
BH4	9/12/2020	10052/5	Water	
H14	9/12/2020	10052/6	Water	
H2	9/12/2020	10052/7	Water	

The sample(s) have been tested as received and the following reports are included:

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

Anthony Crane
Laboratory ManagerLisa Thomson
Signatory

Approved by:

Results have been approved and report finalised on 21/12/2020.

Test Report Number: 10052

Date Issued: 21/12/2020

Revision No: 00

Results

Field Tests	Method	Units	10052/1 H6 9/12/2020	10052/2 H7 9/12/2020	10052/3 H9 9/12/2020	10052/4 H12 9/12/2020	10052/5 BH4 9/12/2020
Depth to Water	AS5667.11	m(bTOC)	11.99	12.94	8.70	10.13	37.81
Temperature	Temp	°C	17.5	17.9	17.3	18.2	18.8
pH	APHA 4500-H B	pH Units	4.6	4.5	4.4	4.4	5.6
Electrical Conductivity	APHA 2510 B	µS/cm	126	118	167	271	135

Field Tests	Method	Units	10052/6 H14 9/12/2020	10052/7 H2 9/12/2020
Depth to Water	AS5667.11	m(bTOC)	9.55	2.82
Temperature	Temp	°C	17.1	20.4
pH	APHA 4500-H B	pH Units	4.5	4.8
Electrical Conductivity	APHA 2510 B	µS/cm	78	70

Total Dissolved Solids	Method	Units	10052/1 H6 9/12/2020	10052/2 H7 9/12/2020	10052/3 H9 9/12/2020	10052/4 H12 9/12/2020	10052/5 BH4 9/12/2020
Total Dissolved Solids	AS3550.4	mg/L	88	75	100	183	92

Total Dissolved Solids	Method	Units	10052/6 H14 9/12/2020	10052/7 H2 9/12/2020
Total Dissolved Solids	AS3550.4	mg/L	72	53

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Sampling Report Number: 10052

Date Issued: 21/12/2020

Revision No: 00

Sampling Conditions: Fine 17°-26°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10052/1	H6		T.Walker	9/12/2020 8:28 AM	AS5667.11, Bail	AS5667.1
10052/2	H7		T.Walker	9/12/2020 8:54 AM	AS5667.11, Bail	AS5667.1
10052/3	H9		T.Walker	9/12/2020 9:18 AM	AS5667.11, Pump	AS5667.1
10052/4	H12		T.Walker	9/12/2020 9:41 AM	AS5667.11, Pump	AS5667.1
10052/5	BH4		T.Walker	9/12/2020 10:02 AM	AS5667.11, Pump	AS5667.1
10052/6	H14		T.Walker	9/12/2020 10:26 AM	AS5667.11, Bail	AS5667.1
10052/7	H2		T.Walker	9/12/2020 2:35 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10052/1	H6	
10052/2	H7	
10052/3	H9	
10052/4	H12	
10052/5	BH4	
10052/6	H14	Bailed due to pump blockage @ 4.5m (bent pipe?)
10052/7	H2	

Sampling procedures have been approved and report finalised on 21/12/2020.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road 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	312159	6294614			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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: 11045

Date Issued: 11/06/2021

Revision Number: 00

Site/Job: Haerses Road 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 1/06/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
H6	1/06/2021	11045/1	Water	
H7	1/06/2021	11045/2	Water	
H9	1/06/2021	11045/3	Water	
H12	1/06/2021	11045/4	Water	
BH4	1/06/2021	11045/5	Water	
H14	1/06/2021	11045/6	Water	
H2	1/06/2021	11045/7	Water	

The sample(s) have been tested as received and the following reports are included:

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

Anthony Crane
Laboratory Manager

Approved by:

Results have been approved and report finalised on 11/06/2021.

Test Report Number: 11045

Date Issued: 11/06/2021

Revision No: 00

Results

Field Tests	Method	Units	11045/1 H6 1/06/2021	11045/2 H7 1/06/2021	11045/3 H9 1/06/2021	11045/4 H12 1/06/2021	11045/5 BH4 1/06/2021
Depth to Water	AS5667.11	m(bTOC)	11.16	11.58	8.02	9.06	37.76
Temperature	Temp	°C	17.7	18.5	17.5	18.3	18.3
pH	APHA 4500-H B	pH Units	4.7	4.6	4.5	4.5	5.6
Electrical Conductivity	APHA 2510 B	µS/cm	141	116	91.0	283	134

Field Tests	Method	Units	11045/6 H14 1/06/2021	11045/7 H2 1/06/2021
Depth to Water	AS5667.11	m(bTOC)	8.23	2.39
Temperature	Temp	°C	18.3	17.8
pH	APHA 4500-H B	pH Units	4.5	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	133	67.0

Total Dissolved Solids	Method	Units	11045/1 H6 1/06/2021	11045/2 H7 1/06/2021	11045/3 H9 1/06/2021	11045/4 H12 1/06/2021	11045/5 BH4 1/06/2021
Total Dissolved Solids	AS3550.4	mg/L	88	92	64	143	63

Total Dissolved Solids	Method	Units	11045/6 H14 1/06/2021	11045/7 H2 1/06/2021
Total Dissolved Solids	AS3550.4	mg/L	84	53

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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: 11045

Date Issued: 11/06/2021

Revision No: 00

Sampling Conditions: Cloudy, 15°- 17°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
11045/1	H6		T & D.Walker	1/06/2021 11:49 AM	AS5667.11, Pump	AS5667.1
11045/2	H7		T & D.Walker	1/06/2021 12:07 PM	AS5667.11, Pump	AS5667.1
11045/3	H9		T & D.Walker	1/06/2021 12:44 PM	AS5667.11, Pump	AS5667.1
11045/4	H12		T & D.Walker	1/06/2021 12:57 PM	AS5667.11, Pump	AS5667.1
11045/5	BH4		T & D.Walker	1/06/2021 1:13 PM	AS5667.11, Pump	AS5667.1
11045/6	H14		T & D.Walker	1/06/2021 1:36 PM	AS5667.11, Pump	AS5667.1
11045/7	H2		T & D.Walker	1/06/2021 12:29 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
11045/1	H6	
11045/2	H7	
11045/3	H9	
11045/4	H12	
11045/5	BH4	Logger weight installed
11045/6	H14	
11045/7	H2	

Sampling procedures have been approved and report finalised on 11/06/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road 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	312159	6294614			

Well ID	Date Well Measured	Case Height (monument) (m)	Depth to bottom m(bTOC)	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:

9381



Date Issued: 31/07/2020

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

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


PO Box 2335 Greenhills NSW 2323
P (02) 4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 600

The following 14 samples were received on 24/07/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		24/07/2020	9381/1	Water	
BH01B		24/07/2020	9381/2	Water	
BH01C		24/07/2020	9381/3	Water	
BH02A		24/07/2020	9381/4	Water	
BH02B		24/07/2020	9381/5	Water	
BH02C		24/07/2020	9381/6	Water	
BH03A		24/07/2020	9381/7	Water	
BH03B		24/07/2020	9381/8	Water	
BH03C		24/07/2020	9381/9	Water	
BH05B		24/07/2020	9381/10	Water	
BH06A		24/07/2020	9381/11	Water	
BH06B		24/07/2020	9381/12	Water	
BH06C		24/07/2020	9381/13	Water	
BH5		24/07/2020	9381/14	Water	

The sample(s) have been tested as received and the following reports are included:

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


Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Test Report Number:**9381**

Date Issued:

31/07/2020

Revision No: 00

Results

Field Tests	Units	Method	Report Limit	9381/1 BH01A 24/07/2020	9381/2 BH01B 24/07/2020	9381/3 BH01C 24/07/2020	9381/4 BH02A 24/07/2020	9381/5 BH02B 24/07/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	11.58	15.65	7.17	26.94	19.26
Temperature	°C	Temp	0.1	19.8	19.7	19.4	20.8	20.6
pH	pH Units	APHA 4500-H B	0.1	5.4	4.8	4.9	5.2	4.6
Electrical Conductivity	µS/cm	APHA 2510 B	50	210	181	196	173	163

Field Tests	Units	Method	Report Limit	9381/6 BH02C 24/07/2020	9381/7 BH03A 24/07/2020	9381/8 BH03B 24/07/2020	9381/9 BH03C 24/07/2020	9381/10 BH05B 24/07/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	15.53	57.97	22.39	13.84	20.25
Temperature	°C	Temp	0.1	20.3	21.6	20.8	20.7	20.5
pH	pH Units	APHA 4500-H B	0.1	5.6	9.6	4.7	4.3	4.7
Electrical Conductivity	µS/cm	APHA 2510 B	50	177	224	145	170	182

Field Tests	Units	Method	Report Limit	9381/11 BH06A 24/07/2020	9381/12 BH06B 24/07/2020	9381/13 BH06C 24/07/2020	9381/14 BH5 24/07/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	38.49	35.42	13.22	30.14
Temperature	°C	Temp	0.1	20.7	20.6	20.8	20.8
pH	pH Units	APHA 4500-H B	0.1	11.3	5.0	4.3	5.5
Electrical Conductivity	µS/cm	APHA 2510 B	50	579	147	119	231

Total Dissolved Solids	Units	Method	Report Limit	9381/1 BH01A 24/07/2020	9381/2 BH01B 24/07/2020	9381/3 BH01C 24/07/2020	9381/4 BH02A 24/07/2020	9381/5 BH02B 24/07/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	154	115	110	109	133

Total Dissolved Solids	Units	Method	Report Limit	9381/6 BH02C 24/07/2020	9381/7 BH03A 24/07/2020	9381/8 BH03B 24/07/2020	9381/9 BH03C 24/07/2020	9381/10 BH05B 24/07/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	109	108	86	97	94

Total Dissolved Solids	Units	Method	Report Limit	9381/11 BH06A 24/07/2020	9381/12 BH06B 24/07/2020	9381/13 BH06C 24/07/2020	9381/14 BH5 24/07/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	186	84	52	146

Report Comments:

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

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

Results have been approved and report finalised on 31/07/2020

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sampling Report Number:

9381



Date Issued: 31/07/2020
Sampling Conditions: Cloudy 12°-17°C

Revision No: 00

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9381/1	BH01A	24/07/2020 3:07 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9381/2	BH01B	24/07/2020 3:18 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9381/3	BH01C	24/07/2020 3:30 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/4	BH02A	24/07/2020 2:23 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9381/5	BH02B	24/07/2020 2:39 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9381/6	BH02C	24/07/2020 2:51 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/7	BH03A	24/07/2020 12:46 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/8	BH03B	24/07/2020 1:14 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/9	BH03C	24/07/2020 1:38 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/10	BH05B	24/07/2020 2:08 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9381/11	BH06A	24/07/2020 11:56 AM	T.Walker	AS5667.11, Pump	AS5667.1	1 meter of logger cable tangled
9381/12	BH06B	24/07/2020 12:16 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/13	BH06C	24/07/2020 12:29 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9381/14	BH5	24/07/2020 1:53 PM	T.Walker	AS5667.11, Pump	AS5667.1	

Sampling procedures have been approved and report finalised on 31/07/2020
Where method is "unknown" sampling procedures are not endorsed

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd
Site/Job: Haerses Road Monthly Ground Water



Well ID	GPS location (Easting)	GPS location (Northing)	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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:

9503



Date Issued: 1/09/2020

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

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


PO Box 2335 Greenhills NSW 2323
P (02) 4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 600

The following 14 samples were received on 21/08/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		21/08/2020	9503/1	Water	
BH01B		21/08/2020	9503/2	Water	
BH01C		21/08/2020	9503/3	Water	
BH02A		21/08/2020	9503/4	Water	
BH02B		21/08/2020	9503/5	Water	
BH02C		21/08/2020	9503/6	Water	
BH03A		21/08/2020	9503/7	Water	
BH03B		21/08/2020	9503/8	Water	
BH03C		21/08/2020	9503/9	Water	
BH05B		21/08/2020	9503/10	Water	
BH06A		21/08/2020	9503/11	Water	
BH06B		21/08/2020	9503/12	Water	
BH06C		21/08/2020	9503/13	Water	
BH5		21/08/2020	9503/14	Water	

The sample(s) have been tested as received and the following reports are included:

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


Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Test Report Number:**9503**

Date Issued:

1/09/2020

Revision No: 00

Results

Field Tests	Units	Method	PQL	9503/1 BH01A 21/08/2020	9503/2 BH01B 21/08/2020	9503/3 BH01C 21/08/2020	9503/4 BH02A 21/08/2020	9503/5 BH02B 21/08/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	11.02	15.66	6.74	26.58	19.06
Temperature	°C	Temp	0.1	19.9	19.8	18.8	20.8	20.5
pH	pH Units	APHA 4500-H B	0.1	5.5	4.7	4.6	5.3	4.5
Electrical Conductivity	µS/cm	APHA 2510 B	50	211	181	201	174	161

Field Tests	Units	Method	PQL	9503/6 BH02C 21/08/2020	9503/7 BH03A 21/08/2020	9503/8 BH03B 21/08/2020	9503/9 BH03C 21/08/2020	9503/10 BH05B 21/08/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	15.33	57.69	22.20	13.31	20.02
Temperature	°C	Temp	0.1	20.2	20.8	20.6	20.7	21.3
pH	pH Units	APHA 4500-H B	0.1	5.3	6.1	4.7	4.2	5.2
Electrical Conductivity	µS/cm	APHA 2510 B	50	169	216	155	171	196

Field Tests	Units	Method	PQL	9503/11 BH06A 21/08/2020	9503/12 BH06B 21/08/2020	9503/13 BH06C 21/08/2020	9503/14 BH5 21/08/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	38.85	35.19	12.92	29.86
Temperature	°C	Temp	0.1	21.2	21.0	20.4	21.0
pH	pH Units	APHA 4500-H B	0.1	11.4	5.1	4.2	5.3
Electrical Conductivity	µS/cm	APHA 2510 B	50	682	172	121	217

Total Dissolved Solids	Units	Method	PQL	9503/1 BH01A 21/08/2020	9503/2 BH01B 21/08/2020	9503/3 BH01C 21/08/2020	9503/4 BH02A 21/08/2020	9503/5 BH02B 21/08/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	84	99	105	64	75

Total Dissolved Solids	Units	Method	PQL	9503/6 BH02C 21/08/2020	9503/7 BH03A 21/08/2020	9503/8 BH03B 21/08/2020	9503/9 BH03C 21/08/2020	9503/10 BH05B 21/08/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	87	76	71	62	115

Total Dissolved Solids	Units	Method	PQL	9503/11 BH06A 21/08/2020	9503/12 BH06B 21/08/2020	9503/13 BH06C 21/08/2020	9503/14 BH5 21/08/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	212	82	62	127

Report Comments:

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

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

Results have been approved and report finalised on 1/09/2020

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sampling Report Number:

9503



Date Issued: 1/09/2020
Sampling Conditions: Cloudy 14°-17°C

Revision No: 00

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9503/1	BH01A	21/08/2020 2:48 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9503/2	BH01B	21/08/2020 3:03 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9503/3	BH01C	21/08/2020 3:19 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9503/4	BH02A	21/08/2020 2:01 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9503/5	BH02B	21/08/2020 2:16 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9503/6	BH02C	21/08/2020 2:31 PM	T.Walker	AS5667.11, Bail	AS5667.1	1 Bail available only
9503/7	BH03A	21/08/2020 12:38 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9503/8	BH03B	21/08/2020 12:54 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9503/9	BH03C	21/08/2020 1:05 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9503/10	BH05B	21/08/2020 1:27 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9503/11	BH06A	21/08/2020 11:49 AM	T.Walker	AS5667.11, Pump	AS5667.1	
9503/12	BH06B	21/08/2020 12:07 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9503/13	BH06C	21/08/2020 12:20 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9503/14	BH5	21/08/2020 1:43 PM	T.Walker	AS5667.11, Pump	AS5667.1	Was 0.3m knot in logger string

Sampling procedures have been approved and report finalised on 1/09/2020
Where method is "unknown" sampling procedures are not endorsed

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd
Site/Job: Haerses Road Monthly Ground Water



Well ID	GPS location (Easting)	GPS location (Northing)	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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:

9657



Date Issued: 25/09/2020

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

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


PO Box 2335 Greenhills NSW 2323
P (02) 4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 600

The following 14 samples were received on 18/09/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		18/09/2020	9657/1	Water	
BH01B		18/09/2020	9657/2	Water	
BH01C		18/09/2020	9657/3	Water	
BH02A		18/09/2020	9657/4	Water	
BH02B		18/09/2020	9657/5	Water	
BH02C		18/09/2020	9657/6	Water	
BH03A		18/09/2020	9657/7	Water	
BH03B		18/09/2020	9657/8	Water	
BH03C		18/09/2020	9657/9	Water	
BH05B		18/09/2020	9657/10	Water	
BH06A		18/09/2020	9657/11	Water	
BH06B		18/09/2020	9657/12	Water	
BH06C		18/09/2020	9657/13	Water	
BH5		18/09/2020	9657/14	Water	

The sample(s) have been tested as received and the following reports are included:

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


Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Test Report Number:**9657**

Date Issued:

25/09/2020

Revision No: 00

Results

Field Tests	Units	Method	PQL	9657/1 BH01A 18/09/2020	9657/2 BH01B 18/09/2020	9657/3 BH01C 18/09/2020	9657/4 BH02A 18/09/2020	9657/5 BH02B 18/09/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	10.61	15.89	6.87	26.69	19.22
Temperature	°C	Temp	0.1	16.6	16.5	15.1	17.6	17.4
pH	pH Units	APHA 4500-H B	0.1	5.2	4.7	4.7	5.1	4.5
Electrical Conductivity	µS/cm	APHA 2510 B	50	208	180	199	168	163

Field Tests	Units	Method	PQL	9657/6 BH02C 18/09/2020	9657/7 BH03A 18/09/2020	9657/8 BH03B 18/09/2020	9657/9 BH03C 18/09/2020	9657/10 BH05B 18/09/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	15.47	57.78	22.42	13.78	20.20
Temperature	°C	Temp	0.1	17.3	17.2	17.1	17.2	17.4
pH	pH Units	APHA 4500-H B	0.1	5.5	6.7	4.8	4.3	5.2
Electrical Conductivity	µS/cm	APHA 2510 B	50	170	373	149	169	193

Field Tests	Units	Method	PQL	9657/11 BH06A 18/09/2020	9657/12 BH06B 18/09/2020	9657/13 BH06C 18/09/2020	9657/14 BH5 18/09/2020
Depth to Water	m(bTOC)	AS5667.11	0.01	38.73	35.43	13.04	30.01
Temperature	°C	Temp	0.1	17.7	17.6	17.5	17.3
pH	pH Units	APHA 4500-H B	0.1	11.3	4.9	4.5	5.2
Electrical Conductivity	µS/cm	APHA 2510 B	50	519	148	118	207

Total Dissolved Solids	Units	Method	PQL	9657/1 BH01A 18/09/2020	9657/2 BH01B 18/09/2020	9657/3 BH01C 18/09/2020	9657/4 BH02A 18/09/2020	9657/5 BH02B 18/09/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	124	102	118	90	76

Total Dissolved Solids	Units	Method	PQL	9657/6 BH02C 18/09/2020	9657/7 BH03A 18/09/2020	9657/8 BH03B 18/09/2020	9657/9 BH03C 18/09/2020	9657/10 BH05B 18/09/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	103	266	101	90	111

Total Dissolved Solids	Units	Method	PQL	9657/11 BH06A 18/09/2020	9657/12 BH06B 18/09/2020	9657/13 BH06C 18/09/2020	9657/14 BH5 18/09/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	20	154	73	52	105

Report Comments:

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

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

Results have been approved and report finalised on 25/09/2020

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 – Testing. The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.



Sampling Report Number:

9657



Date Issued: 25/09/2020
Sampling Conditions: Cloudy 13°-15°C

Revision No: 00

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9657/1	BH01A	18/09/2020 12:51 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9657/2	BH01B	18/09/2020 1:07 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9657/3	BH01C	18/09/2020 1:22 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/4	BH02A	18/09/2020 12:03 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9657/5	BH02B	18/09/2020 12:18 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9657/6	BH02C	18/09/2020 12:33 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/7	BH03A	18/09/2020 10:44 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/8	BH03B	18/09/2020 11:01 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/9	BH03C	18/09/2020 11:12 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/10	BH05B	18/09/2020 11:27 AM	T.Walker	AS5667.11, Pump	AS5667.1	
9657/11	BH06A	18/09/2020 9:55 AM	T.Walker	AS5667.11, Pump	AS5667.1	
9657/12	BH06B	18/09/2020 10:13 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/13	BH06C	18/09/2020 10:28 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9657/14	BH5	18/09/2020 11:45 AM	T.Walker	AS5667.11, Pump	AS5667.1	

Sampling procedures have been approved and report finalised on 25/09/2020
Where method is "unknown" sampling procedures are not endorsed

NATA Accredited Laboratory – 20375

Accredited for compliance with ISO/IEC 17025 –
Testing. The results of the tests, calibrations and/or
measurements included in this document are
traceable to Australian/national standards.



Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd
Site/Job: Haerses Road Monthly Ground Water



Well ID	GPS location (Easting)	GPS location (Northing)	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 9787

Date Issued: 23/10/2020

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 16/10/2020

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	16/10/2020	9787/1	Water	
BH01B	16/10/2020	9787/2	Water	
BH01C	16/10/2020	9787/3	Water	
BH02A	16/10/2020	9787/4	Water	
BH02B	16/10/2020	9787/5	Water	
BH02C	16/10/2020	9787/6	Water	
BH03A	16/10/2020	9787/7	Water	
BH03B	16/10/2020	9787/8	Water	
BH03C	16/10/2020	9787/9	Water	
BH05B	16/10/2020	9787/10	Water	
BH06A	16/10/2020	9787/11	Water	
BH06B	16/10/2020	9787/12	Water	
BH06C	16/10/2020	9787/13	Water	
BH5	16/10/2020	9787/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 23/10/2020.

Test Report Number: 9787

Date Issued: 23/10/2020

Revision No: 00

Results

Field Tests	Method	Units	9787/1 BH01A 16/10/2020	9787/2 BH01B 16/10/2020	9787/3 BH01C 16/10/2020	9787/4 BH02A 16/10/2020	9787/5 BH02B 16/10/2020
Depth to Water	AS5667.11	m(bTOC)	10.58	15.96	6.79	26.49	19.11
Temperature	Temp	°C	17.6	17.1	15.8	18.2	17.9
pH	APHA 4500-H B	pH Units	5.3	4.7	4.7	5.0	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	217	182	199	169	165

Field Tests	Method	Units	9787/6 BH02C 16/10/2020	9787/7 BH03A 16/10/2020	9787/8 BH03B 16/10/2020	9787/9 BH03C 16/10/2020	9787/10 BH05B 16/10/2020
Depth to Water	AS5667.11	m(bTOC)	15.39	57.68	22.31	13.74	20.09
Temperature	Temp	°C	17.9	17.5	17.3	17.3	17.7
pH	APHA 4500-H B	pH Units	5.2	6.0	4.7	4.2	4.9
Electrical Conductivity	APHA 2510 B	µS/cm	166	215	148	171	191

Field Tests	Method	Units	9787/11 BH06A 16/10/2020	9787/12 BH06B 16/10/2020	9787/13 BH06C 16/10/2020	9787/14 BH5 16/10/2020
Depth to Water	AS5667.11	m(bTOC)	39.50	35.29	13.18	29.99
Temperature	Temp	°C	18.8	17.9	17.8	18.0
pH	APHA 4500-H B	pH Units	11.2	4.8	4.3	5.1
Electrical Conductivity	APHA 2510 B	µS/cm	489	147	120	212

Total Dissolved Solids	Method	Units	9787/1 BH01A 16/10/2020	9787/2 BH01B 16/10/2020	9787/3 BH01C 16/10/2020	9787/4 BH02A 16/10/2020	9787/5 BH02B 16/10/2020
Total Dissolved Solids	AS3550.4	mg/L	104	91	94	83	69

Total Dissolved Solids	Method	Units	9787/6 BH02C 16/10/2020	9787/7 BH03A 16/10/2020	9787/8 BH03B 16/10/2020	9787/9 BH03C 16/10/2020	9787/10 BH05B 16/10/2020
Total Dissolved Solids	AS3550.4	mg/L	84	90	67	67	76

Total Dissolved Solids	Method	Units	9787/11 BH06A 16/10/2020	9787/12 BH06B 16/10/2020	9787/13 BH06C 16/10/2020	9787/14 BH5 16/10/2020
Total Dissolved Solids	AS3550.4	mg/L	178	74	39	102

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

Sampling Report Number: 9787

Date Issued: 23/10/2020

Revision No: 00

Sampling Conditions: Cloudy 18°-22°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
9787/1	BH01A		T.Walker	16/10/2020 1:10 PM	AS5667.11, Pump	AS5667.1
9787/2	BH01B		T.Walker	16/10/2020 1:25 PM	AS5667.11, Pump	AS5667.1
9787/3	BH01C		T.Walker	16/10/2020 1:41 PM	AS5667.11, Bail	AS5667.1
9787/4	BH02A		T.Walker	16/10/2020 12:22 PM	AS5667.11, Pump	AS5667.1
9787/5	BH02B		T.Walker	16/10/2020 12:36 PM	AS5667.11, Pump	AS5667.1
9787/6	BH02C		T.Walker	16/10/2020 12:49 PM	AS5667.11, Bail	AS5667.1
9787/7	BH03A		T.Walker	16/10/2020 11:08 AM	AS5667.11, Bail	AS5667.1
9787/8	BH03B		T.Walker	16/10/2020 11:23 AM	AS5667.11, Bail	AS5667.1
9787/9	BH03C		T.Walker	16/10/2020 11:38 AM	AS5667.11, Bail	AS5667.1
9787/10	BH05B		T.Walker	16/10/2020 11:52 AM	AS5667.11, Pump	AS5667.1
9787/11	BH06A		T.Walker	16/10/2020 10:26 AM	AS5667.11, Pump	AS5667.1
9787/12	BH06B		T.Walker	16/10/2020 10:40 AM	AS5667.11, Bail	AS5667.1
9787/13	BH06C		T.Walker	16/10/2020 10:52 AM	AS5667.11, Bail	AS5667.1
9787/14	BH5		T.Walker	16/10/2020 12:07 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
9787/1	BH01A	
9787/2	BH01B	
9787/3	BH01C	
9787/4	BH02A	
9787/5	BH02B	
9787/6	BH02C	
9787/7	BH03A	
9787/8	BH03B	
9787/9	BH03C	
9787/10	BH05B	
9787/11	BH06A	
9787/12	BH06B	
9787/13	BH06C	
9787/14	BH5	

Sampling procedures have been approved and report finalised on 23/10/2020.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 9894

Date Issued: 23/11/2020

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 13/11/2020

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	13/11/2020	9894/1	Water	
BH01B	13/11/2020	9894/2	Water	
BH01C	13/11/2020	9894/3	Water	
BH02A	13/11/2020	9894/4	Water	
BH02B	13/11/2020	9894/5	Water	
BH02C	13/11/2020	9894/6	Water	
BH03A	13/11/2020	9894/7	Water	
BH03B	13/11/2020	9894/8	Water	
BH03C	13/11/2020	9894/9	Water	
BH05B	13/11/2020	9894/10	Water	
BH06A	13/11/2020	9894/11	Water	
BH06B	13/11/2020	9894/12	Water	
BH06C	13/11/2020	9894/13	Water	
BH5	13/11/2020	9894/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 23/11/2020.

Test Report Number: 9894

Date Issued: 23/11/2020

Revision No: 00

Results

Field Tests	Method	Units	9894/1 BH01A 13/11/2020	9894/2 BH01B 13/11/2020	9894/3 BH01C 13/11/2020	9894/4 BH02A 13/11/2020	9894/5 BH02B 13/11/2020
Depth to Water	AS5667.11	m(bTOC)	10.48	15.65	6.48	26.23	18.92
Temperature	Temp	°C	17.8	17.7	16.4	19.7	19.0
pH	APHA 4500-H B	pH Units	5.7	4.9	4.8	5.1	4.6
Electrical Conductivity	APHA 2510 B	µS/cm	246	183	196	166	163

Field Tests	Method	Units	9894/6 BH02C 13/11/2020	9894/7 BH03A 13/11/2020	9894/8 BH03B 13/11/2020	9894/9 BH03C 13/11/2020	9894/10 BH05B 13/11/2020
Depth to Water	AS5667.11	m(bTOC)	15.23	57.51	22.17	13.39	19.91
Temperature	Temp	°C	19.2	18.5	17.8	17.6	19.8
pH	APHA 4500-H B	pH Units	5.6	6.4	4.5	4.1	5.3
Electrical Conductivity	APHA 2510 B	µS/cm	161	229	148	169	195

Field Tests	Method	Units	9894/11 BH06A 13/11/2020	9894/12 BH06B 13/11/2020	9894/13 BH06C 13/11/2020	9894/14 BH5 13/11/2020
Depth to Water	AS5667.11	m(bTOC)	39.68	35.13	13.06	29.82
Temperature	Temp	°C	21.2	19.7	18.3	19.7
pH	APHA 4500-H B	pH Units	11.2	5.2	4.5	5.1
Electrical Conductivity	APHA 2510 B	µS/cm	592	149	116	209

Total Dissolved Solids	Method	Units	9894/1 BH01A 13/11/2020	9894/2 BH01B 13/11/2020	9894/3 BH01C 13/11/2020	9894/4 BH02A 13/11/2020	9894/5 BH02B 13/11/2020
Total Dissolved Solids	AS3550.4	mg/L	170	110	89	75	83

Total Dissolved Solids	Method	Units	9894/6 BH02C 13/11/2020	9894/7 BH03A 13/11/2020	9894/8 BH03B 13/11/2020	9894/9 BH03C 13/11/2020	9894/10 BH05B 13/11/2020
Total Dissolved Solids	AS3550.4	mg/L	95	137	99	70	92

Total Dissolved Solids	Method	Units	9894/11 BH06A 13/11/2020	9894/12 BH06B 13/11/2020	9894/13 BH06C 13/11/2020	9894/14 BH5 13/11/2020
Total Dissolved Solids	AS3550.4	mg/L	202	79	80	116

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

[NT]: Not tested

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

Sampling Report Number: 9894

Date Issued: 23/11/2020

Revision No: 00

Sampling Conditions: Intermittent showers, 21°-27°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
9894/1	BH01A		T.Walker	13/11/2020 2:26 PM	AS5667.11, Pump	AS5667.1
9894/2	BH01B		T.Walker	13/11/2020 2:55 PM	AS5667.11, Pump	AS5667.1
9894/3	BH01C		T.Walker	13/11/2020 2:39 PM	AS5667.11, Bail	AS5667.1
9894/4	BH02A		T.Walker	13/11/2020 1:44 PM	AS5667.11, Pump	AS5667.1
9894/5	BH02B		T.Walker	13/11/2020 2:10 PM	AS5667.11, Pump	AS5667.1
9894/6	BH02C		T.Walker	13/11/2020 1:57 PM	AS5667.11, Bail	AS5667.1
9894/7	BH03A		T.Walker	13/11/2020 12:21 PM	AS5667.11, Bail	AS5667.1
9894/8	BH03B		T.Walker	13/11/2020 12:37 PM	AS5667.11, Bail	AS5667.1
9894/9	BH03C		T.Walker	13/11/2020 12:52 PM	AS5667.11, Bail	AS5667.1
9894/10	BH05B		T.Walker	13/11/2020 1:08 PM	AS5667.11, Pump	AS5667.1
9894/11	BH06A		T.Walker	13/11/2020 11:23 AM	AS5667.11, Pump	AS5667.1
9894/12	BH06B		T.Walker	13/11/2020 11:49 AM	AS5667.11, Bail	AS5667.1
9894/13	BH06C		T.Walker	13/11/2020 12:04 PM	AS5667.11, Bail	AS5667.1
9894/14	BH5		T.Walker	13/11/2020 1:21 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
9894/1	BH01A	
9894/2	BH01B	
9894/3	BH01C	
9894/4	BH02A	
9894/5	BH02B	
9894/6	BH02C	
9894/7	BH03A	
9894/8	BH03B	
9894/9	BH03C	
9894/10	BH05B	
9894/11	BH06A	
9894/12	BH06B	
9894/13	BH06C	
9894/14	BH5	

Sampling procedures have been approved and report finalised on 23/11/2020.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10053

Date Issued: 21/12/2020

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 9/12/2020

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	9/12/2020	10053/1	Water	
BH01B	9/12/2020	10053/2	Water	
BH01C	9/12/2020	10053/3	Water	
BH02A	9/12/2020	10053/4	Water	
BH02B	9/12/2020	10053/5	Water	
BH02C	9/12/2020	10053/6	Water	
BH03A	9/12/2020	10053/7	Water	
BH03B	9/12/2020	10053/8	Water	
BH03C	9/12/2020	10053/9	Water	
BH05B	9/12/2020	10053/10	Water	
BH06A	9/12/2020	10053/11	Water	
BH06B	9/12/2020	10053/12	Water	
BH06C	9/12/2020	10053/13	Water	
BH5	9/12/2020	10053/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 21/12/2020.

Test Report Number: 10053

Date Issued: 21/12/2020

Revision No: 00

Results

Field Tests	Method	Units	10053/1 BH01A 9/12/2020	10053/2 BH01B 9/12/2020	10053/3 BH01C 9/12/2020	10053/4 BH02A 9/12/2020	10053/5 BH02B 9/12/2020
Depth to Water	AS5667.11	m(bTOC)	11.04	15.04	6.69	26.28	19.07
Temperature	Temp	°C	18.3	17.8	17.2	19.1	18.8
pH	APHA 4500-H B	pH Units	5.3	4.7	4.7	5.1	4.6
Electrical Conductivity	APHA 2510 B	µS/cm	210	174	194	160	160

Field Tests	Method	Units	10053/6 BH02C 9/12/2020	10053/7 BH03A 9/12/2020	10053/8 BH03B 9/12/2020	10053/9 BH03C 9/12/2020	10053/10 BH05B 9/12/2020
Depth to Water	AS5667.11	m(bTOC)	15.39	57.58	22.36	13.72	20.08
Temperature	Temp	°C	18.9	18.0	17.7	17.4	18.9
pH	APHA 4500-H B	pH Units	5.4	6.4	4.6	4.2	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	166	233	146	163	183

Field Tests	Method	Units	10053/11 BH06A 9/12/2020	10053/12 BH06B 9/12/2020	10053/13 BH06C 9/12/2020	10053/14 BH5 9/12/2020
Depth to Water	AS5667.11	m(bTOC)	40.34	35.28	13.22	29.90
Temperature	Temp	°C	18.9	18.5	18.0	19.1
pH	APHA 4500-H B	pH Units	11.3	5.0	4.5	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	574	151	114	204

Total Dissolved Solids	Method	Units	10053/1 BH01A 9/12/2020	10053/2 BH01B 9/12/2020	10053/3 BH01C 9/12/2020	10053/4 BH02A 9/12/2020	10053/5 BH02B 9/12/2020
Total Dissolved Solids	AS3550.4	mg/L	136	99	113	109	82

Total Dissolved Solids	Method	Units	10053/6 BH02C 9/12/2020	10053/7 BH03A 9/12/2020	10053/8 BH03B 9/12/2020	10053/9 BH03C 9/12/2020	10053/10 BH05B 9/12/2020
Total Dissolved Solids	AS3550.4	mg/L	99	115	102	92	90

Total Dissolved Solids	Method	Units	10053/11 BH06A 9/12/2020	10053/12 BH06B 9/12/2020	10053/13 BH06C 9/12/2020	10053/14 BH5 9/12/2020
Total Dissolved Solids	AS3550.4	mg/L	206	91	53	117

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Sampling Report Number: 10053

Date Issued: 21/12/2020

Revision No: 00

Sampling Conditions: Fine 17°-26°

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10053/1	BH01A		T.Walker	9/12/2020 1:37 PM	AS5667.11, Pump	AS5667.1
10053/2	BH01B		T.Walker	9/12/2020 2:03 PM	AS5667.11, Pump	AS5667.1
10053/3	BH01C		T.Walker	9/12/2020 1:50 PM	AS5667.11, Bail	AS5667.1
10053/4	BH02A		T.Walker	9/12/2020 12:49 PM	AS5667.11, Pump	AS5667.1
10053/5	BH02B		T.Walker	9/12/2020 1:18 PM	AS5667.11, Pump	AS5667.1
10053/6	BH02C		T.Walker	9/12/2020 1:04 PM	AS5667.11, Bail	AS5667.1
10053/7	BH03A		T.Walker	9/12/2020 11:38 AM	AS5667.11, Bail	AS5667.1
10053/8	BH03B		T.Walker	9/12/2020 11:54 AM	AS5667.11, Bail	AS5667.1
10053/9	BH03C		T.Walker	9/12/2020 12:09 PM	AS5667.11, Bail	AS5667.1
10053/10	BH05B		T.Walker	9/12/2020 12:21 PM	AS5667.11, Pump	AS5667.1
10053/11	BH06A		T.Walker	9/12/2020 10:49 AM	AS5667.11, Pump	AS5667.1
10053/12	BH06B		T.Walker	9/12/2020 11:04 AM	AS5667.11, Bail	AS5667.1
10053/13	BH06C		T.Walker	9/12/2020 11:19 AM	AS5667.11, Bail	AS5667.1
10053/14	BH5		T.Walker	9/12/2020 12:36 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10053/1	BH01A	
10053/2	BH01B	
10053/3	BH01C	
10053/4	BH02A	
10053/5	BH02B	
10053/6	BH02C	
10053/7	BH03A	
10053/8	BH03B	
10053/9	BH03C	
10053/10	BH05B	
10053/11	BH06A	
10053/12	BH06B	
10053/13	BH06C	
10053/14	BH5	

Sampling procedures have been approved and report finalised on 21/12/2020.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10206

Date Issued: 15/01/2021

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 8/01/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	8/01/2021	10206/1	Water	
BH01B	8/01/2021	10206/2	Water	
BH01C	8/01/2021	10206/3	Water	
BH02A	8/01/2021	10206/4	Water	
BH02B	8/01/2021	10206/5	Water	
BH02C	8/01/2021	10206/6	Water	
BH03A	8/01/2021	10206/7	Water	
BH03B	8/01/2021	10206/8	Water	
BH03C	8/01/2021	10206/9	Water	
BH05B	8/01/2021	10206/10	Water	
BH06A	8/01/2021	10206/11	Water	
BH06B	8/01/2021	10206/12	Water	
BH06C	8/01/2021	10206/13	Water	
BH5	8/01/2021	10206/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 15/01/2021.

Test Report Number: 10206

Date Issued: 15/01/2021

Revision No: 00

Results

Field Tests	Method	Units	10206/1 BH01A 8/01/2021	10206/2 BH01B 8/01/2021	10206/3 BH01C 8/01/2021	10206/4 BH02A 8/01/2021	10206/5 BH02B 8/01/2021
Depth to Water	AS5667.11	m(bTOC)	10.61	15.16	6.65	26.19	19.07
Temperature	Temp	°C	17.7	17.1	17.8	18.4	18.0
pH	APHA 4500-H B	pH Units	5.8	4.6	4.7	4.9	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	234	176	193	167	163

Field Tests	Method	Units	10206/6 BH02C 8/01/2021	10206/7 BH03A 8/01/2021	10206/8 BH03B 8/01/2021	10206/9 BH03C 8/01/2021	10206/10 BH05B 8/01/2021
Depth to Water	AS5667.11	m(bTOC)	15.39	57.53	22.37	13.59	20.08
Temperature	Temp	°C	17.9	18.0	17.6	17.3	19.0
pH	APHA 4500-H B	pH Units	5.4	6.3	4.4	4.0	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	164	233	147	166	186

Field Tests	Method	Units	10206/11 BH06A 8/01/2021	10206/12 BH06B 8/01/2021	10206/13 BH06C 8/01/2021	10206/14 BH5 8/01/2021
Depth to Water	AS5667.11	m(bTOC)	40.02	35.30	13.07	29.87
Temperature	Temp	°C	19.0	18.3	18.2	17.9
pH	APHA 4500-H B	pH Units	11.5	5.0	4.2	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	741	145	119	206

Total Dissolved Solids	Method	Units	10206/1 BH01A 8/01/2021	10206/2 BH01B 8/01/2021	10206/3 BH01C 8/01/2021	10206/4 BH02A 8/01/2021	10206/5 BH02B 8/01/2021
Total Dissolved Solids	AS3550.4	mg/L	117	99	106	83	78

Total Dissolved Solids	Method	Units	10206/6 BH02C 8/01/2021	10206/7 BH03A 8/01/2021	10206/8 BH03B 8/01/2021	10206/9 BH03C 8/01/2021	10206/10 BH05B 8/01/2021
Total Dissolved Solids	AS3550.4	mg/L	107	134	75	93	104

Total Dissolved Solids	Method	Units	10206/11 BH06A 8/01/2021	10206/12 BH06B 8/01/2021	10206/13 BH06C 8/01/2021	10206/14 BH5 8/01/2021
Total Dissolved Solids	AS3550.4	mg/L	210	84	54	139

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Sampling Report Number: 10206

Date Issued: 15/01/2021

Revision No: 00

Sampling Conditions: Cloudy, 15°- 20°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10206/1	BH01A		T.Walker	8/01/2021 2:36 PM	AS5667.11, Pump	AS5667.1
10206/2	BH01B		T.Walker	8/01/2021 3:08 PM	AS5667.11, Pump	AS5667.1
10206/3	BH01C		T.Walker	8/01/2021 2:48 PM	AS5667.11, Bail	AS5667.1
10206/4	BH02A		T.Walker	8/01/2021 1:42 PM	AS5667.11, Pump	AS5667.1
10206/5	BH02B		T.Walker	8/01/2021 2:07 PM	AS5667.11, Pump	AS5667.1
10206/6	BH02C		T.Walker	8/01/2021 1:53 PM	AS5667.11, Bail	AS5667.1
10206/7	BH03A		T.Walker	8/01/2021 12:13 PM	AS5667.11, Bail	AS5667.1
10206/8	BH03B		T.Walker	8/01/2021 12:25 PM	AS5667.11, Bail	AS5667.1
10206/9	BH03C		T.Walker	8/01/2021 12:37 PM	AS5667.11, Bail	AS5667.1
10206/10	BH05B		T.Walker	8/01/2021 1:04 PM	AS5667.11, Pump	AS5667.1
10206/11	BH06A		T.Walker	8/01/2021 11:33 AM	AS5667.11, Pump	AS5667.1
10206/12	BH06B		T.Walker	8/01/2021 11:45 AM	AS5667.11, Bail	AS5667.1
10206/13	BH06C		T.Walker	8/01/2021 11:55 AM	AS5667.11, Bail	AS5667.1
10206/14	BH5		T.Walker	8/01/2021 1:16 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10206/1	BH01A	
10206/2	BH01B	
10206/3	BH01C	
10206/4	BH02A	
10206/5	BH02B	
10206/6	BH02C	
10206/7	BH03A	
10206/8	BH03B	
10206/9	BH03C	
10206/10	BH05B	
10206/11	BH06A	Logger string had 1.0m tangle
10206/12	BH06B	
10206/13	BH06C	
10206/14	BH5	

Sampling procedures have been approved and report finalised on 15/01/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (m)	Depth to bottom m(bTOC)	Recharge Rate	Approx 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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10330

Date Issued: 16/02/2021

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 5/02/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	5/02/2021	10330/1	Water	
BH01B	5/02/2021	10330/2	Water	
BH01C	5/02/2021	10330/3	Water	
BH02A	5/02/2021	10330/4	Water	
BH02B	5/02/2021	10330/5	Water	
BH02C	5/02/2021	10330/6	Water	
BH03A	5/02/2021	10330/7	Water	
BH03B	5/02/2021	10330/8	Water	
BH03C	5/02/2021	10330/9	Water	
BH05B	5/02/2021	10330/10	Water	
BH06A	5/02/2021	10330/11	Water	
BH06B	5/02/2021	10330/12	Water	
BH06C	5/02/2021	10330/13	Water	
BH5	5/02/2021	10330/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 16/02/2021.

Test Report Number: 10330

Date Issued: 16/02/2021

Revision No: 00

Results

Field Tests	Method	Units	10330/1 BH01A 5/02/2021	10330/2 BH01B 5/02/2021	10330/3 BH01C 5/02/2021	10330/4 BH02A 5/02/2021	10330/5 BH02B 5/02/2021
Depth to Water	AS5667.11	m(bTOC)	10.59	15.15	6.51	25.95	19.83
Temperature	Temp	°C	18.4	18.6	18.9	19.8	18.9
pH	APHA 4500-H B	pH Units	5.5	4.5	4.7	4.9	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	232	178	200	162	166

Field Tests	Method	Units	10330/6 BH02C 5/02/2021	10330/7 BH03A 5/02/2021	10330/8 BH03B 5/02/2021	10330/9 BH03C 5/02/2021	10330/10 BH05B 5/02/2021
Depth to Water	AS5667.11	m(bTOC)	15.25	57.43	22.24	13.55	19.92
Temperature	Temp	°C	19.8	19.2	19.4	18.5	19.8
pH	APHA 4500-H B	pH Units	5.5	6.5	4.7	4.2	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	177	224	150	169	189

Field Tests	Method	Units	10330/11 BH06A 5/02/2021	10330/12 BH06B 5/02/2021	10330/13 BH06C 5/02/2021	10330/14 BH5 5/02/2021
Depth to Water	AS5667.11	m(bTOC)	39.95	35.17	13.01	29.79
Temperature	Temp	°C	20.2	19.1	18.2	19.8
pH	APHA 4500-H B	pH Units	11.3	5.0	4.2	4.9
Electrical Conductivity	APHA 2510 B	µS/cm	571	160	123	210

Total Dissolved Solids	Method	Units	10330/1 BH01A 5/02/2021	10330/2 BH01B 5/02/2021	10330/3 BH01C 5/02/2021	10330/4 BH02A 5/02/2021	10330/5 BH02B 5/02/2021
Total Dissolved Solids	AS3550.4	mg/L	154	103	111	104	92

Total Dissolved Solids	Method	Units	10330/6 BH02C 5/02/2021	10330/7 BH03A 5/02/2021	10330/8 BH03B 5/02/2021	10330/9 BH03C 5/02/2021	10330/10 BH05B 5/02/2021
Total Dissolved Solids	AS3550.4	mg/L	120	129	79	82	76

Total Dissolved Solids	Method	Units	10330/11 BH06A 5/02/2021	10330/12 BH06B 5/02/2021	10330/13 BH06C 5/02/2021	10330/14 BH5 5/02/2021
Total Dissolved Solids	AS3550.4	mg/L	152	86	37	111

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Sampling Report Number: 10330

Date Issued: 16/02/2021

Revision No: 00

Sampling Conditions: Fine, 25°- 31°C

Lab ID	Client Sample Reference	Licence Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10330/1	BH01A		D.Walker	5/02/2021 2:46 PM	AS5667.11, Pump	AS5667.1
10330/2	BH01B		D.Walker	5/02/2021 3:12 PM	AS5667.11, Pump	AS5667.1
10330/3	BH01C		D.Walker	5/02/2021 2:58 PM	AS5667.11, Bail	AS5667.1
10330/4	BH02A		D.Walker	5/02/2021 1:52 PM	AS5667.11, Pump	AS5667.1
10330/5	BH02B		D.Walker	5/02/2021 2:18 PM	AS5667.11, Pump	AS5667.1
10330/6	BH02C		D.Walker	5/02/2021 2:04 PM	AS5667.11, Bail	AS5667.1
10330/7	BH03A		D.Walker	5/02/2021 12:35 PM	AS5667.11, Bail	AS5667.1
10330/8	BH03B		D.Walker	5/02/2021 12:51 PM	AS5667.11, Bail	AS5667.1
10330/9	BH03C		D.Walker	5/02/2021 1:04 PM	AS5667.11, Bail	AS5667.1
10330/10	BH05B		D.Walker	5/02/2021 1:24 PM	AS5667.11, Pump	AS5667.1
10330/11	BH06A		D.Walker	5/02/2021 11:36 AM	AS5667.11, Pump	AS5667.1
10330/12	BH06B		D.Walker	5/02/2021 11:49 AM	AS5667.11, Bail	AS5667.1
10330/13	BH06C		D.Walker	5/02/2021 12:02 PM	AS5667.11, Bail	AS5667.1
10330/14	BH5		D.Walker	5/02/2021 1:36 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10330/1	BH01A	
10330/2	BH01B	
10330/3	BH01C	
10330/4	BH02A	
10330/5	BH02B	
10330/6	BH02C	
10330/7	BH03A	
10330/8	BH03B	
10330/9	BH03C	
10330/10	BH05B	
10330/11	BH06A	
10330/12	BH06B	
10330/13	BH06C	
10330/14	BH5	

Sampling procedures have been approved and report finalised on 16/02/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (monument) (m)	Depth to bottom m(bTOC)	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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10530

Date Issued: 17/03/2021

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 9/03/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	9/03/2021	10530/1	Water	
BH01B	9/03/2021	10530/2	Water	
BH01C	9/03/2021	10530/3	Water	
BH02A	9/03/2021	10530/4	Water	
BH02B	9/03/2021	10530/5	Water	
BH02C	9/03/2021	10530/6	Water	
BH03A	9/03/2021	10530/7	Water	
BH03B	9/03/2021	10530/8	Water	
BH03C	9/03/2021	10530/9	Water	
BH05B	9/03/2021	10530/10	Water	
BH06A	9/03/2021	10530/11	Water	
BH06B	9/03/2021	10530/12	Water	
BH06C	9/03/2021	10530/13	Water	
BH5	9/03/2021	10530/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 17/03/2021.

Test Report Number: 10530

Date Issued: 17/03/2021

Revision No: 00

Results

Field Tests	Method	Units	10530/1 BH01A 9/03/2021	10530/2 BH01B 9/03/2021	10530/3 BH01C 9/03/2021	10530/4 BH02A 9/03/2021	10530/5 BH02B 9/03/2021
Depth to Water	AS5667.11	m(bTOC)	10.55	15.23	6.59	25.88	18.91
Temperature	Temp	°C	18.6	18.0	18.9	19.8	18.7
pH	APHA 4500-H B	pH Units	5.2	4.7	4.6	4.9	4.0
Electrical Conductivity	APHA 2510 B	µS/cm	208	175	198	160	159

Field Tests	Method	Units	10530/6 BH02C 9/03/2021	10530/7 BH03A 9/03/2021	10530/8 BH03B 9/03/2021	10530/9 BH03C 9/03/2021	10530/10 BH05B 9/03/2021
Depth to Water	AS5667.11	m(bTOC)	15.28	57.43	22.26	13.63	19.94
Temperature	Temp	°C	18.3	19.1	18.5	18.0	21.8
pH	APHA 4500-H B	pH Units	5.1	6.2	4.8	4.1	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	163	213	149	160	185

Field Tests	Method	Units	10530/11 BH06A 9/03/2021	10530/12 BH06B 9/03/2021	10530/13 BH06C 9/03/2021	10530/14 BH5 9/03/2021
Depth to Water	AS5667.11	m(bTOC)	40.64	35.16	13.07	29.82
Temperature	Temp	°C	20.4	19.8	18.3	20.3
pH	APHA 4500-H B	pH Units	11	4.3	4.1	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	592	150	113	209

Total Dissolved Solids	Method	Units	10530/1 BH01A 9/03/2021	10530/2 BH01B 9/03/2021	10530/3 BH01C 9/03/2021	10530/4 BH02A 9/03/2021	10530/5 BH02B 9/03/2021
Total Dissolved Solids	AS3550.4	mg/L	82	76	86	76	65

Total Dissolved Solids	Method	Units	10530/6 BH02C 9/03/2021	10530/7 BH03A 9/03/2021	10530/8 BH03B 9/03/2021	10530/9 BH03C 9/03/2021	10530/10 BH05B 9/03/2021
Total Dissolved Solids	AS3550.4	mg/L	96	142	85	77	62

Total Dissolved Solids	Method	Units	10530/11 BH06A 9/03/2021	10530/12 BH06B 9/03/2021	10530/13 BH06C 9/03/2021	10530/14 BH5 9/03/2021
Total Dissolved Solids	AS3550.4	mg/L	179	61	46	118

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

[NT]: Not tested

Sampling Report Number: 10530

Date Issued: 17/03/2021

Revision No: 00

Sampling Conditions: Cloudy, 26°- 30°C

Lab ID	Client Sample Reference	Licence/Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10530/1	BH01A		T.Walker/D.Walker	9/03/2021 3:19 PM	AS5667.11, Pump	AS5667.1
10530/2	BH01B		T.Walker/D.Walker	9/03/2021 3:42 PM	AS5667.11, Pump	AS5667.1
10530/3	BH01C		T.Walker/D.Walker	9/03/2021 3:29 PM	AS5667.11, Bail	AS5667.1
10530/4	BH02A		T.Walker/D.Walker	9/03/2021 2:47 PM	AS5667.11, Pump	AS5667.1
10530/5	BH02B		T.Walker/D.Walker	9/03/2021 3:02 PM	AS5667.11, Pump	AS5667.1
10530/6	BH02C		T.Walker/D.Walker	9/03/2021 2:57 PM	AS5667.11, Bail	AS5667.1
10530/7	BH03A		T.Walker/D.Walker	9/03/2021 1:31 PM	AS5667.11, Bail	AS5667.1
10530/8	BH03B		T.Walker/D.Walker	9/03/2021 1:46 PM	AS5667.11, Bail	AS5667.1
10530/9	BH03C		T.Walker/D.Walker	9/03/2021 2:06 PM	AS5667.11, Bail	AS5667.1
10530/10	BH05B		T.Walker/D.Walker	9/03/2021 2:21 PM	AS5667.11, Pump	AS5667.1
10530/11	BH06A		T.Walker/D.Walker	9/03/2021 12:21 PM	AS5667.11, Pump	AS5667.1
10530/12	BH06B		T.Walker/D.Walker	9/03/2021 12:42 PM	AS5667.11, Bail	AS5667.1
10530/13	BH06C		T.Walker/D.Walker	9/03/2021 1:11 PM	AS5667.11, Bail	AS5667.1
10530/14	BH5		T.Walker/D.Walker	9/03/2021 2:34 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10530/1	BH01A	
10530/2	BH01B	
10530/3	BH01C	
10530/4	BH02A	
10530/5	BH02B	
10530/6	BH02C	
10530/7	BH03A	
10530/8	BH03B	
10530/9	BH03C	
10530/10	BH05B	
10530/11	BH06A	
10530/12	BH06B	
10530/13	BH06C	
10530/14	BH5	

Sampling procedures have been approved and report finalised on 17/03/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (monument) (m)	Depth to bottom m(bTOC)	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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10756

Date Issued: 12/04/2021

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 6/04/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	6/04/2021	10756/1	Water	
BH01B	6/04/2021	10756/2	Water	
BH01C	6/04/2021	10756/3	Water	
BH02A	6/04/2021	10756/4	Water	
BH02B	6/04/2021	10756/5	Water	
BH02C	6/04/2021	10756/6	Water	
BH03A	6/04/2021	10756/7	Water	
BH03B	6/04/2021	10756/8	Water	
BH03C	6/04/2021	10756/9	Water	
BH05B	6/04/2021	10756/10	Water	
BH06A	6/04/2021	10756/11	Water	
BH06B	6/04/2021	10756/12	Water	
BH06C	6/04/2021	10756/13	Water	
BH5	6/04/2021	10756/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 12/04/2021.

Test Report Number: 10756

Date Issued: 12/04/2021

Revision No: 00

Results

Field Tests	Method	Units	10756/1 BH01A 6/04/2021	10756/2 BH01B 6/04/2021	10756/3 BH01C 6/04/2021	10756/4 BH02A 6/04/2021	10756/5 BH02B 6/04/2021
Depth to Water	AS5667.11	m(bTOC)	10.38	15.05	6.43	25.81	18.88
Temperature	Temp	°C	17.7	17.4	18.8	18.4	18.1
pH	APHA 4500-H B	pH Units	5.3	4.6	4.6	4.8	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	210	173	199	158	162

Field Tests	Method	Units	10756/6 BH02C 6/04/2021	10756/7 BH03A 6/04/2021	10756/8 BH03B 6/04/2021	10756/9 BH03C 6/04/2021	10756/10 BH05B 6/04/2021
Depth to Water	AS5667.11	m(bTOC)	15.26	57.33	22.30	13.62	19.93
Temperature	Temp	°C	18.3	18.5	18.2	17.8	18.8
pH	APHA 4500-H B	pH Units	5.4	6.2	4.5	4.1	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	161	206	142	167	193

Field Tests	Method	Units	10756/11 BH06A 6/04/2021	10756/12 BH06B 6/04/2021	10756/13 BH06C 6/04/2021	10756/14 BH5 6/04/2021
Depth to Water	AS5667.11	m(bTOC)	40.63	35.25	12.89	29.74
Temperature	Temp	°C	20.1	19.1	18.4	18.3
pH	APHA 4500-H B	pH Units	11	5.1	4.5	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	569	160	121	201

Total Dissolved Solids	Method	Units	10756/1 BH01A 6/04/2021	10756/2 BH01B 6/04/2021	10756/3 BH01C 6/04/2021	10756/4 BH02A 6/04/2021	10756/5 BH02B 6/04/2021
Total Dissolved Solids	AS3550.4	mg/L	121	94	102	88	80

Total Dissolved Solids	Method	Units	10756/6 BH02C 6/04/2021	10756/7 BH03A 6/04/2021	10756/8 BH03B 6/04/2021	10756/9 BH03C 6/04/2021	10756/10 BH05B 6/04/2021
Total Dissolved Solids	AS3550.4	mg/L	106	145	90	96	104

Total Dissolved Solids	Method	Units	10756/11 BH06A 6/04/2021	10756/12 BH06B 6/04/2021	10756/13 BH06C 6/04/2021	10756/14 BH5 6/04/2021
Total Dissolved Solids	AS3550.4	mg/L	197	91	61	121

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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

When considering the pass or fail of tests against guidelines,
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: 10756

Date Issued: 12/04/2021

Revision No: 00

Sampling Conditions: Intermittent showers, 20°- 23°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10756/1	BH01A		T.Walker/ D.Walker	6/04/2021 2:28 PM	AS5667.11, Pump	AS5667.1
10756/2	BH01B		T.Walker/ D.Walker	6/04/2021 2:54 PM	AS5667.11, Pump	AS5667.1
10756/3	BH01C		T.Walker/ D.Walker	6/04/2021 2:39 PM	AS5667.11, Bail	AS5667.1
10756/4	BH02A		T.Walker/ D.Walker	6/04/2021 1:33 PM	AS5667.11, Pump	AS5667.1
10756/5	BH02B		T.Walker/ D.Walker	6/04/2021 1:55 PM	AS5667.11, Pump	AS5667.1
10756/6	BH02C		T.Walker/ D.Walker	6/04/2021 1:43 PM	AS5667.11, Bail	AS5667.1
10756/7	BH03A		T.Walker/ D.Walker	6/04/2021 12:32 PM	AS5667.11, Bail	AS5667.1
10756/8	BH03B		T.Walker/ D.Walker	6/04/2021 12:42 PM	AS5667.11, Bail	AS5667.1
10756/9	BH03C		T.Walker/ D.Walker	6/04/2021 12:52 PM	AS5667.11, Bail	AS5667.1
10756/10	BH05B		T.Walker/ D.Walker	6/04/2021 1:07 PM	AS5667.11, Pump	AS5667.1
10756/11	BH06A		T.Walker/ D.Walker	6/04/2021 11:46 AM	AS5667.11, Pump	AS5667.1
10756/12	BH06B		T.Walker/ D.Walker	6/04/2021 12:01 PM	AS5667.11, Bail	AS5667.1
10756/13	BH06C		T.Walker/ D.Walker	6/04/2021 12:11 PM	AS5667.11, Bail	AS5667.1
10756/14	BH5		T.Walker/ D.Walker	6/04/2021 1:17 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10756/1	BH01A	
10756/2	BH01B	
10756/3	BH01C	
10756/4	BH02A	
10756/5	BH02B	
10756/6	BH02C	
10756/7	BH03A	
10756/8	BH03B	
10756/9	BH03C	
10756/10	BH05B	
10756/11	BH06A	
10756/12	BH06B	
10756/13	BH06C	
10756/14	BH5	

Sampling procedures have been approved and report finalised on 12/04/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (monument) (m)	Depth to bottom m(bTOC)	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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10863

Date Issued: 12/05/2021

Revision Number: 00

Site/Job: Haerses Road Monthly Ground Water

Client: Dixon Sand (No.1) Pty Ltd

Address: PO Box 4019

PITT TOWN NSW 2756

Contact: David Dixon

The following 14 sample(s) were received on 4/05/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	4/05/2021	10863/1	Water	
BH01B	4/05/2021	10863/2	Water	
BH01C	4/05/2021	10863/3	Water	
BH02A	4/05/2021	10863/4	Water	
BH02B	4/05/2021	10863/5	Water	
BH02C	4/05/2021	10863/6	Water	
BH03A	4/05/2021	10863/7	Water	
BH03B	4/05/2021	10863/8	Water	
BH03C	4/05/2021	10863/9	Water	
BH05B	4/05/2021	10863/10	Water	
BH06A	4/05/2021	10863/11	Water	
BH06B	4/05/2021	10863/12	Water	
BH06C	4/05/2021	10863/13	Water	
BH5	4/05/2021	10863/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 12/05/2021.

Test Report Number: 10863

Date Issued: 12/05/2021

Revision No: 00

Results

Field Tests	Method	Units	10863/1 BH01A 4/05/2021	10863/2 BH01B 4/05/2021	10863/3 BH01C 4/05/2021	10863/4 BH02A 4/05/2021	10863/5 BH02B 4/05/2021
Depth to Water	AS5667.11	m(bTOC)	10.23	15.15	6.38	25.67	18.80
Temperature	Temp	°C	16.4	16.5	17.5	16.9	17.2
pH	APHA 4500-H B	pH Units	5.4	4.6	4.8	4.8	4.5
Electrical Conductivity	APHA 2510 B	µS/cm	213	172	203	158	161

Field Tests	Method	Units	10863/6 BH02C 4/05/2021	10863/7 BH03A 4/05/2021	10863/8 BH03B 4/05/2021	10863/9 BH03C 4/05/2021	10863/10 BH05B 4/05/2021
Depth to Water	AS5667.11	m(bTOC)	15.20	57.29	22.25	13.59	19.84
Temperature	Temp	°C	16.8	17.3	16.9	17.0	17.0
pH	APHA 4500-H B	pH Units	5.3	5.9	4.4	4.1	4.8
Electrical Conductivity	APHA 2510 B	µS/cm	1,160	195	142	168	187

Field Tests	Method	Units	10863/11 BH06A 4/05/2021	10863/12 BH06B 4/05/2021	10863/13 BH06C 4/05/2021	10863/14 BH5 4/05/2021
Depth to Water	AS5667.11	m(bTOC)	41.52	35.19	12.90	29.72
Temperature	Temp	°C	17.7	17.4	17.4	16.9
pH	APHA 4500-H B	pH Units	11	4.9	4.5	5.0
Electrical Conductivity	APHA 2510 B	µS/cm	753	147	115	201

Total Dissolved Solids	Method	Units	10863/1 BH01A 4/05/2021	10863/2 BH01B 4/05/2021	10863/3 BH01C 4/05/2021	10863/4 BH02A 4/05/2021	10863/5 BH02B 4/05/2021
Total Dissolved Solids	AS3550.4	mg/L	152	103	111	87	73

Total Dissolved Solids	Method	Units	10863/6 BH02C 4/05/2021	10863/7 BH03A 4/05/2021	10863/8 BH03B 4/05/2021	10863/9 BH03C 4/05/2021	10863/10 BH05B 4/05/2021
Total Dissolved Solids	AS3550.4	mg/L	123	128	88	89	106

Total Dissolved Solids	Method	Units	10863/11 BH06A 4/05/2021	10863/12 BH06B 4/05/2021	10863/13 BH06C 4/05/2021	10863/14 BH5 4/05/2021
Total Dissolved Solids	AS3550.4	mg/L	348	92	69	122

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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: 10863

Date Issued: 12/05/2021

Revision No: 00

Sampling Conditions: Raining, 15°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10863/1	BH01A		T.Walker/ D.Walker	4/05/2021 2:48 PM	AS5667.11, Pump	AS5667.1
10863/2	BH01B		T.Walker/ D.Walker	4/05/2021 3:14 PM	AS5667.11, Pump	AS5667.1
10863/3	BH01C		T.Walker/ D.Walker	4/05/2021 2:59 PM	AS5667.11, Bail	AS5667.1
10863/4	BH02A		T.Walker/ D.Walker	4/05/2021 1:35 PM	AS5667.11, Pump	AS5667.1
10863/5	BH02B		T.Walker/ D.Walker	4/05/2021 2:02 PM	AS5667.11, Pump	AS5667.1
10863/6	BH02C		T.Walker/ D.Walker	4/05/2021 1:47 PM	AS5667.11, Bail	AS5667.1
10863/7	BH03A		T.Walker/ D.Walker	4/05/2021 12:15 PM	AS5667.11, Bail	AS5667.1
10863/8	BH03B		T.Walker/ D.Walker	4/05/2021 12:27 PM	AS5667.11, Bail	AS5667.1
10863/9	BH03C		T.Walker/ D.Walker	4/05/2021 12:39 PM	AS5667.11, Bail	AS5667.1
10863/10	BH05B		T.Walker/ D.Walker	4/05/2021 12:59 PM	AS5667.11, Pump	AS5667.1
10863/11	BH06A		T.Walker/ D.Walker	4/05/2021 11:29 AM	AS5667.11, Pump	AS5667.1
10863/12	BH06B		T.Walker/ D.Walker	4/05/2021 11:44 AM	AS5667.11, Bail	AS5667.1
10863/13	BH06C		T.Walker/ D.Walker	4/05/2021 11:56 AM	AS5667.11, Bail	AS5667.1
10863/14	BH5		T.Walker/ D.Walker	4/05/2021 1:14 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10863/1	BH01A	
10863/2	BH01B	
10863/3	BH01C	
10863/4	BH02A	
10863/5	BH02B	
10863/6	BH02C	
10863/7	BH03A	
10863/8	BH03B	
10863/9	BH03C	
10863/10	BH05B	
10863/11	BH06A	Approx 2m tangle in logger string
10863/12	BH06B	
10863/13	BH06C	
10863/14	BH5	

Sampling procedures have been approved and report finalised on 12/05/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (monument) (m)	Depth to bottom m(bTOC)	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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>60

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: 10958

Date Issued: 11/06/2021

Revision Number: 00

Site/Job: Haerses Road 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 1/06/2021

Client Sample Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A	1/06/2021	10958/1	Water	
BH01B	1/06/2021	10958/2	Water	
BH01C	1/06/2021	10958/3	Water	
BH02A	1/06/2021	10958/4	Water	
BH02B	1/06/2021	10958/5	Water	
BH02C	1/06/2021	10958/6	Water	
BH03A	1/06/2021	10958/7	Water	
BH03B	1/06/2021	10958/8	Water	
BH03C	1/06/2021	10958/9	Water	
BH05B	1/06/2021	10958/10	Water	
BH06A	1/06/2021	10958/11	Water	
BH06B	1/06/2021	10958/12	Water	
BH06C	1/06/2021	10958/13	Water	
BH5	1/06/2021	10958/14	Water	

The sample(s) have been tested as received and the following reports are included:

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



Anthony Crane

Approved by: Laboratory Manager

Results have been approved and report finalised on 11/06/2021.

Test Report Number: 10958

Date Issued: 11/06/2021

Revision No: 00

Results

Field Tests	Method	Units	10958/1 BH01A 1/06/2021	10958/2 BH01B 1/06/2021	10958/3 BH01C 1/06/2021	10958/4 BH02A 1/06/2021	10958/5 BH02B 1/06/2021
Depth to Water	AS5667.11	m(bTOC)	10.36	15.05	6.36	25.57	18.82
Temperature	Temp	°C	16.2	16.1	16.9	17.6	17.1
pH	APHA 4500-H B	pH Units	5.5	4.6	4.7	4.7	4.4
Electrical Conductivity	APHA 2510 B	µS/cm	221	169	203	157	162

Field Tests	Method	Units	10958/6 BH02C 1/06/2021	10958/7 BH03A 1/06/2021	10958/8 BH03B 1/06/2021	10958/9 BH03C 1/06/2021	10958/10 BH05B 1/06/2021
Depth to Water	AS5667.11	m(bTOC)	15.20	57.26	22.28	13.63	19.85
Temperature	Temp	°C	17.0	17.3	16.8	17.0	17.2
pH	APHA 4500-H B	pH Units	5.5	6.0	4.4	4.1	4.7
Electrical Conductivity	APHA 2510 B	µS/cm	172	181	142	169	191

Field Tests	Method	Units	10958/11 BH06A 1/06/2021	10958/12 BH06B 1/06/2021	10958/13 BH06C 1/06/2021	10958/14 BH5 1/06/2021
Depth to Water	AS5667.11	m(bTOC)	42.05	35.22	12.95	29.68
Temperature	Temp	°C	18.3	17.8	17.6	17.0
pH	APHA 4500-H B	pH Units	11	4.9	4.2	4.9
Electrical Conductivity	APHA 2510 B	µS/cm	711	141	119	195

Total Dissolved Solids	Method	Units	10958/1 BH01A 1/06/2021	10958/2 BH01B 1/06/2021	10958/3 BH01C 1/06/2021	10958/4 BH02A 1/06/2021	10958/5 BH02B 1/06/2021
Total Dissolved Solids	AS3550.4	mg/L	82	73	91	97	77

Total Dissolved Solids	Method	Units	10958/6 BH02C 1/06/2021	10958/7 BH03A 1/06/2021	10958/8 BH03B 1/06/2021	10958/9 BH03C 1/06/2021	10958/10 BH05B 1/06/2021
Total Dissolved Solids	AS3550.4	mg/L	113	112	81	76	113

Total Dissolved Solids	Method	Units	10958/11 BH06A 1/06/2021	10958/12 BH06B 1/06/2021	10958/13 BH06C 1/06/2021	10958/14 BH5 1/06/2021
Total Dissolved Solids	AS3550.4	mg/L	302	86	41	107

Report Comments:

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

Accredited for compliance with ISO/IEC 17025 – Testing.

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: 10958

Date Issued: 11/06/2021

Revision No: 00

Sampling Conditions: Cloudy, 15°- 17°C

Lab ID	Client Sample Reference	Licence/ Reference	Sampler	Date Sampled	Method of Sampling	Pre-treatment / Preservation
10958/1	BH01A		T & D.Walker	1/06/2021 4:32 PM	AS5667.11, Pump	AS5667.1
10958/2	BH01B		T & D.Walker	1/06/2021 5:01 PM	AS5667.11, Pump	AS5667.1
10958/3	BH01C		T & D.Walker	1/06/2021 4:43 PM	AS5667.11, Bail	AS5667.1
10958/4	BH02A		T & D.Walker	1/06/2021 3:51 PM	AS5667.11, Pump	AS5667.1
10958/5	BH02B		T & D.Walker	1/06/2021 4:12 PM	AS5667.11, Pump	AS5667.1
10958/6	BH02C		T & D.Walker	1/06/2021 4:01 PM	AS5667.11, Bail	AS5667.1
10958/7	BH03A		T & D.Walker	1/06/2021 2:49 PM	AS5667.11, Bail	AS5667.1
10958/8	BH03B		T & D.Walker	1/06/2021 3:02 PM	AS5667.11, Bail	AS5667.1
10958/9	BH03C		T & D.Walker	1/06/2021 3:10 PM	AS5667.11, Bail	AS5667.1
10958/10	BH05B		T & D.Walker	1/06/2021 3:27 PM	AS5667.11, Pump	AS5667.1
10958/11	BH06A		T & D.Walker	1/06/2021 1:56 PM	AS5667.11, Pump	AS5667.1
10958/12	BH06B		T & D.Walker	1/06/2021 2:09 PM	AS5667.11, Bail	AS5667.1
10958/13	BH06C		T & D.Walker	1/06/2021 2:20 PM	AS5667.11, Bail	AS5667.1
10958/14	BH5		T & D.Walker	1/06/2021 3:37 PM	AS5667.11, Pump	AS5667.1

Lab ID	Client Sample Reference	Sampling Observations
10958/1	BH01A	Logger weight installed
10958/2	BH01B	
10958/3	BH01C	
10958/4	BH02A	Logger weight installed
10958/5	BH02B	
10958/6	BH02C	
10958/7	BH03A	Logger weight installed
10958/8	BH03B	
10958/9	BH03C	
10958/10	BH05B	
10958/11	BH06A	Logger weight installed
10958/12	BH06B	
10958/13	BH06C	
10958/14	BH5	Logger weight installed

Sampling procedures have been approved and report finalised on 11/06/2021.

Where method is "unknown" sampling procedures are not endorsed

Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd

Site/Job: Haerses Road Monthly Ground Water

Well ID	GPS-Easting	GPS-Northing	Survey Date	Surveyed AHD (m)	Depth to Screen (m)
BH01A	312186	6293968			
BH01B	312189	6293976			
BH01C	312184	6293972			
BH02A	312305	6293793			
BH02B	312315	6293800			
BH02C	312303	6293801			
BH03A	312341	6293579			
BH03B	312342	6293588			
BH03C	312341	6293583			
BH05B	312160	6293752			
BH06A	312379	6293346			
BH06B	312376	6293360			
BH06C	312371	6293363			
BH5	312159	6293753			

Well ID	Date Well Measured	Case Height (monument) (m)	Depth to bottom m(bTOC)	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
BH06A	28/10/2019	0.99	>60	Slow	>43
BH06B	28/10/2019	1.11	39.10	Slow	8
BH06C	28/10/2019	1.06	16.03	Slow	3
BH5	28/10/2019	0.57	>60	Fast	>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

CERTIFICATE OF ANALYSIS

Work Order : **ES2027640**
Client : **DIXON SAND (PENRITH) PTY LTD**
Contact : **HUNNY CHURCHER**
Address :
Telephone : **02 4566 8348**
Project : **Haersas Road Quarry**
Order number : **----**
C-O-C number : **----**
Sampler : **Mick Munnoch**
Site : **----**
Quote number : **EN/333**
No. of samples received : **2**
No. of samples analysed : **2**

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 10-Aug-2020 12:45
Date Analysis Commenced : 10-Aug-2020
Issue Date : 17-Aug-2020 15:50



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 ^ = This result is computed from individual analyte detections at or above the level of reporting
 ø = ALS is not NATA accredited for these tests.
 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				SW1	SW2	----	----	----
Client sampling date / time				10-Aug-2020 08:00	10-Aug-2020 08:00	----	----	----
Compound	CAS Number	LOR	Unit	ES2027640-001	ES2027640-002	-----	-----	-----
Result				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.58	5.79	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	----	44	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	279	105	----	----	----

CERTIFICATE OF ANALYSIS

Work Order : **ES2037542**
Client : **DIXON SAND (PENRITH) PTY LTD**
Contact : **HUNNY CHURCHER**
Address :
Telephone : **02 4566 8348**
Project : **Haerses Road Quarry**
Order number : ----
C-O-C number : ----
Sampler : **Mick Munnoch**
Site : ----
Quote number : **EN/333**
No. of samples received : **2**
No. of samples analysed : **2**

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 26-Oct-2020 14:55
Date Analysis Commenced : 26-Oct-2020
Issue Date : 31-Oct-2020 16:48



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Wisam Marassa	Inorganics Coordinator	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 ^ = This result is computed from individual analyte detections at or above the level of reporting
 ø = ALS is not NATA accredited for these tests.
 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

Client sample ID

				SW1	SW2	----	----	----
Client sampling date / time				26-Oct-2020 12:15	26-Oct-2020 12:26	----	----	----
Compound	CAS Number	LOR	Unit	ES2037542-001	ES2037542-002	-----	-----	-----
Result				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	6.33	5.84	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	5	16	----	----	----
EA045: Turbidity								
Turbidity	----	0.1	NTU	107	54.4	----	----	----

CERTIFICATE OF ANALYSIS

Work Order : **ES2100148**
Client : **DIXON SAND (PENRITH) PTY LTD**
Contact : **HUNNY CHURCHER**
Address :
Telephone : **02 4566 8348**
Project : **Haerses Road Quarry**
Order number : ----
C-O-C number : ----
Sampler : **Ben Grogan**
Site : ----
Quote number : **EN/333**
No. of samples received : **1**
No. of samples analysed : **1**

Page : 1 of 2
Laboratory : Environmental Division Sydney
Contact : Customer Services ES
Address : 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone : +61-2-8784 8555
Date Samples Received : 05-Jan-2021 14:50
Date Analysis Commenced : 06-Jan-2021
Issue Date : 08-Jan-2021 11:57



Accreditation No. 825
 Accredited for compliance with
 ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 ^ = This result is computed from individual analyte detections at or above the level of reporting
 ø = ALS is not NATA accredited for these tests.
 ~ = Indicates an estimated value.

Analytical Results

Sub-Matrix: **WATER**
 (Matrix: **WATER**)

				Sample ID	SW2	----	----	----	----
				Sampling date / time	05-Jan-2021 11:23	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2100148-001	-----	-----	-----	-----
				Result	----	----	----	----	----
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit		5.68	----	----	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		<5	----	----	----	----
EA045: Turbidity									
Turbidity	----	0.1	NTU		9.0	----	----	----	----

Appendix D – Noise Compliance Report

Dixon Sand (No.1) Pty Ltd

Haerses Road Quarry, Maroota

Noise monitoring report
June 2021

Doc no. 19020-NV-RP-6-0





Dixon Sand (No.1) Pty Ltd
Haerses Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-6-0
Revision	0
Date	19 August 2021
Author	John Hutchison
Reviewer	Scott Hughes
File path	I:\PROJECTS\19020 - Dixon Sand\02 Deliverables\021 Reports\Winter 2021\19020-NV-RP-6-0 Dixon Sand Haerses Road Noise Monitoring June 2021.docx

Hutchison Weller Pty Ltd
ABN 37 001 024 095
13/357 Military Road
Mosman NSW 2008

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Revision history

0	19 August 2021	Draft report to client
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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 of 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 briefly but have been postponed since June 2020. Operation of areas included in Stages 1 to 4 are currently underway.

The Development Consent requires 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 22 June 2021.

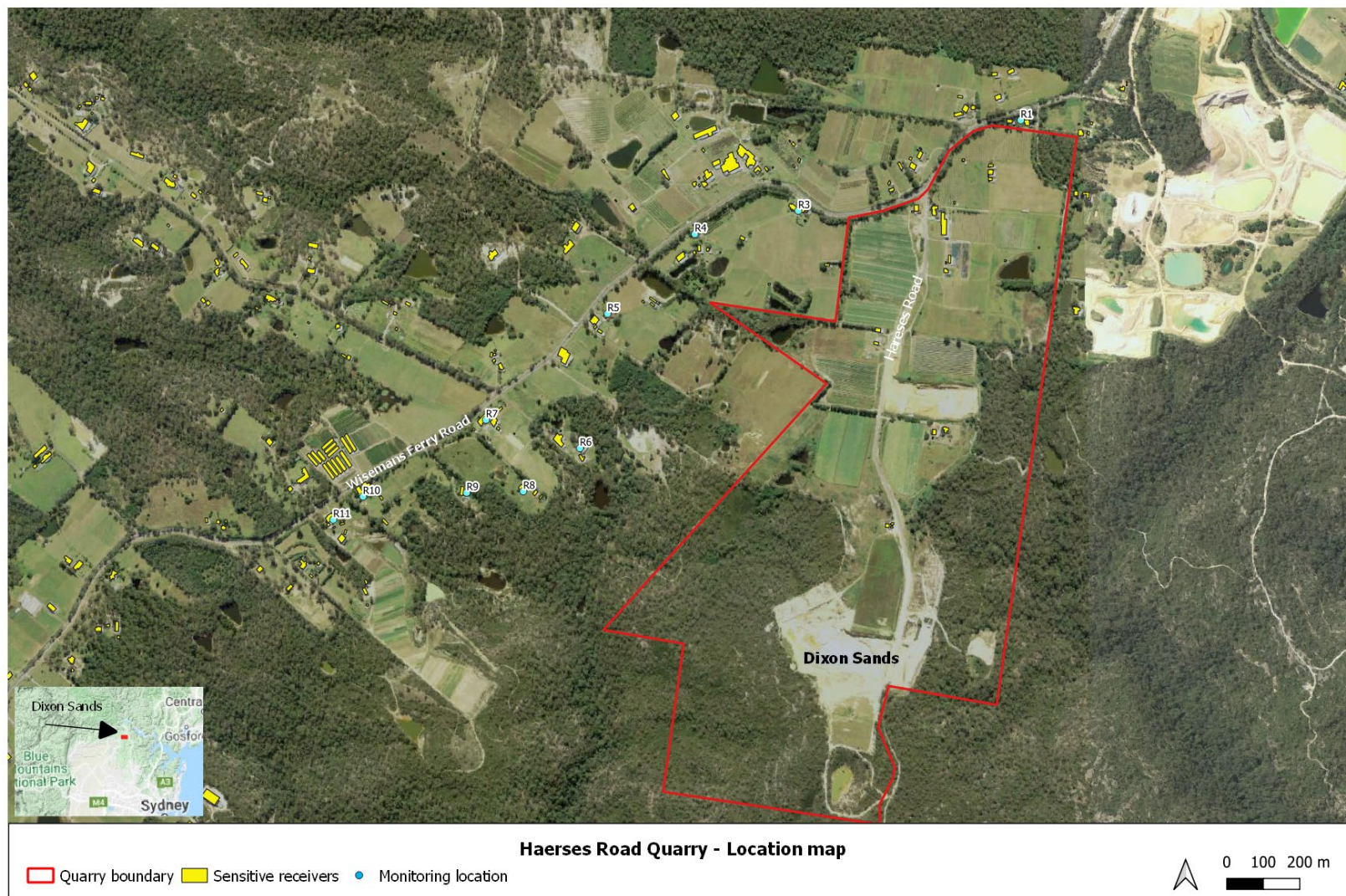


Figure 1 Location of the Quarry

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)	LAmx
R1	37	37	45
R2	40	40	
R3	38	38	
R4	37	37	
R6	37	35	
R7	36	35	
R8	36	35	
All other receivers	35	35	

Noise generated by the development is to be measured in accordance with the relevant requirements and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy. Appendix 5 sets out the meteorological conditions under which these criteria apply and the requirements for evaluating compliance with these criteria. These are as follows.

- a) Wind speeds greater than 3 m/s at 10 m above ground level; or



- b) Temperature inversion conditions between 1.5°C and 3°C/100 m and wind speed greater than 2 m/s at 10 m above ground level; or
- c) Temperature inversion conditions greater than 3°C/100m

Meteorological data is sourced from a weather station located adjacent to Maroota Public School

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 land owners including:

- Residential receiver identified as R2 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 22 June 2021 by John Hutchison of Hutchison Weller, an independent acoustic specialist. Monitoring locations included those associated with Stage 1-Stage 4 operation of the quarry, as described in the Quarry Noise Management Plan 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 predicted instead
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 2022.

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, or where access to the receiver location was not granted, 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 are presented in Table 4.

The main sources of noise from quarry operations were sand processing and truck loading (screening, front end loaders, trucks).

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 again inaudible at R3, with traffic on Wisemans Ferry Road the dominant source of noise.

On-site measurements were taken to determine the noise level of various noise sources without the influence of traffic noise. Measurements were undertaken over 15-minute periods to establish representative sound power 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.

In all cases, the Haerses Road quarry was compliant with the project noise objectives.

4.2 Modifying factors

No tonal, impulsive or low frequency noise characteristics were observed 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			
Shoulder (6.00am to 7.00am)	6:33AM	R3	38	49.4	41.8	66.7	<38	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 59-62 dBA for HV and 50-53 for LV. Some activity on flower farm audible but quiet. No quarry-related activity audible. 1 truck with stone blocks and another with sand observed on Haerses Road, turning right onto Wisemans Ferry Road ~ 42-43 dBA for less than 30 s. During breaks in traffic, frogs audible. No LAmix attributable to the quarry.	Light breeze from NE @ 1-2 km/h Temperature 8°C Clear sky Unstable conditions (A to C- class)
Day (7.00am to 6.00pm)	7:25AM	HAS1	N/A	60.8	57.4	74.0	60	Empty screen operates at 57-58 @ 68 m FEL loading screen ~ 60 Operating screen under load ~ 62 @ 68 m FEL loading from sand stockpile ~ 57 dBA @ 90m Excavators handling blocks @ 155 m 72 dBA engines inaudible – all claw noise FEL slow moving ~63 dBA @ 33m Excavator loading blocks truck ~ 62 dBA @ 68m	Light breeze from NW @ 2 km/h Temperature 8 - 9 °C Clear sky Unstable conditions (A to B - class)
Day (7.00am to 6.00pm)	8:36AM	R3	38	47.8	37.7	62.8	<38	Quarry noise inaudible Wisemans Ferry Road audible with pass-bys of 44-46 dBA for LV and 53-57 dBA for HV Traffic dropped out and ambient level fell below 38 dBA – quarry not audible. Truck turned into Haerses Road ~ 35 dBA for less than 30 s.	Light breeze from W-NW @ 1-3 km/h Temperature 10°C Clear sky Unstable conditions (A-B class)

4.3 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible adjacent to Wisemans Ferry Road due to ambient noise levels affected by road traffic. Therefore, measurements captured on-site without substantial influence from these sources were used to calculate sound pressure levels at each receiver.

Calculations were based on 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 measurements described in Table 4, extrapolated noise results for each receiver are presented in Table 5 and illustrated in Figure 2. Results are shown for all equipment operating (screen, loader, trucks and excavator).

Extrapolated results demonstrate the Quarry is compliant with the criteria for shoulder and daytime operations when all observed equipment is operating.

Table 5 Extrapolated monitoring results

Receiver	Noise criteria		Extrapolated noise level, LAeq, 15 minute	Comment
	Shoulder	Day		
R1	37	37	28	Predicted levels correlate well with measured levels and all locations shown to comply with noise limits.
R3	38	38	31	
R4	37	37	31	
R6	37	35	34	
R7	36	35	32	
R8	36	35	33	
All other receivers	35	35	See Figure 2	

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.

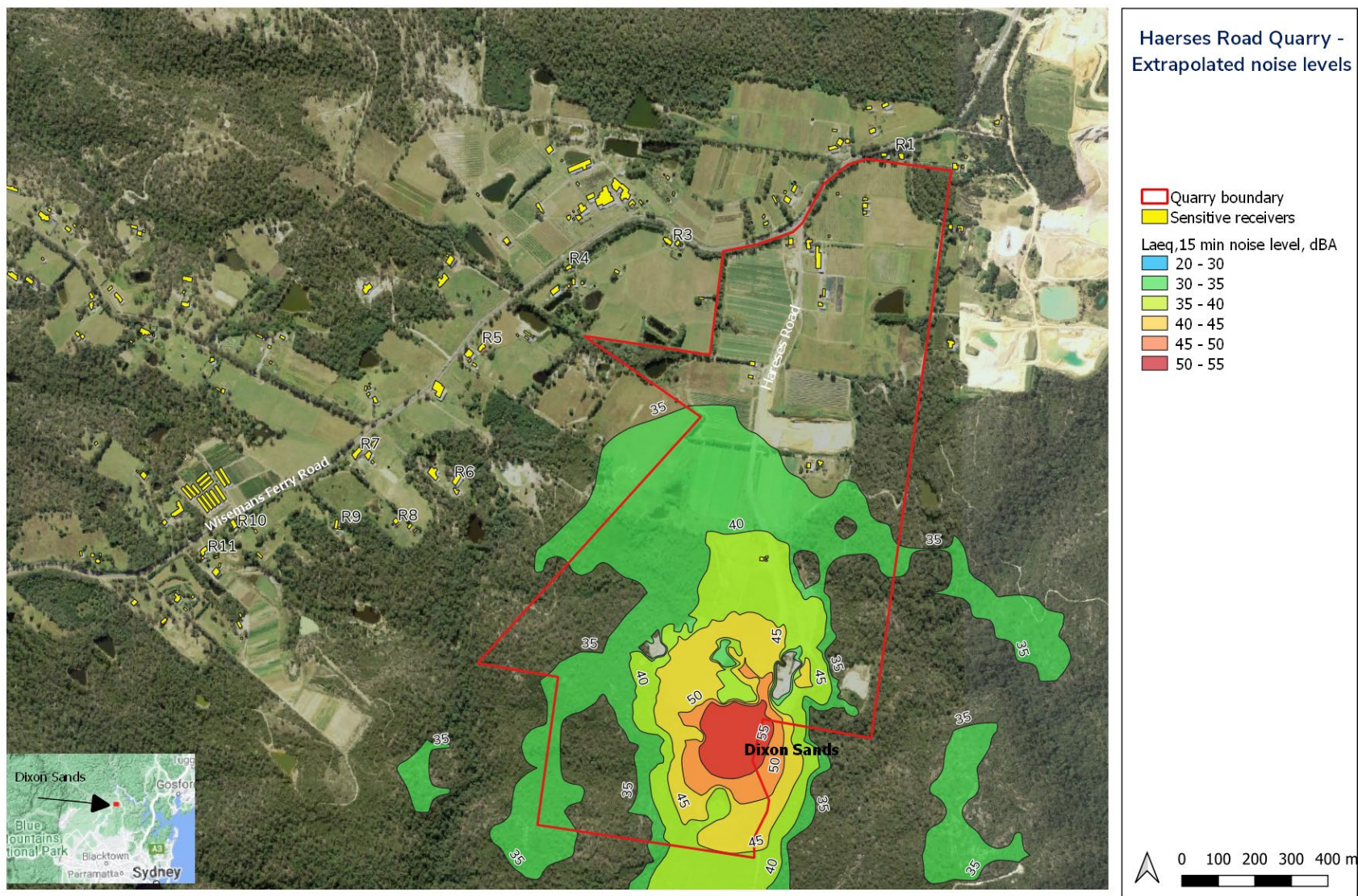


Figure 2 Extrapolated noise levels from Haerses Road quarry based on on-site measurements.

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:	23/06/2021			
Inspection by:	Melissa Mass			33.6 mm
Measured monthly rainfall (mm)	Period 25/05/2021 - 23/06/2021 - Rainfall =			
	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 issues or transport of sediment noted this period.		M.M.
Effectiveness and capacity of Erosion and Sediment controls checked (drains, basins, filters etc.)	✓	Drains, basins etc clear.		M.M.
Stockpiles located and maintained correctly	✓			
Tree clearance restricted to required area	N/A			

WATER QUALITY AND QUANTITY

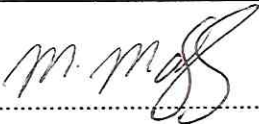
Monthly water quality samples collected from monitoring bores. Samples tested for pH and electrical conductivity	✓	Sampling and lab analysis undertaken by V&T		M.M.
Monthly surface water monitoring of the in-pit sump	N/A			
6 monthly monitoring of groundwater quality at 13 bores	✓	Undertaken by V&T		M.M.
Monthly depth measurement of all groundwater bores and comparison with rainfall	✓	Undertaken by V&T		M.M.
Monthly inspection of drainage & sediment controls including water storages, pumps, pipes and dams' walls	✓			
Any Fuel or oil spills reported and maintained	✓	No spills recorded this period.		M.M.
Fuels/chemicals stored in bunded areas	✓	EPA approved bunding.		M.M.

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 CBASED		M.M.
On site dust suppression	✓	Regular use of water cart when required		M.M.

Loads covered entering and leaving site	✓	In compliance with TMP		M.M.
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	✓	in accordance with EPL recruitments		M.M.
NOISE				
Compliance with approved hours of operation	✓	In accordance with NMP and TMP		M.M.
No complaints received from surrounding residences	✓	No complaints this period		M.M.
Annual attended and unattended monitoring	✓	undertaken by Hutchison and Weller		M.M.
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 accordance with NMP		M.M.
In the wet processing plant area, stockpiles are located along to western boundary of the area to shield loading and unloading activities	N/A	} Condition not yet triggered		
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	N/A			
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	✓			
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		M.M.
WASTE AND SITE CONDITION				

No rubbish visible or buried on site	✓			
Recyclables removed by licensed Contractors	✓	By council contractors		M.M.
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		M.M.
Truck movements have not exceeded 56 per day, or 20 between 6:00 am and 7:00 am	✓	Refer to truck records		M.M.
Highbridge/log book records retained and recorded	✓	Refer to truck records		M.M.
REPORTING				
Complaints register maintained	✓	Updated and published monthly		M.M.
Environmental incidents reported to EPA and DPIE	✓	No incidents to report this period		M.M.
Monitoring results and statements of compliance with Development Consent and EPL conditions provided in the Annual Review and EPL Annual Return	✓	Submitted on the 22/09/2020		M.M.
Staff and Contractors undergo relevant environmental inductions. Sighting of training/induction records	✓			
PIRMP / SPILL KIT				
Spill kits inspected and used items replaced	✓			
Copy of PIRMP flowchart available in each Spill Kit	✓			

Signed:  (Environmental Officer or Delegate)

Appendix F – Truck Movement Data

Example of Monthly Summary of Truck Data

Jun 2021						
Day	Total Sale Trucks (unladen + laden)	Total Sale Sold from Haerses (t)	No. of Transfers to ONR (laden)	Total Transfer to ONR (t)	Total Trucks VENM/ENM (laden)	TOTAL TRUCK MOVEMENT (unladen + laden)
1/06/2021	4	55	17	595		38
2/06/2021	2	28				2
3/06/2021					7	14
4/06/2021					18	36
5/06/2021						0
6/06/2021						0
7/06/2021						0
8/06/2021	2	28	18	630		38
9/06/2021						0
10/06/2021						0
11/06/2021						0
12/06/2021						0
13/06/2021						0
14/06/2021						0
15/06/2021			17	595		34
16/06/2021						0
17/06/2021						0
18/06/2021	2	28				2
19/06/2021						0
20/06/2021						0
21/06/2021	8	112				8
22/06/2021	18	225				18
23/06/2021	10	147				10
24/06/2021	2	28				2
25/06/2021	2	27				2
26/06/2021						0
27/06/2021						0
28/06/2021						0
29/06/2021	6	85.8			11	28
30/06/2021	8	116.5				8
TOTAL	64	879.8	52	1820.0	36	

Denotes Saturday
 Denotes Sunday
 Denotes Public Holiday

Example of Monthly Record of Transfers and Morning Truck

TRANSFERS

NOV 2020			Tonnes/Mth	6,638.50		
			Number/Mth	187		
Date	AM/PM	Arrival Time	Dispatch Time	Tonnes	No Trks/day	Morning 6:00-7:00am Truck no. at Haerses (one way)
02-Nov-20	AM	6.12	6.17	35.50		1
02-Nov-20	AM	8.01	8.06	35.50		
02-Nov-20	AM	8.05	8.10	35.50		
02-Nov-20	AM	9.38	9.43	35.50		
02-Nov-20	AM	11.14	11.19	35.50		
02-Nov-20	PM	1.11	1.16	35.50		
02-Nov-20	PM	2.04	2.09	35.50		
02-Nov-20	PM	2.54	2.59	35.50	8	
03-Nov-20	AM	6.11	6.16	35.50		1
03-Nov-20	AM	8.02	8.07	35.50		
03-Nov-20	AM	9.49	9.54	35.50		
03-Nov-20	AM	11.39	11.44	35.50		
03-Nov-20	PM	1.14	1.19	35.50		
03-Nov-20	PM	2.51	2.56	35.50		
03-Nov-20	PM	4.32	4.37	35.50	7	
04-Nov-20	AM	6.10	6.15	35.50		1
04-Nov-20	AM	8.00	8.05	35.50		
04-Nov-20	AM	9.46	9.51	35.50		
04-Nov-20	AM	11.25	11.30	35.50		
04-Nov-20	PM	1.08	1.13	35.50		
04-Nov-20	PM	2.53	2.58	35.50		
04-Nov-20	PM	4.40	4.45	35.50	7	
05-Nov-20	AM	6.03	6.08	35.50		1
05-Nov-20	AM	8.06	8.11	35.50		
05-Nov-20	AM	10.00	10.05	35.50		
05-Nov-20	AM	10.20	10.25	35.50		
05-Nov-20	AM	11.51	11.56	35.50	5	
06-Nov-20	AM	6.12	6.17	35.50		1
06-Nov-20	AM	7.58	8.03	35.50		
06-Nov-20	AM	9.58	10.03	35.50		
06-Nov-20	AM	11.39	11.44	35.50		
06-Nov-20	PM	1.23	1.28	35.50	5	
09-Nov-20	AM	6.14	6.19	35.50		1
09-Nov-20	AM	7.58	8.03	35.50		
09-Nov-20	AM	8.07	8.12	35.50		
09-Nov-20	AM	9.44	9.49	35.50		
09-Nov-20	AM	11.21	11.26	35.50		
09-Nov-20	AM	11.48	11.53	35.50		
09-Nov-20	PM	1.01	1.06	35.50		
09-Nov-20	PM	3.06	3.11	35.50		
09-Nov-20	PM	4.40	4.45	35.50	9	
10-Nov-20	AM	6.11	6.16	35.50		1
10-Nov-20	AM	7.50	7.55	35.50		
10-Nov-20	AM	9.50	9.55	35.50		
10-Nov-20	AM	11.30	11.35	35.50		

10-Nov-20	PM	1.17	1.22	35.50		
10-Nov-20	PM	3.06	3.11	35.50		
10-Nov-20	PM	4.43	4.48	35.50	7	
11-Nov-20	AM	6.00	6.05	35.50		1
11-Nov-20	AM	6.05	6.10	35.50		
11-Nov-20	AM	6.14	6.19	35.50		
11-Nov-20	AM	7.26	7.31	35.50		
11-Nov-20	AM	7.38	7.43	35.50		
11-Nov-20	AM	8.22	8.27	35.50		
11-Nov-20	AM	8.56	9.01	35.50		
11-Nov-20	AM	9.27	9.32	35.50		
11-Nov-20	AM	10.24	10.29	35.50		
11-Nov-20	AM	11.14	11.19	35.50		
11-Nov-20	PM	1.57	2.02	35.50		
11-Nov-20	PM	3.08	3.13	35.50		
11-Nov-20	PM	3.46	3.51	35.50	13	
12-Nov-20	AM	6.04	6.09	35.50		1
12-Nov-20	AM	7.53	7.58	35.50		
12-Nov-20	AM	9.49	9.54	35.50		
12-Nov-20	AM	11.35	11.40	35.50		
12-Nov-20	PM	1.07	1.12	35.50		
12-Nov-20	PM	3.15	3.20	35.50		
12-Nov-20	PM	4.50	4.55	35.50	7	
13-Nov-20	AM	6.07	6.12	35.50		1
13-Nov-20	AM	8.01	8.06	35.50		
13-Nov-20	AM	9.43	9.48	35.50		
13-Nov-20	AM	11.27	11.32	35.50		
13-Nov-20	AM	11.34	11.39	35.50		
13-Nov-20	PM	1.02	1.07	35.50		
13-Nov-20	PM	1.24	1.29	35.50		
13-Nov-20	PM	3.05	3.10	35.50		
13-Nov-20	PM	3.12	3.17	35.50		
13-Nov-20	PM	4.45	4.50	35.50		
13-Nov-20	PM	4.54	4.59	35.50	11	
14-Nov-20	AM	6.33	6.38	35.50		1
14-Nov-20	AM	8.12	8.17	35.50		
14-Nov-20	AM	9.45	9.50	35.50		
14-Nov-20	AM	11.39	11.44	35.50	4	
16-Nov-20	AM	6.03	6.08	35.50		1
16-Nov-20	AM	7.50	7.55	35.50		
16-Nov-20	AM	9.46	9.51	35.50		
16-Nov-20	AM	11.23	11.28	35.50		
16-Nov-20	AM	11.47	11.52	35.50		
16-Nov-20	PM	1.15	1.20	35.50		
16-Nov-20	PM	3.14	3.19	35.50		
16-Nov-20	PM	3.21	3.26	35.50		
16-Nov-20	PM	4.56	5.01	35.50	9	
17-Nov-20	AM	6.02	6.07	35.50		1
17-Nov-20	AM	7.39	7.44	35.50		
17-Nov-20	AM	9.30	9.35	35.50		
17-Nov-20	AM	11.04	11.09	35.50		
17-Nov-20	PM	1.00	1.05	35.50		
17-Nov-20	PM	2.42	2.47	35.50		

17-Nov-20	PM	3.31	3.36	35.50		
17-Nov-20	PM	4.22	4.27	35.50	8	
18-Nov-20	AM	6.04	6.09	35.50		1
18-Nov-20	AM	7.57	8.02	35.50		
18-Nov-20	AM	9.46	9.51	35.50		
18-Nov-20	AM	11.27	11.32	35.50		
18-Nov-20	PM	1.28	1.33	35.50		
18-Nov-20	PM	3.31	3.36	35.50		
18-Nov-20	PM	3.58	4.03	35.50	7	
19-Nov-20	AM	6.14	6.19	35.50		1
19-Nov-20	AM	7.52	7.57	35.50		
19-Nov-20	AM	8.00	8.05	35.50		
19-Nov-20	AM	9.41	9.46	35.50		
19-Nov-20	AM	10.04	10.09	35.50		
19-Nov-20	AM	11.29	11.34	35.50		
19-Nov-20	PM	12.24	12.29	35.50		
19-Nov-20	PM	1.05	1.10	35.50		
19-Nov-20	PM	1.51	1.56	35.50		
19-Nov-20	PM	2.42	2.47	35.50		
19-Nov-20	PM	3.25	3.30	35.50		
19-Nov-20	PM	4.22	4.27	35.50	12	
20-Nov-20	AM	6.12	6.17	35.50		1
20-Nov-20	AM	7.53	7.58	35.50		
20-Nov-20	AM	9.40	9.45	35.50		
20-Nov-20	AM	9.47	9.52	35.50		
20-Nov-20	AM	11.14	11.19	35.50		
20-Nov-20	AM	11.33	11.38	35.50		
20-Nov-20	PM	12.41	12.46	35.50		
20-Nov-20	PM	1.10	1.15	35.50		
20-Nov-20	PM	2.17	2.22	35.50		
20-Nov-20	PM	2.45	2.50	35.50		
20-Nov-20	PM	3.55	4.00	35.50		
20-Nov-20	PM	4.30	4.35	35.50	12	
21-Nov-20	AM	6.05	6.10	35.50		1
21-Nov-20	AM	7.40	7.45	35.50		
21-Nov-20	AM	9.27	9.32	35.50		
21-Nov-20	AM	11.04	11.09	35.50	4	
23-Nov-20	AM	6.04	6.09	35.50		1
23-Nov-20	AM	7.49	7.54	35.50		
23-Nov-20	AM	9.37	9.42	35.50		
23-Nov-20	AM	11.47	11.52	35.50		
23-Nov-20	PM	2.07	2.12	35.50	5	
24-Nov-20	AM	6.04	6.09	35.50		1
24-Nov-20	AM	8.06	8.11	35.50		
24-Nov-20	AM	9.52	9.57	35.50		
24-Nov-20	AM	10.02	10.07	35.50		
24-Nov-20	AM	11.50	11.55	35.50		
24-Nov-20	PM	2.09	2.14	35.50		
24-Nov-20	PM	3.50	3.55	35.50	7	
25-Nov-20	AM	6.06	6.11	35.50		1
25-Nov-20	AM	7.54	7.59	35.50		
25-Nov-20	AM	9.39	9.44	35.50		
25-Nov-20	AM	11.41	11.46	35.50		

25-Nov-20	PM	1.18	1.23	35.50		
25-Nov-20	PM	3.14	3.19	35.50	6	
26-Nov-20	AM	6.09	6.14	35.50		1
26-Nov-20	AM	6.33	6.38	35.50		
26-Nov-20	AM	8.01	8.06	35.50		
26-Nov-20	AM	10.00	10.05	35.50		
26-Nov-20	AM	10.06	10.11	35.50		
26-Nov-20	AM	10.20	10.25	35.50		
26-Nov-20	AM	11.16	11.21	35.50		
26-Nov-20	AM	11.53	11.58	35.50		
26-Nov-20	PM	12.00	12.05	35.50		
26-Nov-20	PM	12.32	12.37	35.50		
26-Nov-20	PM	1.14	1.19	35.50		
26-Nov-20	PM	2.00	2.05	35.50		
26-Nov-20	PM	2.06	2.11	35.50		
26-Nov-20	PM	3.48	3.53	35.50	14	
27-Nov-20	AM	6.10	6.15	35.50		1
27-Nov-20	AM	7.39	7.44	35.50		
27-Nov-20	AM	9.04	9.09	35.50		
27-Nov-20	AM	10.49	10.54	35.50		
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28-Nov-20	AM	8.04	8.09	35.50		
28-Nov-20	AM	9.37	9.42	35.50		
28-Nov-20	AM	11.23	11.28	35.50	4	
30-Nov-20	AM	6.09	6.14	35.50		
30-Nov-20	AM	6.48	6.53	35.50		2
30-Nov-20	AM	7.15	7.20	35.50		
30-Nov-20	AM	9.54	9.59	35.50		
30-Nov-20	AM	10.15	10.20	35.50		
30-Nov-20	AM	11.37	11.42	35.50		
30-Nov-20	PM	1.19	1.24	35.50		
30-Nov-20	PM	3.09	3.14	35.50		
30-Nov-20	PM	4.50	4.55	35.50	9	
					Max Daily Transfer from HR to ONR (laden)	Max Morning truck at haerses (one way)
					14	2

Appendix G – Bush Regeneration Report



Dixon Sand (No.1) – Haerses Road
(Haerses Road DA 165-7-2005)



Annual Report
July 2020 – June 2021
Bush Regeneration Works
Author: Jeff Gibbs & Zoe Ridgway

Date: 08/07/2021

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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 2020 and June 2021 in accordance with Haerses Road DA 165-7-2005. A total of 222.5 hours (\$12,357.65 excluding GST) were worked throughout the year with an average team size of four per visit.

Dixon Sand (Penrith) 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 as shown in Figure 1, only a strip of remnant native vegetation that is attached to the Biodiversity Offset Area, which is actively managed as part of the Old Northern Road site, is currently worked with the remaining area under passive management. 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. The translocation area (2009) where there was previously an old orchard lies within the ONR Biodiversity Offset area but is managed as part of the Haerses rd quarry. The visual screen is a 30m wide vegetation buffer adjoining Wisemans Ferry Road as shown in Figure 4. The Porters Rd site which is yet to have any works undertaken by Bush-it also forms part of the Haerses rd site, as seen in Figure 5.

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 mine, 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.

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Overview of management zones and work areas

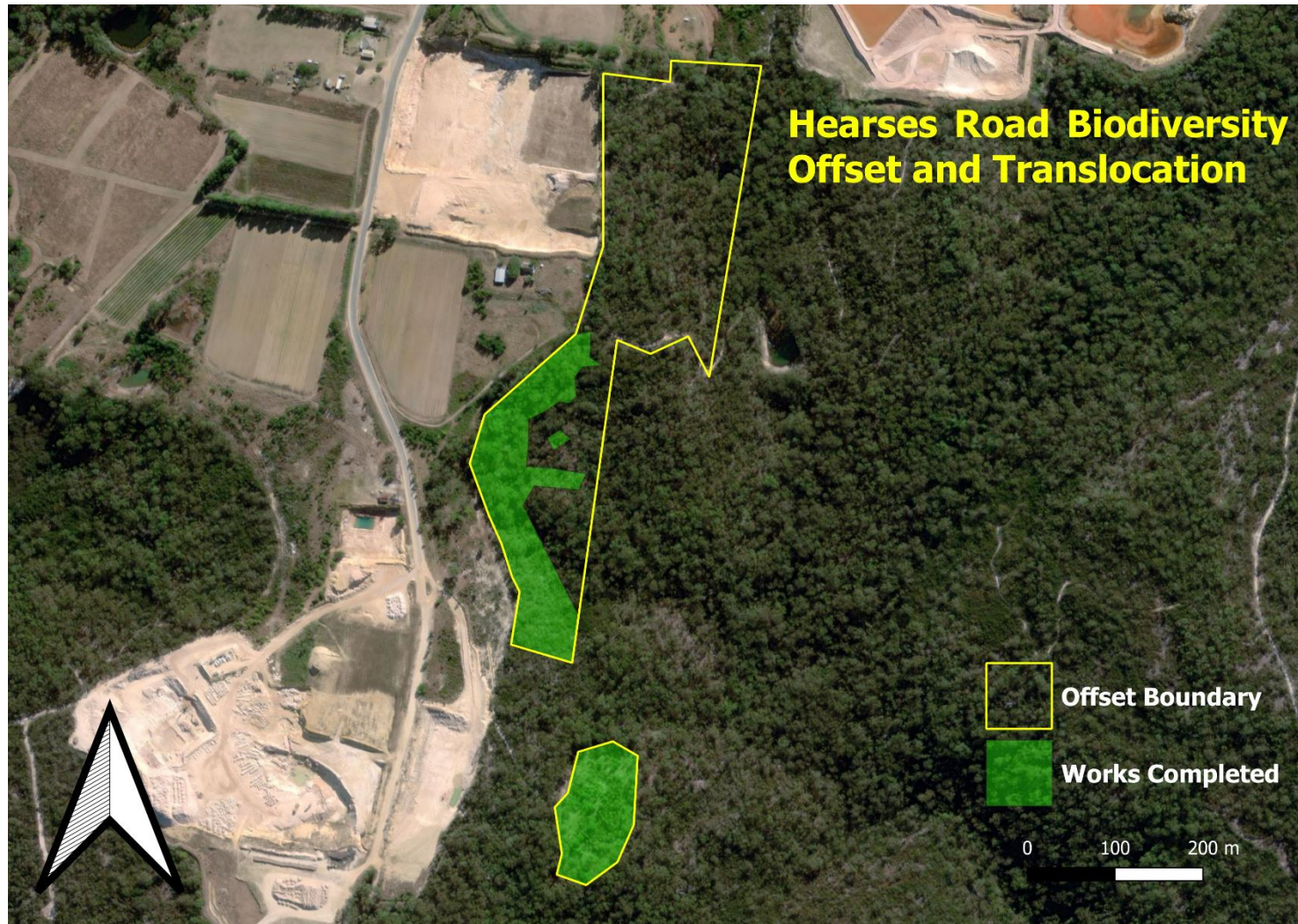


Figure 1 – Aerial photo illustrating the areas worked and overall biodiversity offset boundary

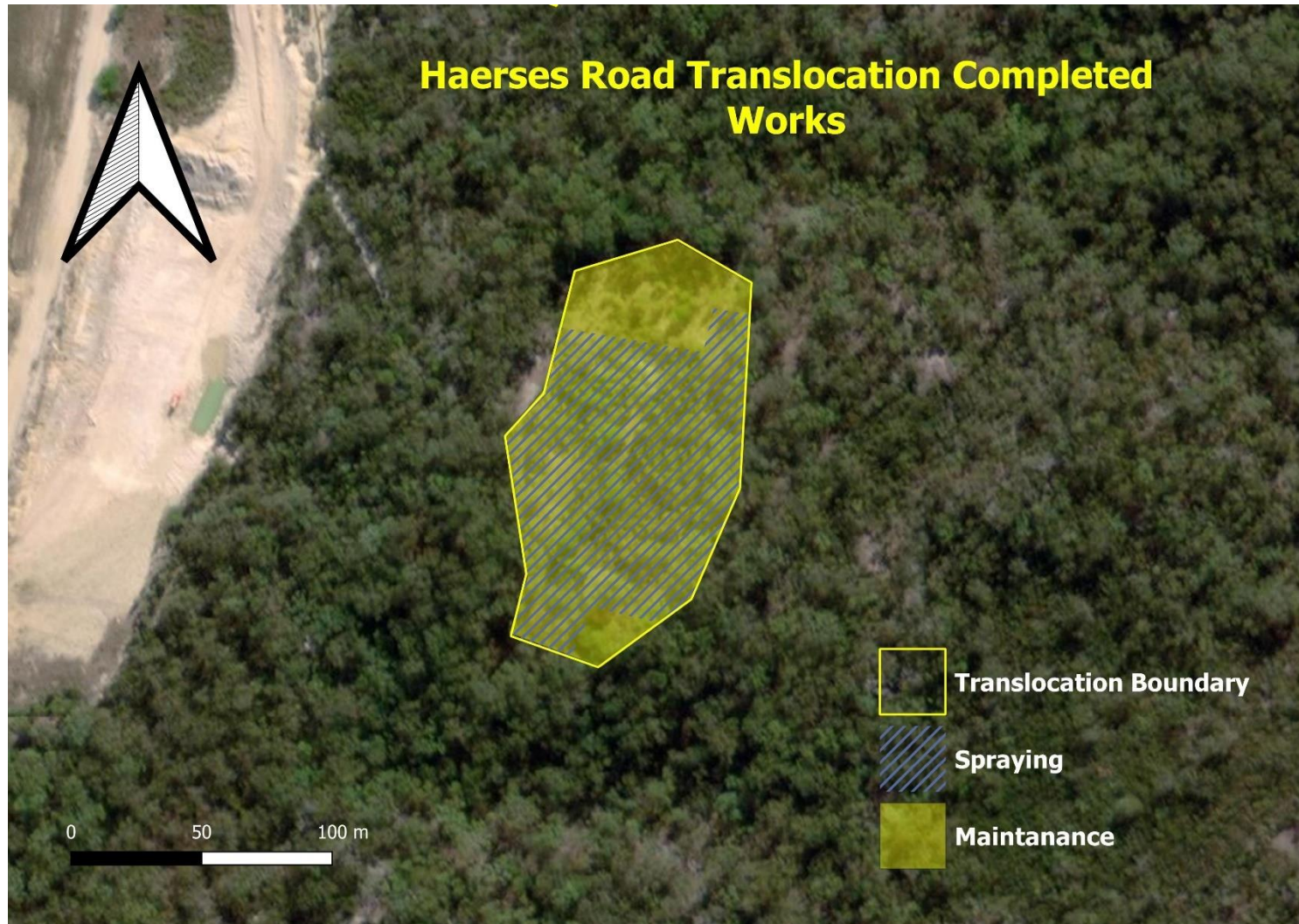


Figure 2 – Aerial overview of specific works undertaken in the translocation area.

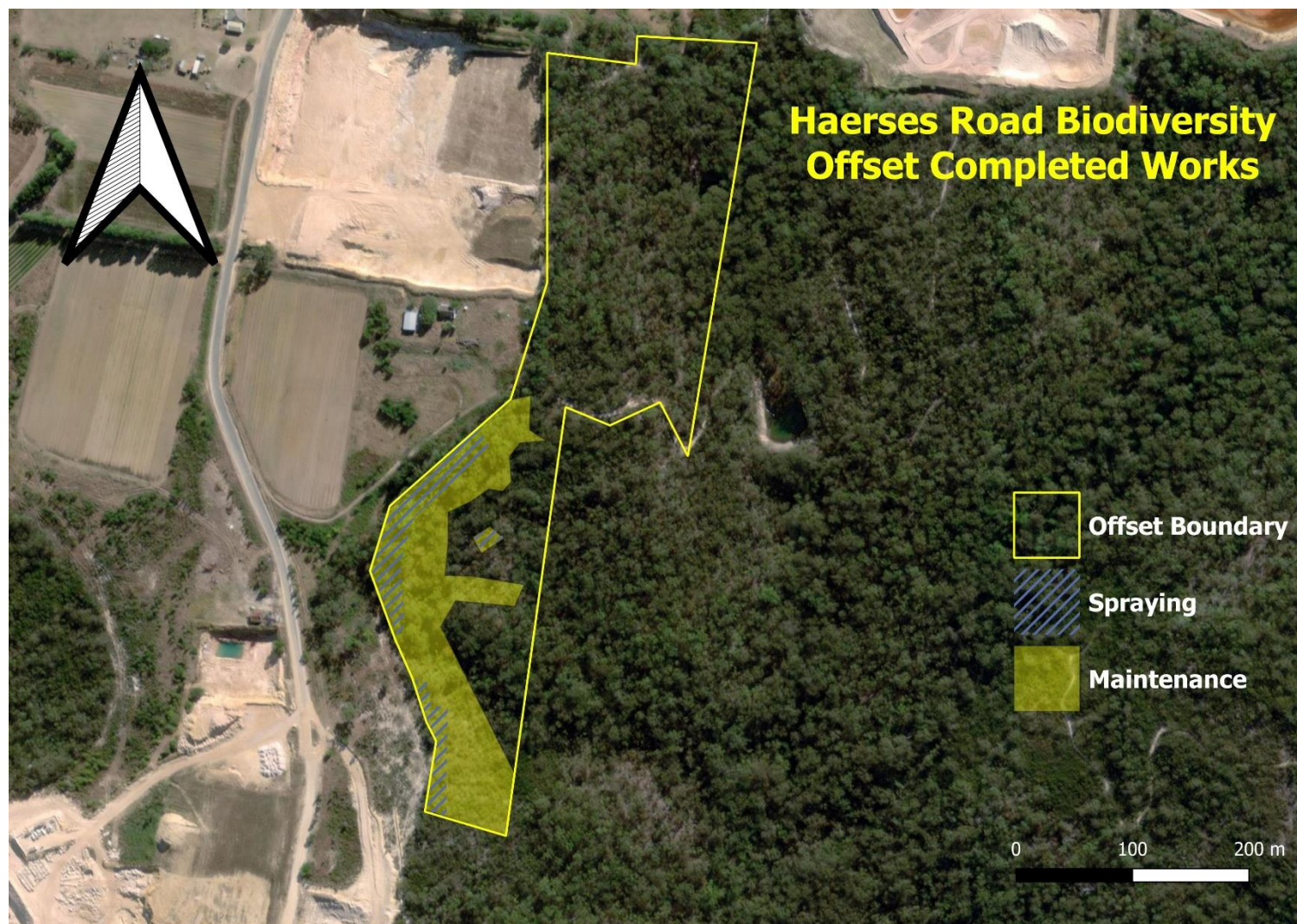


Figure 3 – Aerial overview of specific works undertaken in the HR biodiversity offset.

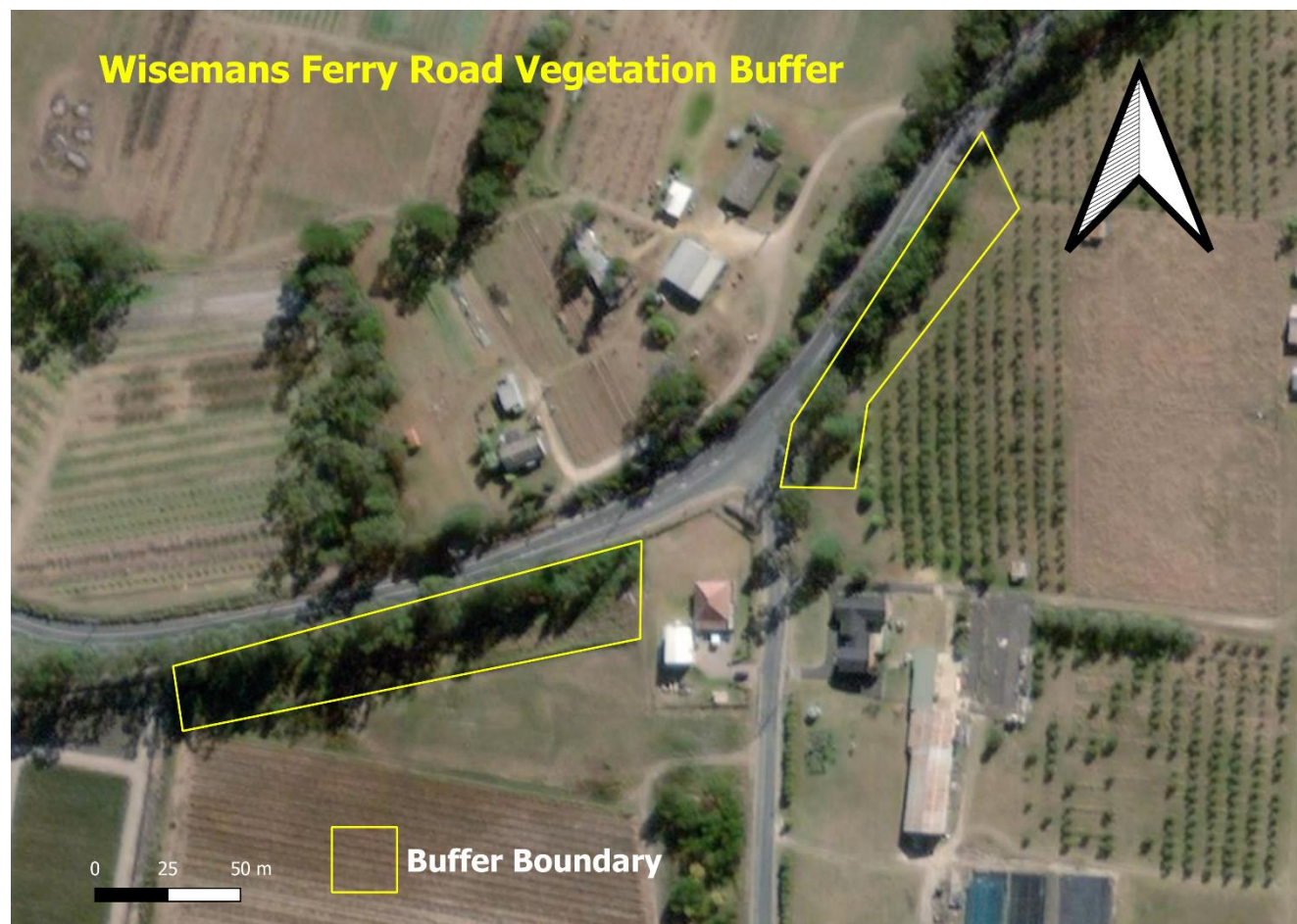


Figure 4 – Aerial overview of boundary to vegetation buffer along Wisemans Ferry Rd

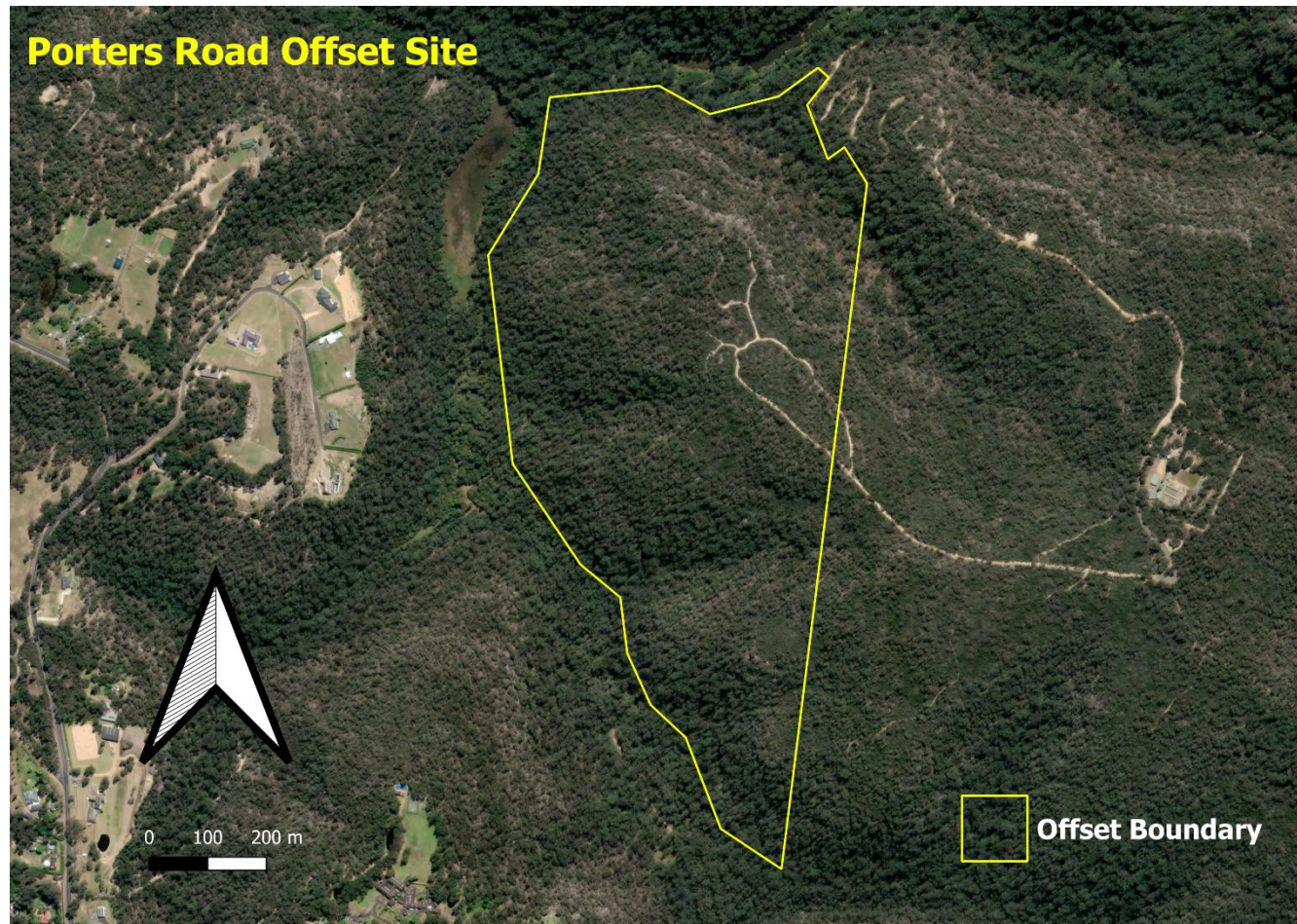


Figure 5 – Aerial overview of Porters Road Offset.

SCOPE

Haerses Road (HR) offset site is 'passively' managed under a BCT agreement according to HR DA 165-7-2005.

The vegetation communities represented at HR offset 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 offset 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 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 – 182.5 HOURS

Most of the hours spent working at the HR offset were used to control incursions of exotic grasses and annuals along the western boundary. (as illustrated in Figure 6). We successfully prevented the establishment of any new infestations and pursued crofton and lantana down the drainage lines. A small infestation of turkey rhubarb was removed before it had the opportunity to seed and cobblers pegs was routinely brush cut and sprayed along the top edge.

Following above average rainfall this year, we saw a flourish of exotic grasses through the open areas of the (2009) translocation site and much of our time here was spent chipping out tussocks of whisky and love grass. Manual removal is a method we are using because, we are keen to discover if disturbing the soil in this manner, will stimulate native regeneration.



Figure 6. Suppression of exotic grasses on the edge of the Offset Area

The remaining hours at (2009) translocation site were spent cutting back thickets of *Kunzea* and culling canopy trees where smaller shrubs and groundcovers are struggling to get sunlight. In the thickly forested areas of the translocation area, an infestation of common couch has also been targeted with a monocot specific herbicide.

We also cleaned out most of the plastic rubbish that had been left on the approach to the (2009) translocation site. Sheets of black plastic used to solarise grass cuttings, old tree guards and stakes were all removed from the site. The plastic has been disposed of and the stakes have been retained for use elsewhere.

RECOMMENDATIONS

Regular select spraying of herbicide and hand removal of seeding annuals is required to control incursions around the perimeter of the HR offset area.

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 and manage invasive grasses in the translocation area, especially common couch that has vigorously established itself.

SCOPE

The roadwork undertaken by Roads and Maritime Services (RMS) at the corner of Haerses Road and Wisemans Ferry Road severely impacted our ability to work in the visual screen this year. The road widening and resurfacing work that began in February 2020 closed off our access to the northern side of Haerses Road.

On the southern side of the road, the plant canopy trees *Callistemon sp* are continuing to establish themselves but, there is no native resilience here and the area could best be described as an exotic grassland with thickets of blackberry and an infestation of turkey rhubarb.

RESOURCES – 21 HOURS

Much the hours worked in this area were spent cutting and spot spraying whisky and love grass and manual treatment of blackberry is both time consuming and laborious. It has emerged alongside the plantings and so, the risk of off-target damage prevents the application of herbicide with a foliar spray.

A new infestation of turkey rhubarb was also treated this year but, where it is entangled in blackberry, it is proving very difficult to eradicate and de-seed.

RECOMMENDATIONS

Continued vigilance will be required to control infestations of blackberry and turkey rhubarb and suppress the spread of exotic grasses along the Visual Buffer.

Given the absence of any native resilience and the presence of some particularly difficult to treat weeds – i.e. Blackberry and Turkey Rhubarb, it is recommended that a full reconstruction of this area, involving cap of crushed sandstone be considered as a possible option.

APPENDIX

DISTRIBUTION OF HOURS

Zone	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	TOTAL
HR Offset	24	37	16	16	8.5	1	18	43.5	28.5	9	201.5
VSB	0	0	6	0	0	15	0	0	0	0	21
TOTAL	24	37	22	16	8.5	16	18	43.5	28.5	9	222.5

HOURS UNDERTAKING DIFFERENT ACTIVITIES ACROSS ALL SITES

ACTIVITY	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total
Admin	1	1	1.5	0.5	0.5	0.5	1	1.5	2	0.5	1	14	25
Brush Matting	0	0	0	0	0	0	0	0	0	0	0	0	0
Direct Seeding	0	0	0	3	0	0	0	0	0	0	0	0	3
Hazard Reduction	0	0	0	0	0	0	0	0	0	0	0	0	0
Maintenance	56	48.5	88	16	21.5	16	49.5	86.5	82.5	16.5	0	49	530
Miscellaneous	0	0	0	0	0	6.5	1.5	3.5	0	6	1.5	22.5	41.5
Mulching	0	0	0	0	0	0	0	0	0	0	0	0	0
Planting	0	0	0	0	0	0	0	0	0	0	21	0	21
Primary	0	0	0	0	6	0	0	0	0	0	0	63.5	69.5
Secondary	0	0	0	0	0	0	0	0	0	0	0	0	0
Spraying	4	11.5	2	3.5	2.5	0	1.5	0	0	0	0	0	25
TOTAL	61	61	91.5	23	30.5	23	53.5	91.5	84.5	23	23.5	149	715

WEED SPECIES CONTROLLED

Common name	Scientific name
Bridal Creeper	<i>Asparagus asparagoides</i>
Turkey Rhubarb	<i>Rumex sagittatus</i>
Moth vine	<i>Araujia sericifera</i>
Lantana	<i>Lantana camara</i>
Blackberry	<i>Rubus fruticosus</i> agg.
Ochna	<i>Ochna serrulata</i>
Wild Tobacco	<i>Solanum mauritianum</i>
Crofton weed	<i>Ageratina adenophora</i>
Bidens - Cobblers Peg	<i>Bidens pilosa</i>
Fleabane	<i>Conyza</i> spp.
Catsear, flatweed	<i>Hypochaeris radicata</i>
Fireweed	<i>Senecio madagascariensis</i>
Paddy's Lucerne	<i>Sida rhombifolia</i>
Blackberry Nightshade	<i>Solanum nigrum</i>
Sowthistle	<i>Sonchus oleraceus</i>
Purple Top	<i>Verbena bonariensis</i>
Panic Veldtgrass	<i>Ehrharta erecta</i>
Paspalum	<i>Paspalum dilatatum</i>
Couch common	<i>Cynodon dactylon</i>
Briza- Quaking Grass- Blowfly Grass	<i>Briza maxima</i>
Cudweed	<i>Gnaphalium</i> spp.
African Lovegrass	<i>Eragrostis curvula</i>
Buffalo Grass	<i>Stenotaphrum secundatum</i>
Flatweed	<i>Hypochaeris</i> sp
Paspalum (tussock)	<i>Paspalum quadrifarium</i>
Vetch	<i>Vicia</i> spp
Whisky grass	<i>Andropogon virginicus</i>
Summer grass	<i>Digitaria sanguinalis</i>
Periwinkle	<i>Vinca major</i>
Castor Oil	<i>Ricinus communis</i>
Stinking Roger	<i>Tagetes</i> spp.
Pigeon Grass	<i>Setaria</i> spp.
Pampas Grass	<i>Cortaderia selloana</i>
Ink weed	<i>Phytolacca octandra</i>
Chickweed	<i>Stellaria media</i>
Parramatta grass	<i>Sporobolus africanus</i>
Rhodes grass	<i>Chloris gayana</i>
Paspalum, large	<i>Paspalum urvillei</i>
Black-eyed Susan	<i>Thunbergia alata</i>
Spear thistle	<i>Cirsium vulgare</i>
Bamboo, rhizomatous	<i>Phyllostachys</i> spp

REGISTER OF HERBICIDE RECORDS

Date	User name	Herbicide name	Wind descrip.	Direct.	Notes	Method	Qty	Vol. spray.	Start time	End time
9/07/2020	Jeff Gibbs	Round-up, Glyphosate	1 - Light Air	NE	Wind 4km/hr	Spray	150	15	10:01	12:01
20/07/2020	Joshua Freeman	Round-up, Glyphosate	1 - Light Air	NW	Sprayed love grass, annuals and whiskey grass on edge of lot 2. Wind 3km/hr	Spray	100	10	7:01	9:01
5/08/2020	Maddy Walsh	Round-up, Glyphosate	2 - Light Breeze	NE	Wind 6km/hr. Sprayed andropogon and eragrostis on edge of translocation zone.	Spray	100	10	7:01	9:01
5/08/2020	Darius Ottignon	Round-up, Glyphosate	2 - Light Breeze	NE	Wind 6km/hr. Sprayed andropogon and eragrostis on edge of translocation zone.	Spray	100	10	7:01	9:01
17/08/2020	Joshua Freeman	Round-up, Glyphosate	2 - Light Breeze	NE	Wind 5km/hr, sprayed eragrostis above bio offset area near beehives	Spray	100	10	7:01	9:01
17/08/2020	Maddy Walsh	Round-up, Glyphosate	2 - Light Breeze	NE	Wind 5km/hr, sprayed eragrostis above bio offset area near beehives	Spray	100	10	7:01	9:01
17/08/2020	Maddy Walsh	Round-up, Glyphosate	2 - Light Breeze	NE	Wind 5km/hr, spray eragrostis around translocation area	Spray	80	8	9:01	12:01
17/08/2020	Maddy Walsh	Round-up, Glyphosate	2 - Light Breeze	NE	Wind 6km/hr, spot sprayed eragrostis at raid edge of lot 1	Spray	80	8	13:01	14:01
1/09/2020	Maddy Walsh	Round-up, Glyphosate	1 - Light Air	NE	Wind 3km/hr. Sprayed invasive grasses and annuals through edges of lot 2	Spray	150	15	10:01	12:01
13/10/2020	Joshua Freeman	Round-up, Glyphosate	2 - Light Breeze	NW	Wind 4km/hr. Sprayed Crofton, thistles and whiskey grass at commander below lot 196	Spray	50	5	7:01	8:01
13/10/2020	Maddy Walsh	Other - see notes	2 - Light Breeze	NW	Wind 4km/hr. Sprayed fusilade on couch on mounds next to nvc	Spray	40	5	8:01	9:01
13/10/2020	Joshua Freeman	Starane, Fluroxypyr-meptyl	2 - Light Breeze	NW	Wind speed 6km/hr. Treated vinca in on access Rd of lot 2.	Spray	30	5	10:01	11:01
16/11/2020	Maddy Walsh	Round-up, Glyphosate	2 - Light Breeze	NW	Wind 8km/hr. Spot sprayed annuals, Crofton and any other seed spreading species on southern edge of lot 2	Spray	200	20	9:01	12:01
6/01/2021	Jeff Gibbs	Round-up, Glyphosate	2 - Light Breeze	SE	Suppress annual grasses on the road edge adjacent to the MVR overburden.	Spray	50	5	9:01	10:01
6/01/2021	Jeff Gibbs	Round-up, Glyphosate	2 - Light Breeze	SE	Containment spray for annual grasses and Bidens pilosa along the front of the Biodiversity Offset.	Spray	100	10	13:01	14:01

18/01/2021	Joshua Freeman	Round-up, Glyphosate	1 - Light Air	NW	Used to treat a flush of annuals (Bidens and Conyza) behind the Southern wall.	Spray	100	10	9:01	10:01
18/01/2021	Darius Ottignon	Round-up, Glyphosate	2 - Light Breeze	N	Used to treat a flush of annuals(Bidens and Conyza) below the holding dam.	Spray	50	5	13:01	14:01
3/02/2021	Jeff Gibbs	Round-up, Glyphosate	2 - Light Breeze		1% spray to control flowering Whiskey grass	Spray	100	10	11:01	12:01
12/02/2021	Joshua Freeman	Fusilade forte 128EC - Fluazifop-p @ 128g/L	0 - Calm	SE		Spray	30	10	7:01	14:01
22/02/2021	Joshua Freeman	Fusilade forte 128EC - Fluazifop-p @ 128g/L	2 - Light Breeze	E	Used to control Couch grass in the overburden piles	Spray	30	5	8:01	9:01
22/02/2021	Joshua Freeman	Fusilade forte 128EC - Fluazifop-p @ 128g/L	3 - Gentle Breeze	E	Used to control African love grass on the perimeter of the translocation area.	Spray	60	10	13:01	14:01
9/03/2021	Joshua Freeman	Fusilade forte 128EC - Fluazifop-p @ 128g/L	1 - Light Air	W	Used to control exotic grasses along the edge of the NVC	Spray	100	10	9:01	10:01
9/03/2021	Jeff Gibbs	Round-up, Glyphosate	1 - Light Air	W	Used to control exotic grasses and flowering annuals.	Spray	100	10	12:01	14:01
15/03/2021	Joshua Freeman	Round-up, Glyphosate	2 - Light Breeze	E	Used to control emergent annuals in the overburden piles	Spray	50	5	8:01	8:01
7/04/2021	Michael Shilman	Round-up, Glyphosate	2 - Light Breeze	W	Used to control exotic grasses.	Spray	200	10	8:01	10:01

Appendix H - Annual Biodiversity & Rehabilitation Management Report

**ANNUAL
BIODIVERSITY
&
REHABILITATION
MANAGEMENT
REPORT
HAERSES ROAD MAROOTA
2021**

Prepared for Dixon Sand Pty Ltd

September 2021 V.1



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**Annual Biodiversity
&
Rehabilitation Management
Report
Haerses Road Maroota
2021
Dixon Sand Pty Ltd**

This assessment has been prepared by

Melissa Mass

September 2021 V.1

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 1	Modification 1
Mod 2	Modification 2
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 was modified on the 22 January 2018 (Mod 1) and again on 29 January 2019 (Mod 2).

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.

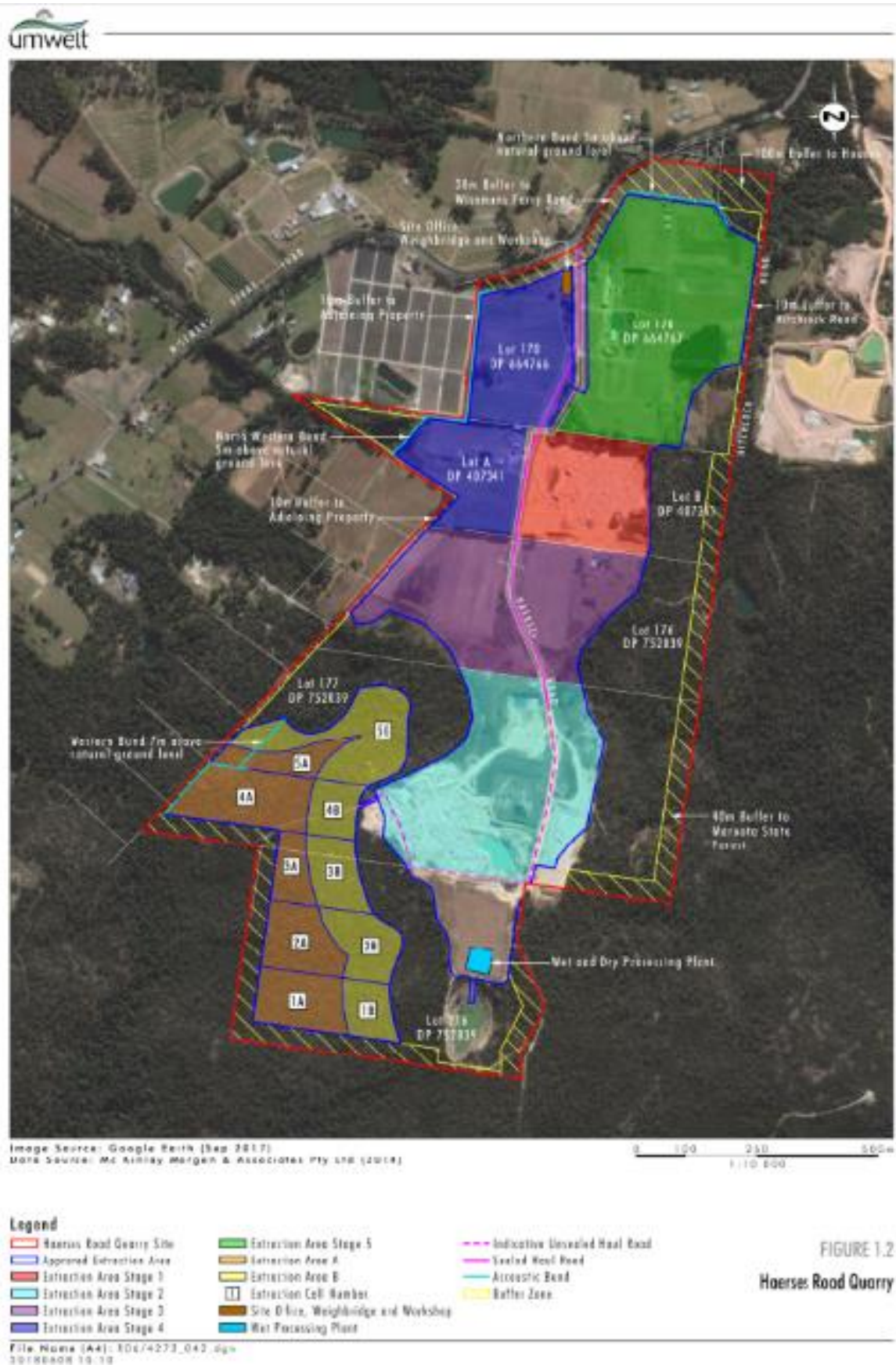


Image 1. Haerses Road Quarry site (source Umwelt Australia 2019)

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 and 1B although operations were suspended temporarily during the 2020-21 reporting period due to lodgement of DA165-7-2005 Modification 4 to alter the sequence of extraction cells. 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. At the time of reporting the construction of the intersection has been completed and rehabilitation of the site is likely to get underway in the next reporting period.

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. An area within the Maroota State Forest buffer area 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 during this reporting period. 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. Further rehabilitation work will also take place within the Wisemans Ferry Road buffer area within 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. The eastern portion of the extraction area remains exhausted and is currently awaiting the start of rehabilitation works. These works are expected to begin during the 2021-2022 reporting period.

The eastern area of the site is currently being used to stockpile material for rehabilitation. It is expected that within the next reporting period these stockpiles will be screened to remove rock fragments larger than 150mm in diameter. The material will then be spread across the site in preparation for agricultural use.



Image 2. Extraction area stage 1 stockpile locations



Image 3. Extraction area stage 1 active rehabilitation area

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 farm 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. It is expected this soil will produce sandstone heath vegetation over time. Threatened flora species such as *Darwinia biflora*, *Darwinia fascicularis subsp. Oligantha* and *Tetratheca glandulosa* may occur within the seed bank therefore the site will be regularly assessed to record any emerging individuals. To date no threatened species have been recorded within this rehabilitation area.



Image 4. Extraction area stage 2 dam construction site



Image 5. Extraction area stage 2 active rehabilitation area

3.3 EXTRACTION AREA A AND B

Sand and sandstone extraction is currently in active operation within Cell 1A and 1B within Lot 216 DO 752039. Extraction in Cells 1A and 1B were temporarily suspended during the 2020-21 reporting period due to lodgement of DA165-7-2005 Mod 4 to alter the sequence of extraction cells.

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.

Baseline vegetation data was obtained during the reporting period on 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. Cell 1 (A & B) has already begun extraction so therefore establishing a monitoring site was not possible. Four monitoring locations were established within Cells 2 - 5 to provide information on current vegetation condition for use in rehabilitation following extraction completion. 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 four 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 four 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 6. 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	Corymbia gummifera, Eucalyptus haemastoma, Eucalyptus punctata, Angophora hispida, Eucalyptus oblonga			
Shrubs	0.5 – 2m	Grevillea buxifolia, Persoonia levis, Phyllanthus hirtellus, Lambertia Formosa, Petrophile pulchella			
Groundcover	0.1 – 0.5m	Lomandra multiflora, Entolasia stricta, Austrostipa pubescens, Billardiera scandens, Caustis pentandra			
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		24		70	
Grasses etc		9		20	
Forbs		4		5	
Ferns		0		0	
Other		3		1	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					25m
Litter cover					30%
Bare ground cover					10%
Cryptogam cover					15%
Rock cover					5%
Overstorey foliage cover					30%
Mid-storey foliage cover					60%
Groundcover foliage cover		26%			



Image 7. 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</i> , <i>Angophora hispida</i> , <i>Aucalyptus squamosa</i>		
Shrubs	0.5 – 2m	<i>Banksia ericifolia</i> , <i>Grevillea buxifolia</i> , <i>Persoonia lanceolate</i> , <i>Lambertia Formosa</i> , <i>Petrophile pulchella</i> , <i>Banksia spinulosa</i>		
Groundcover	0.1 – 0.5m	<i>Lomandra multiflora</i> , <i>Cyathochaeta diandra</i> , <i>Lepidosperma neesii</i> , <i>Actinotus minor</i>		
Stem Class		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		3		20
Shrubs		21		80
Grasses etc		4		50
Forbs		3		5
Ferns		0		0
Other		1		0.1
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs	5 m			
Litter cover	20%			
Bare ground cover	0%			
Cryptogam cover	10%			
Rock cover	0%			
Overstorey foliage cover	10%			
Mid-storey foliage cover	60%			
Groundcover foliage cover	55%			



Image 8. Quadrat 3 centre midline point

Table 4. Survey summary from Haerses Road monitoring survey site quadrat 3.

Transition of 1134 – Scribbly Gum – Hairpin Banksia – Dwarf Apple heathy woodland on sandstone plateaux of the Central Coast, 1083 - Red Bloodwood – Scribbly Gum heathy woodland on sandstone plateaux of the Sydney Basin, and 1181 – Smooth-barked Apple – Red Bloodwood – Sydney Peppermint heathy open forest on slopes of dry sandstone gullies of western and southern Sydney, Sydney Basin Bioregion				
AGD	Zone 56	Easting – 031225	Northing – 06293372	Midline - 160°
Vegetation Layer		Height Range	Vegetation Layer	
Trees	15 – 20m	Eucalyptus haemastoma, Hispida, Banksia serrata		
Shrubs	0.5 – 2m	Grevillea buxifolia, Leptospermum trinervium, Lambertia Formosa, Banksia spinulosa, Hakea dactyloides		
Groundcover	0.1 – 0.5m	Austrostipa pubescens, Gahnia sieberiana, Entolasia stricta, Cheilanthes sieberi, Goodenia hederacea, Actinotus minor		
Stem Class		Hollows		
Dbh	Eucalyptus	Non-Eucalypt	<20cm	>20cm
80cm+				
50-79cm				
30-49cm	✓		3	
20-29cm	✓			
10-19cm	✓	✓		
5-9cm	✓	✓		
<5cm	✓	✓		
Composition & Structure		Composition Count		Structure cover %
Trees		3		20
Shrubs		27		70
Grasses etc		11		60
Forbs		4		5
Ferns		3		1
Other		3		1
High Threat Weeds		0		0
Ecosystem Functions				
Length of habitat logs		15 m		
Litter cover		30%		
Bare ground cover		0%		
Cryptogam cover		0%		
Rock cover		10%		
Overstorey foliage cover		10%		
Mid-storey foliage cover		60%		
Groundcover foliage cover		67%		



Image 9. Quadrat 4 centre midline point

Table 6. 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	Corymbia gummifera, Eucalyptus haemastoma, Angophora hispida, Eucalyptus oblonga			
Shrubs	0.5 – 2m	Grevillea buxifolia, Persoonia levis, Banksia ericifolia, Lambertia Formosa, Petrophile pulchella, Leptospermum trinervium			
Groundcover	0.1 – 0.5m	Entolasia stricta, Lomandra obliqua, Actinotus minor, Caustis pentandra, Rytidosperma racemosum			
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		24		50	
Grasses etc		8		30	
Forbs		3		5	
Ferns		0		0	
Other		3		1	
High Threat Weeds		0		0	
Ecosystem Functions					
Length of habitat logs					12 m
Litter cover					30%
Bare ground cover					0%
Cryptogam cover					0%
Rock cover					0%
Overstorey foliage cover					30%
Mid-storey foliage cover					40%
Groundcover foliage cover		36%			

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.

The construction of the road has now been completed with rehabilitation of the 30m buffer expected to begin within the 2021-2022 reporting period.



Image 10. Western side of Haerses Road within the Wisemans Ferry Road buffer area



Image 11. Eastern side of Haerses Road within the Wisemans Ferry Road buffer area

3.5 MAROOTA 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 work due to recommence 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 area
- 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 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 3	Plot 4
	<i>Acacia suaveolens</i>	Sweet Wattle			*	
	<i>Acacia ulicifolia</i>	Prickly Moses	*		*	*
	<i>Actinotus minor</i>	Lesser Flannel Flower	*	*	*	*
	<i>Angophora hispida</i>	Dwarf Apple	*	*	*	*
	<i>Aristida warburgii</i>	Fine Leaf Wire Grass	*	*	*	*
	<i>Austrostipa pubescens</i>	Spear Grass	*		*	
	<i>Banksia ericifolia</i>	Heath Leaved Banksia	*	*	*	*
	<i>Banksia oblongifolia</i>	Fern-leaved Banksia		*	*	
	<i>Banksia serrata</i>	Old Man Banksia			*	
	<i>Banksia spinulosa</i>	Hairpin Banksia		*	*	*
	<i>Billardiera scandens</i>	Hairy Apple Berry	*		*	*
	<i>Boronia floribunda</i>	Pale Pink Boronia	*	*	*	*
	<i>Boronia ledifolia</i>	Sydney Boronia	*		*	
	<i>Bossiaea obcordata</i>	Spiny Bossiaea	*			
	<i>Bossiaea scolopendria</i>	Sword Bossiaea		*	*	
	<i>Cassytha glabella</i>	Slender Devils Twine	*	*	*	*
	<i>Caustis pentandra</i>	Thick Twist Rush	*	*	*	*
	<i>Cheilanthes sieberi</i>	Mulga Fern			*	
	<i>Corymbia gummifera</i>	Red Bloodwood	*			*
	<i>Cryptostylis subulata</i>	Large Tongue Orchid	*			
	<i>Cyathochaeta diandra</i>	Sheath Rush	*	*		*
V	<i>Darwinia biflora</i>		*	*		*
	<i>Dillwynia retorta</i>	Heathy Parrot Pea	*	*	*	*
	<i>Drosera peltata</i>	Sundew		*	*	*
	<i>Entolasia stricta</i>	Wiry Panic	*		*	*
	<i>Epacris longiflora</i>	Fushia Heath			*	
	<i>Epacris pulchella</i>	Wallum Heath		*	*	*
	<i>Eucalyptus haemastoma</i>	Scribbly Gum	*	*	*	*
	<i>Eucalyptus oblonga</i>	Narrow-leaved Stringybark	*			*
	<i>Eucalyptus punctata</i>	Grey Gum	*			
	<i>Eucalyptus squamosa</i>	Scaly Gum		*		*
	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge			*	
	<i>Gleichenia dicarpa</i>	Pouched Coral Fern			*	
	<i>Gompholobium glabratum</i>	Dainty Wedge Pea	*	*		*
	<i>Goodenia hederacea</i>	Forest Goodenia			*	
	<i>Grevillea buxifolia</i>	Grey Spider Flower	*	*	*	*

En	<i>Grevillea parviflora</i> subsp. <i>supplicans</i>	Small-flowered Grevillea	*			
	<i>Grevillea speciosa</i>	Red Spider Flower	*	*	*	*
	<i>Hakea dactyloides</i>	Broad Leaved Hakea	*	*	*	*
	<i>Hakea sericea</i>	Needlebush	*	*		*
	<i>Hovea heterophylla</i>	Creeping Hovea	*			
	<i>Hovea linearis</i>	Common Hovea	*		*	*
	<i>Isopogon anemonifolius</i>	Broad-leaved Drumsticks	*	*		*
	<i>Lambertia formosa</i>	Mountain Devil	*	*	*	*
	<i>Lepidosperma neesii</i>	Stiff Rapier-sedge	*	*	*	
	<i>Leptospermum juniperinum</i>	Prickly Tea-tree			*	
	<i>Leptospermum trinervium</i>	Flaky-barked Tea-tree	*	*	*	*
	<i>Leucopogon juniperinus</i>	Prickly-beard Heath	*			*
	<i>Leucopogon microphyllus</i>	Small Leaved White Beard	*	*	*	*
	<i>Lomandra filiformis</i>	Wattle Mat-rush				*
	<i>Lomandra glauca</i>	Pale Mat-rush	*		*	
	<i>Lomandra multiflora</i>	Many Flowered Mat-rush	*	*	*	*
	<i>Lomandra obliqua</i>	Fish Bones	*		*	*
	<i>Micrantheum ericoides</i>	Micrantheum			*	
	<i>Micromyrtus ciliata</i>	Fringed Heath-myrtle		*	*	
	<i>Ozothamnus diosmifolius</i>	Rice Flower	*			
	<i>Persoonia lanceolata</i>	Lance Leaf Geebung	*	*		*
	<i>Persoonia levis</i>	Broad Leaved Geebung				*
	<i>Petrophile pulchella</i>	Conesticks	*	*	*	*
	<i>Phebalium squamulosum</i> subsp. <i>squamulosum</i>	Forest Phebalium			*	
	<i>Phyllanthus hirtellus</i>	Thyme Spurge	*			*
	<i>Pimelea linifolia</i>	Slender Rice Flower	*			*
	<i>Platysace linearifolia</i>	Carrot Tops			*	
	<i>Pultenaea daphnoides</i>	Large-leaf Bush-pea	*			
	<i>Pultenaea villosa</i>	Hairy Bush-pea		*	*	
	<i>Rytidosperma racemosum</i>	Wallaby Grass			*	*
	<i>Scaevola ramosissima</i>	Purple Fan-flower	*	*	*	*
	<i>Schizaea bifida</i>	Forked Comb Fern			*	
	<i>Schoenus ericetorum</i>	Heath Bog Rush			*	
	<i>Styphelia tubiflora</i>	Red Five-corner			*	
V	<i>Tetradlea glandulosa</i>	Glandular Pink Bells				*
	<i>Tetradlea thymifolia</i>	Black Eyed Susan			*	
	<i>Xanthorrhoea resinosa</i>	Grass Tree	*		*	*

Appendix I – Annual Management Reports for Year 2 - Passive Management of Stewardship Sites

Environment

From: Environment
Sent: Friday, 26 February 2021 11:30 AM
To: info@bct.nsw.gov.au
Cc: David Dixon; Mark Dixon; Melissa Mass
Subject: BSA Annual Passive Management Reports 2020-21 Submission: BSA 414 & 415
Attachments: Reminder - BSA414 Haerses Road - Passive 2 Annual Report.pdf; 2021 BSA Passive Reporting Haerses Road BSA 414 signed.docx; Reminder - BSA415 Dixon Porters Road - Passive 2 Annual Report.pdf; 2021 BSA Passive Reporting Porters Road Kenthurst BSA 415 signed.docx

Hi,

Please find attached Dixon Sand's submission of the Annual Passive Management Reports 2020 – 2021 for BSA 414 & 415.

The reports are in Word Document format as requested.

Please do not hesitate to contact me should you require any clarification or additional information.

Kind Regards,

Hunny Churcher
Environmental Officer
Dixon Sand Pty Ltd
P: 02 4566 8348
m: 0405 844 207
w: www.dixonsand.com.au

**Biodiversity Stewardship agreement
ID number: BSA 414
for sites established under the NSW Threatened Species
Conservation Act, 1995**

**2020
Annual Management Report
for Year 2 (2021) of passive management**

for Haerses Road Maroota



**Biodiversity
Conservation
Trust**

Biodiversity stewardship site annual reports (including this report) should be filed and stored in a such a way to ensure successive landholders of the site are able to access the management and audit history related to this site.

Annual report summary of passive management actions

BSA Site Reporting and Monitoring				
Audit details				
Reporting year of BSA site: 2021 Site visit (if required): BCT Contact: Jennie Powell Phone: 0282751688 Email: jennie.powell@bct.nsw.gov.au			Biodiversity Stewardship agreement ID: BSA 414 Name of landowner/site contact: David Dixon Phone: 0414330490 Property address: Haerses Road Maroota	
Management actions				
Annual reporting undertaken by landowner of the site (as per landowner's annual report)				
Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
1. Management of grazing for conservation	1.1 Stock must not be permitted to graze in any area of the BSA site.	Ongoing from commencement date	Yes	No stock kept or located on property. Last inspection 22/02/2021
	1.4 If stock is observed, the landowner must take measures to remove the stock immediately.	Ongoing from commencement date	N/A	
2. Weed control	N/A until active management		N/A	
3. Management of fire for conservation	N/A until active management		N/A	
	3.3 The landowner must light no additional fires on the property except that which has been outlined	Ongoing from commencement date	Yes	No fire within BSA site boundary during previous 12 month period. Last inspection 22/02/2021

Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
	as part of the fire management plan.			
4. Management of human disturbance	4.1 & 4.2 Human activities that adversely affect biodiversity values must not be carried out except as permitted under the agreement.	Ongoing from commencement date	Yes	No human activities undertaken within BSA site. Fence installed where activities occur nearby to define boundary. Last inspection 22/02/2021
	4.4 The landowner must not store or dispose of any waste on the BSA site.	Ongoing from commencement date	Yes	No waste disposed of within the BSA site. Last inspection 22/02/2021
5. Retention of regrowth and remnant native vegetation	5.1 Native vegetation must not be cut down or removed.	Ongoing from commencement date	Yes	No disturbance to any native vegetation within the BSA site during the previous 12 month period. Last inspection 22/02/2021
	5.2 Native vegetation must not be burnt except in accordance with fire management plan.	Ongoing from commencement date	Yes	No fire within BSA site boundary during previous 12 month period. Last inspection 22/02/2021
6. Replanting or supplementary planting where natural regeneration will not be sufficient	N/A until active management		N/A	
	6.5 Seeds and plants used for planting must be from locally collected provenances unless there are reasons to do otherwise.	As required (from commencement date if relevant to prepare for future planting).	N/A	

Management action	Item reference number	Required completion and frequency	Action completed (Yes/No)	Dates of inspection and description of actions undertaken
7. Retention of dead timber	7.1 Dead timber (whether standing or fallen and including branches and leaf litter) must not be removed from or within the BSA site.	Ongoing from commencement date	Yes	No removal of dead timber, standing or fallen, from within the BSA site during the previous 12 month period. Last inspection 22/02/2021
8. Erosion control	N/A until active management		N/A	
9. Retention of rocks	9.1 The landowner must not remove, or cause or permit to be removed, rocks from or within the BSA site.	Ongoing from commencement date	Yes	No removal of rocks from within the BSA site during the previous 12 month period. Last inspection 22/02/2021
10. Control of feral and overabundant native herbivores	N/A until active management		N/A	
11. Vertebrate pest management – foxes	N/A until active management		N/A	
12. Nutrient control	N/A until active management		N/A	
14. Maintenance or reintroduction of natural flow regimes	14.3 Artificial structures such as dams or levee banks that impede the natural flow regimes on the BSA site must not be constructed unless approved in writing for the purpose of restoring natural flows.	Ongoing from commencement date	Yes	No changes to natural flow regimes within the BSA site has occurred within the previous 12 month period. Last inspection 22/02/2021


Details of incidents or events that have had an adverse effect on biodiversity values on biobank site	
Description of incident or event (e.g. natural events)	Action taken and/or proposed recommended actions
Any other comments or observations regarding the biobank site	
<div> <div> Photo monitoring site 1. A return to average rainfall conditions throughout 2020 has seen an increase in grass diversity within the site. Individual shrubs which survived the drought conditions have good vegetative growth occurring. Ground cover forbs and ferns are re-emerging. </div> <div>  </div> </div>	

Photo monitoring site 2.

A return to average rainfall conditions throughout 2020 has seen an increase in grass diversity within the site. Individual shrubs which survived the drought conditions have good vegetative growth occurring. Ground cover forbs and ferns are re-emerging.



Photo monitoring site 3.

A return to average rainfall conditions throughout 2020 has seen an increase in grass diversity within the site. Individual shrubs which survived the drought conditions have good vegetative growth occurring. Ground cover forbs and ferns are re-emerging.



Signature and declaration

I hereby declare that the information supplied in this report is accurate and complies with the reporting requirements under clause 2 of the Annexure D to the biodiversity stewardship agreement.

Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report.

Signed

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

Signed

Date

26 / 02 / 2021

Date

**Biodiversity Stewardship agreement
ID number: BSA 415
for sites established under the NSW Threatened Species
Conservation Act, 1995**

**2020
Annual Management Report
for Year 2 (2021) of passive management**

for Porters Road Kenthurst



**Biodiversity
Conservation
Trust**


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Description of incident or event (e.g. natural events)	Action taken and/or proposed recommended actions
Any other comments or observations regarding the biobank site	
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<p>Photo monitoring site 1.</p>	

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Note: If the land that forms the biobank site is owned by multiple persons, each landowner must sign this annual report.

Signed

A handwritten signature in black ink, consisting of several loops and a long horizontal stroke extending to the right.

Signed

Date

26 / 02 / 2021

Date

Appendix J – S94 Contributions



DIXON SAND (No 1) PTY LTD

SECTION 94 CONTRIBUTION

SAND & SANDSTONE SALES MAY 2021

1	
3	
4	
5	
6	
7	
8	
10	
11	
12	
13	
14	
15	
17	
18	
19	27.00
20	27.00
21	
22	
24	
25	81.00
26	54.00
27	54.00
28	27.00
29	
31	

270.00 Tonnes @ \$1.04
\$280.80



DIXON SAND (No 1) PTY LTD

SECTION 94 CONTRIBUTION

SAND & SANDSTONE SALES JUNE 2021

1	55.00
2	28.00
3	
4	
5	
7	
8	28.00
9	
10	
11	
12	
15	
16	
17	
18	28.00
19	
21	112.00
22	237.00
23	147.00
24	28.00
25	27.00
26	
28	
29	85.75
30	116.47

892.22 Tonnes @ \$1.04
\$927.91

Appendix K – Community Engagement and CCC Meeting Minutes



Dixon Sand (Penrith) Pty Ltd

MINUTES OF THE BI-ANNUAL COMMUNITY CONSULTATIVE COMMITTEE 11 NOVEMBER 2020 GLENORIE RSL CLUB - GLENORIE

PRESENT	NAME	ORGANISATION
	Lisa Andrews (LA)	Independent Chairperson
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Daniel Giffney (DG)	The Hills Shire Council Representative
	Pat Schwartz (PS)	Community Representative (<i>left at 2.20pm</i>)
	Farley Roberts (FR)	Community Representative
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
	Hunny Churcher (HC)	Environmental Officer, Dixon Sand
	David Dixon (DD)	General Manager, Dixon Sand
	Mark Dixon (MD)	Dixon Sand
	Melissa Mass (MM)	Dixon Sand - Ecologist
APOLOGIES	Jemma Roberts (JR)	Community Representative (alternate)
	Lisa Aylward (LAy)	Maroota Public School Representative

The meeting was held in accordance with COVID-19 directives, with social distancing, hand sanitising, etc. A health declaration was completed by all attendees.

WELCOME & INTRODUCTION	LA opened the meeting at 1.10pm following a light luncheon. All members were welcomed and the new Bush-It representative, Timothy Baker was introduced.			
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. LA advised that TB has completed his pecuniary interest declaration & code of conduct forms.			No changes to previous declarations by members.
BUSINESS ARISING FROM PREVIOUS MEETING (13/5/20)	Item	Issue	Responsibility	LA to continue to follow up response from MP.
	1	Follow-up response from Robyn Preston MP regarding the school zone (Complete – see correspondence report)	LA	
CORRESPONDENCE (as emailed with Meeting Notice on 12/10/20)	<ul style="list-style-type: none"> 27/5/20 - Draft minutes sent to members for review 3/6/20 - Finalised minutes sent to members. 30/6/20 – Email from HC advising that Bush-Its representative on the CCC will now be Tim Baker (Managing Director). Forms sent through to him for completion and return. 2/7/20 – Email from TB with completed forms. 11/9/20 – Email from Chris Spraggon advising that he was leaving Bush-It. I responded to 			

	<p>Chris, thanking him for his contributions at our CCCs and wishing him all the best in his future endeavours.</p> <ul style="list-style-type: none"> • 28/9/20 – Email from HC advising that the Annual Review 2019 – 2020 for the Old Northern Road and Haerses Road Quarries has been submitted to the DPIE. A website link to access the documents was provided. • 12/10/20 – Email to CCC members with the Meeting Notice, Agenda and Correspondence Report for this meeting. • 12/10/20 – Email to Robyn Preston MP, following up a response in relation to the school zone outside Maroota Public School. • 2/11/20 – Email to members confirming the venue for this meeting (Glenorie RSL). • 7/11/20 – Email to Robyn Preston MP seeking a response. 	
<p>PROJECT REPORT, INCLUDING PRODUCTION/SALES OLD NORTHERN ROAD</p> <p>HAERSES ROAD QUARRY</p> <p>HAERSES ROAD QUARRY MOD. 3</p> <p>HAERSES ROAD QUARRY MOD. 4</p>	<p>DD advised that sales have been healthy and steady with interest in logs.</p> <ul style="list-style-type: none"> • Status of HR and WFR intersection upgrade to construct a channelised right-turn 'CHR' treatment is completed and awaiting RMS' final sign off. • Completion of extension of power to the proposed Processing Plant area • Completion of minimum 2 year groundwater monitoring of newly installed monitoring wells located within the 100m buffer zone to the MTSGS. • Extraction in Cell 1A (Mod 1 area) which commenced in December 2019 have been postponed. • Following from the formal response prepared for the submissions, Dixon Sand received a Request for Additional Information from DPIE in May 2020 • Dixon Sand responded to the RFI in late May 2020 by providing additional information regarding air quality assessment (as requested by EPA). • Current status – Proposed Modification under Assessment • Application for Modification 4 lodged on 7 October 2020 under Section 4.55(1A) of EP&A Act – minimal environmental impact. • Changing the sequence of approved extraction within the Mod. 1 Friable Hawkesbury Sandstone resource. • Approved Extraction Cells 1A and 2A ❖ Proposed Extraction Cells 1A and 1B (map shown and explained) 	<p>Questions asked and answered throughout the presentation.</p>

ENVIRONMENTAL MANAGEMENT	<p>The following documents were prepared and submitted to DPIE for review and approval:</p> <ul style="list-style-type: none"> o Maximum Extraction Depth Maps o Rehabilitation Bonds o EMS and Management Plans o 2 year of Groundwater Monitoring Data within the MTSGS Buffer Zone at Haerses Road o Annual Reviews 	
EPA VISIT	The EPA visited ONR and HR quarries mid June 2020 to undertake the 5 yearly risk assessment for the licensed premises.	
ENVIRONMENTAL MONITORING RESULTS	<p>The presentation showed the:</p> <ul style="list-style-type: none"> o Environmental Monitoring Locations o Environmental Incident o TEOM – PM10 data o Dust Deposition o Noise o Ground water; and o Surface water 	Maps accompanied presentation (see separate categories)
ENVIRONMENTAL INCIDENT/NON-COMPLIANCE	<p>Unplanned discharge over weir of main water channel at ONR:</p> <ul style="list-style-type: none"> – Reported to DPIE and EPA – Cause of incident – Incident rectification / remediation – Formal warning in relation to breaches of EPL 3916. Details provided. <p>Two non-compliance matters were advised in relation to conditions of approval for DA 250-09-01 and EPL 3916.</p>	See Slides 19 & 20
TEOM DATA	<p>TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc.</p> <p>Monitoring Criteria</p> <ul style="list-style-type: none"> o Long term: Annual PM10 average (light blue line) should not exceed the annual average criteria (pink line – 30µg/m3) o Short term: 24hr PM10 average (blue bars) should not exceed the 24hr PM10 NEPM Criteria (yellow line – 50µg/m3) o 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 o TEOM station represent the EPL Points 1 and 3. o PM10 data presented for July 2020 to September 2020. No PM10 exceedance recorded during this period. 	Graphs and colour coded data explained. (Slide 22)

DEPOSITIONAL DUST DATA	<p>Data and graphs explained for all sites for the monitoring period July 2020 to October 2020.</p> <ul style="list-style-type: none"> ➤ Old Northern Road (D1A, D4, D5 & D7) ➤ Haerses Road (D8, D10, D11 & D12). <p>No dust deposition exceedance recorded during this period.</p>	See Slides 23 - 32
NOISE MONITORING	<p>The noise monitoring program and data was explained for ONR & HR.</p> <p>Noise monitoring results demonstrated compliance with noise criteria.</p>	See Slides 34 - 37
GROUND WATER MONITORING	<p>GW Monitoring wells:</p> <ul style="list-style-type: none"> – 11 x BHs at ONR – 8 x BHs at HR (original extraction in Tertiary Sand) – 13 x BHs at HR (new – 100 MTSGS Buffer zone for <p>Mod 1 extraction cells</p> <p>GW level: monthly + continuous data loggers</p> <p>GW quality sampling & lab analysis:</p> <ul style="list-style-type: none"> – 6 monthly sampling and testing (ONR and HR original bores) – Monthly quality sampling and testing (HR MTSGS 100m Buffer) 	See Slides 38 - 55
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) 	Graphs explained. See Slides 56 - 59
BUSH REGENERATION WORKS	<p>TB advised that he hadn't been to the site for quite some time and was pleasantly surprised to see how remarkable the rehabilitation is. TB provided a comprehensive presentation of the rehabilitation and regeneration works undertaken on all sites:</p> <ul style="list-style-type: none"> ➤ Native Vegetation Corridor ➤ Lot 1 ➤ Lot 2 ➤ Biodiversity Offset – Haerses Road ➤ Future works 	See Slides 60 - 67
BIODIVERSITY AND REHABILITATION	<p>MM Provided a comprehensive presentation on the Biodiversity and Rehabilitation annual report, monitoring results and threatened species update.</p> <p>Photographs and maps were shown and explained.</p>	See Slides 68 - 79
GENERAL BUSINESS	<ul style="list-style-type: none"> ○ KM enquired whether auditing has been carried out through DPIE – DD advised that DPIE have only been involved with processing of the Annual Independent Environment Review and project Management Plans. EPA has attended the site, but this was not an audit. 	

	<ul style="list-style-type: none"> ○ HC advised that LAy had informed her that the P&C had no issues to raise. ○ HC raised on behalf of Phil Acurso that he has had problems with trespassers using Crown Land to access his private property. People are going to the dams, taking photographs, having picnics and leaving rubbish, etc. He requested that Dixon Sand install gates where ONR meets the crown road. KM commented that this was up to the Crown. All agreed that this is a difficult issue. MD will speak with HC to discuss issue and options. 	
MEETING SCHEDULE FOR 2021	<p>It was agreed to continue to hold the meetings bi-annually with the same schedule:</p> <ul style="list-style-type: none"> 📅 Wednesday 12th May 2021, and 📅 Wednesday 10th November 2021. <p>On site at 12.30pm with a light lunch, followed by the CCC commencing at 1pm.</p>	

The meeting was closed at 2.30pm with the chair thanking all members for their attendance and contribution throughout 2020 and wishing them a safe and happy festive season.

ACTION ITEM

Item	Issue	Responsibility
1	Follow-up response from Robyn Preston MP regarding the school zone	LA



DIXON SAND

MINUTES OF THE BI-ANNUAL COMMUNITY CONSULTATIVE COMMITTEE 12 MAY 2021 GLENORIE RSL CLUB - GLENORIE

PRESENT	NAME	ORGANISATION
	Lisa Andrews (LA)	Independent Chairperson
	Kristine McKenzie (KM)	The Hills Shire Council Representative
	Robert Buckham (RB)	The Hills Shire Council Representative
	Pat Schwartz (PS)	Community Representative
	Farley Roberts (FR)	Community Representative
	Lisa Aylward (LAy)	Maroota Public School Representative
	Timothy Baker (TB)	Bush Regeneration Contractor (Bush-It)
	Hunny Churcher (HC) <i>via video-conference</i>	Environmental Officer, Dixon Sand
	David Dixon (DD)	General Manager, Dixon Sand
	Mark Dixon (MD)	Dixon Sand
	Melissa Mass (MM)	Dixon Sand - Ecologist
APOLOGIES	Jemma Roberts (JR)	Community Representative (alternate)


WELCOME & INTRODUCTION	LA opened the meeting at 12.58pm following a light luncheon. All members were welcomed and LA advised that HC was participating via video-conferencing.			
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 by members.
BUSINESS ARISING FROM PREVIOUS MEETING (13/5/20)	Item	Issue	Responsibility	Members advised that subject area is located in The Hills Shire Council LGA. LA to advise RP. Action.
	1	Follow-up response from Robyn Preston MP regarding the school zone (Complete – RP advised that she had made representations to Hawkesbury City Council)	LA	
	PS advised that the issue of extending the length of the 60km zone at Cattai had been raised at a previous CCC and did not seem to have been addressed. LA to review. Action – see post script at end of these minutes.			
CORRESPONDENCE (as emailed with Meeting Notice on 14/4/21 with 5 additional items)	<ul style="list-style-type: none"> 18/11/20 - Draft minutes sent to members for review 19/11/20 – Email from HC to members advising of the approved Old Northern Road Quarry EMS & Management Plans from DPIE, which are available on the project website. 			

	<ul style="list-style-type: none"> ○ Rehabilitation Bonds ○ EMS and Management Plans ○ 2 year of Groundwater Monitoring Data within the MTSGS Buffer Zone at Haerses Road ○ Annual Reviews 	
ENVIRONMENTAL MONITORING RESULTS	<p>The presentation showed the:</p> <ol style="list-style-type: none"> 1. Environmental Monitoring Locations 2. Incidents 3. TEOM – PM10 data 4. Dust Deposition 5. Noise 6. Ground water; and 7. Surface water 	1. See Location Maps in Slides: 11-14
INCIDENT	<p>Exceedance of PM10 air quality on 25-4-21 to 26-4-21 (Sunday/Anzac Day):</p> <ul style="list-style-type: none"> – Reported to DPIE and EPA – Cause of incident was due to scheduled hazard reduction burns across the Greater Sydney and local areas, which are considered as extraordinary events. - The site was non-operational at the time 	See Slides 15-17
TEOM DATA	<p>TEOM and Meteorological station records PM10 levels and weather data such as rain, temperature, wind etc.</p> <p>Monitoring Criteria</p> <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 and 3. 	See Slides 18-19
DEPOSITIONAL DUST DATA	Data and graphs explained for all sites for the monitoring period July 2020 to April 2021.	See Slides 20-29

	<table><tr><th>Location</th><th>Dust Gauge</th></tr><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></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	
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	The 6-monthly noise monitoring program and data was explained for ONR (note HR currently requires annual monitoring if not quarrying in the new Mod 1 extraction cells). Noise monitoring results demonstrated compliance with noise criteria.	See Slides 30-32												
GROUND WATER MONITORING	GW Monitoring wells: – 11 x BHs at ONR – 8 x BHs at HR (original extraction in Tertiary Sand) – 13 x BHs at HR (new – 100 MTSGS Buffer zone for Mod 1 extraction cells) GW level: monthly + continuous data loggers GW quality sampling & lab analysis: – 6 monthly sampling and testing (ONR and HR original bores) – Monthly quality sampling and testing (HR MTSGS 100m Buffer)	Graphs explained - See Slides 33-49												
SURFACE WATER MONITORING	ONR • SW19 = Surface water monitoring at creek on Lot 196 • LDP1 = EPL 3916 Licenced Discharge Point at Weir of Main Water Channel HR • 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)	Graphs explained - See Slides 50-53												
BUSH REGENERATION WORKS	TB presented on the bush regeneration works: Old nursery site & surrounds Area intensively treated Feb – March to prevent Whiskey grass from seeding. Bare areas brush matted with seeding shrubs. The area is heavily compacted and would benefit from further revegetation to speed up the recovery process.	See photographs in Slides 55 - 62												

	<p>NVC – non topsoil section</p> <p>Recruitment and recovery witnessed is much slower with minimal microbial and mycorrhizal fungi. However minimal organic matter vastly reduces the ability of weeds to colonise. We have brush matted bare areas with seeding Acacias previously and now the area requires ongoing thinning of dense species i.e. Grevillea buxifolia and allelopathic canopy species.</p> <p>NVC – filled section</p> <p>Good growth of endangered plantings and excellent natural recruitment from seed bank. Only a very small amount of spot spraying along the edge has been undertaken targeting exotic grasses. Pampass and whiskey grass controlled recently. Thinning also required in this section to promote longer term diversity of species (Learning taken from Haerses road translocation.)</p> <p>Lot 1</p> <p>Recruitment on mass thanks to wetter than average conditions. We have mainly focused on targeting woody weeds such as Lantana and the occasional patches of Bridal Creeper. Exotic grasses targeted along edges. Predation from herbivores less evident now.</p> <p>Lot 2</p> <p>Mostly primary/secondary weed control of Lantana in this section. Open more degraded areas require revegetation with canopy species at the appropriate density in July-August. Recommend seed collection from site for future plantings in years to come. Intensive primary works scheduled for June – August.</p> <p>PS enquired that with all the rain is Bush-It keeping an eye on the Crofton weed. TB advised that they were.</p> <p>PS advised that eDNA water testing has found evidence of platypus in a number of sites on Cattai and Little Cattai Creeks. This indicates that they are present but not how well they are doing. Also noting that the koala population appears to be coming back.</p> <p>TB advised that he had seen white breasted sea eagles in the area.</p> <p>Biodiversity Offset – Haerses Rd</p> <p>Problematic species on disturbed edge next to access road predominantly. Relatively stable now with a dense buffer of competitive grasses and bracken fern.</p>	
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	<p>Future works</p> <p>Bush-it looks forward to taking on further work to ensure the rehabilitation of sites and the maintenance of remnant ecosystems adjacent to Dixon Sand.</p>	
BIODIVERSITY AND REHABILITATION	<p>MM Provided a comprehensive presentation on the Biodiversity and Rehabilitation annual report, monitoring results and threatened species update.</p> <p>Photographs and maps were shown and explained.</p> <p>Threatened Species Update</p> <p>Biodiversity and Rehabilitation Annual Report 2021</p> <ul style="list-style-type: none"> ○ The Biodiversity and Rehabilitation Annual Report for 2021 will be completed in September. ○ The Annual Report identifies native flora and fauna within the Native Vegetation Corridor and the Haerses Road Biodiversity Offset Area, monitors the success of the rehabilitation area within the NVC and describes the current condition of threatened flora and their habitats within the Old Northern Road site and the HRBOA. ○ The rehabilitation areas are thriving and increasing in diversity and density. The overall biodiversity of the NVC and HRBOA is stable. <p>Photographs were shown of the threatened species in the rehabilitation areas, ONR and HRBOA.</p> <p>Photographs were shown of fauna monitoring (micro bats):</p> <p>10 bat species identified, 5 of them listed as threatened species via the NSW Biodiversity & Conservation Act.</p> <p>MM commented that bats play an important role in the pollination process and also with controlling moths, etc at night.</p> <p>Photographs were shown of the <i>Melaleuca deanei</i> – Propagation:</p> <p>23 larger sized plants.</p> <p>25 smaller sized plants.</p> <p>Larger plants to be planted in May 2021 with smaller plants to be planted Spring 2021.</p> <p>BCT Reporting</p> <p>Annual Management Report for year 2 has been completed - Passive Management at Haerses Road and Porters Road.</p>	See Slides 63 - 70
GENERAL BUSINESS	<ul style="list-style-type: none"> ○ TB thanked Dixon Sand for fixing up the access trails. ○ PS thanked Dixon Sand for the lunch. 	

NEXT MEETING	 Wednesday 10 th November 2021. On site at 12.30pm with a light lunch, followed by the CCC commencing at 1pm .	
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The meeting was closed at 2:01pm with the chair thanking all members for their attendance.

ACTION ITEM

Item	Issue	Responsibility
1	Follow-up response from Robyn Preston MP regarding the school zone	LA
2	Extending the length of the 60km zone at Cattai had been raised at a previous CCC and did not seem to have been addressed.	LA

Post Script for Action Item 2: LA researched the previous minutes. This item was discussed at the extra-ordinary CCC held on 24 February 2020 – extract from minutes:

- PS further commented that the Eastbend committee had raised the issue of speed around the Cattai School, specifically where the speed goes from 80km to 40km during school times (from O'Brians Rd to Millers Rd or Threlkeld Dr – both sides of the school). Discussions on whether the speed should go from 80km to 60km to 40km or whether more signage should be erected, warning drivers of the upcoming school zone (40km). DD mentioned that it may be difficult to alter a main arterial road from 80km to 60km, stating it would require a robust argument with supporting technical data. Notwithstanding this, Dixon Sand is committed to safety and driver conduct.

Listed as an agenda item for discussion at the next CCC (10/11/21).

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 2020	0	3 Aug 2020
Aug 2020	0	11 Sep 2020
Sep 2020	0	6 Oct 2020
Oct 2020	0	2 Nov 2020
Nov 2020	0	1 Dec 2020
Dec 2020	0	4 Jan 2021
Jan 2021	1	1 Feb 2021
Feb 2021	0	1 Mar 2021
Mar 2021	0	9 Apr 2021
Apr 2021	0	11 May 2021
May 2021	0	2 Jun 2021
Jun 2021	0	2 Jul 2021
Total No. of Complaints	1	

Date Received	29/01/2021	Time	2:15 pm	Complaint Received By	Tom Watson
Contact Methodology	Phone Call	Complaint Nature	Traffic / Haulage Truck	Weather	Wet
Issue(s) raised					
A local resident (the Complainant) said that a haulage truck had turned into Old Northern Road from Wisemans Ferry Road and cut him off. The Complainant was driving along on Old Northern Road. The Complainant provided the truck company name.					
Recommendation(s)					
To contact the identified truck driver and verify the complaint.					
Outcome / Action(s) / Future Action(s)					
<p>Tom Watson contacted David Dixon (Quarry Manager) and informed him of the complaint.</p> <p>David Dixon spoke with the truck driver who admitted they misread the Complainant's driving and thought the Complainant was slowing down to turn into Wisemans Ferry Road from the Old Northern Road. The truck driver admitted he made a mistake and apologised for this.</p> <p>The Complainant arrived at the Quarry and spoke to David Dixon whom explained that the truck driver had admitted his mistake and apologised for it. David Dixon also explained to the Complainant that he will be contacting the Senior Manager of the truck company to inform them of the complaint and request that they remind their drivers of their responsibility. This information was also passed onto the truck driver involved in the complaint.</p> <p>On 01/02/2021 Hunny Churcher (Enviro Advisor) requested that Tom Watson communicate this 'verified' complaint to all truck drivers and that they are reminded of their responsibilities whilst driving on both public roads and Dixon Sand's premises. The details of the truck driver, truck company and the Complainant to remain confidential.</p>					
Closed Out Date	29/01/2021	Closed Out By	David Dixon and Hunny Churcher		

Appendix M – Waste and ENM/VENM Registers

Haerses Road Waste Tracking Register 2020-2021

Date	Waste Type	Amount	Measurement	Contractor	Disposal / Recycle	Receipt No
01/07/20 - 30/06/21	Genral Solid Waste - putrescible	26	cubic metre	Council Waste Contractor	Disposal	Council Rate
01/07/20 - 30/06/21	General Solid Waste - recyclable	13	cubic metre	Council Waste Contractor	Recycle	Council Rate

Total	Non-Putrescible skip	0	m3
	Council Putrescible	26	m3
	Council Recycle	13	m3

Haerses Road Quarry - Material Transport Register

Material	VENM Owner	Transport Company	Registration No.	Transport Date	Tip Time	Batch No	Testing Certificate	Quantity (t)	Application
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery	No ENM / VENM imported in 2020 calendar (January - December 2020)							
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								
VENM - Sandstone	Glenorie Bakery								

Total Annual Quantity (2020 Calendar year) (t)	-
Total Quantity (FY 2020 - 2021) (t)	-

Haerses Road Quarry - Material Transport Register

FY 2020 - 2021

Material	Source of Material	Transport Company	Registration No.	Transport Date	Tip Time	Batch No	Testing Certificate	Quantity (t)	Application
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	18/03/2021	7:30 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN41RN	18/03/2021	7:50 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN22IU	18/03/2021	8:20 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	EG0102	18/03/2021	8:40 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	ETHER GROUP	BAD950	18/03/2021	9:00 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	18/03/2021	9:05 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	18/03/2021	9:45 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN41RN	18/03/2021	10:30 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN22IV	18/03/2021	10:40 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	EGD102	18/03/2021	10:45 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	18/03/2021	11:10 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	18/03/2021	11:40 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	ETHER GROUP	BAD950	18/03/2021	11:45 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN22IU	18/03/2021	12:30 PM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN41RN	18/03/2021	12:40 PM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	18/03/2021	1:30 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	29/03/2021	7:50 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	29/03/2021	8:35 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	29/03/2021	8:55 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CG15MM	29/03/2021	9:15 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	29/03/2021	10:00 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	29/03/2021	10:10 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	29/03/2021	10:35 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	29/03/2021	11:00 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CG15MM	29/03/2021	11:30 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	29/03/2021	12:00 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	29/03/2021	12:20 PM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	29/03/2021	12:30 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	29/03/2021	1:00 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CG15MM	29/03/2021	1:30 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	29/03/2021	2:15 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	30/03/2021	8:45 AM	1	120120_ENM_V1	31	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN32VK	30/03/2021	8:50 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	30/03/2021	8:55 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CG15MM	30/03/2021	9:10 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	30/03/2021	9:15 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CI4420	30/03/2021	10:50 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	30/03/2021	11:00 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	30/03/2021	11:05AM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CG15MM	30/03/2021	11:10 AM	1	120120_ENM_V1	32	Lot 216 DP 752039
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VENM - Sandstone	Macquarie Park Site	BT Civil	XN32VK	30/03/2021	12:55 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG900	30/03/2021	1:00 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	CG15MM	30/03/2021	1:10 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	30/03/2021	1:15 PM	1	120120_ENM_V1	32	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN32VK	10/05/2021	8:10 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	BTPETE	10/05/2021	8:10 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	DUKSHV	10/05/2021	8:15 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN14YU	10/05/2021	8:20 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	10/05/2021	8:30 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	10/05/2021	8:50 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN32VK	10/05/2021	10:15 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	BTPETE	10/05/2021	10:20 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN14YU	10/05/2021	10:30 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	10/05/2021	10:45 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	10/05/2021	10:55 AM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN32VK	10/05/2021	12:20 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	BTPETE	10/05/2021	12:20 PM	1	120120_ENM_V1	30	Lot 216 DP 752039

VENM - Sandstone	Macquarie Park Site	BT Civil	XN14YU	10/05/2021	12:30 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	10/05/2021	12:55 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	10/05/2021	1:00 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN32VK	10/05/2021	2:35 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	BTPETE	10/05/2021	2:35 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN14YU	10/05/2021	2:45 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	LEG950	10/05/2021	2:55 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Sandstone	Macquarie Park Site	BT Civil	XN20EP	10/05/2021	3:20 PM	1	120120_ENM_V1	30	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	LEG900	26/05/2021	7:30 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	26/05/2021	8:20 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	MA0080	26/05/2021	8:30 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	13KDUB	26/05/2021	8:55 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DKS404	26/05/2021	9:00 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CI4420	26/05/2021	9:10 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	LEG900	26/05/2021	10:35 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	26/05/2021	11:00 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	MA0080	26/05/2021	11:20 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	13KDUB	26/05/2021	11:25 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DKS404	26/05/2021	11:30 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	26/05/2021	2:00 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	MA0080	26/05/2021	2:10 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DKS404	26/05/2021	2:20 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	13KDUB	26/05/2021	2:25 PM	1	E24348.E05.002_Rev1	31	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	LEG950	3/06/2021	12:20 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CI4420	3/06/2021	12:35 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DVKSHV	3/06/2021	12:40 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	LEG900	3/06/2021	12:45 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	3/06/2021	1:00 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	3/06/2021	1:40 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN32VK	3/06/2021	1:45 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DUKSHV	4/06/2021	8:00 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CN85VK	4/06/2021	8:30 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	4/06/2021	8:45 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	BTPETE	4/06/2021	9:00 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CG15MM	4/06/2021	9:15 AM	1	E24348.E05.002_Rev1	30	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	WAZ408	4/06/2021	9:30 AM	1	E24348.E05.002_Rev1	30	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DUKSHV	4/06/2021	10:45 AM	1	E24348.E05.002_Rev1	30	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CN85VK	4/06/2021	11:00 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	4/06/2021	11:20 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	BTPETE	4/06/2021	11:40 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CG15MM	4/06/2021	11:50 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	WAZ408	4/06/2021	12:00 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DUKSHV	4/06/2021	1:40 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CN85VK	4/06/2021	1:45 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	4/06/2021	1:50 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	BTPETE	4/06/2021	2:00 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	CG15MM	4/06/2021	2:15 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	WAZ408	4/06/2021	2:20 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DUKSHV	29/06/2021	7:50 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	29/06/2021	8:50 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	29/06/2021	8:30 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	29/06/2021	11:20 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	29/06/2021	11:30 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DUKSHV	29/06/2021	11:50 AM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	DUKSHV	29/06/2021	1:00 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN24VK	29/06/2021	2:20 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	29/06/2021	2:30 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN34VK	29/06/2021	5:00 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039
VENM - Clay	Parramatta Site	BT Civil	XN14YU	29/06/2021	5:05 PM	1	E24348.E05.002_Rev1	32	Lot 216 DP 752039

Total Annual Quantity
(2021 Calendar year) (t)

3,702.00

Total Quantity
(FY 2020 - 2021)
(t)

3,702.00

Appendix N – RFS Meeting Minutes

Meeting with Maroota Rural Fire Brigade – August 2020

Date: 25/08/2020

Time: 10:00 am – 11:00 am

Attendees:

- J David Dixon (DD) – Dixon Sand Quarry Manager / Director
- J Peter Kazzi (PK) – Maroota Rural Fire Brigade Captain

Agenda:

- J Annual review of bushfire mitigations and risk analysis with the local RFS representative.

Points for Discussion

- J DD accompanied PK at both Old Northern Road and Haerses Road Quarries
- J DD informed PK of the operational changes at both quarries
 - o Old Northern Road
 - rock and block operation on Lots 1 and 2
 - o Haerses Road
 - commencement of extraction in Cell 1A
 - intersection road upgrade works coming to completion,
 - erection of private power poles to Lot 216 which is the newly proposed location for a processing plant, amenities and truck loading.
- J PK discussed that the bushfire danger season for this year will commence on 1st October 2020. Bushfire danger season in some areas in Northern NSW will commence a few weeks prior to this date.
- J DD advised that the Quarry intends to acquire a new water truck for Haerses Road and will ensure a 'storz' fitting is installed for compatibility with RFS water infrastructure and appliances.
- J DD discussed the locations of the static water supplies at both quarries:
 - o Old Northern Road
 - drafting from water storage in Cons Hill
 - o Haerses Road
 - drafting from 2 water storage locations – 1) Stage 2 Eastern Pit and 2) Stage 2 Western Pit
- J DD advised that the location of the standpipe at Old Northern Road (currently used for filling the watercart) may be relocated in the future. If this is the case the local RFS will be notified.
- J PK discussed that a number of Hazard Reduction burns are scheduled in the district.
- J DD and PK agreed that:
 - o the Bushfire Management Plans (BFMP) for both quarries have been reviewed and no change is warrant until the processing plant at Haerses Road is in operation.
 - o both quarries remain low risk of bushfire due to quarry operations acting as a fire break, low risk of infrastructure catching fire.
- J PK and the local Maroota RFS brigade still has possession of a key to Old Northern Road quarry's front gate. In the case of an emergency and if required, the RFS will have access to the quarry.

Action

Action	To Action By:
Nil	-