Dixon Sand Pty Ltd

Haerses Road Quarry, Maroota

Annual Review
2019 – 2020

File Name: J16-001_AR_HR_2019-20

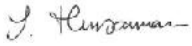
Version 1.0

Client: Dixon Sand (No. 1) Pty Ltd

Prepared by: Project Environmental Services Pty Ltd

Project Environmental Services

Document Control

Name of Operation	Haerses Road Quarry, Maroota
Name of Operator	Dixon Sand (No. 1) Pty Ltd
Development Consent / Project Approval #	DA165-7-2005 (Mod 2) – Haerses Road Quarry
Annual Review Start Date	1 July 2019
Annual Review End Date	30 June 2020
Name of Authorised reporting officer	Hunsamon Churcher
Title of Authorised reporting officer	Environmental Advisor
Signature of Authorised reporting officer	
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Report name	Dixon Sand - Haerses Road Quarry Annual Review 2019 - 2020		
Cover Page Image	Haerses Road Quarry Stage 2 west (courtesy: PES, March 2019)		
Prepared by:	Hunsamon Churcher	Date:	28/09/2020

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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
EIS	Environmental Impact Statement
EPA	NSW Environment Protection Authority
EP&A Act	NSW *Environment Planning and Assessment Act* 1979
EPL12513	Environment Protection Licence 12513 for the Haerses Road quarry
MTSGS	Maroota Tertiary Sands Groundwater Source
PIRMP	Pollution Incident Response Management Plan
PM10	Particulate matter <10um
SCBGS	Sydney Central Basin Groundwater Source
TEOM	Tapered Element Oscillating Microbalance
TSP	Total suspended particulates
WAL	Water Access License

1. Statement of Compliance

Table 1: Statement of Compliance

All Conditions of the relevant approval(s) were complied with?		
Haerses Road Quarry	DA165-7-2005	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: • 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: • Potential for moderate environmental consequences, but is unlikely to occur, or • Potential for low environmental consequences, but is likely to occur		
Administrative non-compliances	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions)		

2. Introduction

2.1 Project Background

Dixon Sand (No.1) 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 the Haerses Road quarry in 2006 with current extraction operation occurring in Stage 1, Stage 2 and Cell 1A. Sand is being transferred to the 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.

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 2019 to 30 June 2020, which is in line with the reporting for the Old Northern Road Quarry. Reporting for the rehabilitation assessment and ecological monitoring extends outside the specified period due to seasonal timing requirement for surveys.

Development consent DA165-07-05 (Modification 2) is applicable to this Annual Review.

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) *escribe 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 to local and regional markets from Haerses Road site commenced in 2015 however, no direct sale has taken place during this reporting period.

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.

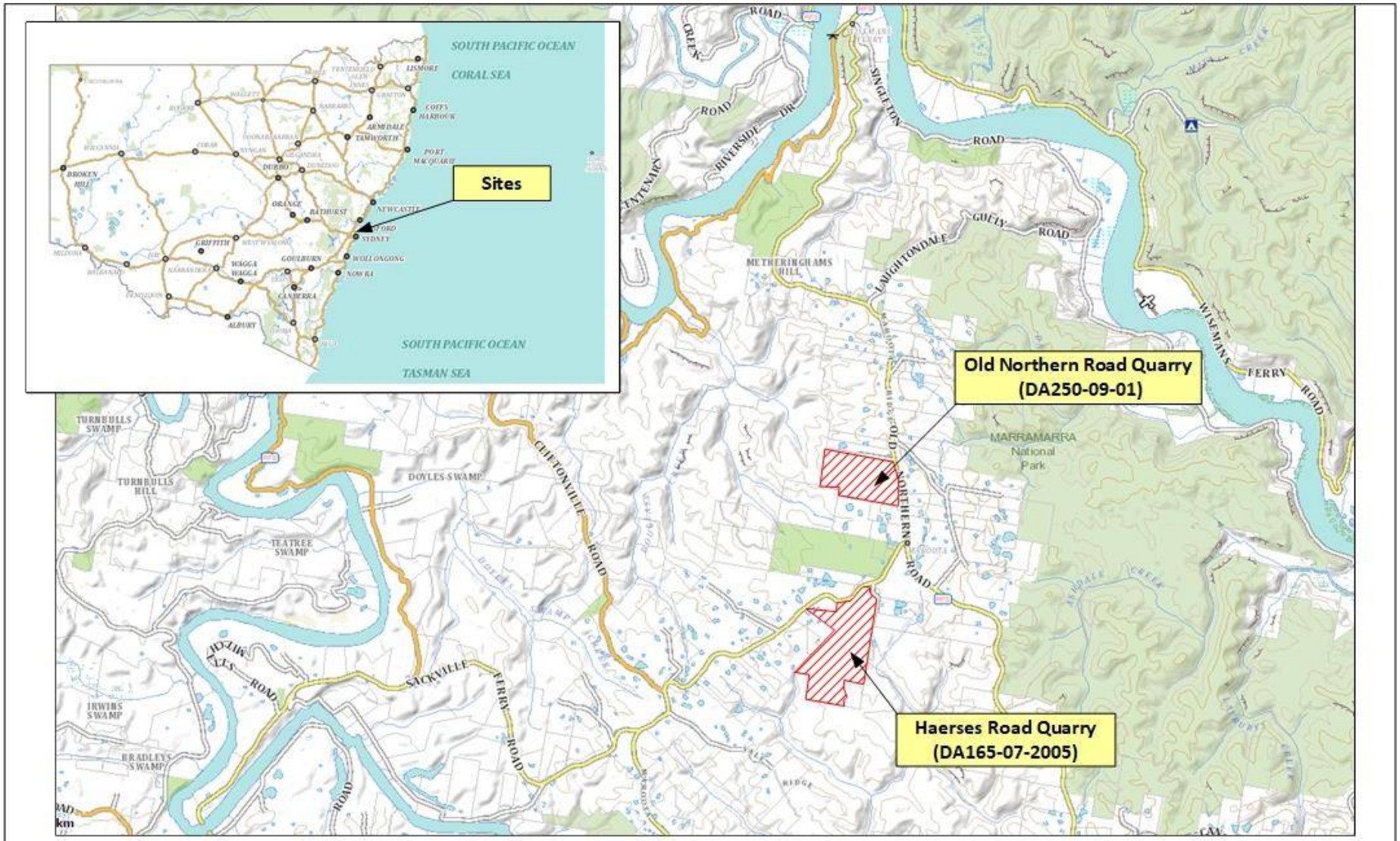
Dixon Sand lodged a modification application to modify DA165-7-2005 to expand the quarry extraction area, process products on site and to extend the life of the quarry. Approval for DA165-7-2005 Modification 1 was granted on 22 January 2018.

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.

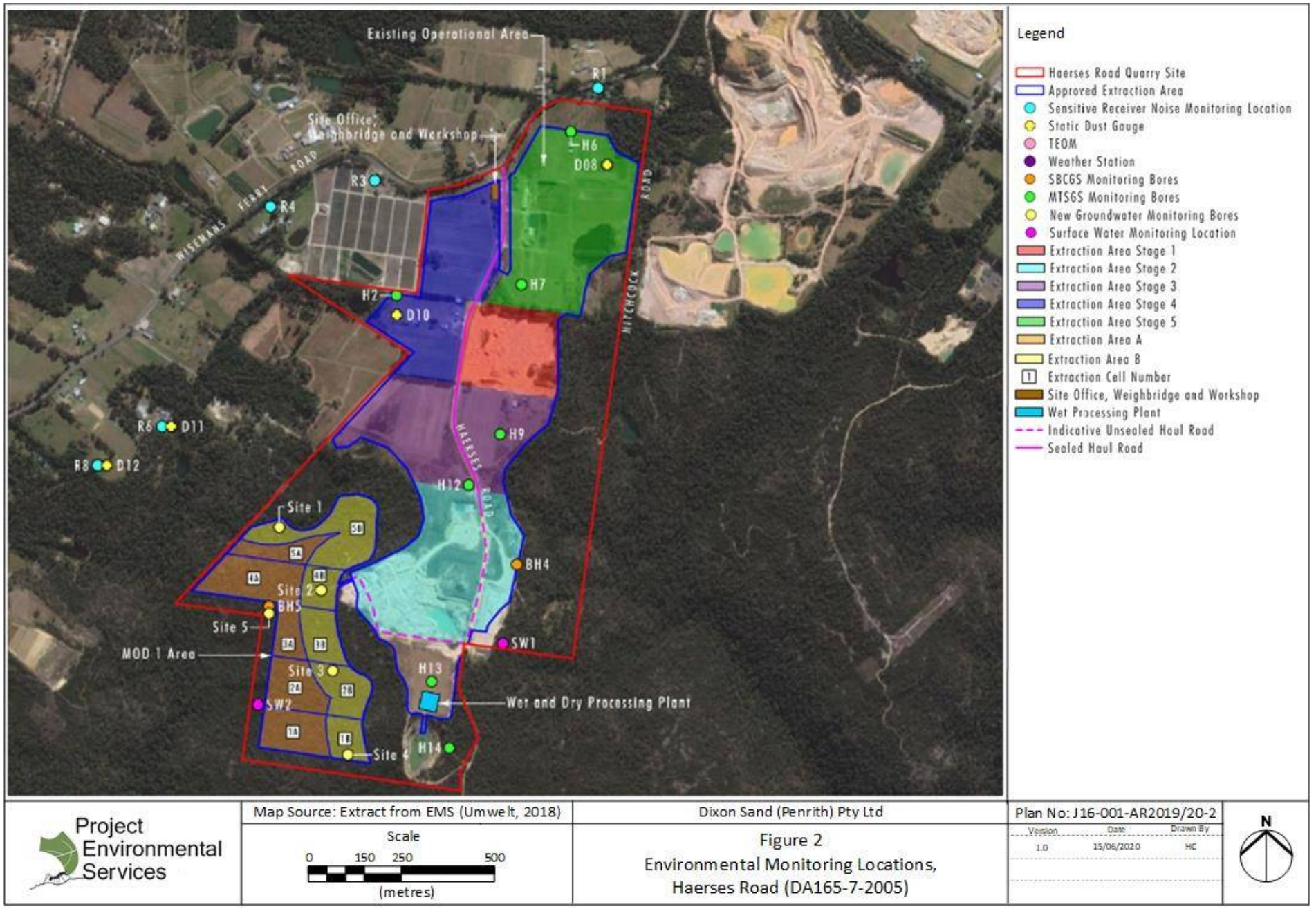
A summary of the development consents and modifications is provided in Table 3.

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 current	29 January 2019	Correction applied to an administrative error in Appendix 2 of DA165-7-2005 Modification 1 consent conditions.



Project Environmental Services	Map Source: Sixmap (2016) Scale 0 120 200 400 (kilometres)	Dixon Sand (Penrith) Pty Ltd Figure 1 Locality Plan of the Old Northern Road and Haerses Road Quarries	Plan No: J16-001-AR2017/18-1 Version: 1.0 Date: 01/08/2019 Drawn By: HC



Project Environmental Services

Map Source: Extract from EMS (Umwelt, 2018)

Scale

0 150 250 500

(metres)

Dixon Sand (Penrith) Pty Ltd

Figure 2

Environmental Monitoring Locations, Haerses Road (DA165-7-2005)

Plan No: J16-001-AR2019/20-2

Version	Date	Drawn By
1.0	15/06/2020	HC

N

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. No direct sales occurred during this reporting period.

A total of **62,303.5** tonnes of product has been extracted from Haerses Road and transferred to Old Northern Road for processing in **1,755** truckloads during this reporting period. No 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 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 Production and 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 Daily Direct Sale Truck Movement at HR (in and out bound)	Max Daily Transfer between HR and ONR inbound (in and out bound)	Max Daily Morning Truck between 6:00-7:00am (in and out bound)
Jul 2019	0	5928.5	5928.5	3,353	0	22	4
Aug 2019	0	6000.0	6000.0	3,421	0	24	4
Sep 2019	0	5183.0	5183.0	2,953	0	26	2
Oct 2019	0	6177.0	6177.0	3,447	0	26	4
Nov 2019	0	6355.0	6355.0	3,613	0	24	2
Dec 2019	0	5005.5	5005.5	2,809	0	26	4
Jan 2020	0	3372.5	3372.5	1,895	0	22	4
Feb 2020	0	3798.5	3798.5	2,186	0	20	4
Mar 2020	0	5076.5	5076.5	2,874	0	18	4
Apr 2020	0	4899.0	4899.0	2,840	0	18	4
May 2020	0	5076.5	5076.5	2,867	0	24	4
Jun 2020	0	5431.5	5431.5	3,292	0	20	2
Totals / Maximum	**0**	**62,303.5**	**62,303.5**	**35,551**	**0**	**26**	**4**
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 using the standard form, and include a copy of this data in the Annual Review.

The DRG 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. At the time of this Annual Review, Dixon Sand is awaiting the Minerals Return forms for the financial year 2019 – 2020 to be supplied by the DRG. The same production data contained in Table 4 will form the basis for calculations for DRG 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 2018-2019 Annual Review have been actioned by Dixon Sand, as summarised in Table 5.

Table 5: Summary of Recommendations and Actions

Recommendation from the 2017 – 2018 Annual Review	Actions
Vegetation clearing and extraction	
• Work associated with Modification 1 will continue into the next reporting period.	• Pre-commencement actions completed and extraction in Modification 1 area (Cell 1A) commenced in this reporting period.
Rehabilitation and bush regeneration	
• Rehabilitation to continue in Stage 1 cell. Rehabilitation works will continue in the Offset Area and Wisemans Ferry Road buffer zone.	• Rehabilitation continued in Stage 1 extraction area. Bush regeneration operation undertaken in the Offset Area.
• Erosion and sediment controls will be maintained. A focus should also be placed on weed control, particularly *Lantana camara* which has a priority ranking under the Biosecurity Act 2016. Ecological monitoring associated with Modification 1 will commence.	• Erosion and sediment controls maintained. Continuing weed management with a focus on *Lantana camara* and other weed species including *E. curvula*, *A. virginicus*, *Chloris gayana*, *B. Pilosa* and *T. minuta*. • Ecological monitoring for Mod 1 extraction area to commence in the next reporting period.
• Monitoring and management of the Haerses Road and Porters Road biobank sites to be undertaken in accordance with the Biobanking Agreement once finalised.	• Monitoring and management of the Haerses Road and Porters Road biobank sites were undertaken in accordance with the Biobanking agreement.

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
• 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; • product transportation along unsealed haul roads; and • occasional haul road grading.	• minimising the area of disturbance by only clearing areas immediately prior to extraction; • progressive rehabilitation; • stabilising topsoil stockpiles by planting with a cover crop of non-invasive cereal or legumes; • using a water cart to suppress dust on unsealed roads, during dry conditions on days of operation; • sealing Haerses Road; • limiting vehicle speed to 20 km/hr on internal unsealed access tracks; • ensuring all loads leaving the site are covered; and • regularly maintaining mobile and fixed equipment to minimise exhaust emissions.

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 180º-240º	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 2019	Aug 2019	Sep 2019	Oct 2019	Nov 2019	Dec 2019	Jan 2020	Feb 2020	Mar 2020	Apr 2020	May 2020	Jun 2020
Ave Temp (ºC)	12.3	12.5	15.1	18.1	20.4	22.1	23.3	21.8	19.1	18.1	13.6	12.0
Total Rainfall (mm)	5.8	79.0	21.4	7.2	10.0	0.8	18.6	119.2	28.0	11.8	9.2	2.2

Data presented in Table 8 shows that the highest monthly rainfall of 119.2 mm was recorded in February 2020 and the lowest monthly rainfall of 0.8 mm was recorded in December 2019. The total annual rainfall recorded during this reporting period is 313.2 mm, representing a higher annual rainfall than the previous reporting period (165.2mm for 2018 - 2019), but lower than the previous four reporting periods (372.8 mm in 2017 - 2018, 924 mm in 2016 - 2017, 1026.4 mm in 2015 - 2016 and 942 mm in 2014 - 2015).

From the recorded data of monthly temperature, January 2020 experienced the highest average temperature at 23.3°C with June 2018 experiencing the lowest average temperature at 12.0°C. Fluctuations of temperatures recorded 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 2019 and June 2020. Table 11 contains the calculated annual averages for the deposited dust. The monitoring cycle yielded 13 months of monitoring results during this reporting period.

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 2016 - 2017, 2017 - 2018, 2018 - 2019 and 2019 - 2020 respectively.

Table 10: Dust Deposition Results: July 2019 – June 2020.

Dust Gauge Location	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	May-20	Jun-20
	(g/m2/month)												
D08 Hitchcock Rd Grove	0.1	0.5	1.0	1.5*	1.8	4.4*	3.3*	8.2*	1.9	0.7*	0.5	0.4	0.4
D10 Haerses Rd (Pt 3, EPL12513)	2.5*	158*	1.5	11.1*	8.5*	5.6*	9.4*	6.9*	1.3	1.2*	1.8*	2.4*	0.7
D11	0.1	0.4	0.8	1.5*	1.8*	4.1*	3.3*	7.6*	1.3	0.4	0.8*	0.4*	0.5
D12	0.1	0.2	0.8	0.8	1.2	3.5*	3.4*	7.6*	1.3	0.3	0.5	0.3	0.3

Table 11: Calculated Annual Averages of Dust Deposition: June 2019 – June 2020.

Dust Gauge Location	Jul-19	Aug-19	Sep-19	Oct-19	Nov-19	Dec-19	Jan-20	Feb-20	Mar-20	Apr-20	May-20	May-20	Jun-20
	(g/m2/month)												
D08 Hitchcock Rd Grove	0.1	0.3	0.5	0.8*	1.0	1.6*	1.8*	2.6*	2.5	2.3*	2.2	2.0	1.9
D10 Haerses Rd (Pt 3, EPL12513)	2.5*	2.5*	2.0	5.0*	5.9*	5.8*	6.4*	6.5*	5.9	5.3*	5.0*	4.7*	4.4
D11	0.1	0.3	0.4	0.7*	0.9*	1.5*	1.7*	2.5*	2.3	2.1	2.0*	1.9*	1.8
D12	0.1	0.2	0.4	0.5	0.6	1.1*	1.4*	2.2*	2.1	1.9	1.8	1.7	1.6

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

TEOM PM_{10}

In accordance with Condition 10 of Schedule 3, DA165-7-2005, the concentration of particulates with an aerodynamic diameter less than ten microns (PM_{10}) is monitored via the continuous dust monitor (TEOM) near Maroota Public School. The TEOM records data for the whole 360º angles, of which the 180º - 240º quadrat (southerly to south-westerly) indicate potential airborne contributions from Haerses Road Quarry. Chart 8 illustrates the PM_{10} results for this reporting period, in comparison with relevant consent criteria. Charts 5 to 8 show the PM_{10} results for the reporting periods of 2016 - 2017, 2017 - 2018, 2018 - 2019 and 2019 - 2020 respectively.

A number of PM10 exceedance events occurred in the reporting period. Thirty-four (34) average 24-hour PM10 results have exceeded the EPL 42 ug/m3 and the NEPM 50 ug/m3 criteria.

Reporting of TSP results commenced in December 2017 and are shown in Charts 9 to 11. No TSP exceedance occurred during this 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.

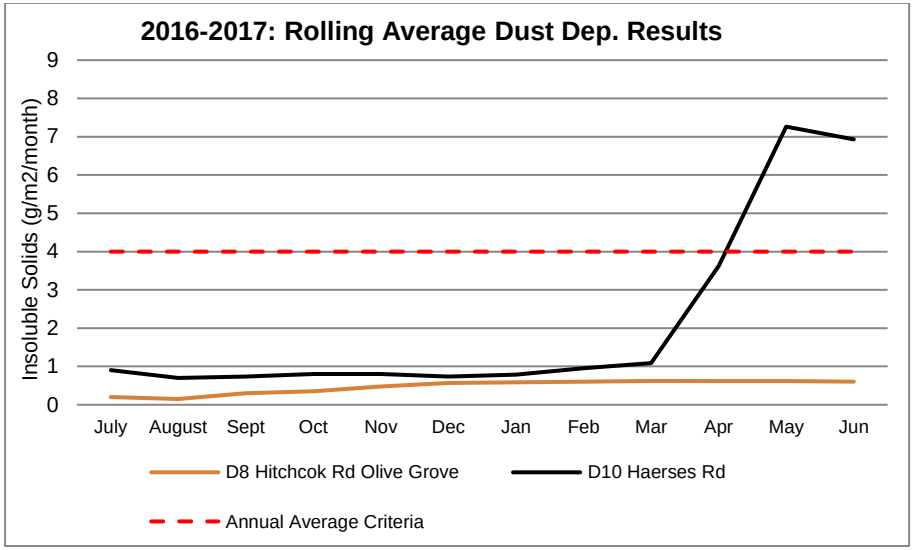


Chart 1: 2016 – 2017 Rolling Average of Dust Deposition Results

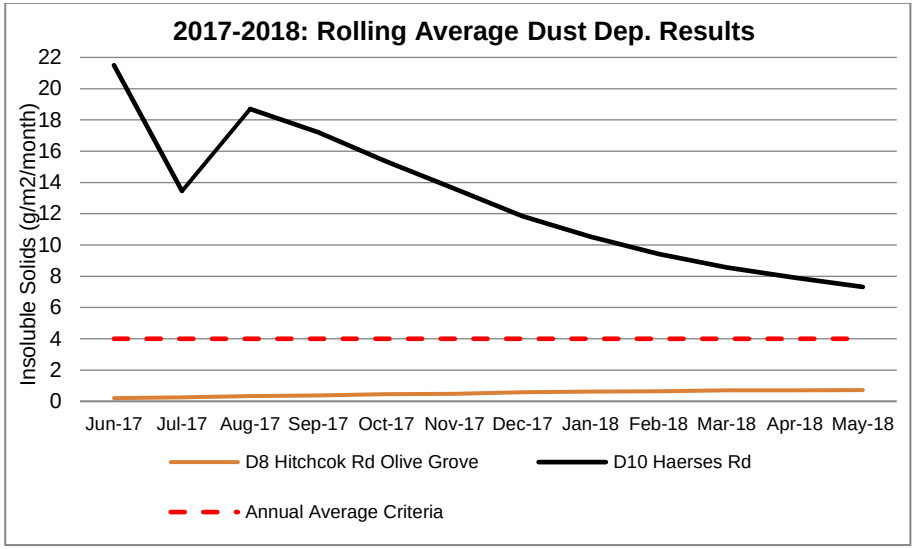


Chart 2: 2017 – 2018 Rolling Average of Dust Deposition Results

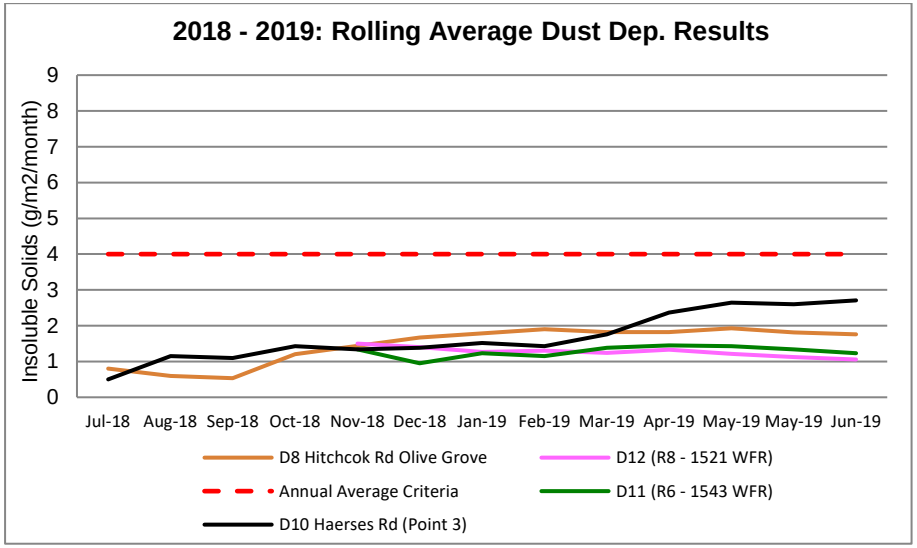


Chart 3: 2018 – 2019 Rolling Average of Dust Deposition Results

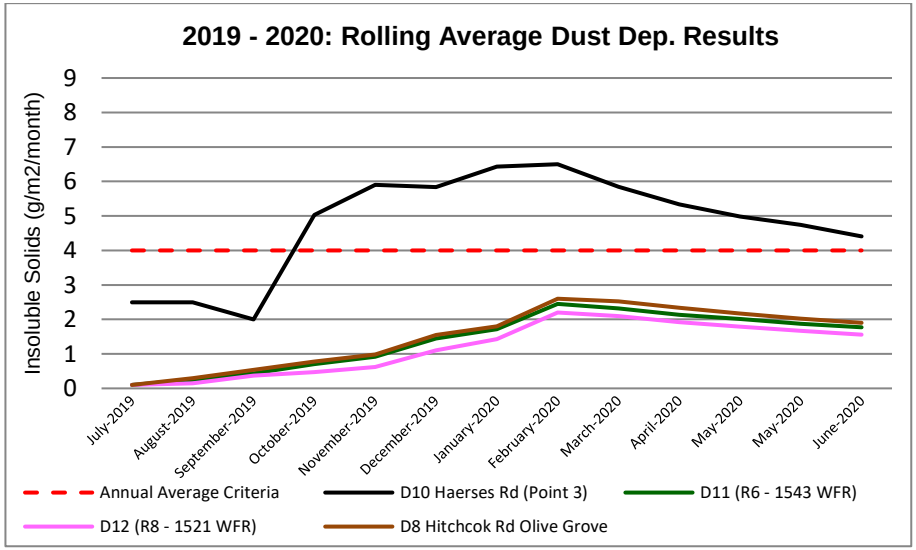


Chart 4: 2019 – 2020 Rolling Average of Dust Deposition Results

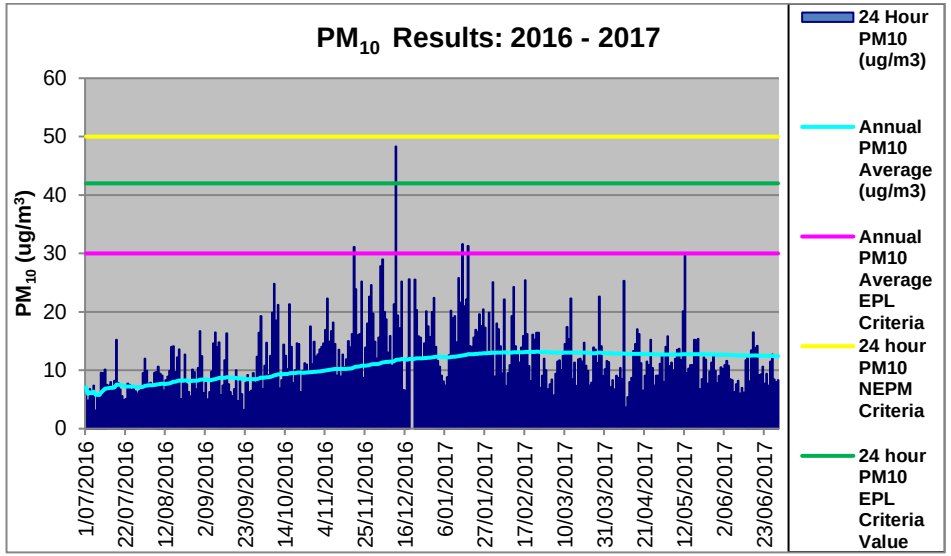


Chart 5: 2016 - 2017 PM10 Results and Criteria

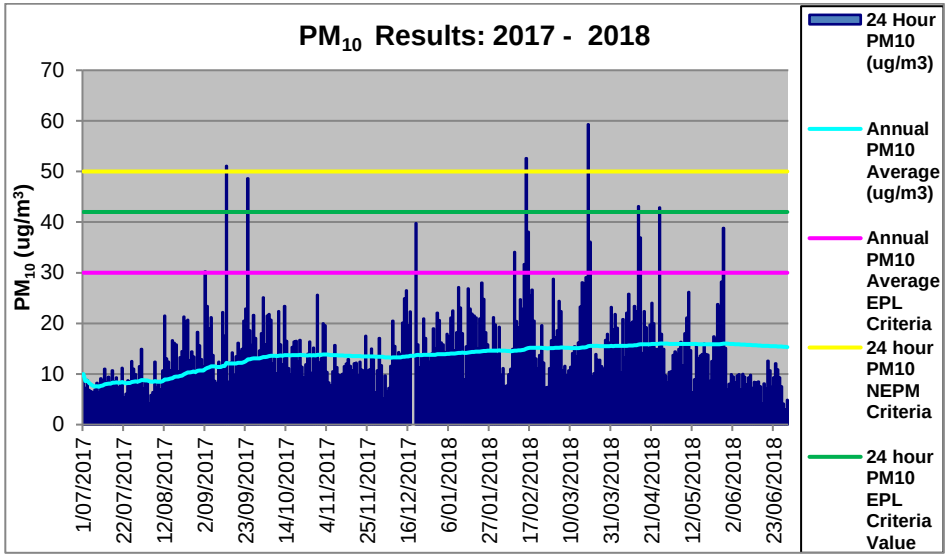


Chart 6: 2017 - 2018 PM10 Results and Criteria

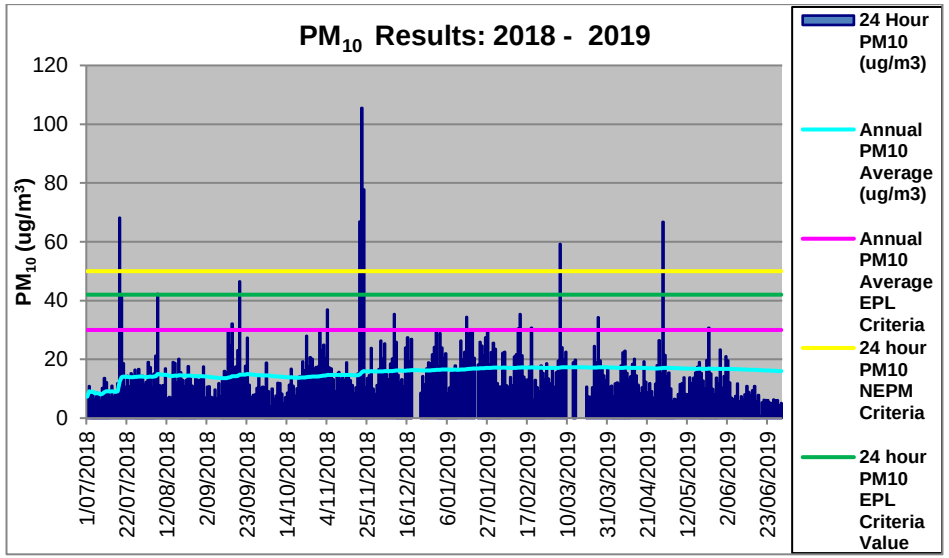


Chart 7: 2018 - 2019 PM10 Results and Criteria

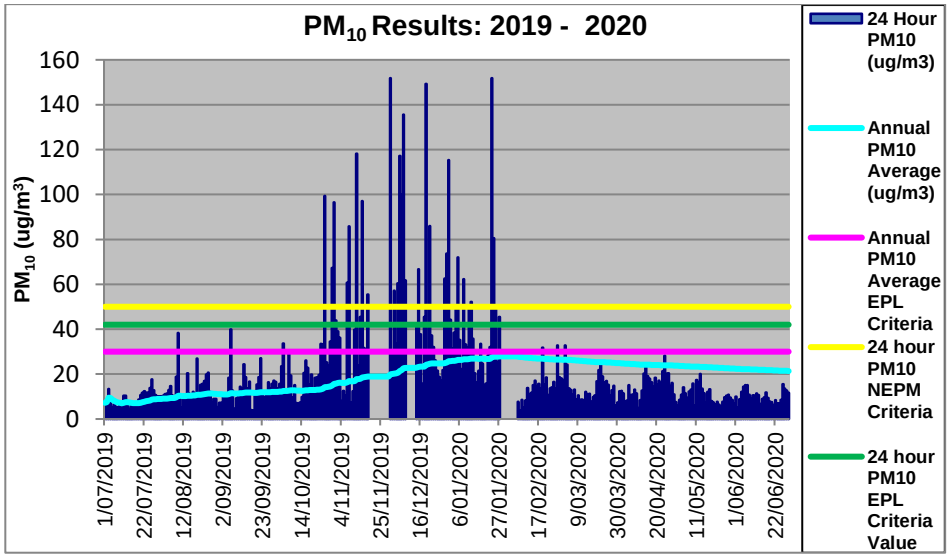


Chart 8: 2019 - 2020 PM10 Results and Criteria

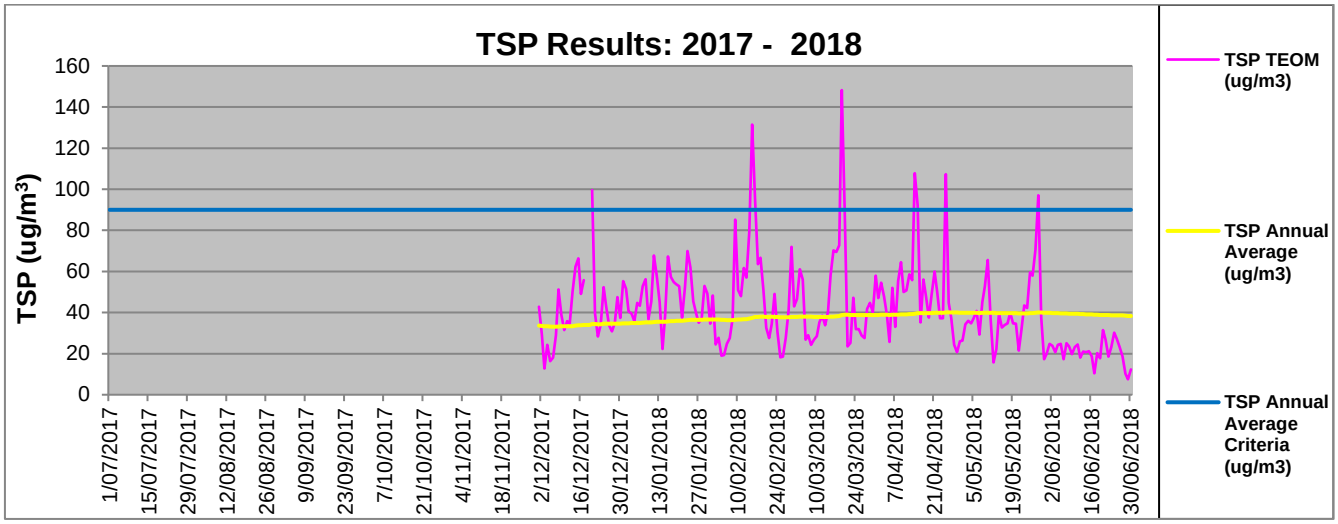


Chart 9: 2017 - 2018 TSP Results and Criteria

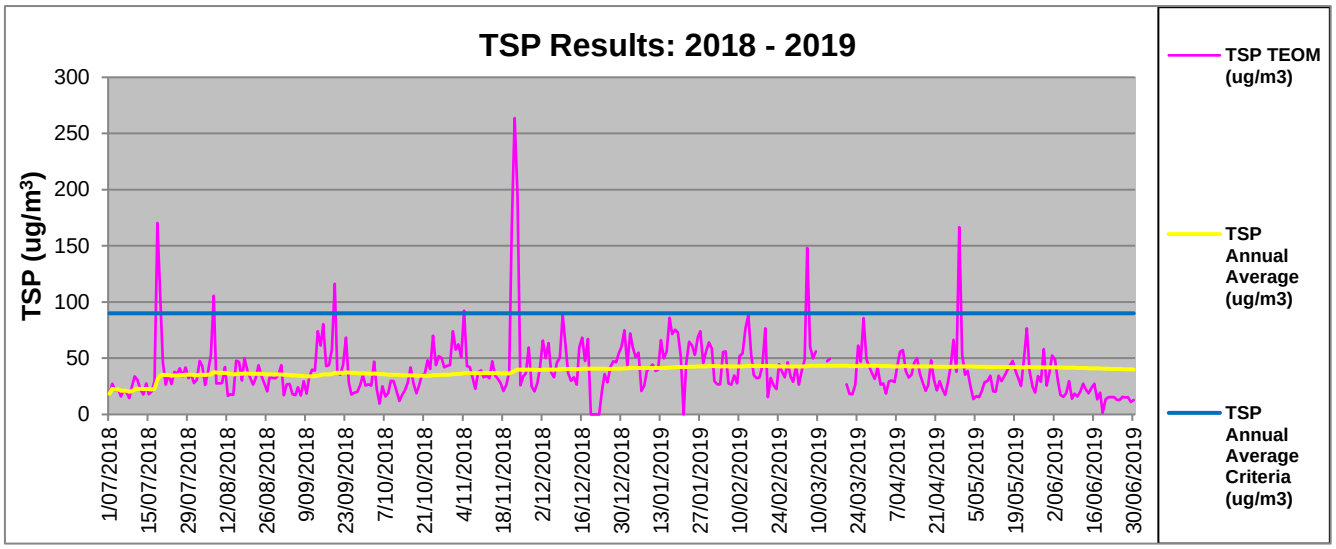


Chart 10: 2018 - 2019 TSP Results and Criteria

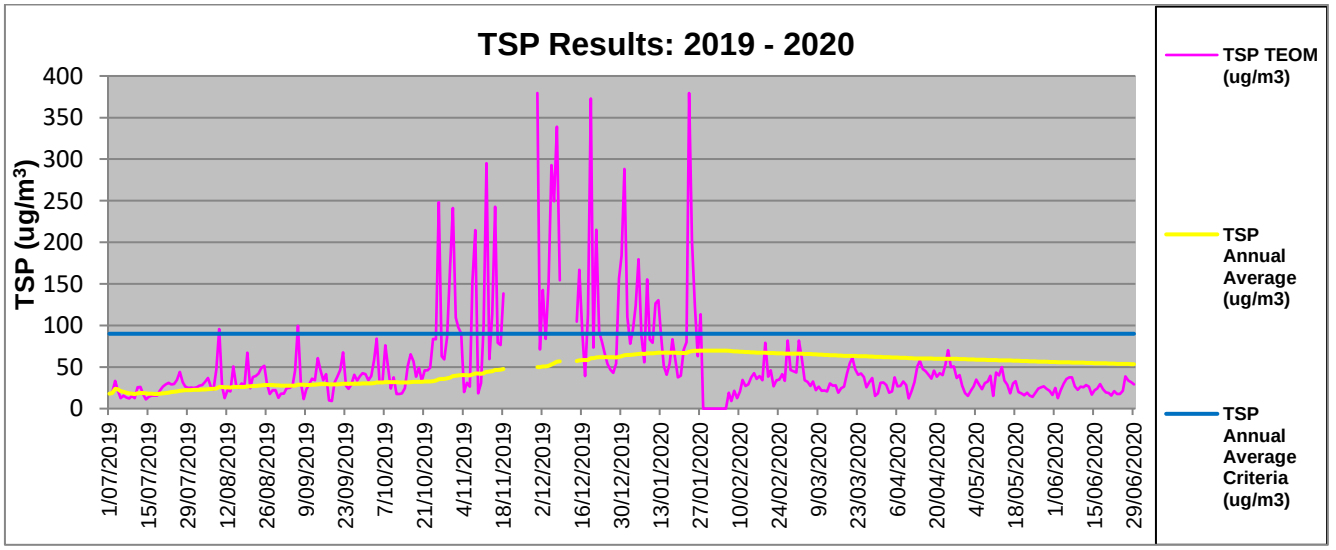


Chart 11: 2019 - 2020 TSP Results and Criteria

5.1.4 Analysis

Dust Deposition

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), D12 (Receiver R6) and D12 (Receiver R8) for the July 2019 to June 2020 period were in compliant. Monthly and annual average exceedances were recorded for dust gauge D10 (EPL 12513 Monitoring Point 3) during the reporting period. Table 12 provides explanations for the exceedances which were mainly attributed to local, regional and interstate bushfire events and backburning operations resulting in cumulative poor air quality for an extended period of time. Bushfires are considered extraordinary events as defined in the DA 250-09-01.

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. During the period of active bushfires and backburning operations which occurred from October 2019 to February 2020, elevated monthly dust deposition and annual averages were recorded for all dust gauges.

Table 12: PM10 – EPL and NEPM Management criteria exceedance

Exceedance Date	Comments
August 2019	The monthly deposited dust returned 158 g/m2/mth of **total insoluble solids** (comprising 107.3 g/m2/mth of **ash** and 50.7 g/m2/mth of **combustible matter**). Field observation indicated a deceased bird next to the dust gauge with mineral material droppings visible in the dust gauge. This excessively high dust result was considered an anomaly and omitted from the annual average calculation.
October 2019	The monthly deposited dust returned 11.1 g/m2/mth of **total insoluble solids** (comprising 6.2 g/m2/mth of **ash** and 4.9 g/m2/mth of **combustible matter**). This resulted in the annual average deposited dust being exceeded. Field observation indicated the presence of bird droppings, minor insects, algae, vegetation and sand in the dust gauge. Rehabilitation commenced in Stage 2 west and no extraction was undertaken during the monitoring period. The cause of high deposited dust levels is likely to also be attributed to ongoing bushfires and backburning operations, as supported by the elevated PM10 levels. (EPA notified, Ref C-15493-2019)
November 2019	The monthly deposited dust returned 8.5 g/m2/mth of **total insoluble solids** (comprising 4.3 g/m2/mth of **ash** and 4.2 g/m2/mth of **combustible matter**). The exceedance of annual average deposited dust continued. Field observation indicated the presence of major bird droppings and algae. Dry weather condition was recorded for this monitoring period. Active farming activity in dry condition was present in the adjacent plot to the north of the dust gauge. The soil has been worked in preparation for summer crop, exposing topsoil therefore creating high potential for wind erosion and deposition, and contributing to the high monthly dust levels at dust gauge D10. Rehabilitation commenced in Stage 2 west of the quarry and no extraction was undertaken during the monitoring period. The cause of high deposited dust levels is likely to also be attributed to ongoing bushfires and backburning operations, as supported by the elevated PM10 levels. (EPA notified, Ref C16048-2019).
December 2019	The monthly deposited dust returned 5.6 g/m2/mth of **total insoluble solids** (comprising 3.6 g/m2/mth of **ash** and 2.0 g/m2/mth of **combustible matter**). The exceedance of annual average deposited dust continued.

Exceedance Date	Comments
	Field observation indicated the presence of bird droppings, insects, algae and ash. It must be noted that other dust gauges in the monitoring network simultaneously returned high results this month. Dry weather condition was recorded for this monitoring period. The cause of high deposited dust levels is likely to also be attributed to ongoing bushfires and backburning operations, as supported by the elevated PM10 levels. (EPA notified, Ref C00386-2020).
January 2020	The monthly deposited dust returned 9.4 g/m2/mth of **total insoluble solids** (comprising 6.0 g/m2/mth of **ash** and 3.4 g/m2/mth of **combustible matter**). The exceedance of annual average deposited dust continued. Field observation indicated the presence dust, vegetation, algae and ash in the dust gauge. It must be noted that other dust gauges in the monitoring network simultaneously returned high results this month. The cause of high deposited dust levels is likely to also be attributed to ongoing bushfires and backburning operations, as supported by the elevated PM10 levels. (EPA notified, Ref C00775-2020).
February 2020	The monthly deposited dust returned 6.9 g/m2/mth of **total insoluble solids** (comprising 5.9 g/m2/mth of **ash** and 1.0 g/m2/mth of **combustible matter**). The exceedance of annual average deposited dust continued. Field observation indicated the presence of ash in the dust gauge. It must be noted that other dust gauges in the monitoring network simultaneously returned high results this month. The cause of high deposited dust levels is likely to also be attributed to ongoing bushfires and backburning operations, as supported by the elevated PM10 levels. (EPA notified, Ref C02940-2020).
Annual Average between July 2019 and June 2020	The exceedances of the annual average deposited dust levels at Monitoring Point 3 were due to ongoing local, regional and interstate bushfires and backburn operations, as supported by the elevated PM10 levels. Elevated deposited dust levels can be observed from the chart for an extended period commencing October 2019 extending to February 2020, coinciding with the occurrences of poor air quality associated with prolonged bushfires and backburning operations. Elevated monthly dust deposition results have been observed during these months across Dixon Sand's monitoring system inclusive of both Haerses Road and Old Northern Road quarries.

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 from approximately mid-2017 and through the 2017 – 2018 monitoring period due to impacts from prolonged earthwork activities and exposed ground surface in the neighbouring property.

PM10

Reporting Period 2019-2020

The Environmental Assessment (Umwelt, 2018) indicated that the long term annual average PM10 concentration is 13 µg/m^3.

The 24 hour average PM_{10} levels (dark blue columns on Chart 8) remained below the 24 hour EPL management level of 42 µg/m^3 (green line on Chart 8) and the 24 hour NEPM short term criteria level of 50 µg/m^3 (yellow line on Chart 8), except on thirty-four (34) days during this reporting period. Table 13 lists the 24 hour average PM_{10} exceedances and explanations.

During the period between October 2019 and February 2020, the rolling annual average PM_{10} values began rising, peaking at 27.6 µg/m^3 at the end of January 2020. The rolling annual average PM_{10} then declined steadily and concluded at 21.3 µg/m^3 at the end of this reporting period, remaining below the criteria of 30 µg/m^3. The 'rise and fall' trend of the rolling annual average PM_{10} coincided with the ongoing local, regional and interstate bushfire and backburning operations which resulted in cumulative poor air quality.

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. The single 24 hour PM10 average exceedance in 2016 - 2017 was not quarry related as the exceedance fell on a Sunday on which the quarry did not operate, with predominantly southerly winds being recorded. 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.

The annual PM_{10} average for the 2019 - 2020 reporting period was 21.3µg/m³, which was lower than the EPA criterion of 30µg/m³ but more than doubles the annual average of 13 µg/m³ contained in the Environmental Assessment (Umwelt, 2018). This annual average is evidently higher than previous records of 16.0 µg/m³ (2018 - 2019), 15.3 µg/m³ (2017 - 2018), 12.4µg/m³ (2016 - 2017) and 11.6 µg/m³ (2015 - 2016). The higher annual PM10 averages over the past earlier 3 reporting years were likely due to relatively dryer and dustier conditions compared to historical records. The higher annual PM10 average for this reporting period was highly influenced by cumulative poor air quality associated with local, regional and interstate bushfires and backburning operations.

Table 13: PM10 – EPL and NEPM Management criteria exceedance

Event No.	Exceedance Date	24 Hour Average PM10 (ug/m^3)	Exceeded criteria (ug/m^3)	Comment
1	26 October 2019	99.3	EPL: 42 ug/m3 NEPM: 50 ug/m3	Self-Reports to EPA on multiple occasions: • EPA Ref C14574-2019 • EPA Ref C14729-2019 • EPA Ref C15181-2019 • EPA Ref C15336-2019 • EPA Ref C15492-2019 • EPA Ref C15673-2019 • EPA Ref C16310-2019 • EPA Ref C00388-2020 • EPA Ref C00539-2020 • EPA Ref C01036-2020 • EPA Ref C01332-2020 On-going localised, regional and interstate bushfires and backburning operations have resulted in residual poor air quality and elevated PM10 levels. Bureau of Meteorology forecasted areas of haze around Sydney on a number of days. This is supported by the poor air quality data recorded across the DPIE Monitoring Stations. Visible smoke haze was observed at the premise on the majority of the days the exceedances occurred. PM10 exceedance not attributed to quarry operations.
2	30 October 2019	67.3		
3	31 October 2019	96.5		
4	1 November 2019	43.9		
5	7 November 2019	60.7		
6	8 November 2019	85.8		
7	12 November 2019	118.1		
8	14 November 2019	45.5		
9	15 November 2019	97.1		
10	18 November 2019	55.4		
11	30 November 2019	151.8		
12	2 December 2019	57.1		
13	4 December 2019	60.4		
14	5 December 2019	117.1		
15	6 December 2019	99.8		
16	7 December 2019	135.6		
17	8 December 2019	61.7		
18	15 December 2019	66.7		
19	18 December 2019	45.4		
20	19 December 2019	149.2		
21	21 December 2019	86.0		
22	29 December 2019	62.6		
23	30 December 2019	73.6		
24	31 December 2019	115.3		
25	1 January 2020	44.1		
26	4 January 2020	49.4		
27	5 January 2020	71.9		
28	8 January 2020	62.2		
29	11 January 2020	50.6		
30	12 January 2020	52.1		
31	23 January 2020	151.8		
32	24 January 2020	80.5		
33	25 January 2020	49.5		
34	27 January 2020	45.4		

Total Suspended Particles

Reporting Period 2019-2020

The Total Suspended Particles (TSP) results are reported in Charts 9, 10 and 11. The annual average TSP for this reporting period is 53.4 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 reflected the elevated PM10 values associated with local, regional and interstate bushfires and backburning operations.

Historical Data

Reporting of TSP commenced in December 2017. Historical annual average TSP values were 38.3 µg/m³ (2017 - 2018) and 40.0 (2018 - 2019). The TSP value for this reporting period is 53.4 µg/m³ which is a higher result than the previous monitoring years.

5.1.5 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 14.

Table 14: Potential sources of Noise and mitigation measures.

Potential Noise Sources	Mitigation Measures
• 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	• 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. The main sources of noise generated from Haerses Road quarry during the attended noise monitoring were sand processing and truck loading utilising a screen, front end loaders and dump trucks.

5.2.2 Compliance Limits

Haerses Road's noise criteria are listed in Table 15. Noise criteria in Table 15 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 receiver R2 and all identified receivers on Hitchcock Road to the east of Haerses Road quarry.

Approved hours of operation are contained in Table 16. Noise monitoring for the quarry is based on these criteria.

Table 15: Haerses Road Noise Criteria

<table>
<tr><th>Consent Condition</th><th>Conditions</th></tr>
<tr><td>DA165-7-2005, Condition 3 of Schedule 2</td><td>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.
Table 2: Operational noise criteria dB(A)
<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>$L_{Aeq\ (15\ minute)}$</th><th>$L_{Aeq\ (15\ minute)}$</th><th>$L_{A(max)}$</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>
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.

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.

Note:
• Should an agreement with a landowner be terminated for any reason, the Applicant must comply with the noise criteria in Table 2.</td></tr>
</table>

Table 16: Haerses Road Approved Hours of Operation.

<table>
<tr><th>Consent Condition</th><th>Condition</th></tr>
<tr><td>DA165-7-2005, Condition 1 of Schedule 2</td><td>The Applicant must comply with the operating hours set out in Table 1.
Table 1: Operating hours
<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></td></tr>
<tr><td>DA165-7-2005, Condition 2 of Schedule 2</td><td>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.</td></tr>
</table>

5.2.3 Results

Attended noise monitoring for Haerses Road quarry was undertaken in June 2020. 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 being the dominant noise sources. No LAmax noise levels were attributable to quarry operations during the shoulder period.

Extrapolated noise results are calculated in Table 17. The full noise monitoring reports for June 2020 is contained in Appendix D

Table 17: Extrapolated Noise Monitoring results, June 2020.

Receiver	Noise Criteria		Extrapolated Daytime noise level (LAeq 15 min)	Comment
	Shoulder (dBA)	Daytime (dBA)		
R1	37	37	29	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	34	
All other receivers	35	35	<35	

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

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 Changes to Environmental Procedures

Undertake noise monitoring in accordance with the Noise Management Plans.

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 movement records have been sent to Council on a monthly basis and Section 94 Contribution payments made. As there have been no direct sales of sand products from Haerses Road quarry, Section 94 Contribution payment for the Old Northern Road is inclusive of Haerses Road quarry products.

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 did not receive any traffic related complaints associated with Haerses Road quarry during the reporting period.

Please note that Dixon Sand has no jurisdiction over haulage trucks outside the quarry premise as these are not contracted or 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 registers is contained in Appendix L.

5.3.3 Compliance

Assessment of compliance with the relevant conditions is summarised in Table 18.

Table 18: Road and Traffic Compliance.

<table>
<tr><th>DA165-7-2005 (Mod 2)</th><th>Condition</th><th>Compliance</th><th>Comments</th></tr>
<tr><td>Condition 8 of Schedule 2</td><td>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.</td><td>Yes</td><td>Refer to Truck Record</td></tr>
<tr><td>Condition 10 of Schedule 2</td><td>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.</td><td>Yes</td><td>Commencement of VENM importation occurred in June 2019. No receipt of VENM / ENM occurred this reporting period. Refer to Section 5.4.2</td></tr>
<tr><td>Condition 15 of Schedule 2</td><td>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 The Hills Shire Council Contributions Plan No. 6 Extractive Industries, or any subsequent relevant contributions plan adopted by Council.</td><td>Yes</td><td>Refer to Appendix J for s.94 contribution remittances.</td></tr>
<tr><td>Condition 1 of Schedule 3</td><td>The Applicant must comply with the operating hours set out in Table 1.</td><td>Yes</td><td>Refer to truck record</td></tr>
<tr><td colspan="4">Table 1: Operating hours
<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</td></tr><tr><td></td><td>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</td></tr><tr><td></td><td>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</td></tr><tr><td></td><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></td></tr>
<tr><td>Condition 2 of Schedule 3</td><td>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.</td><td>Yes</td><td>Condition not triggered</td></tr>
</table>

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
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	The Applicant must: (a) maintain safe access to the site for the public and emergency services for the duration of the development; and (b) reinstate the extracted length of Haerses Road to the satisfaction of Council. *Notes:* • *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	Ongoing Condition not yet triggered – to be completed Completed Completed Completed Condition not yet triggered – to be completed
Condition 22 of Schedule 3	Prior to carrying out any development, the Applicant must: (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 (b) provide warning signage ("Truck Turning") on the eastern and western approaches of Wisemans Ferry Road, to the satisfaction of RMS.	Yes	Completed

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
Condition 23 of Schedule 3	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. *Notes:* • *Prior to the Construction Certificate being released the Applicant must:* - *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	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: (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 (b) design and construct the intersection treatment in accordance with the Austroads *Guide to Road Design*.	Yes	Road intersection upgrade in progress. Anticipate completion during this next reporting period.
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

DA165-7-2005 (Mod 2)	Condition	Compliance	Comments
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
Condition 28 of Schedule 3	The Applicant must prepare a Traffic Management Plan for the development to the satisfaction of the Secretary. This plan must: (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. The Applicant must implement the approved Traffic Management Plan as approved by the Secretary.	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 2019 - 2020 reporting period.

No traffic related complaints were received by Haerses Road Quarry.

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 19.

Table 19: Haerses Road – Total Waste Generated, July 2019 to June 2020.

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 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 29,496 tonnes of VENM was imported to Haerses Road Quarry during the 2019 calendar year,
- A total of 27,546 tonnes of VENM was imported to Haerses Road Quarry during the 2019 – 2020 financial year (Annual Review reporting period), and
- A total of *nil* tonnes of VENM was imported to Haerses Road Quarry during the 2020 calendar year.

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 for the 2019-2020 reporting period.

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 and 2 require 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 Hearses Road quarry, seven 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, Boreholes BH4 and BH5 were added to Haerses Road quarry water monitoring program, bringing the total number of boreholes monitored to nine. Additional 13 boreholes (Cluster bores located in the MTSGS 100m buffer) were required to be installed by DA 165-7-2005 Modification 1 and 2. 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 20. The adopted 20th and 80th percentile water levels as site specific trigger values in the Soil and Water Management Plan are listed in Table 21.

Table 20: 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
H13	South of the quarry boundary, outside Stage 2	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 21: Baseline Groundwater Level Statistics and Trigger Values.

Monitoring Bore	Minimum	20th Percentile	50th Percentile	80th 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 2019 and June 2020, 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 22below.

Table 22: Baseline Groundwater Quality Statistics and Trigger Values

	pH			Electrical Conductivity (µS/c)		
Monitoring Bore	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. The surface water quality statistics presented in Table 23 were derived from only one sampling event occurred during the reporting period in February 2020. Consequently, data contained in Table 23 represents the interim baseline values which will be subjected to on-going review once additional surface water quality results have been obtained.

Table 23: Baseline Surface water Quality Statistics and Trigger Values

Parameter	Minimum	20th Percentile	50th Percentile	80th Percentile	Maximum
pH	5.9	6.0	6.3	6.5	6.7
TSS (mg/L)	12.0	12.4	13.0	13.6	14.0
Turbidity (NTU)	25.3	36.7	53.7	70.7	82.1

6.2 Extraction Limits

Extraction limits for Haerses Road quarry are defined by DA165-7-2005 and listed in Table 24 below.

Table 24: 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	Within 6 months of the determination of Modification 1, the Applicant must: (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. 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.
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	The Applicant must review and update the Maximum Extraction Depth Map: (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 12 depicts the long term recorded groundwater levels commencing in June 2003 for H-series, BH4 and BH5. Charts 13 to 33 (inclusive) illustrate the groundwater levels for this reporting period.

Groundwater Quality

Chart 34 depicts the long term recorded groundwater pH commencing in June 2003. Charts 35 to 47 (inclusive) illustrate the groundwater pH across all bores during this reporting period.

Chart 48 depicts the long term recorded groundwater electrical conductivity commencing in June 2003. Charts 49 to 61 (inclusive) illustrate the groundwater electrical conductivity across all bores during this reporting period.

Surface Water Quality

Table 25 contains the laboratory analyses results for water samples obtained at SW1 and SW2 in February 2020.

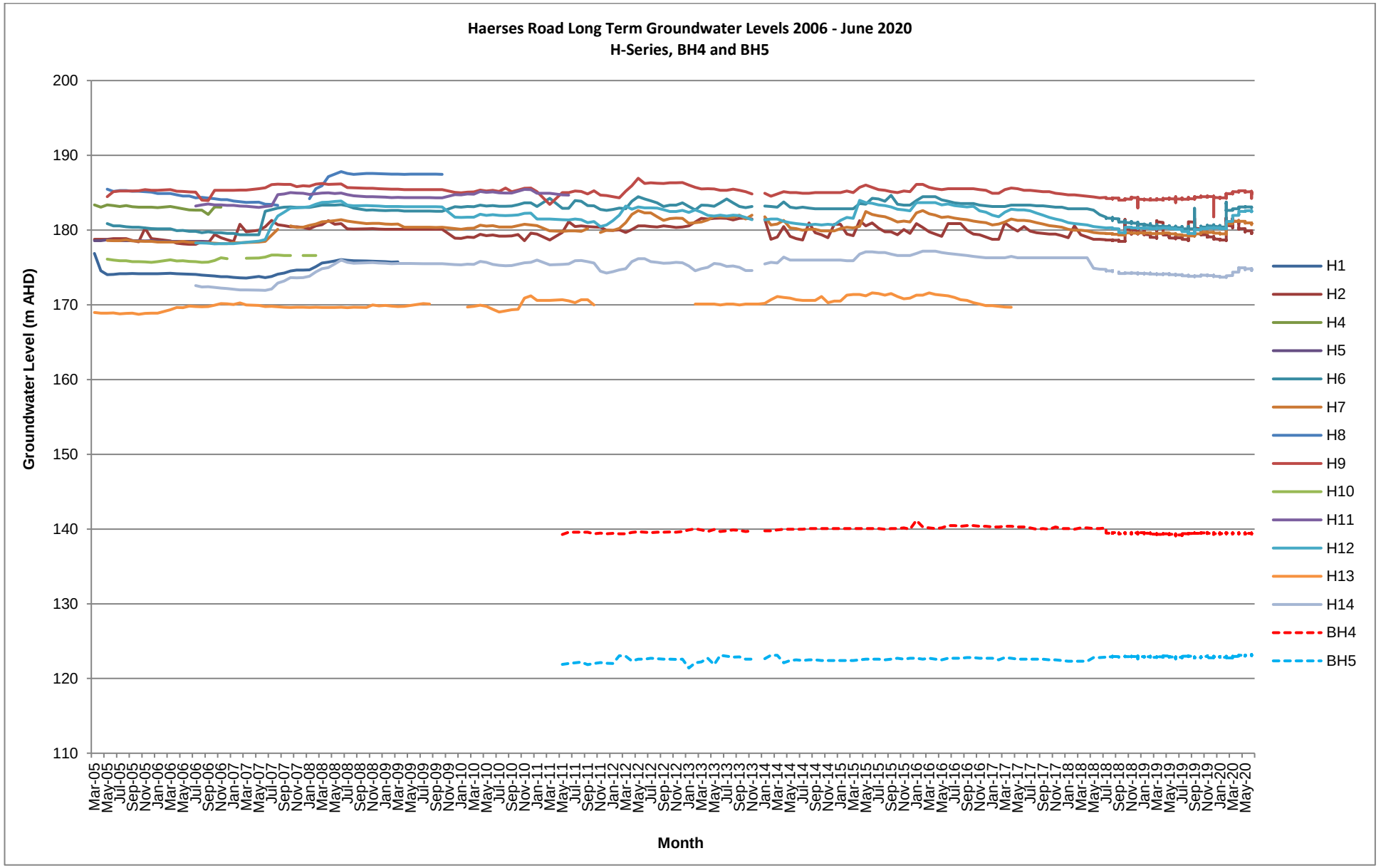


Chart 12: Haerses Road Long Term Groundwater Levels for H-Series, BH4 and BH5.

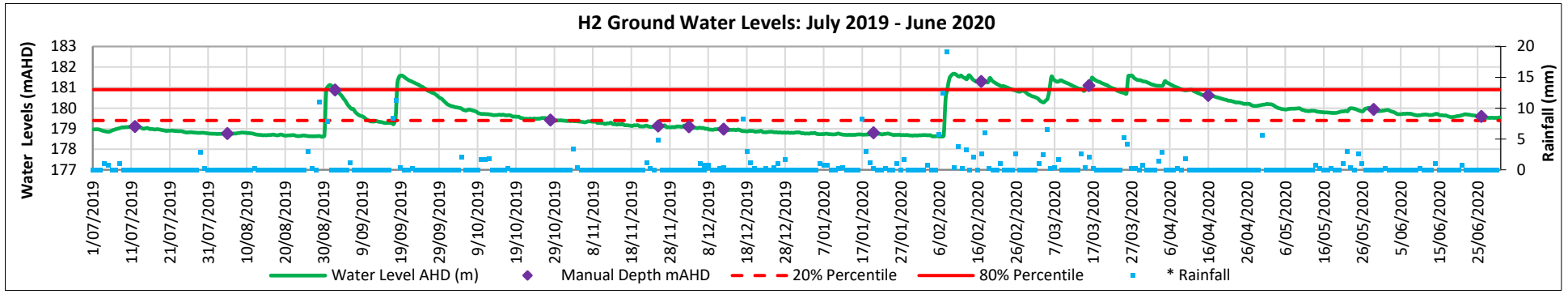


Chart 13: H2 Groundwater Levels for July 2019 – June 2020

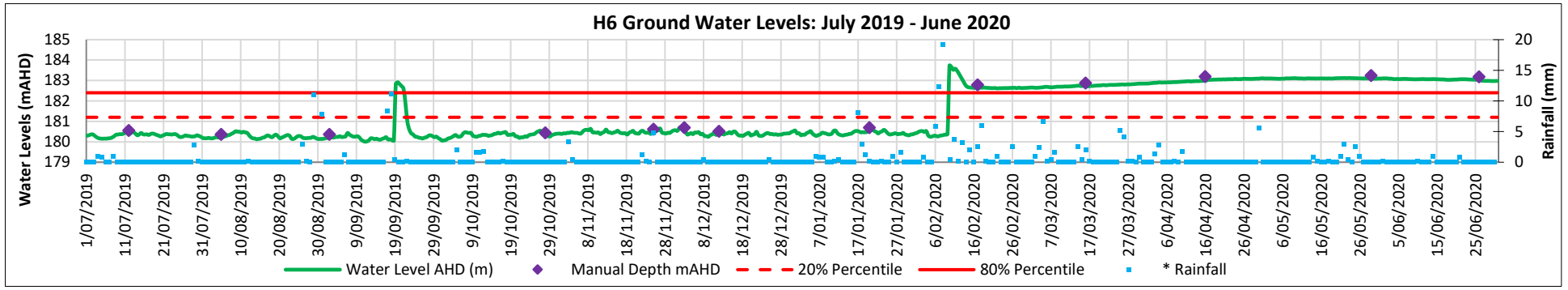


Chart 14: H6 Groundwater Levels for July 2019 – June 2020

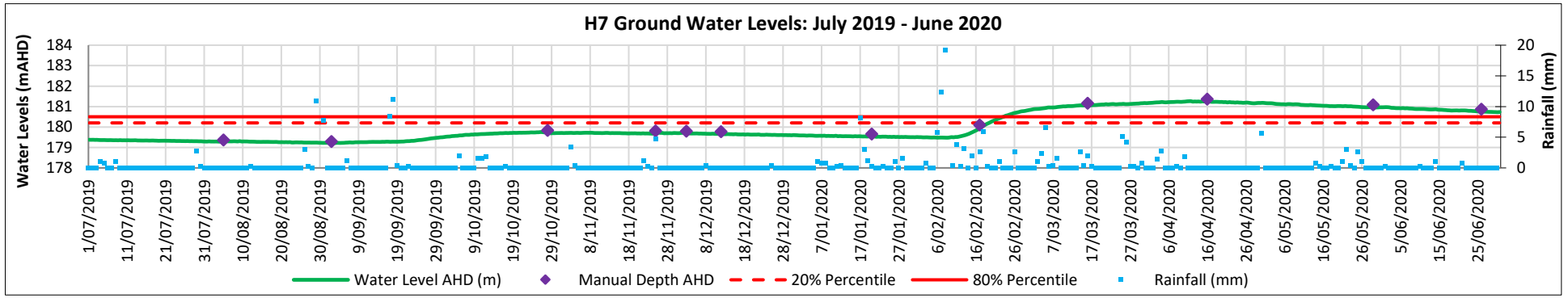


Chart 15: H7 Groundwater Levels for July 2019 – June 2020

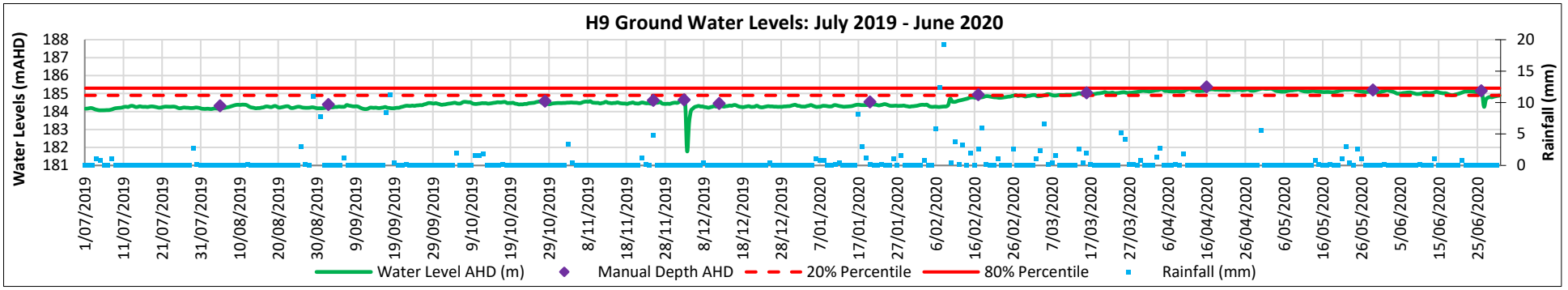


Chart 16: H9 Groundwater Levels for July 2019 – June 2020

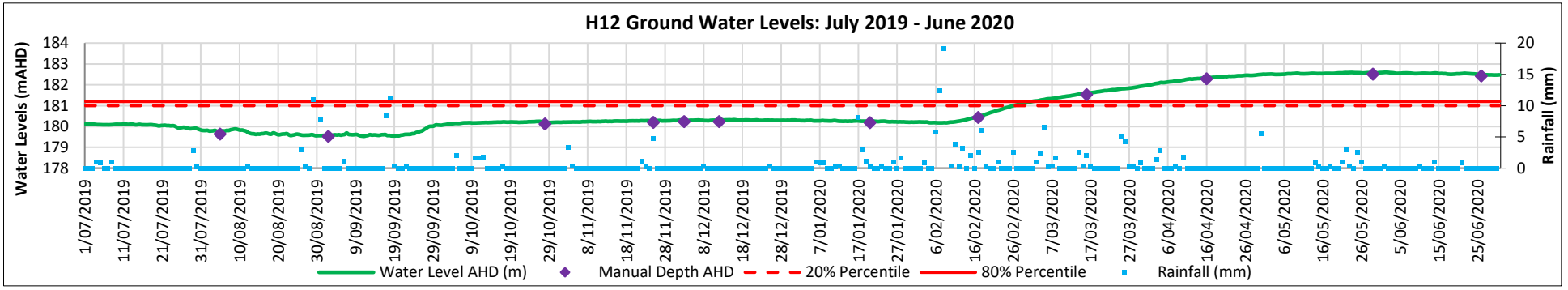


Chart 17: H12 Groundwater Levels for July 2019 – June 2020

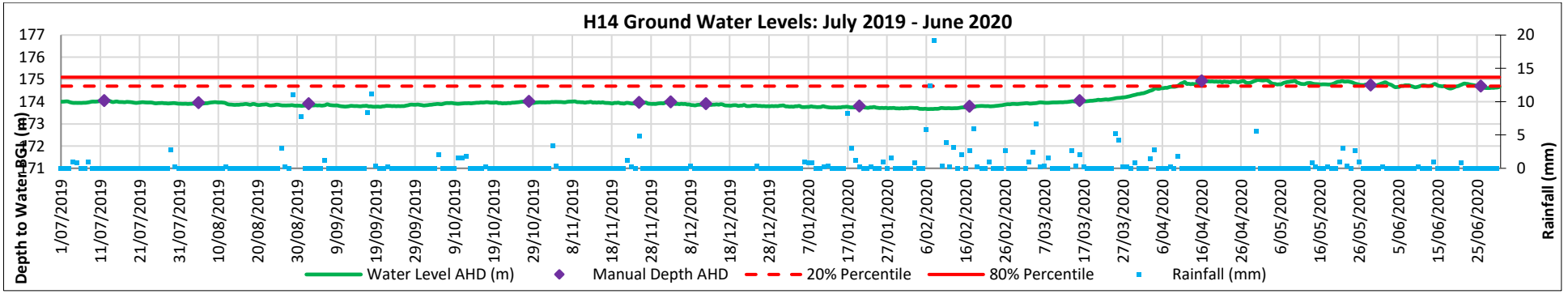


Chart 18: H14 Groundwater Levels for July 2019 – June 2020

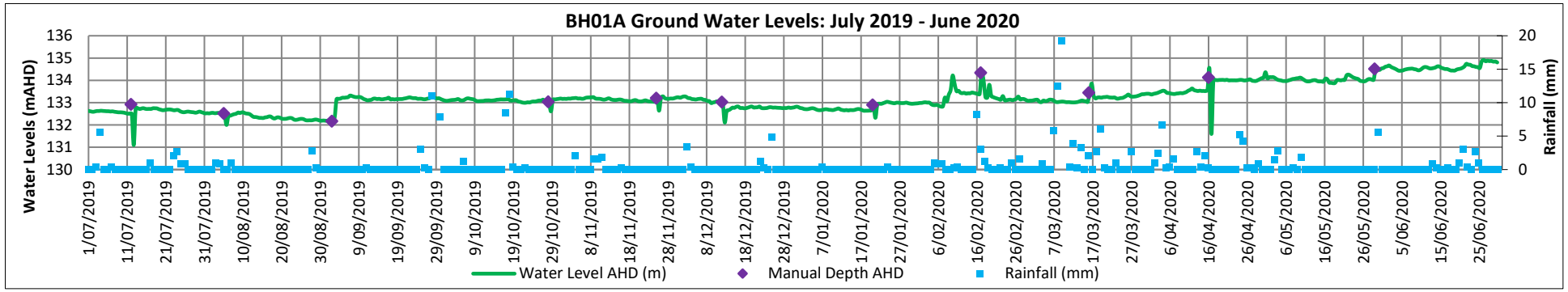


Chart 19: BH01A Groundwater Levels for July 2019 – June 2020.

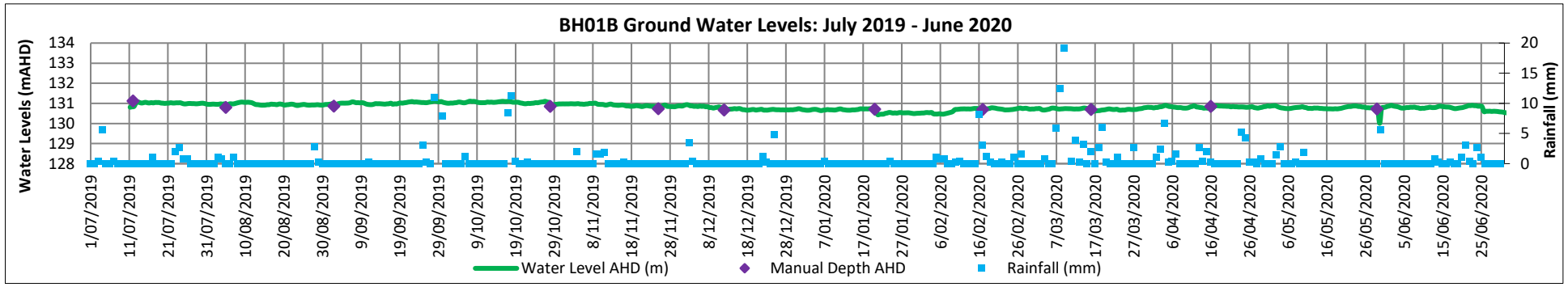


Chart 20: BH01B Groundwater Levels for July 2019 – June 2020.

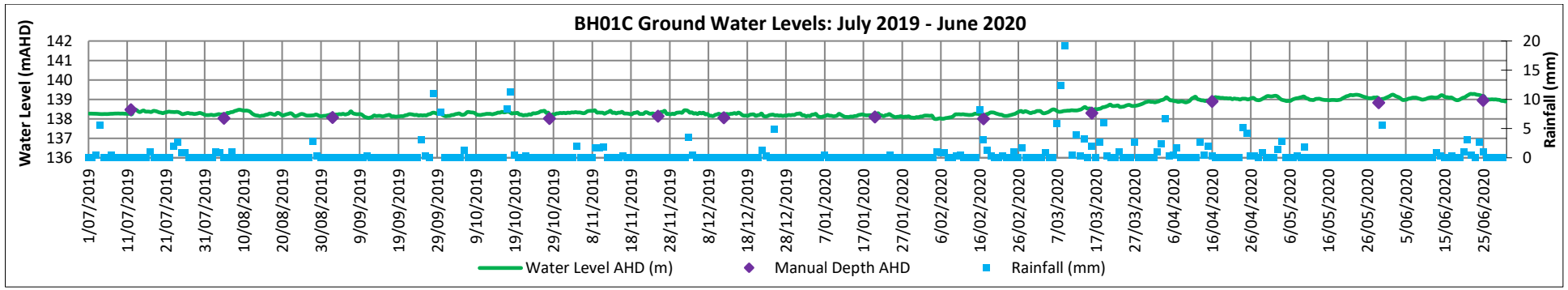


Chart 21: BH01C Groundwater Levels for July 2019 – June 2020.

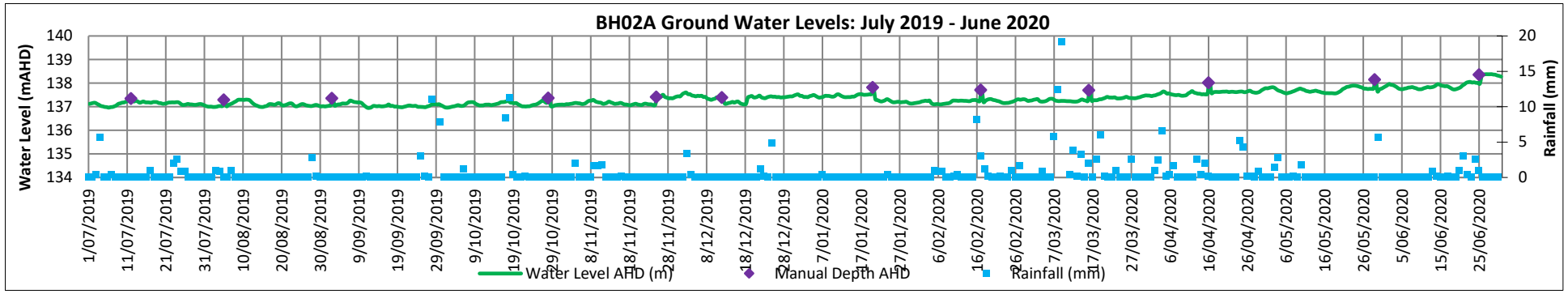


Chart 22: BH02A Groundwater Levels for July 2019 – June 2020

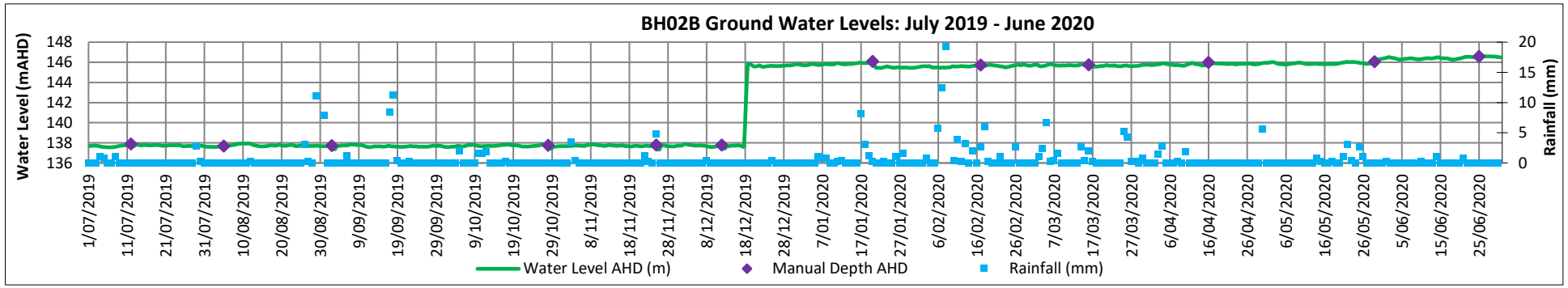


Chart 23: BH02B Groundwater Levels for July 2019 – June 2020

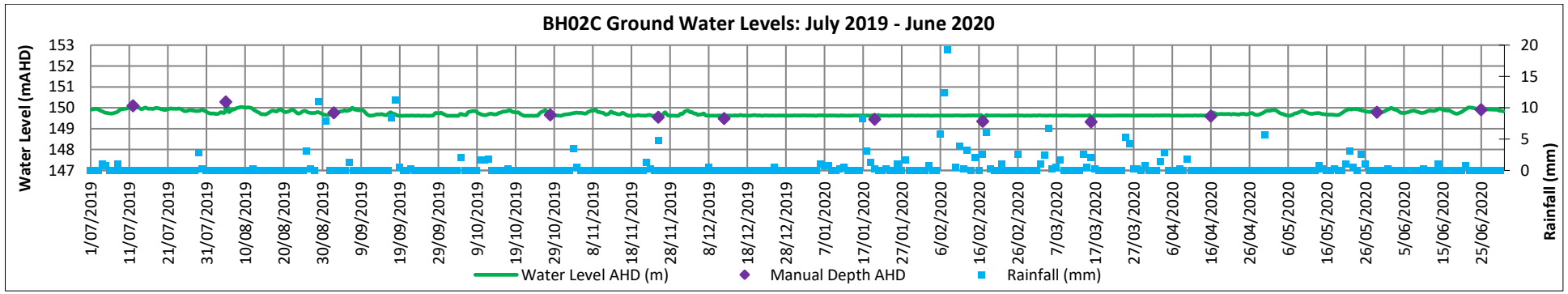


Chart 24: BH02C Groundwater Levels for July 2019 – June 2020

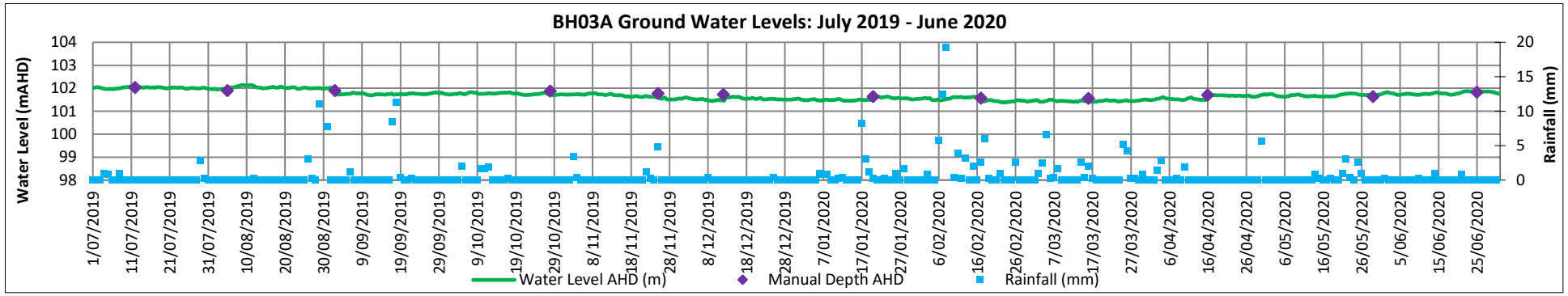


Chart 25: BH03A Groundwater Levels for July 2019 – June 2020

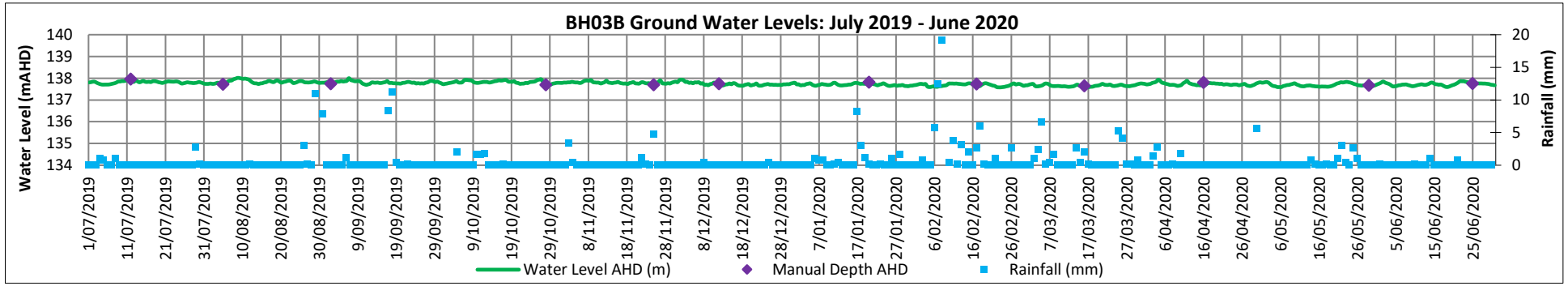


Chart 26: BH03B Groundwater Levels for July 2019 – June 2020

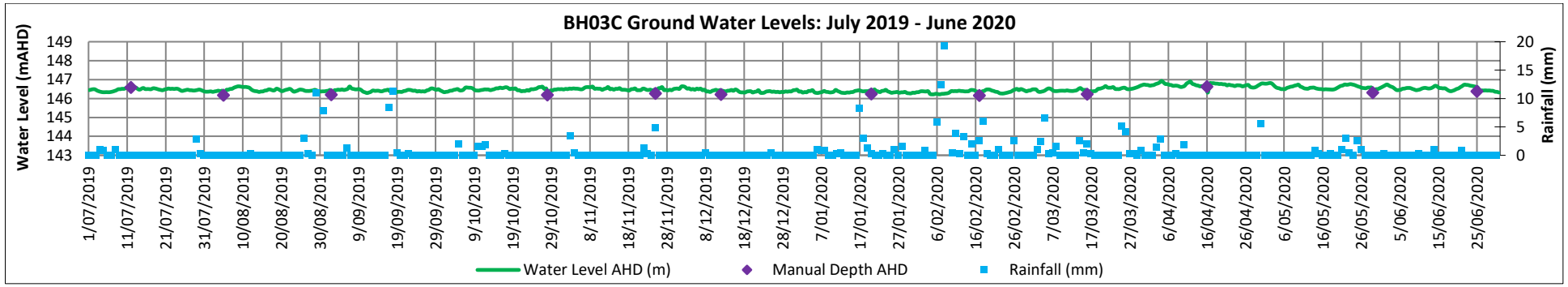


Chart 27: BH03C Groundwater Levels for July 2019 – June 2020

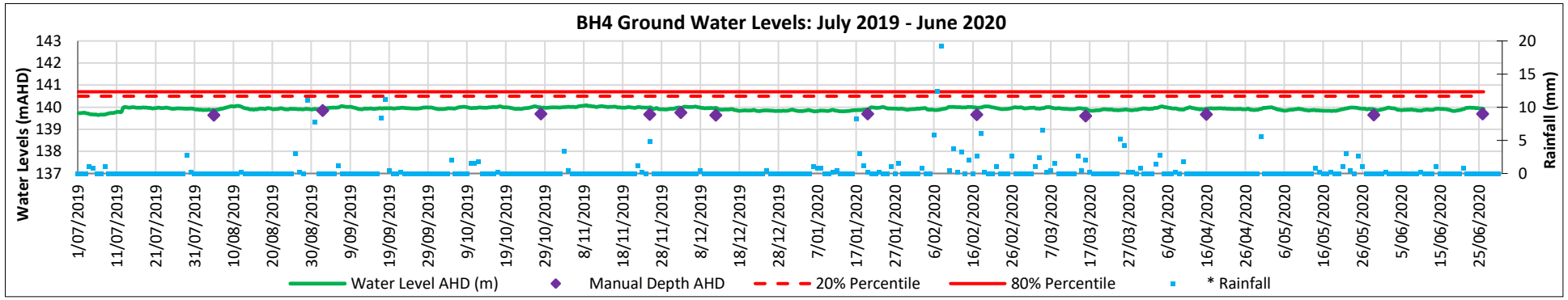


Chart 28: BH4 Groundwater Levels for July 2019 – June 2020

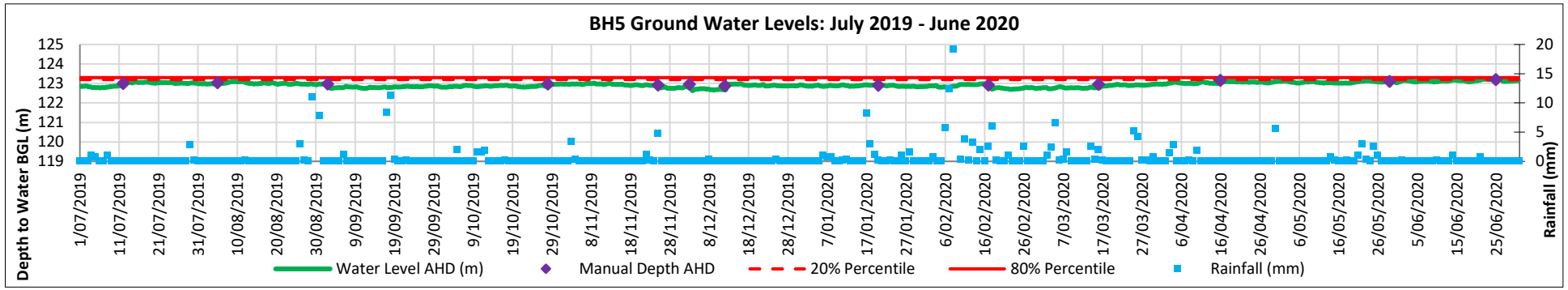


Chart 29: BH05 Groundwater Levels for July 2019 – June 2020

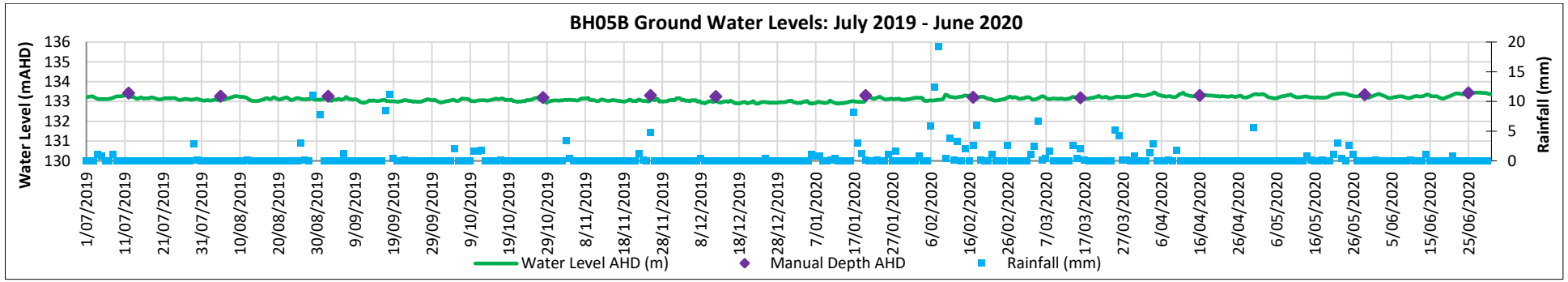


Chart 30: BH05B Groundwater Levels for July 2019 – June 2020

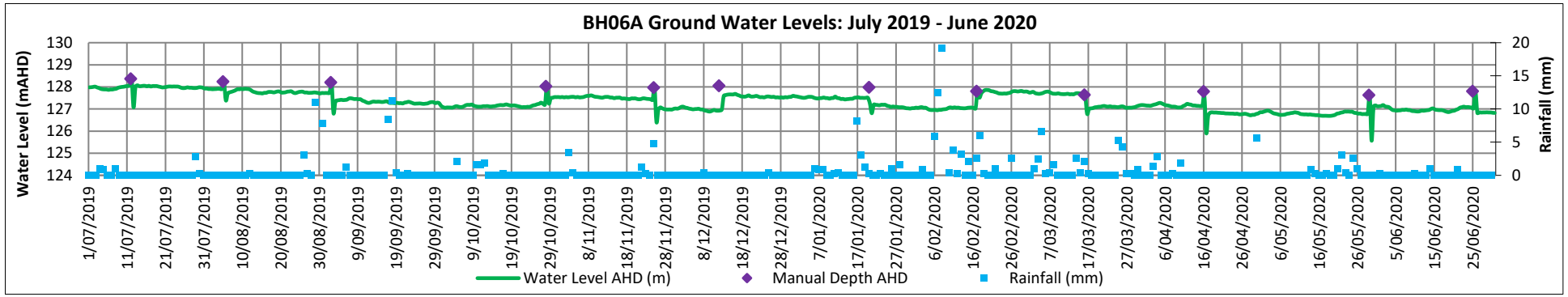


Chart 31: BH06A Groundwater Levels for July 2019 – June 2020

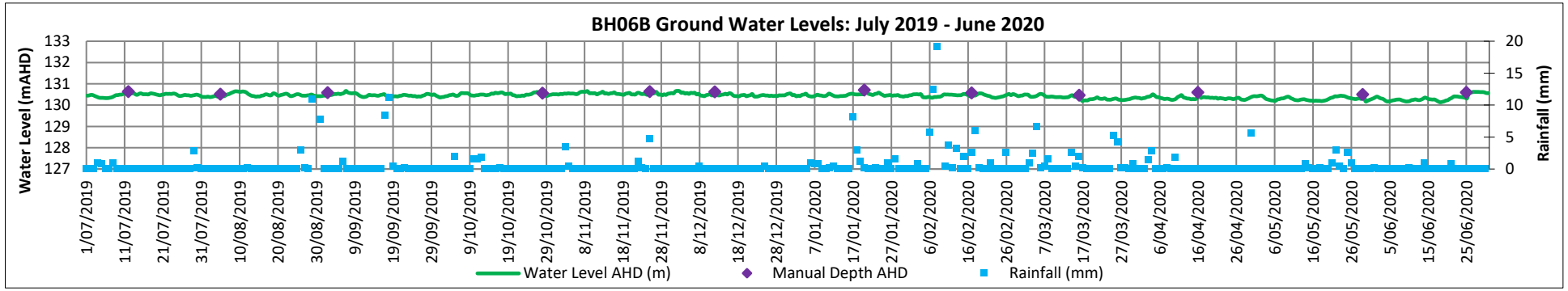


Chart 32: BH06B Groundwater Levels for July 2019 – June 2020

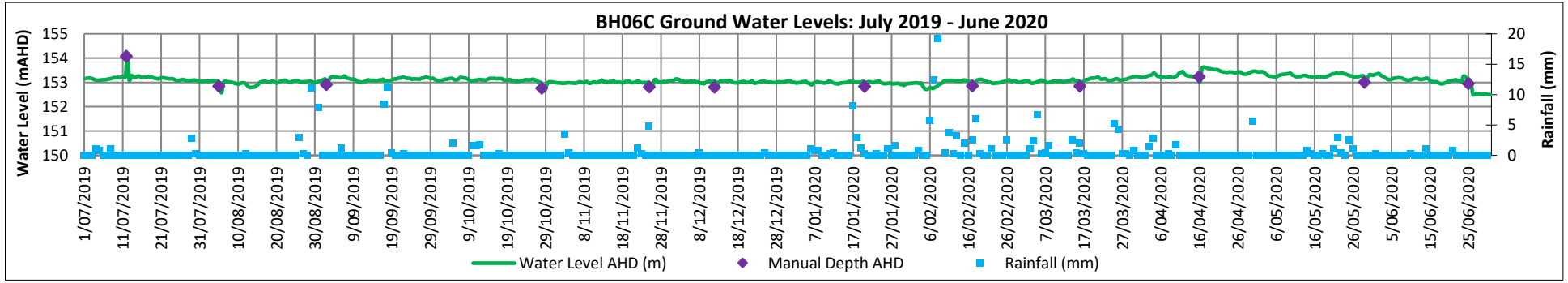


Chart 33: BH06C Groundwater Levels for July 2019 – June 2020

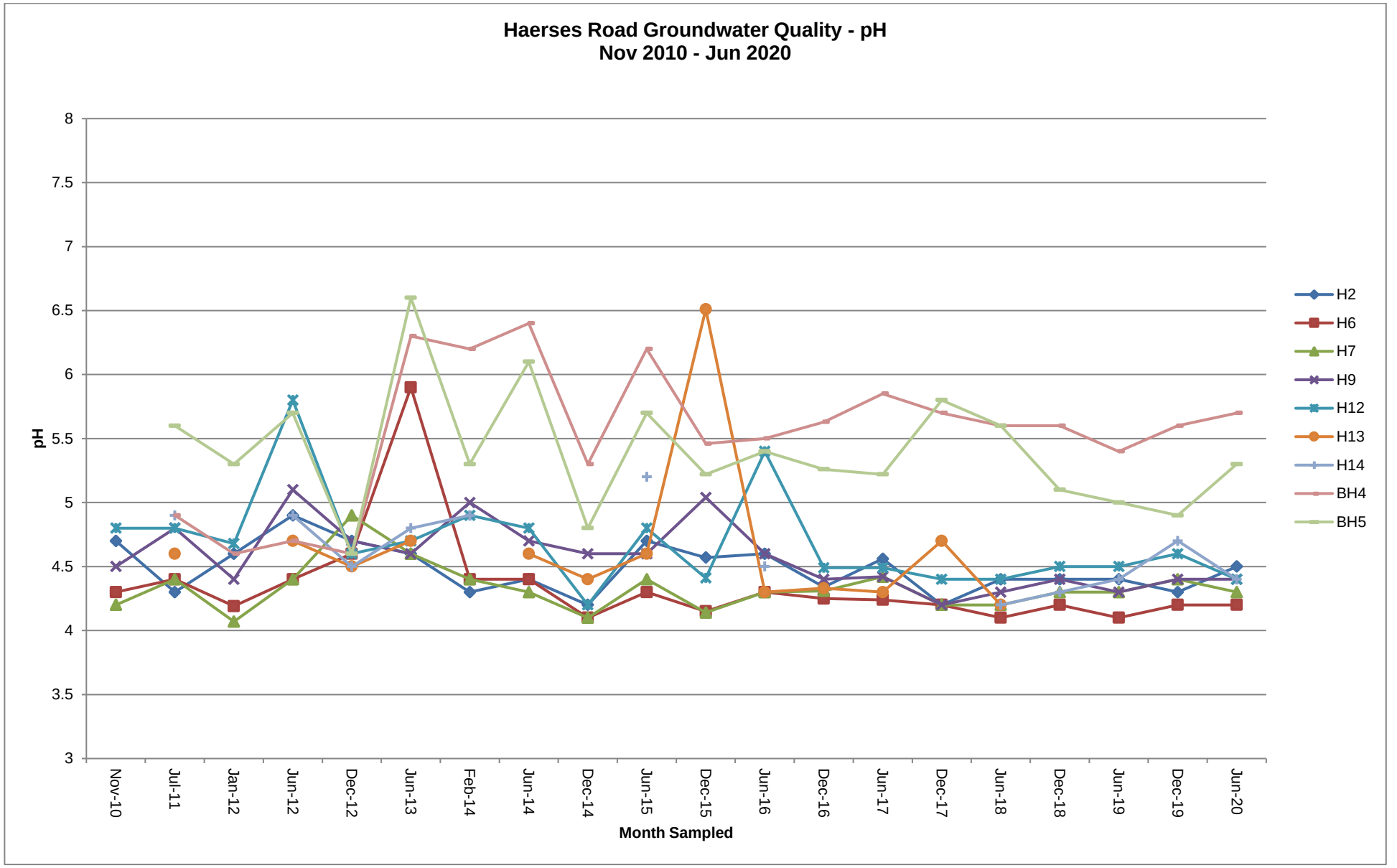


Chart 34: Haerses Road Long Term pH – H series, BH4 and BH5

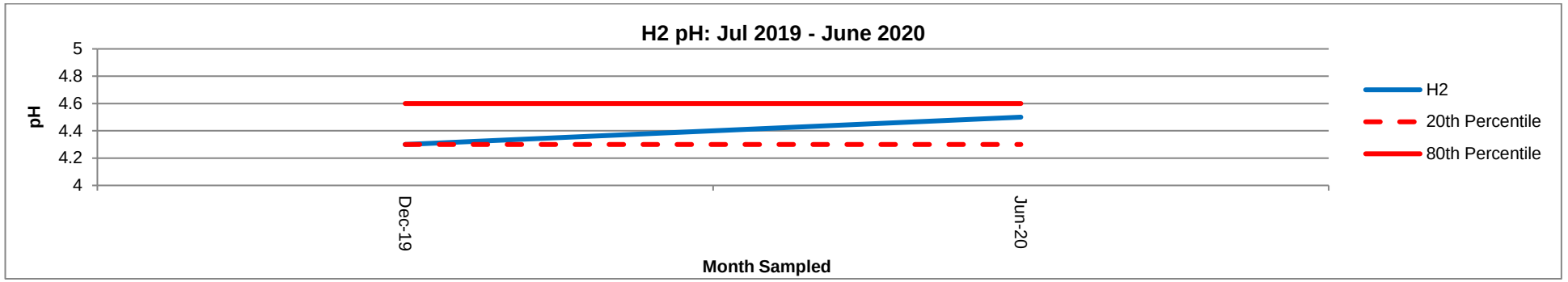


Chart 35: H2 pH Results July 2019 – June 2020.

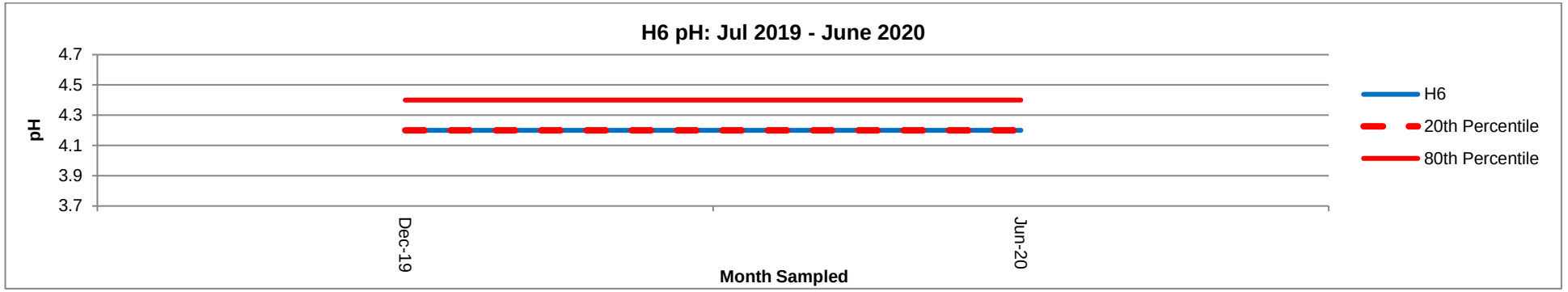


Chart 36: H6 pH Results July 2019 – June 2020.

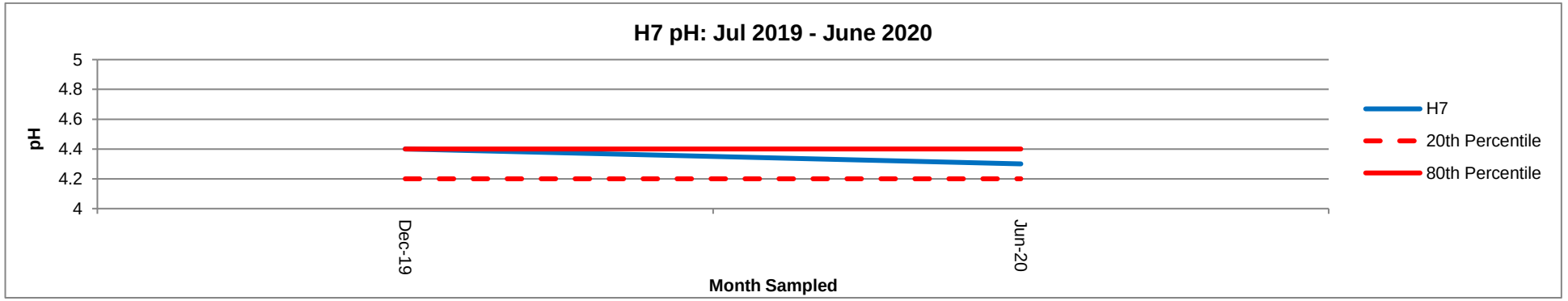


Chart 37: H7 pH Results July 2019 – June 2020.

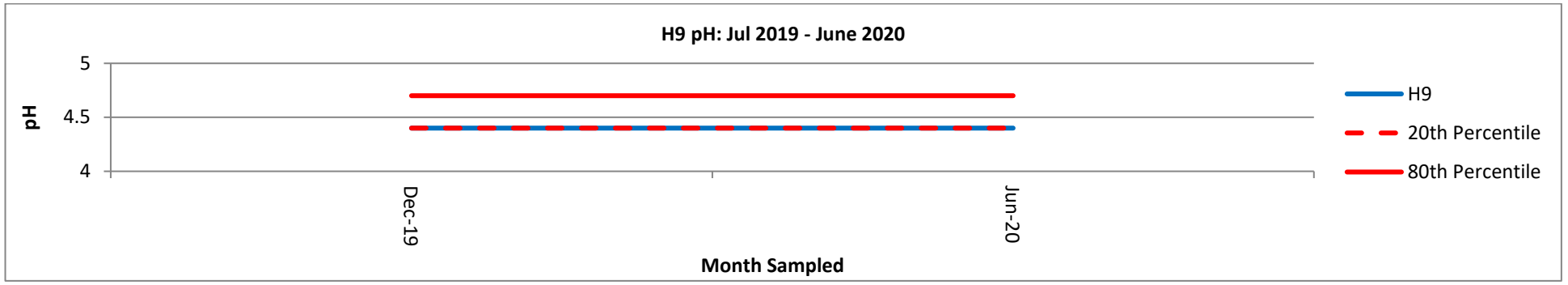


Chart 38: H9 pH Results July 2019 – June 2020.

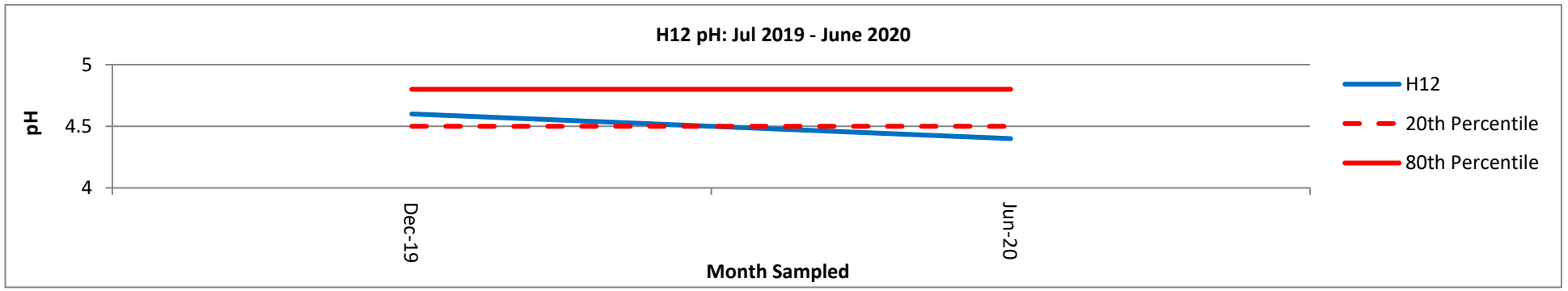


Chart 39: H12 pH Results July 2019 – June 2020.

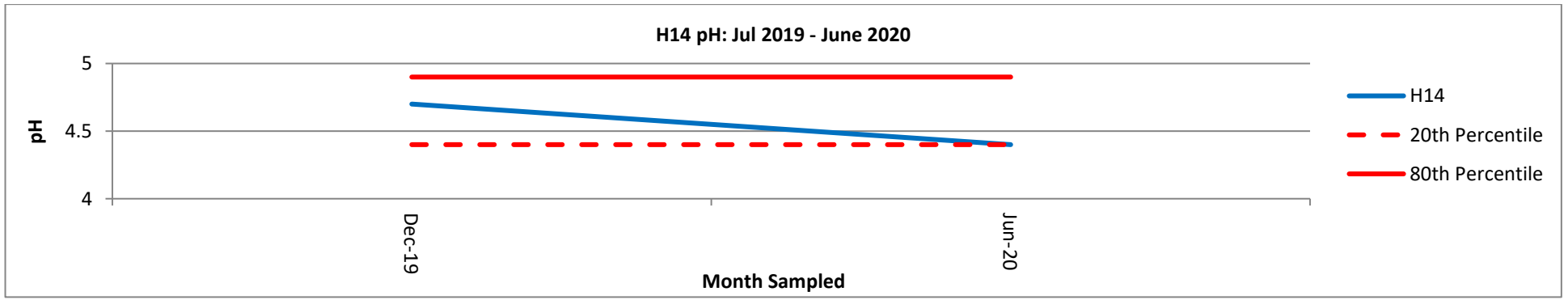


Chart 40: H14 pH Results July 2019 – June 2020.

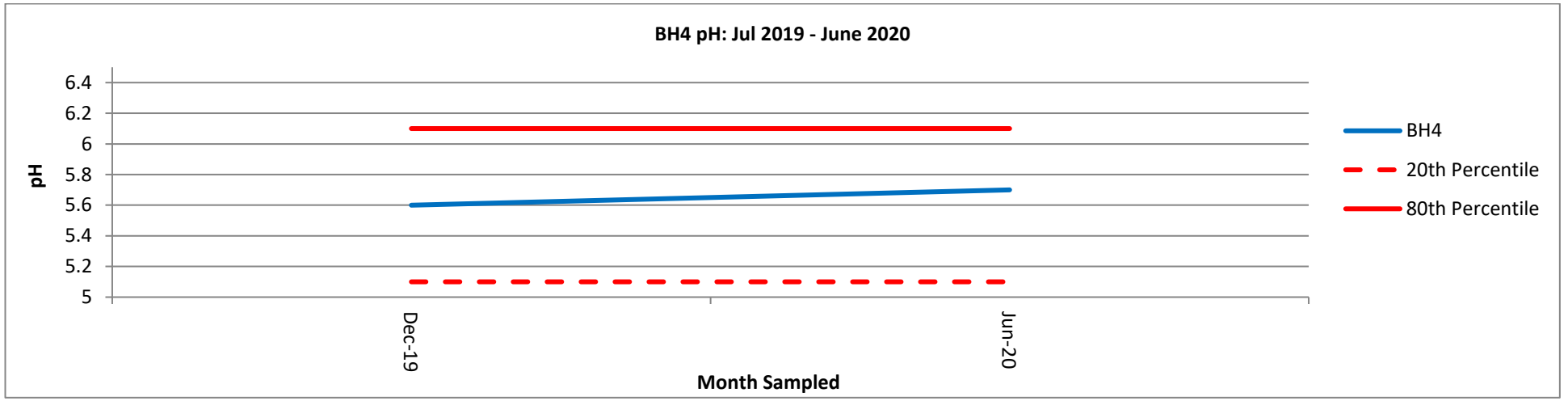


Chart 41: H14 pH Results July 2019 – June 2020.

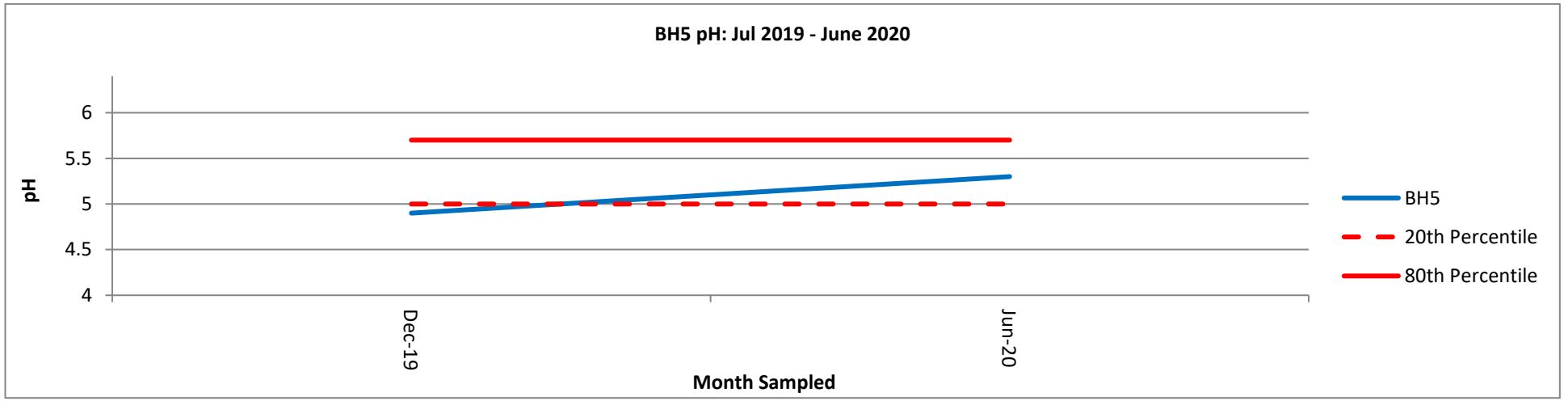


Chart 42: BH4 pH Results July 2019 – June 2020.

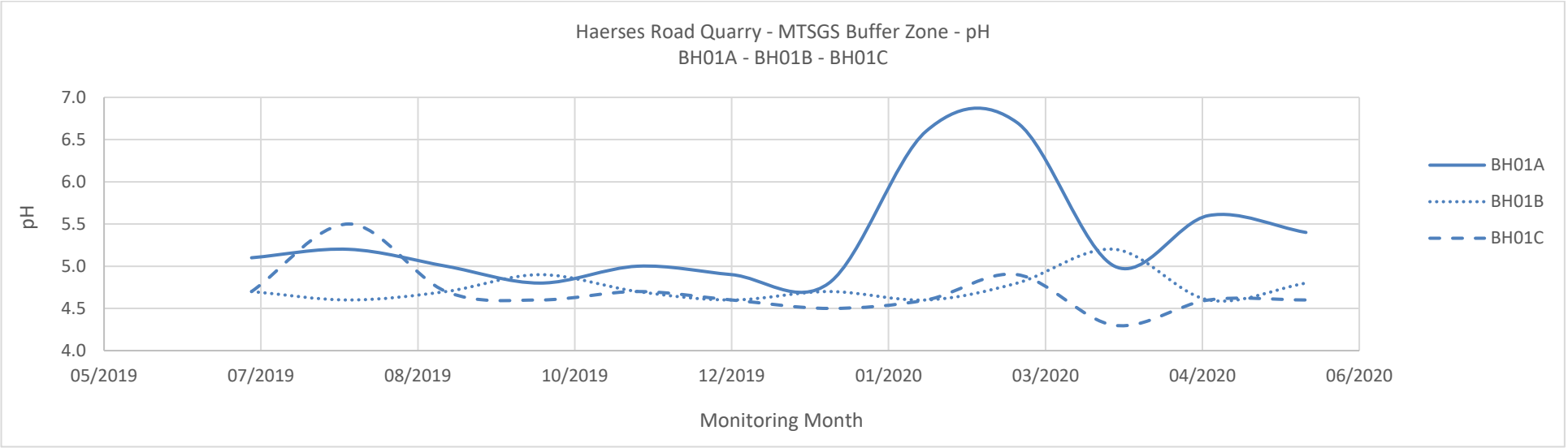


Chart 43: BH01A, BH01B and BH01C pH Results July 2019 – June 2020.

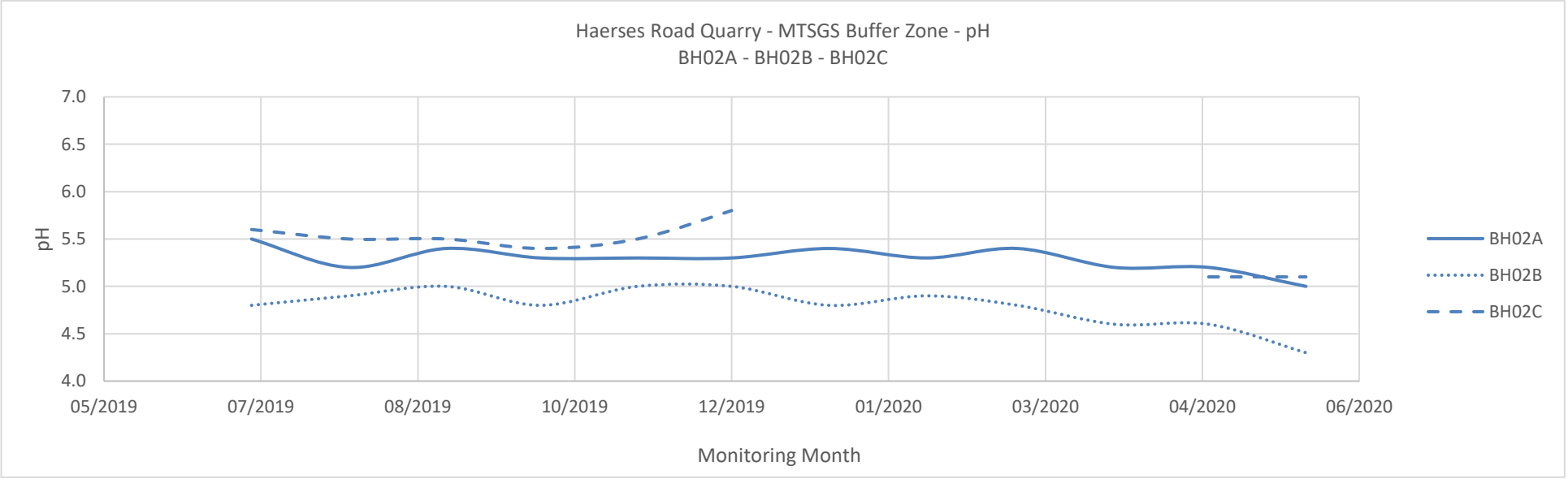


Chart 44: BH02A, BH02B and BH02C pH Results July 2019 – June 2020.

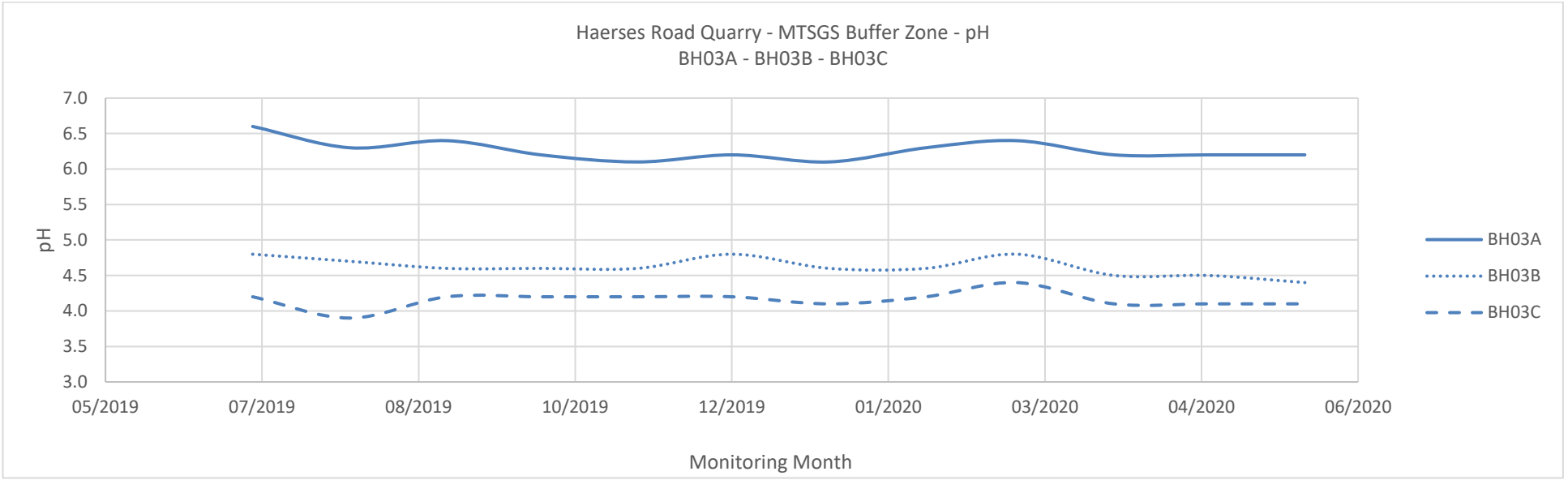


Chart 45: BH03A. BH03B and BH03C pH Results July 2019 – June 2020.

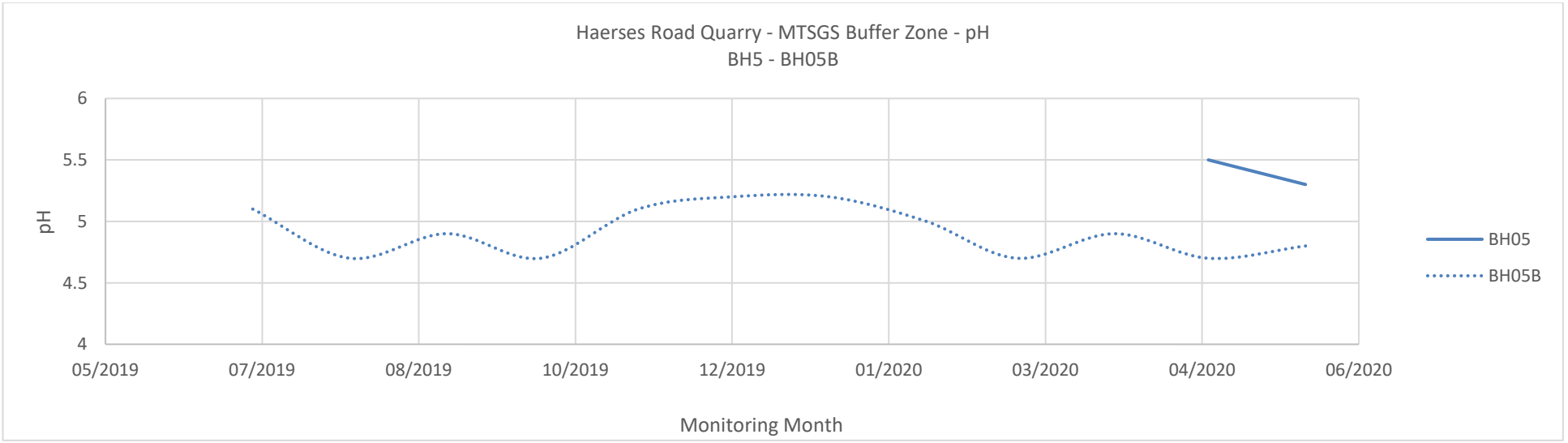


Chart 46: BH5 and BH05B pH Results July 2019 – June 2020.

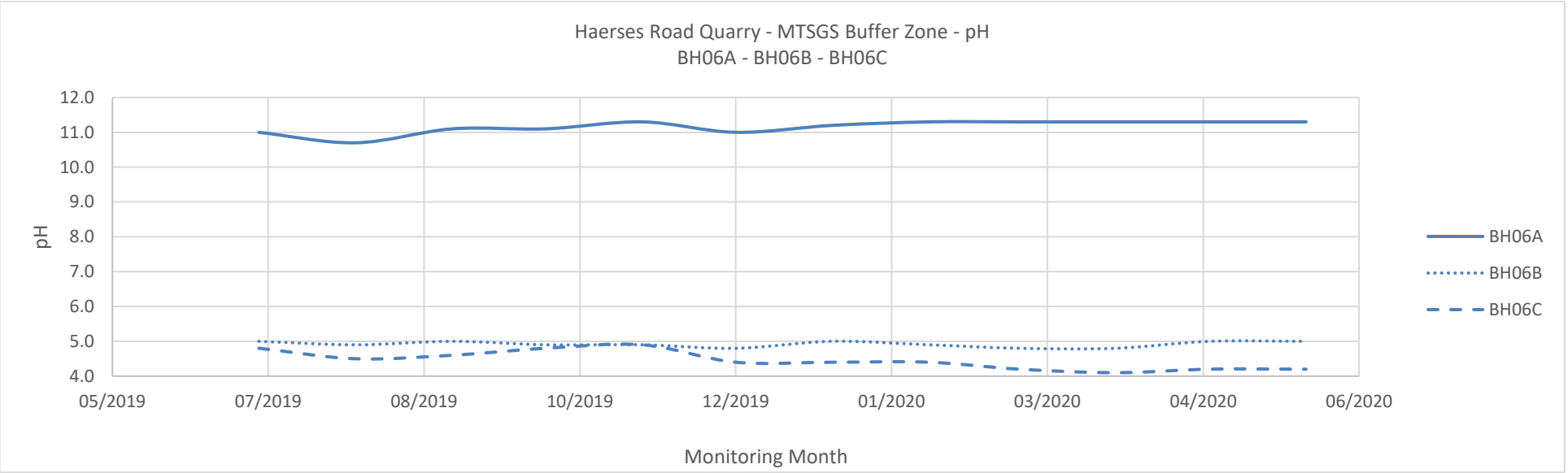


Chart 47: BH06A, BH06B and BH06C pH Results July 2019 – June 2020.

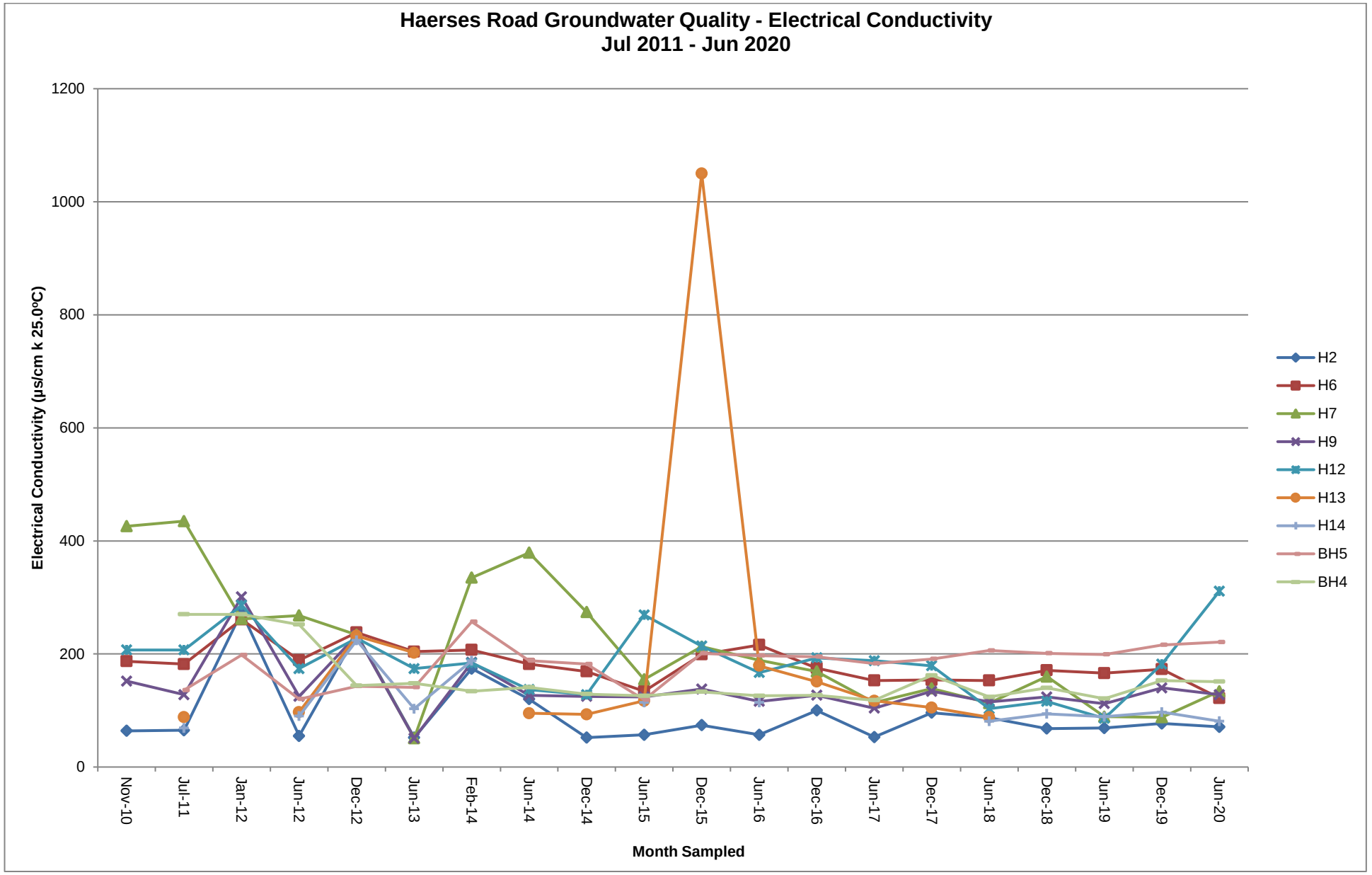


Chart 48: Haerses Road Long Term Electrical Conductivity – H series, BH4 and BH5

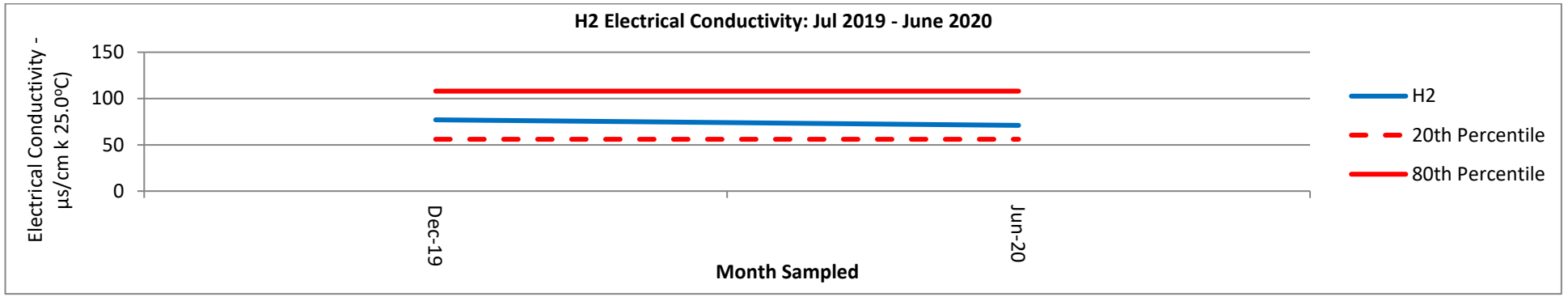


Chart 49: H2 Electrical Conductivity Results July 2019 – June 2020.

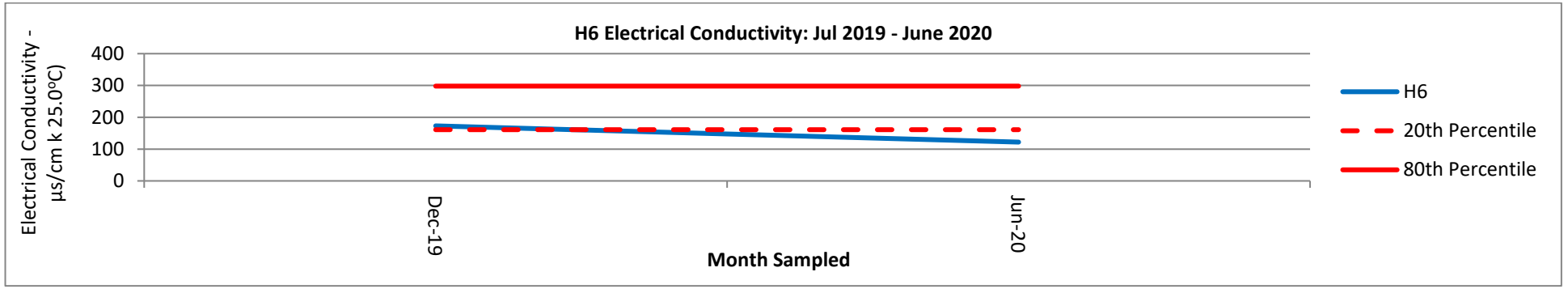


Chart 50: H6 Electrical Conductivity Results July 2019 – June 2020.

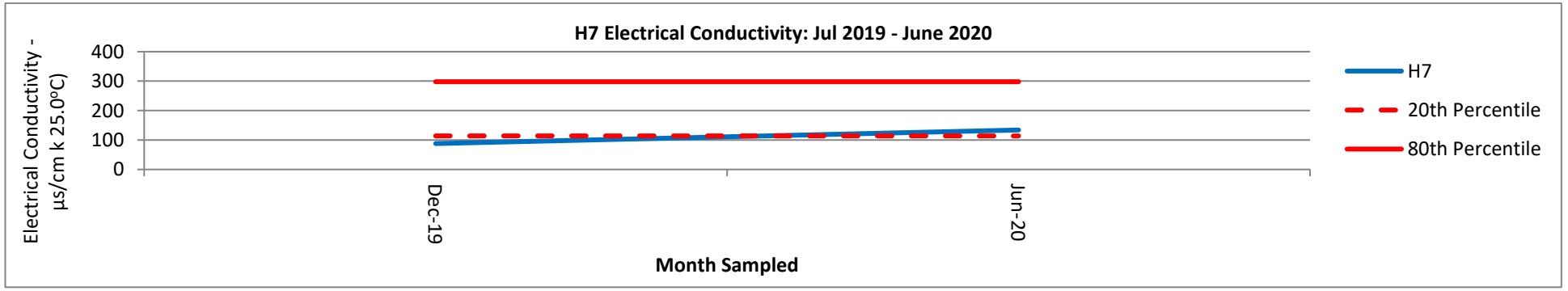


Chart 51: H7 Electrical Conductivity Results July 2019 – June 2020.

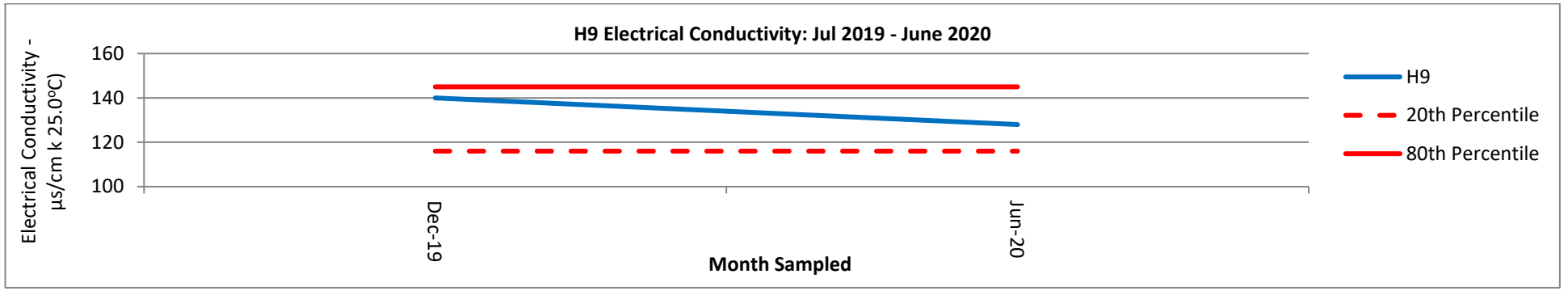


Chart 52: H9 Electrical Conductivity Results July 2019 – June 2020.

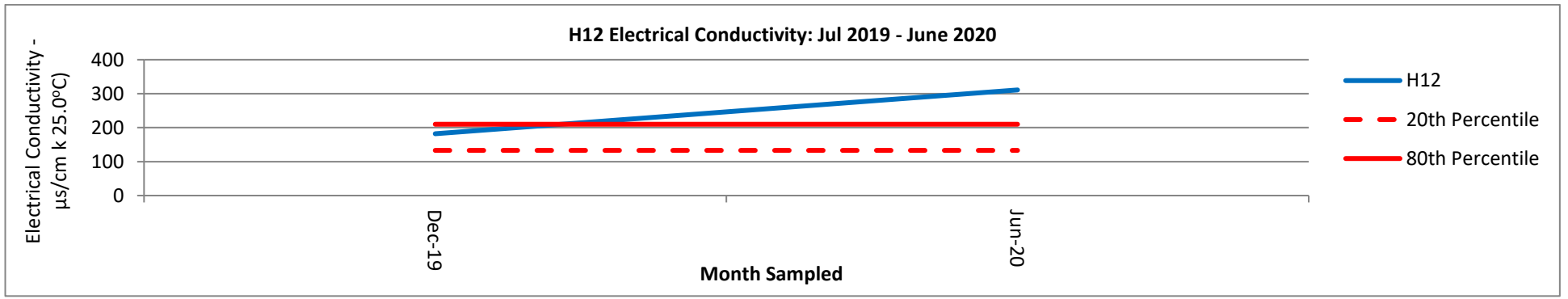


Chart 53: H12 Electrical Conductivity Results July 2019 – June 2020.

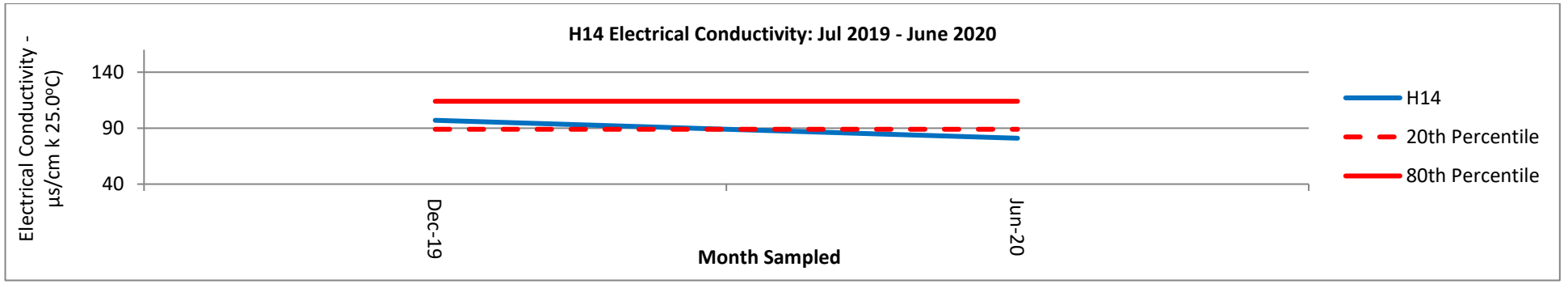


Chart 54: H14 Electrical Conductivity Results July 2019 – June 2020.

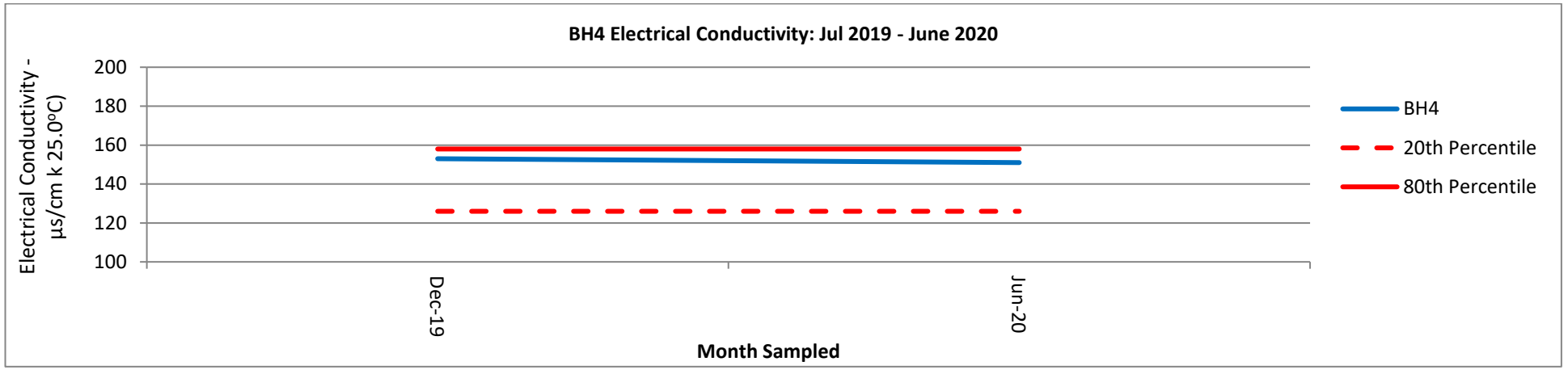


Chart 55: BH4 Electrical Conductivity Results July 2019 – June 2020.

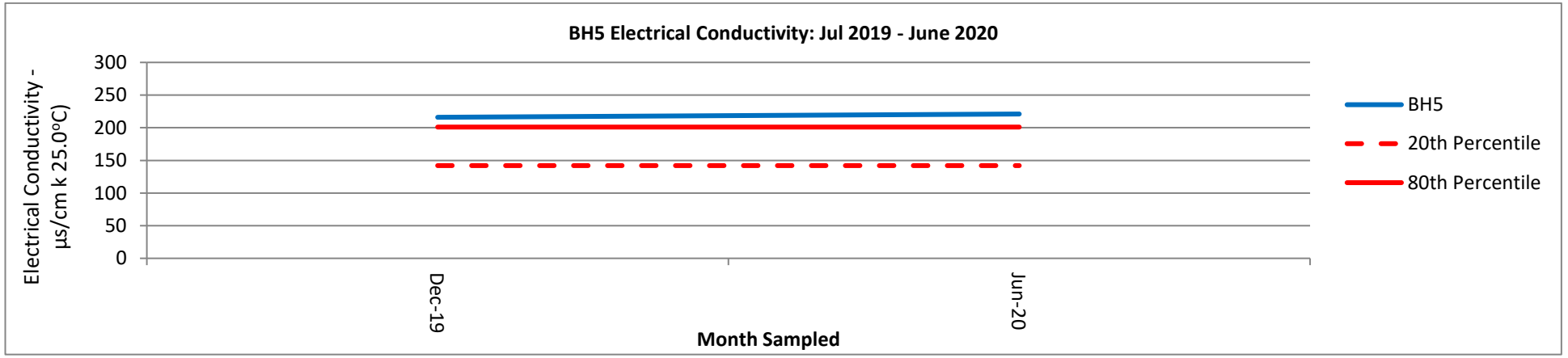


Chart 56: BH5 Electrical Conductivity Results July 2019 – June 2020.

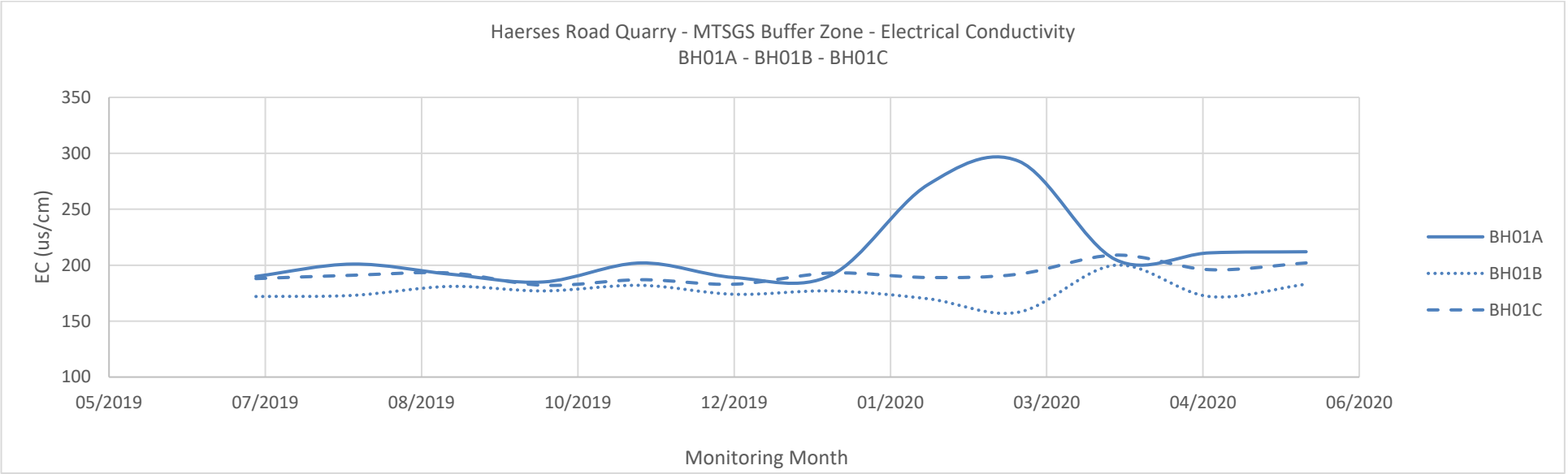


Chart 57: BH01A, BH01B and BH01C Electrical Conductivity Results July 2019 – June 2020.

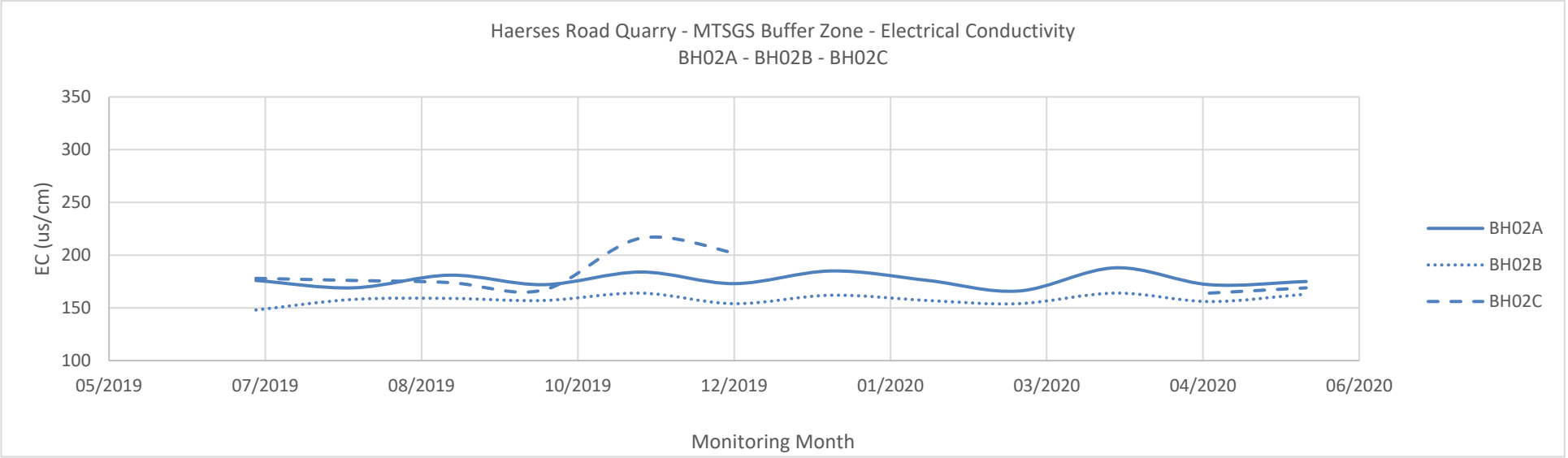


Chart 58: BH02A, BH02B and BH02C Electrical Conductivity Results July 2019 – June 2020.

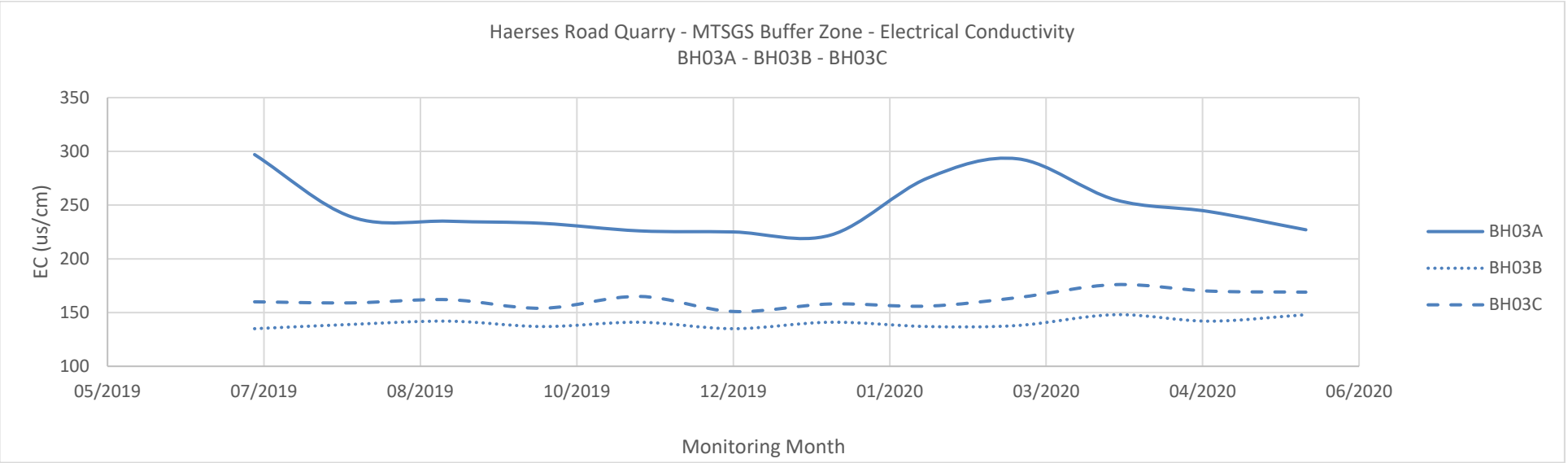


Chart 59: BH03A, BH03B and BH03C Electrical Conductivity Results July 2019 – June 2020.

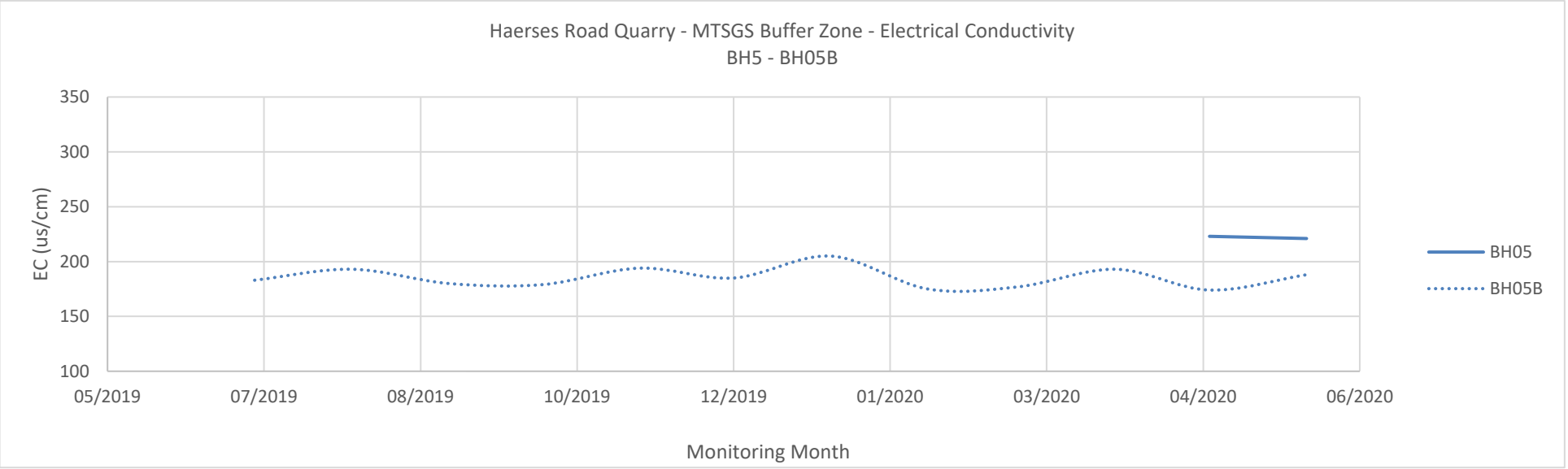


Chart 60: BH5 and BH05B Electrical Conductivity Results July 2019 – June 2020.

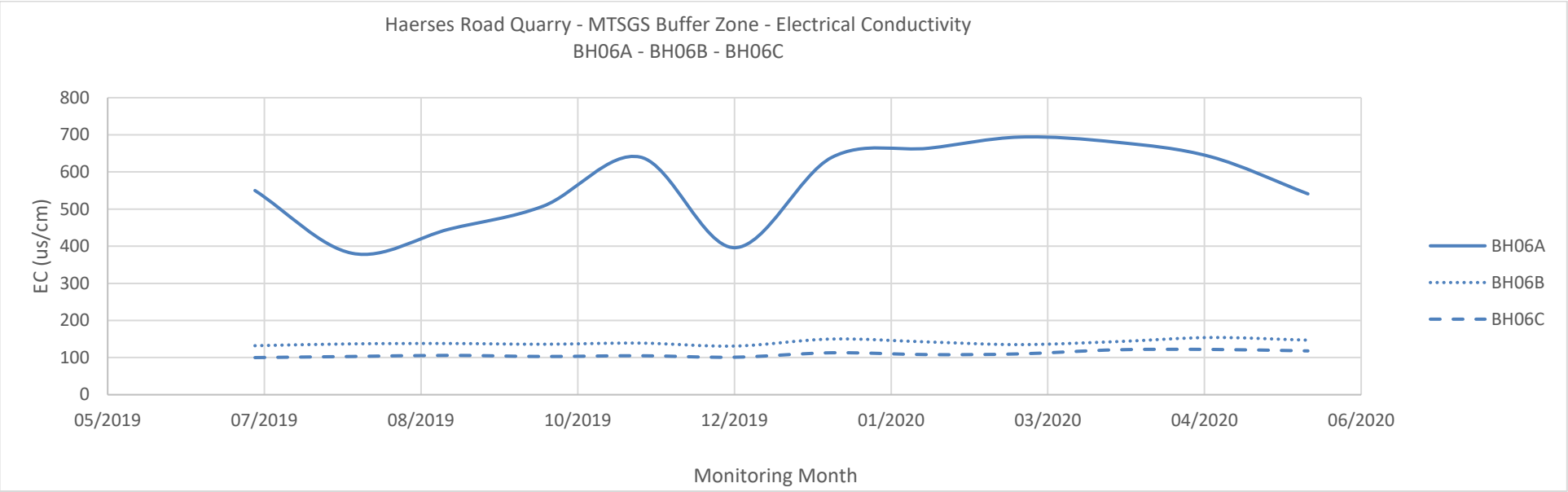


Chart 61: BH06A, BH06B and BH06C Electrical Conductivity Results July 2019 – June 2020.

Table 25: SW1 and SW2 laboratory results, relevant water criteria and compliance with trigger values

Sample Date	Sample Location	pH	Total Suspended Solids (mg/L)	Turbidity (NTU)
10/02/2020	SW1	6.70	12	82.1
	SW2	5.88	14	25.3

6.4 Analyses

Groundwater Levels

During the 2019 – 2020 reporting period, groundwater levels for H-series boreholes indicate 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 12. 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 January, February and March 2020 where rising water levels were a result of aquifer recharge after significant rainfall events (refer to Charts 13 to 18 inclusive). Lower water levels were observed over the previous 2 reporting periods due to extended drought conditions which is evident from less than average annual rainfall.

Minor water level fluctuations have been recorded during this reporting period for Borehole BH4 and BH5 which monitor the SBCGS however, there has been a relatively stable trend since the commission of the boreholes in 2011 (shown on Charts 12, 28 and 29).

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 low-flow pump out methodology for laboratory analysis (refer to Charts 19 to 27 inclusive, 30 to 33 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 include 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 will be reached at the end of July 2020. Records of groundwater levels will be provided to an appropriate expert to undertake review and presentation of the data. The results of this review will be provided and discussed in the future 2020 – 2021 Annual review.

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 directly adjacent to the monitoring bore (refer to Chart 34 and 48). 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.

Records of groundwater quality from the monitoring wells in the MTSGS buffer zone will be provided to an appropriate expert to undertake review and presentation of the data. The results of this review will be provided and discussed in the future 2020 – 2021 Annual review.

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 this reporting period. Table 25 shows the pH, total suspended solids and turbidity of water samples obtained from SW1 and SW2 in February 2020. Limited data interpretation can be achieved from one sampling event. Additional data is 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 which was submitted on 3rd April 2020. Dixon Sand is awaiting the DPIE's approval of the revised MEDM.

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 changes are considered necessary due to the pending approval from the DPIE for the submission in April 2020.

6.6 Water Access License Usage

The Annual Returns for Water Access Licenses (WALs) 25941 and 25956 for the 2019 – 2020 reporting period were submitted to WaterNSW on 3rd July 2020. The total water usage for each WAL is listed in Table 26 below.

Table 26: Water usage for Water Access Licences

Water Access License Number	Annual Water Usage (Megalitres)
WAL 25941	0.1
WAL 25956	5.8

6.7 Water Balance Monitoring

The following water balance related monitoring in Table 27 applied to the quarry during the monitoring period.

Table 27: 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 5.9 Megalitres of water was utilised in accordance with the WALs by the 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 last monitoring period. Minor vegetation clearing and sand extraction commenced in Extraction Cell 1A which extended into the wet period at the beginning of 2020.

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 Chages to Environmental Procedures

Current groundwater management measures are considered adequate. No changes to environmental procedures are proposed.

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.

Water sampling and laboratory analysis of surface water at SW1 and SW2 to continue when there is sufficient flow after rain events.

A review of groundwater levels and quality of the additional monitoring bores in the 100m MTSGS buffer will be undertaken by an expert. The result will be incorporated in the next Annual Review.

7. Ecological Monitoring and Rehabilitation

7.1 Vegetation Clearing

Three sets of pre-clearing surveys were undertaken for the new extraction area on Lot 216 at Haerses Road during this reporting period. The pre-clearing surveys targeted:

- new haul road to extraction cell 1A on Lot 216 (survey undertaken on 9 September 2019),
- new extraction area in cells 1A and 2A on Lot 216 (survey undertaken on 4 December 2019), and
- access road for drilling rig and drilling location in cells 1A and 2A on Lot 216 (survey undertaken on 6 April 2020)

Vegetation clearing were undertaken in accordance with the pre-clearing survey and multi-stage habitat tree clearing protocols implemented by Dixon Sand. Appropriate briefing and induction were provided to the relevant staff prior to commencement of vegetation clearing.

7.2 Bush Regeneration and Weed Management

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

Approximately 101 hours was spent on bush regeneration works at Old Northern Road Quarry, equating to approximately 14% of the time spent between Old Northern Road Quarry and Haerses Road Quarry.

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

- 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.

The Annual Rehabilitation Report provided by the contractor for the 2019 – 2020 reporting period is attached as Appendix G.

7.2.1 Translocation Site

The translocation area located east of Stage 2 extraction area have been managed since 2009. Increased biodiversity and plant establishment have improved yearly. Weed management at this site focused on controlling weed species mainly *Andropogon virginicus* (Whiskey Grass), *Eragrostis curvula* (African Love Grass) and *Ageratina adenophora* (Crofton Weed).

7.2.2 Wisemans Ferry Road 30 Metre Buffer

Weed management in the visual planted buffer area was undertaken during the first half of the reporting period. Weed management focused on controlling *Rubus* sp. (Blackberry), *Andropogon virginicus* (Whiskey Grass) and *Eragrostis curvula* (African Love Grass). In February 2020, access to the site was restricted due to road works associated with the Haerses Road and Wisemans Ferry Road intersection upgrade.

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, 2020) 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 (2019), and
- provide an independent monitoring report for inclusion as part of the external reporting for the quarry Annual Review.

Vegetation survey has not been undertaken for this report due to the early stages of rehabilitation providing limited information. Rehabilitation works will increase in both intensity and measurable criteria within the next reporting period. Baseline information will be collected over the next reporting period.

The following observations and field notes were made.

7.3.1 Stage 1 Extraction Cell

Sand extraction is currently still taking place in the western section of Stage 1. Extraction has concluded for the eastern section which will enable commencement of rehabilitation. The eastern section 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 larger rock fragments and spread across the site to achieve final landform and to enable rehabilitation to Agriculture Class 4.

7.3.2 Stage 2 Extraction Cell

Active quarry operations are occurring in Stage 2. Rehabilitation in Stage 2 west where sandstone extraction took place has commenced. The farm dam has been constructed in this area which will be a permanent water infrastructure, in accordance with the Soil and Water Management Plan.

7.3.3 Extraction Cell 1A

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. Baseline monitoring for extraction Cells A and B series will commence during the next reporting period.

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 intersection during early 2020 have caused some disturbance to the buffer area. The resulting disturbance from the road works was unavoidable. Reinstatement of the buffer vegetation will commence during the next reporting period.

7.4 Management of Biodiversity Stewardship Sites

Two Biodiversity Stewardship Agreements (BSA) were finalised for DA 165-7-2005. The two sites are located at Haerses Road and Porters Road. The BSA stipulates a requirement that management actions are to be implemented when the Agreement commences, and management actions that are to be undertaken when the Total Fund Deposit is met, and Dixon Sand received the first annual management payment. Dixon Sand is yet to reach 80% of the Total Fund Deposit and therefore are undertaking the Passive Management of the stewardship sites.

The annual inspection for Year 1 of the Haerses Road and Porters Road Stewardship sites were undertaken on 27 February 2020 for the purpose of annual reporting of passive management actions at the sites. The reports were submitted to the Biodiversity Conservation Trust (BCT) on 6 March 2020.

Inspections were carried out against a number of management actions which include:

- management of grazing or conservation,
- weed control,
- management of fire for conservation,
- management of human disturbance,
- retention of regrowth and remnant native vegetation,
- replanting or supplementary planting where natural regeneration will not be sufficient,
- retention of dead timber,
- erosion control,
- retention of rocks,
- control of feral and overabundant native herbivores,

- nutrient control, and
- maintenance or reintroduction of natural flow regimes.

During the inspection it was noted that both Stewardship sites experienced ongoing drought condition in 2019. Photographic point monitoring forms part of the assessment with three photo locations being assessed for each Stewardship site. It was observed that loss of some shrubs and ground cover vegetation were evident due to ongoing drought conditions. The rain event which occurred in February 2020 is expected to assist recovery of ground cover species provide a return to average rainfall continues through 2020.

It is proposed that no action be taken with ongoing monitor of flora loss to be carried out and if deemed necessary, revegetation to occur at the return of suitable weather.

The full annual management reports for Year 1 (2020) of passive management for both Stewardship sites are contained in Appendix I.

7.5 Change in Environmental Procedures

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.

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.

8. Community and Social Impacts

8.1 Compliance

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

Table 28: Community related consent conditions

Development Consent Condition	Requirement	Compliance
Condition 8 of Schedule 5	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). Notes: • 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 1st March 2018 (note joint CCC for the Old Northern Road and Haerses Road quarries).
Condition 1(e) of Schedule 5	describe the procedures to be implemented to: • keep the local community and relevant agencies informed about the operation and environmental performance of the development; • receive, record, handle and respond to complaints; • resolve any disputes that may arise during the course of the development; • respond to any non-compliance; • respond to emergencies; and	Refer to the Environmental Management Systems and Management Plans

8.2 Complaints and Follow-up Actions

No complaints have been received by Haerses Road quarry during the 2019 - 2020 reporting period.

A copy of the complaints register (updated July 2020) is contained in Appendix L.

8.3 Community Consultative Committee, Meetings and Guidelines

Two ordinary CCC meetings were held in the 2019 - 2020 reporting period, in accordance with the consent conditions and CCC Guidelines (2016). The CCC meetings were held on 20th November 2019 and 13th May 2020.

One extra-ordinary CCC meeting was held on 24th February to discuss and answer any queries regarding the Haerses Road development consent Modification 3 which was on public exhibition at the time. This CCC meeting provided opportunity to address any issues that were brought up by the community.

The minutes from each meeting are provided 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 owner to Haerses Road quarry regarding general maintenance,
- Notifying the Maroota Public School regarding noise monitoring undertaken in June 2020,
- 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 2020, and
- Bi-annual CCC meetings in November 2019 and May 2020 with the addition of an extra-ordinary CCC meeting in February 2020.

Local Initiatives

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

- demonstration of quarry plant at the Maroota Muster,
- 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.

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 require 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 on 21st August 2019 on the quarry premise to review the Bushfire Management Plans, risk assessment and procedures in the event of a bushfire. 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 Non-Compliances and Incidents

Exceedances associated with the PM10 and dust deposition criteria as discussed in Section 5.1 were not included as non-compliances or incidents as these events were considered as extraordinary events in accordance with Condition 9 of Schedule 3 of DA 165-7-2005.

No environmental incidents occurred during this reporting period.

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

11.2 Section 191 Improvement Notice

The Department of Planning and Environment (Resources Regulator) issued an improvement notice under section 191 of the *Work Health and Safety Act* 2011 (Notice No. NTCE):

- Notice NTCE 0005168 – issued on 8th April 2020, requiring remediation of the contravention or likely contravention with the following specific requirement:
  The mine operator must conduct a review of their PMHP – Roads and other vehicle operating areas comply with Schedule 1:
  - Mobile plant characteristics, including stopping distances, manoeuvrability, operating speeds, driver position, driver line of sight and remote control mobile plant,
  - The effect on road conditions of expected environmental conditions during operation periods (including time of day, weather, temperature and visibility),
  - The impact of road design and characteristics, including grade, camber, surface, radius of curves and intersections,
  - The impact of mine design, including banks and steep drops adjacent to vehicle operating areas,
  - The volume and speed of traffic and the potential for intersections between mobile plant with different operating characteristics, including heavy and light vehicles,
  - The potential for interactions between mobile plant and pedestrians, including consideration of park up areas and driver access,
  - The potential for interaction between mobile plant and public traffic,
  - The potential for interaction between mobile plant and fixed structures, including overhead and underground power lines, tunnel walls and roofs

The Principal Mining Hazard Plan (PMHP) for Haerses Road quarry is still in development.

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: Old Northern Road Report* (RW Corkery & Co, January 2020, Document No. 1021/01) 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 has been 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 IEA Finding Summary

Table 29 outlines the status of compliance against the conditional components of Development Approval DA 165-7-2005, Environment Protection Licence (EPL) 12513, and Water Access Licences (WALs) 25941 and 25956.

Table 29: Compliance Status for the Development Consent and Licences.

Approval	DA 165-7-2005	EPL 12513	WAL 25941	WAL 25956
Compliant	168	49	5	5
Non-compliant	7	0	0	0
Not triggered	36	11	5	5
Not Determined	1	0	1	1
Total	213	60	11	11

12.3 Independent Environmental Audit Outcome and Proposed Actions

A total of 20 compliance-based recommendations and 15 suggested improvements were provided by the IEA.

The proposed actions, implementation timeframe and status for the recommendations arising from non-compliances are outlined in Table 30.

The response, proposed actions, implementation timeframe and status for the suggested improvements are contained in Table 31.

Table 30: Proposed Action, Implementation Timeframe and Status for the Recommendations arising from IEA Non-Compliances.

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
HR R1/19	Ensure that all non-compliances or exceedances are reported in accordance with the relevant requirements and timeframes specified in the conditions of both DA 165-7-2005 and EPL 12513. *Dust exceedances were reported to EPA but not to DPE. Additionally, non-compliances were reported as part of the Annual Review but not reported to DPE within the required 7 day timeframe.*	**Proposed Action:** Non-compliances or exceedances will be reported in accordance with the relevant requirements and timeframes specified in the conditions of both DA 165-7-2005 and EPL 12513. **Implementation Timeframe:** From the point this document is submitted. **Status:** Closed out – reporting requirement noted.
HR R2/19	Include details of VENM/ENM receipt at the Quarry in Annual Reviews, including date, time and quantity of material received. *Schedule 2 Condition 10(b) of DA 165-7-2005 requires a copy of the VENM/ENM records to be included with the Annual Review. VENM importation commenced in 2019 with a total volume reported but not all required records.*	**Proposed Action:** The VENM/ENM Register which records the date, time of tipping and quantity of material received will be included in future Annual Reviews. **Implementation Timeframe:** Immediate – next Annual Review to be submitted by 30 September 2020. **Status:** Closed out - actioned on 28/09/2020. The VENM/ENM register is included in Appendix M of this Annual Review.
HR R3/19	Include in the Biodiversity and Rehabilitation Management Plan a description of the short-, medium- and long-term measures to be implemented to manage remnant vegetation and habitat on site, including within the Biodiversity Offset Area, and to ensure compliance with the rehabilitation objectives and progressive rehabilitation obligations required under DA 165-7 2005 Mod 2. *Section 5.4 of the Biodiversity and Rehabilitation Management Plan notes that the required information is outlined in the approved Biobanking Agreement. To ensure compliance with the development approval, this information must be included in the Biodiversity and Rehabilitation Management Plan either as a summary or by appending the Biobanking Agreement to the Plan.*	**Proposed Action:** The approved Biobanking Agreements for the 1) Haerses Road and 2) Porters Road Biodiversity Offsets will be referenced and appended to the Biodiversity and Rehabilitation Management Plan (BRMP). **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised BRMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request.

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
HR R4/19	Rationalise the water level and water quality trigger values nominated in the Surface Water Management Plan using either default water quality guideline values or site-specific trigger values. *Current water quality and water level trigger values specified by the Surface Water Management Plan are restrictive and inadequately reflect natural variation in water levels and water quality. Default water quality guideline values should be utilised until appropriate site-specific trigger values (20th and 80th percentile values) can be derived from a minimum of two years of monthly data.*	**Proposed Action:** The Soil and Water Management Plan (SWMP) will be revised and updated to rationalise the water level and water quality trigger values. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised SWMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request.
HR R5/19	Ensure that all components of the Environmental Management Strategy for the Quarry are distributed to the relevant stakeholders following approval. *The entire Environmental Management Strategy, or individual sections following revision, should be provided to the relevant stakeholders including the Department of Planning, Infrastructure and Environment, Environment Protection Agency, Biodiversity Conservation Division, Heritage NSW under the Department of Premier and Cabinet, Roads and Maritime Services, the Hills Shire Council and the Community Consultative Committee.*	**Proposed Action:** Future approved Environmental Management Strategy (EMS) and Management Plans will be distributed to the relevant stakeholders and government agencies. **Implementation Timeframe:** Immediately post approval of revised EMS and Management Plans. **Status:** Closed out – action noted and will be executed once the revised EMS and Management Plans have been approved by DPIE.
HR R6/19	Include a monthly check of induction records as an item on the Site Condition Checklist in accordance with Section 11 of the Environmental Management Strategy. *A documented check of the induction records was not available.*	**Proposed Action:** The Monthly Site Condition Checklist will be revised to include an inspection/check of the induction records. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised site Condition Checklist).

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
		EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request.
HR R7/19	Develop and implement a sediment basin inspection form for use during the inspection of sediment basins following storm events. *The sediment basin inspection form should be used to record the date and time of inspection, meteorological data relevant to the preceding storm event (e.g. rainfall over the relevant period), comments on the visual quality of water in the sediment basin, and comments on the stability of the sediment basin and associated drainage structures.*	**Proposed Action:** Develop a sediment basin inspection form to be used during the inspection of sediment basins following storm events. The form to include provisions to record the date and time of inspection, meteorological data relevant to the preceding storm event (e.g. rainfall over the specific period), comments on the visual water quality in the basin, and where applicable, record comments on the stability of the basin and associated drainage structures **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised site Condition Checklist). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request.
HR R8/19	Maintain a record of monthly water cart fills, monthly water transfer volumes and monthly clean water import volumes. *These records were not maintained during the audit period in accordance with Section 4.5 of the Soil and Water Management Plan.*	**Proposed Action:** A record will be kept for: • monthly watercart fills • monthly water transfer volumes • monthly clean water import volumes, **Implementation Timeframe:** • monthly watercart fills – logbook to be utilised immediately Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. The following changes will be made: • monthly water transfer volumes – to be included in the site monthly checklist

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand

- monthly clean water import volumes – to be included in the site monthly checklist

Status:

Closed out - actioned on 21/01/2020 (Watercart Despatch Sheet, DS-ENV-00102). This is an internal document. Copy attached below.

WATERCART DESPATCH SHEET

Quarry Name		Month / Year	

Watercart Usage

Date	Number of Dispatch	Date	Number of Dispatch	Date	Number of Dispatch
1st		11th		21st	
2nd		12th		22nd	
3rd		13th		23rd	
4th		14th		24th	
5th		15th		25th	
6th		16th		26th	
7th		17th		27th	
8th		18th		28th	
9th		19th		29th	
10th		20th		30th	
				31st	

Summary Usage	
Total Monthly Watercart Despatch	
Total Monthly Water Volume	
Comments	

Dixon Sand Pty Ltd DS-ENV-00102 Last updated 21/01/2020, v1.0

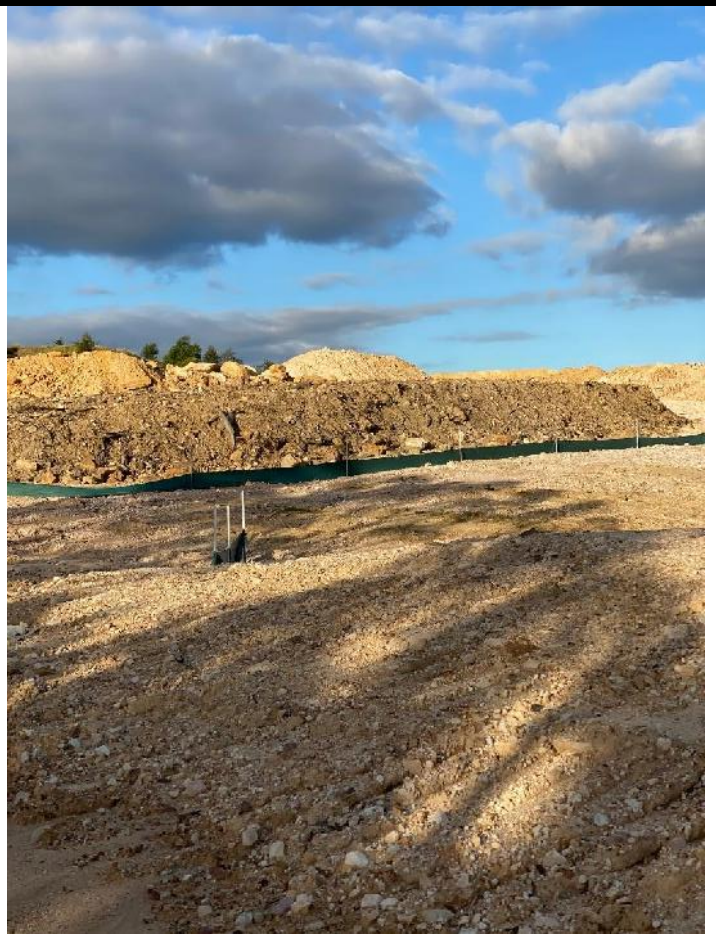
Plate 1: Watercart despatch sheet

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
HR R9/19	Commence 'receiving waters' quality monitoring and continue monthly monitoring for a minimum of two years to establish baseline site-specific trigger values in accordance with Section 5.1.2.1 of the Soil and Water Management Plan (ensuring records of no flows are also maintained). Alternatively, update the Soil and Water Management Plan to specify alternate monitoring locations and/or approach to determining baseline conditions. *As receiving water quality monitoring locations represent ephemeral drainage lines, monthly monitoring must be undertaken for the equivalent of at least two years. However, it is advised that, since the requirement to commence monitoring, no flows have been present during monitoring.*	**Proposed Action:** After a storm event, the nominated sampling locations for water quality in the ephemeral drainage lines will be inspected and water sample obtained where possible. **Implementation Timeframe:** Immediate **Status:** Closed out – the requirement to undertake water quality sampling at the nominated locations have been communicated to the relevant quarry staff. Rainfall events generating sufficient water flow in the ephemeral drainage lines enabled one sampling event in February 2020 to be carried during this reporting period. Continue to inspect the sampling locations and obtain water samples when there is sufficient flow.
HR R10/19	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. *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.*	**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. **Implementation Timeframe:** Inspection by a suitably qualified engineer to be undertaken by 31 December 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.
HR R11/19	Ensure that the Annual Reviews include all relevant aspects committed to be reported to within the Soil and Water Management Plan, including comparisons of receiving water quality results against relevant trigger values, sediment dam spill frequencies, clean water imports compared to the predicted water balance, etc. *The Annual Reviews did not include all information committed to within the management plans.*	**Proposed Action:** Future Annual Reviews will include all information committed to be reported within the SWMP. **Implementation Timeframe:** Immediate – next Annual Review to be submitted by 30 September 2020. **Status:** Closed out - actioned on 28/09/2020. Refer to Table 27 of this Annual Review.
HR R12/19	Ensure that the Annual Reviews report on water take in accordance with the Annual Review Guideline (DPE, 2015 – or latest version).	**Proposed Action:** Water take volumes from Water Access Licences will be reported in future Annual Reviews **Implementation Timeframe:**

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
	The Annual Reviews did not include the details of water take under the Water Access Licences.	Immediate – next Annual Review to be submitted by 30 September 2020. **Status:** Closed out - actioned on 28/09/2020. Refer to Section 6.6 of this Annual Review.
HR R13/19	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. *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).*	**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. **Implementation Timeframe:** From the point this document is submitted. **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.
HR R14/19	Ensure that monthly and annual summaries of truck movements (number of trucks, arrival time and despatch time) and product volumes transported from the Quarry are published on the Dixon Sand website every six months. *Six monthly truck movement summaries are provided on the Dixon Sand website however six monthly production summaries are not provided.*	**Proposed Action:** The six monthly truck movement summaries and production summaries will be published on Dixon Sand website every six months. **Implementation Timeframe:** From the point this document is submitted. **Status:** Closed out - actioned on 09/07/2020. Refer to www.dixonsand.com.au/environment
HR R15/19	Ensure that pre-clearing surveys, including surveys by a qualified ecologist no more than two weeks prior to felling and surveys by the Environmental Officer within 24 hours of clearing, are undertaken prior to any vegetation clearing. *Pre-clearing surveys were not undertaken at the Quarry prior to, albeit minor, vegetation clearing associated with the establishment of access tracks, monitoring bores, and the installation of fencing.*	**Proposed Action:** Ensure pre-clearing surveys are conducted prior to any vegetation clearing. Ensure hold points outlined in the current vegetation clearing and tree felling procedures are followed. **Implementation Timeframe:** Immediate - from the point this document is submitted. **Status:** Closed out – actioned on 06/04/2020.

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
HR R16/19	Ensure that topsoil stockpiles are constructed in accordance with the topsoil management measures outlined in the Biodiversity and Rehabilitation Management Plan. *Topsoil stockpile management measures include the location of stockpiles away from quarrying, traffic affected areas and watercourses, positioning within closed water management areas and within the Quarry disturbance footprint, positioning on level or gently sloping ground, establishment in windrows to a height no greater than 3m, and the establishment of silt fences at the base of stockpiles. Topsoil stockpiles to be kept longer than 3 months must be sown with a vegetation cover, with weed growth monitored on a monthly basis and controlled appropriately.*	**Proposed Action:** A review of the current topsoil stockpile locations will be undertaken and were required, the stockpiles will be rectified and/or establish a windrow to a height no greater than 3 metres and silt fences installed at the base on the downslope side. Advice from a qualified ecologist will be sought regarding the best approach to preserve the native seedbank within topsoil stockpiles whilst limiting dust generation. **Implementation Timeframe:** 31 March 2020 **Status:** Closed out - actioned in February 2020.

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
		 **Plate 2: Stockpiles have been reshaped to < 3 metres in height and silt fence installed at the base on the downslope side.**

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
		 **Plate 3: Stockpiles have been reshaped to < 3 metres in height and silt fence installed at the base on the downslope side.**

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
HR R17/19	Distribute copies of the approved Bushfire Management Plan, or summaries of the most relevant sections including bushfire control measures and response procedures, to key stakeholders including relevant land managers and neighbours. *It is understood that the Bushfire Management Plan has been distributed to Quarry personnel and consultation was undertaken with Council and RFS. However, Section 5.2.5 of the Biodiversity and Rehabilitation Management Plan also requires the bushfire management measures to be communicated to land managers and neighbours. The Bushfire Management Plan may inform bushfire management strategies employed by local landholders and feedback from local landholders and land managers may inform future updates to the Plan.*	**Proposed Action:** The Bushfire Management Plan (BMP) will be published on Dixon Sand website. Section 5.2.5 of the Biodiversity and Rehabilitation Management Plan will be revised to state that details of the bushfire management measures are contained in the BMP which is available for public access on Dixon Sand website (note that the BMP is currently already published on the website). **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised BRMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request.
HR R18/19	Ensure that, when a verified complaint or non-compliance with the Driver's Code of Conduct occurs, notification is provided to the other quarries who are also signatories to the Maroota Local Traffic Management Policy and request confirmation as to whether that truck or driver have any verified complaints/non-compliances at those quarries. Should it be verified that the driver has multiple verified complaints/non-compliances, ensure disciplinary action is undertaken in accordance with the Policy. *Traffic is a key management measure for the community given 5 of 6 complaints received during the audit period related to trucks and that traffic was the key matter raised during the community survey presented at the CCC meeting on 21 November 2017. Whilst the fundamentals of the traffic management is included in the traffic management plan, effective implementation through collaboration with the other local quarries is needed.*	**Proposed Action:** A meeting between the signatories of the Maroota Local Traffic Management Policy will be held to discuss the procedure for verifying complaint and non-compliances between the three quarries. The Maroota Local Traffic Management Policy will be reviewed and revised where appropriate. **Implementation Timeframe:** 31 March 2020. **Status:** Closed out – actioned on 16/01/2020.
HR R19/19	Notify all truck drivers of verified complaints / non-compliances relating to traffic and transportation (but maintain complainant and driver privacy) to ensure that	**Proposed Action:** Truck drivers will be notified of any complaints received or non-compliances relating to traffic and transportation. On-going educational campaign for truck

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
	they are aware of what types of complaints are being received and that these are being actioned. *Supplementing driver induction documentation with ongoing reminders that any non-compliance with these requirements is being actioned may assist in improving driver behaviour*	drivers which are currently in place will continue to be carried out. Please note that Dixon Sand is currently implementing the above measures in the form verbal and written notifications to drivers. **Implementation Timeframe:** Immediate **Status:** Noted – future verified complaints or non-compliances related to traffic and transportation will be notified to haulage truck drivers.
HR R20/19	Ensure that the fuel drum for the water pump is stored in a suitably bunded manner, remove the drum, or replace the pump with an electric pump. *A 205L drum of fuel was observed adjacent the water pump located adjacent "Work 1 Dam". Whilst located within a covered area, given the location and volume of the drum, appropriate bunding is considered necessary to achieve compliance with Condition 3(43) of DA 165-07-2005.*	**Proposed Action:** The fuel drum located adjacent the water pump at "Work Dam 1" will be removed or bunded in a suitable manner. **Implementation Timeframe:** Immediate **Status:** Closed out - actioned on 28/02/2020.

ID	IEA Comments and Recommended Action	Proposed Action and Implementation Timeframe by Dixon Sand
		 **Plate 4: Hydrocarbon drum placed in a suitable spill container.**

Table 31: Response, Proposed Action, Implementation Timeframe and Status for the IEA Suggested Improvements.

ID	IEA Comments and Suggested Improvement	Proposed Action and Implementation Timeframe by Dixon Sand
HR I1/19	Consider preparing a formal document outlining the various plans, strategies, programs, forms, templates, registers etc. which form the Environmental Management System. The document should be structured so as to outline the framework of the Environmental Management System so that a new employee could locate all necessary documentation. In preparing the document, identify any gaps or updates required or where opportunity exists to consolidate or simplify. *Whilst a certified Environmental Management System is not required, a formalised and documented system would assist both existing and future personnel in effectively implementing the system.*	**Proposed Action:** A formal document outlining the components which constitute the Quarry's Environmental Management System will be prepared to highlight the framework of the system and procedures. **Implementation Timeframe:** 30 June 2020 **Status:** Closed out - actioned on 05/06/2020. Examples are provided below.

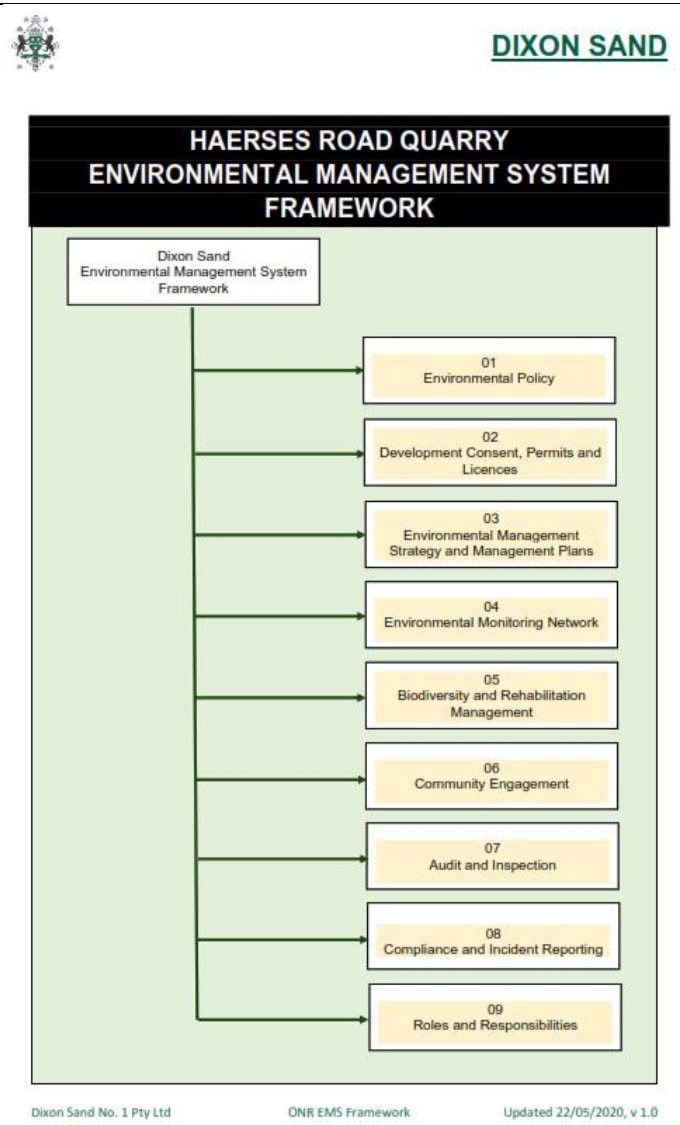


Plate 5: Environmental Management System Framework Table of Contents.

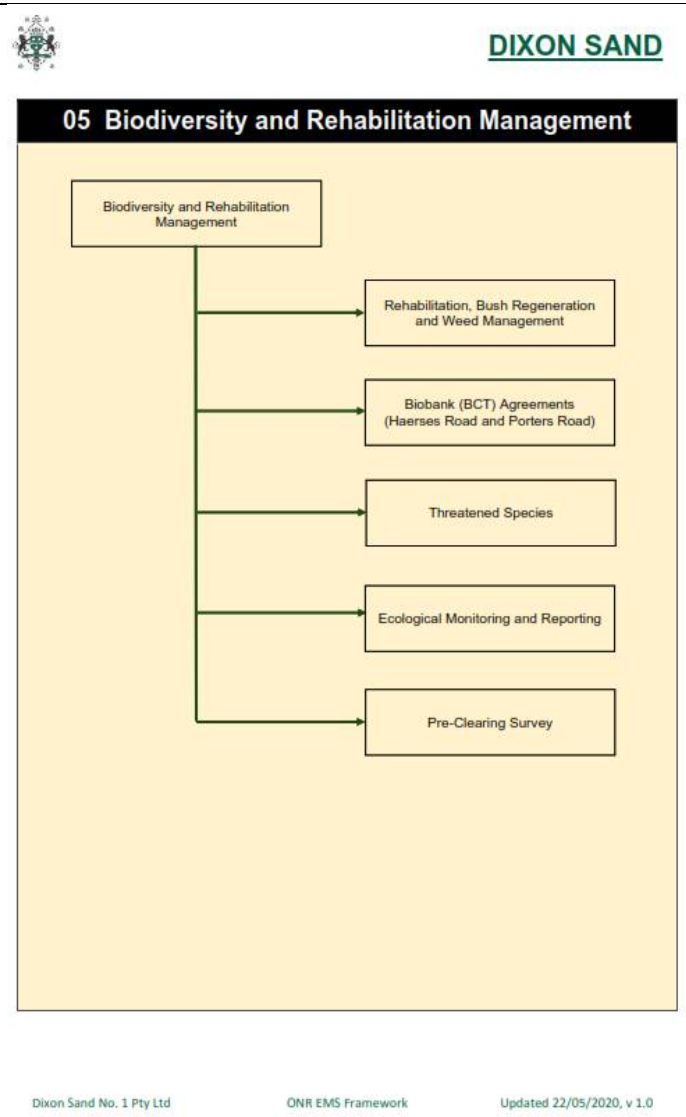


Plate 6: Biodiversity and Rehabilitation Management

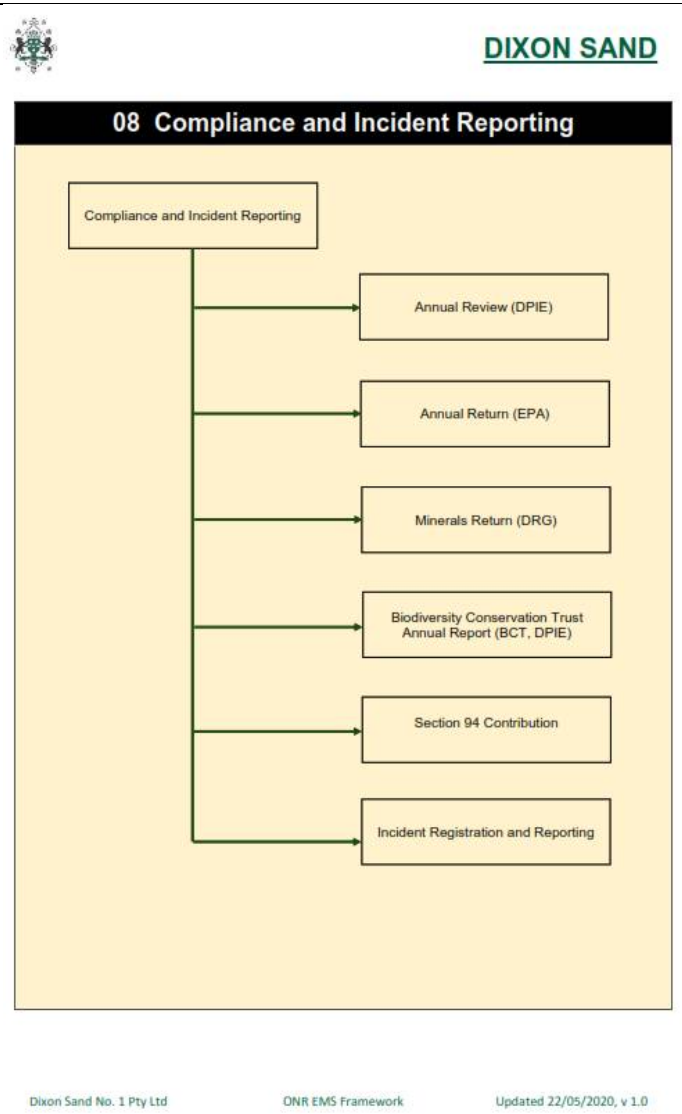


Plate 7: Compliance and Incident Reporting

HR I2/19	Update the Traffic Management Plan to reflect the current School Zone times and alert all truck drivers to this change in times. *It was identified that the TMP current identifies school zone times as 8.30am - 9.00am and 3.00pm – 3.30pm, however, the Department of Education has confirmed they are currently between 8:00am and 9:30am and between 2:30pm and 4:00pm.*	**Proposed Action:** The TMP will be updated to reflect the following school zone times: • 8:00am to 9:30am, and • 2:30pm to 4:00pm **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised TMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I3/19	Include an additional column in the production summaries presented in the Annual Reviews which summarises the total extracted material in comparison to the approved limit of 250 000tpa. *Whilst total extraction can be inferred from the information presented within the Annual Reviews, it would be preferable to explicitly confirm the amount extracted. This is particularly important when the amount of material exported from the Quarry nears the maximum limits given that additional material could possibly be extracted and stockpiled on site.*	**Proposed Action:** A summary of the total extraction will be included in the Annual Review. **Implementation Timeframe:** To be reported in the next Annual Review which is due by 30 September 2020. **Status:** Closed out - actioned on 28/09/2020. Refer to Table 4 of this Annual Review.
HR I4/19	Include an unanticipated Aboriginal heritage find procedure within the Environmental Management Strategy (or separate document / attachment). Condition 2(29) of DA 165-07-2005 outlines actions required in the event that an object of suspected Aboriginal origin is identified. However, there is currently no procedure or other prompt for training and/or implementation in the event that a find occurs.	**Proposed Action:** An "Unexpected Finds Procedure" will be developed as part of the EMS. This is inclusive of any Aboriginal Heritage Finds to address the requirement of DA 165-7-2005 Schedule 2 Condition 29. Toolbox training for Quarry operators will include the above new procedure once the revised EMS is approved by the DPIE. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE.

		Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised EMS). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I5/19	Review all Section cross references within the Biodiversity and Rehabilitation Management Plan and update as necessary. *Numerous incorrect Section cross references were identified within the Biodiversity and Rehabilitation Management Plan, including cross references to incorrect sections or sections which do not exist.*	**Proposed Action:** A review of the Biodiversity and Rehabilitation Management Plan will be undertaken to rectify any errors in cross referencing. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised BRMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I6/19	Ensure that the SWMP includes specific reference to the need for the development of specific measures for road and intersection works and noise bund construction as per Condition O4.2 of EPL 12513. Alternatively, include the specific measures within the SWMP. *Whilst road and intersection works and noise bund construction are not currently applicable, to ensure that inclusion of relevant measures related to these aspects, reference to these aspects should be included or, preferably the measures included now.*	**Proposed Action:** The SWMP will be revised to include a reference to the requirement for specific control measures to be developed for road and intersection works and noise bund construction. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised SWMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request

HR I7/19	Consider removing from Section 7.1 of the Noise Management Plan the commitment to supply a summary of noise monitoring data with the EPL Annual Return. *It is not a requirement of the EPL to include a summary of noise monitoring with the Annual Returns.*	**Proposed Action:** Section 7.1 of the Noise Management Plan (NMP) will be revised and a commitment to provide a summary of noise monitoring data with the EPL Annual Return will be removed as this is not a requirement of the EPL. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised NMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I8/19	Ensure that the annual review of the Maximum Extraction Depth Map as required by Schedule 2 Condition 22 of DA 165-7-2005 is outlined explicitly within the respective Annual Review including where it has been assessed no update to the map is required. *The 2018 and 2019 Annual Review notes that there have been no impacts and states that the Maximum Extraction Depth Map will require review following the 2019 Independent Environmental Audit. It would be preferable to confirm that the map has been reviewed as part of the Annual Review process and, where no change is considered necessary, explicitly state the existing map remains adequate.*	**Proposed Action:** Ensure confirmation that the Maximum Extraction Depth Map has been reviewed is provided in the Annual Review and where no change is required, provide a statement that the existing MEDP remains adequate. **Implementation Timeframe:** Immediate – next Annual Review to be submitted by 30 September 2020. **Status:** Closed out - actioned on 28/09/2020. Refer to Section 6.5 of this Annual Review
HR I9/19	Update Section 8.3 of the Environmental Management Strategy to reflect the current EPA requirements for submitting EPL Annual Returns, i.e. via eConnect. *Section 8.3 of the EMS refers to EPA providing a copy of the Annual Return form and that this must be submitted via registered post. This is no longer undertaken and registered post is no longer an accepted submission option.*	**Proposed Action:** Section 8.3 of the Environmental Management Strategy will be updated to specify that EPL Annual Returns are submitted via eConnect. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE.

		Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised EMS). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I10/19	Rationalise the water level and water quality trigger values nominated in the Surface Water Management Plan using either 'standard' guideline values or values developed based upon the broader locality / region. *in some instances, the interim surface water quality triggers and groundwater level and quality triggers provide a very narrow margin and may potentially lead to regular exceedances and unnecessary action response. For example, the upper and lower groundwater level trigger values for BH5 are 178.5m AHD and 178.6m AHD respectively.*	**Proposed Action:** The water level and water quality trigger values nominated in the SWMP will be rationalised appropriately. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised SWMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I11/19	Review and update the Soil and Water Management Plan taking into consideration the following. • Review and update of the water level and quality trigger levels (see Recommendation HR I10/19). • Rectify the typographical error for the 80th percentile groundwater pH levels in Table 2.5. • Include level 4 headings in the table of contents to assist with document. *During the audit, a range of opportunities were identified to improve the value of the Soil and Water Management Plan. In some instances these improvements will assist in maintaining or demonstrating compliance.*	**Proposed Action:** The SWMP will be reviewed particularly the following: • Review and update of the water level and quality trigger levels (as outlined in Recommendation HR I10/19). • Rectify the typographical error for the 80th percentile groundwater pH levels in Table 2.5. • Include level 4 headings in the table of contents to assist with document where appropriate. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE.

		Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised SWMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I12/19	Continue to consult with the Department of Industry – Water in order to seek formal approval of the aquifer pumping test works undertaken at the Quarry. *Given the potential for this matter to delay the commencement of extraction within the Mod 1 extraction area, the satisfaction of DoI with the pumping tests required DA 165-7-2005 Condition 3(16e) should be actively followed up.*	**Proposed Action:** The Department of Industry – Water (DoI-Water) provided acknowledgement on 22/11/2019 regarding the installation of additional monitoring wells and water level data loggers and pumping test carried out under Condition 16 of Schedule 3 of DA 165-7-2005. The DoI-Water requests: 1. continued inclusion of monitoring of the groundwater levels in these monitoring bores as part of the on-going monitoring programme. 2. Submission of Form A's for the monitoring bores to WaterNSW, if this has not been done. Dixon Sand submitted Form A's for completed works for the abovementioned monitoring bores to water.gds@dpi.nsw.gov.au on 29/11/2019. **Implementation Timeframe:** No further action required in addition to continual of monitoring of the groundwater levels in the abovementioned bores as part of the on-going monitoring programme. **Status:** Closed out - actioned on 29/11/2019
HR I13/19	Undertake a documented formal review of the various requirements of the Soil and Water Management Plan that are to be completed prior to commencement of extraction within the Mod 1 extraction area or that will be triggered by the commencement of extraction. *There a range of measures that are required to be established prior to the commencement of extraction within the Mod 1 extraction area and a range of management actions that are not triggered until extraction commences. A formal review of these matters will assist in ensuring compliance is maintained with the relevant commitments.*	**Proposed Action:** Formal confirmation from the DPIE has been received on 02/12/2019 stating that the pre-commencement requirements for works within extraction cells 1A and 2A of the Mod 1 extraction area have been met. A review of the requirements in the SWMP to be completed prior to and post commencement of extraction within the Mod 1 extraction area will be undertaken and documented. **Implementation Timeframe:** Prior to extraction of cells 1A and 2A. **Status:** Closed out - actioned in January 2020.

HR I14/19	Review and update the Soil and Water Management Plan to clearly specify what measures apply to what areas / aspects of the operation. *Section 3.1 of the Soil and Water Management Plan outlines the existing and future operations, however, it is often not clear in the following subsections what measures are applicable to the existing site or which are applicable to future activities or locations.*	**Proposed Action:** The SWMP will be reviewed and revised to clearly specify what measures apply to what areas/aspects of the quarry operation. **Implementation Timeframe:** Condition 5 (c) of Schedule 5 of DA 250-09-01 requires Dixon Sand to undertake a review of the EMS and Management Plans within 3 months of the submission of the IEA report and a notification to be provided to the DPIE. Should the review lead to revisions of the document, the revised document will be submitted within 6 weeks of the review notification date. **Status:** Closed out - actioned on 09/04/2020 (review notification) and 01/05/2020 (submission of revised SWMP). EMS and Management Plans resubmitted on 15/09/2020 as per DPIE's request
HR I15/19	Include in the logbook records the flow volume at Cattai Creek at the Cattai Ridge Road gauge [No. 2122951] for the day prior to and the day of any water take from WAL 25941 and WAL25956. *Condition MW0078-00005 of WAL 25941 and WAL 25956 requires that the flow rate at the Cattai Ridge Road be >3ML/day. To ensure compliance with this requirement, it is suggested that the recorded flows be included in the logbook*.	**Proposed Action:** Dixon Sand was unable to locate any online monitoring data for the specific location nominated on the WAL which is located approximately 30 minutes from the quarry. Dixon Sand will liaise with WaterNSW regarding the logistics of complying with Condition MW0078-00005 of WAL 25941 and WAL 25956. An application to modify the condition may be required. **Implementation Timeframe:** Immediate **Status:** Closed out – actioned on 22/01/2020. WaterNSW confirmed that both WALs 25941 and 25956 attached to approvals for dams on 1st order watercourses. Under the Water Management Act 2000, these dams are deemed to be 'runoff harvesting dams'. The flow conditions contained in the WALs therefore do not apply.

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

13.1 Vegetation Clearing

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

13.2 Rehabilitation and Bush Regeneration

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.

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.

13.3 Audits and Improvement Notice

Address any outstanding proposed actions for the Independent Environmental Audit and DRG's Improvement Notice.

14. Conclusion

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

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

Report Number: 7776

Date Issued: 5/08/2019 Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

The following 9 samples were received on 25/07/2019 and tested at 4/30 Glenwood Dr Thornton, NSW 2322

Client Sample Reference	Date Sampled	Licence Ref /GPS	Laboratory ID	Matrix	Comment or Non-compliances
D08&9 Hitchcock Rd Olive Grove	25/07/2019 09:19		7776/1	Dust	
D10 Hearses Rd	25/07/2019 09:32		7776/2	Dust	
D06 School	25/07/2019 10:16		7776/3	Dust	
D05 Bund	25/07/2019 10:26		7776/4	Dust	
D04 Rehab	25/07/2019 10:46		7776/5	Dust	
D07 Mullock	25/07/2019 11:02		7776/6	Dust	
D01(A) Front Gate	25/07/2019 10:35		7776/7	Dust	
D11 Goldstien	25/07/2019 09:44		7776/8	Dust	
D12 Ram	25/07/2019 09:58		7776/9	Dust	

The samples have been tested 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.

NATA
WORLD RECOGNISED ACCREDITATION

Test Report Number: 7776

Date Issued: 5/08/2019
Tested between: 25/07/19 and 5/08/19

Results

Sample #	Sample Description	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
7776/1	D08&9 Hitchcock Rd Olive Grove	27/06/2019 08:58	25/07/2019 09:19	28	<0.1	<0.1	<0.1	24
7776/2	D10 Hearses Rd	27/06/2019 09:46	25/07/2019 09:32	28	2.5	1.9	0.6	25
7776/3	D06 School	27/06/2019 10:14	25/07/2019 10:16	28	0.3	0.2	0.1	26
7776/4	D05 Bund	27/06/2019 10:23	25/07/2019 10:26	28	0.4	0.4	<0.1	26
7776/5	D04 Rehab	27/06/2019 10:48	25/07/2019 10:46	28	<0.1	0.1	<0.1	22
7776/6	D07 Mullock	27/06/2019 11:02	25/07/2019 11:02	28	<0.1	0.1	<0.1	24
7776/7	D01(A) Front Gate	27/06/2019 10:33	25/07/2019 10:35	28	0.8	0.8	<0.1	23
7776/8	D11 Goldstien	27/06/2019 09:24	25/07/2019 09:44	28	<0.1	0.1	<0.1	24
7776/9	D12 Ram	27/06/2019 09:58	25/07/2019 09:58	28	<0.1	0.1	<0.1	25

Results have been approved and report finalised on 5/08/2019

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: 7776

Date Issued: 5/08/2019
Sampling Conditions: Fine 8°-13°C

vgt Laboratories Pty Ltd

Sample #	Description	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
7776/1	D08&9 Hitchcock Rd Olive Grove	25/07/2019 09:19	T.Walker	AS3580.10.1	CuSO4	
7776/2	D10 Hearses Rd	25/07/2019 09:32	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
7776/3	D06 School	25/07/2019 10:16	T.Walker	AS3580.10.1	CuSO4	
7776/4	D05 Bund	25/07/2019 10:26	T.Walker	AS3580.10.1	CuSO4	
7776/5	D04 Rehab	25/07/2019 10:46	T.Walker	AS3580.10.1	CuSO4	
7776/6	D07 Mullock	25/07/2019 11:02	T.Walker	AS3580.10.1	CuSO4	
7776/7	D01(A) Front Gate	25/07/2019 10:35	T.Walker	AS3580.10.1	CuSO4	Minor algae
7776/8	D11 Goldstien	25/07/2019 09:44	T.Walker	AS3580.10.1	CuSO4	
7776/9	D12 Ram	25/07/2019 09:58	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 5/08/2019
Where method is "unknown" sampling procedures are not endorsed.

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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.

NATA
WORLD RECOGNISED ACCREDITATION

Report Number: 7899

Date Issued: 3/09/2019 Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

vgt Laboratories Pty Ltd
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 22/08/2019 and tested at 4/30 Glenwood Dr Thornton, NSW 2322

Client Sample Reference	Licence Ref /GPS	Date Sampled	Lab ID	Matrix	Comment or Non-compliances
D08&9 Hitchcock Rd Olive Grove		22/08/2019	7899/1	Dust	
D10 Hearses Rd		22/08/2019	7899/2	Dust	Dead bird near gauge. Mineral material in droppings
D06 School		22/08/2019	7899/3	Dust	
D05 Bund		22/08/2019	7899/4	Dust	
D04 Rehab		22/08/2019	7899/5	Dust	
D07 Mullock		22/08/2019	7899/6	Dust	
D01(A) Front Gate		22/08/2019	7899/7	Dust	
D11 Goldstien		22/08/2019	7899/8	Dust	
D12 Ram		22/08/2019	7899/9	Dust	

The samples have been tested 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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 7899

Date Issued: 3/09/2019
Tested between: 22/08/19 and 3/09/19

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
7899/1	D08&9 Hitchcock Rd Olive Grove	25/07/2019 09:19	22/08/2019 08:58	28	0.5	0.3	0.2	8
7899/2	D10 Hearses Rd	25/07/2019 09:32	22/08/2019 09:08	28	**158.0**	107.3	50.7	6
7899/3	D06 School	25/07/2019 10:16	22/08/2019 10:29	28	0.9	0.7	0.2	7
7899/4	D05 Bund	25/07/2019 10:26	22/08/2019 10:41	28	2.4	2.1	0.3	8
7899/5	D04 Rehab	25/07/2019 10:46	22/08/2019 11:05	28	0.4	0.2	0.2	7
7899/6	D07 Mullock	25/07/2019 11:02	22/08/2019 11:17	28	0.4	0.2	0.2	7
7899/7	D01(A) Front Gate	25/07/2019 10:35	22/08/2019 10:54	28	1.2	1.0	0.2	8
7899/8	D11 Goldstien	25/07/2019 09:44	22/08/2019 09:26	28	0.4	0.1	0.3	6
7899/9	D12 Ram	25/07/2019 09:58	22/08/2019 10:15	28	0.2	0.2	<0.1	7

Results have been approved and report finalised on 3/09/2019

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NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 7899

Date Issued: 3/09/2019
Sampling Conditions: Cloudy 20°C

Laboratories Pty Ltd

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
7899/1	D08&9 Hitchcock Rd Olive Grove	22/08/2019 08:58	T.Walker	AS3580.10.1	CuSO4	
7899/2	D10 Hearses Rd	22/08/2019 09:08	T.Walker	AS3580.10.1	CuSO4	Major bird droppings, algae
7899/3	D06 School	22/08/2019 10:29	T.Walker	AS3580.10.1	CuSO4	
7899/4	D05 Bund	22/08/2019 10:41	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
7899/5	D04 Rehab	22/08/2019 11:05	T.Walker	AS3580.10.1	CuSO4	
7899/6	D07 Mullock	22/08/2019 11:17	T.Walker	AS3580.10.1	CuSO4	
7899/7	D01(A) Front Gate	22/08/2019 10:54	T.Walker	AS3580.10.1	CuSO4	Minor insects
7899/8	D11 Goldstien	22/08/2019 09:26	T.Walker	AS3580.10.1	CuSO4	
7899/9	D12 Ram	22/08/2019 10:15	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 3/09/2019
Where method is "unknown" sampling procedures are not endorsed.

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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.

NATA
WORLD RECOGNISED ACCREDITATION

Report Number: 8016

Date Issued: 30/09/2019

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

vgt Laboratories Pty Ltd
PO Box 2335 Greenhills NSW 2323
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www.vgt.com.au ABN 77 621 943 600

The following 9 samples were received on 19/09/2019 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			19/09/2019	8016/1	Dust	
D10 Hearses Rd			19/09/2019	8016/2	Dust	
D06 School			19/09/2019	8016/3	Dust	
D05 Bund			19/09/2019	8016/4	Dust	
D04 Rehab			19/09/2019	8016/5	Dust	
D07 Mullock			19/09/2019	8016/6	Dust	
D01(A) Front Gate			19/09/2019	8016/7	Dust	
D11 Goldstien			19/09/2019	8016/8	Dust	
D12 Ram			19/09/2019	8016/9	Dust	

The samples have been tested 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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8016

Date Issued: 30/09/2019
Tested between: 19/09/19 and 27/09/19

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8016/1	D08&9 Hitchcock Rd Olive Grove	22/08/2019 08:58	19/09/2019 07:58	28	1.0	0.7	0.3	205
8016/2	D10 Hearses Rd	22/08/2019 09:08	19/09/2019 08:08	28	1.5	1.2	0.3	215
8016/3	D06 School	22/08/2019 10:29	19/09/2019 08:51	28	1.0	0.8	0.2	220
8016/4	D05 Bund	22/08/2019 10:41	19/09/2019 09:07	28	2.4	2.0	0.4	205
8016/5	D04 Rehab	22/08/2019 11:05	19/09/2019 09:33	28	2.1	1.7	0.4	208
8016/6	D07 Mullock	22/08/2019 11:17	19/09/2019 09:48	28	0.8	0.6	0.2	212
8016/7	D01(A) Front Gate	22/08/2019 10:54	19/09/2019 09:19	28	1.6	1.3	0.3	112
8016/8	D11 Goldstien	22/08/2019 09:26	19/09/2019 08:21	28	0.8	0.5	0.3	204
8016/9	D12 Ram	22/08/2019 10:15	19/09/2019 08:39	28	0.8	0.5	0.3	208

Results have been approved and report finalised on 30/09/2019

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.

NATA
WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8016

Date Issued: 30/09/2019
Sampling Conditions: Showers 14°-17°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8016/1	D08&9 Hitchcock Rd Olive Grove	19/09/2019 07:58	T.Walker	AS3580.10.1	CuSO4	
8016/2	D10 Hearses Rd	19/09/2019 08:08	T.Walker	AS3580.10.1	CuSO4	
8016/3	D06 School	19/09/2019 08:51	T.Walker	AS3580.10.1	CuSO4	Bird droppings in funnel
8016/4	D05 Bund	19/09/2019 09:07	T.Walker	AS3580.10.1	CuSO4	Minor vegetation, algae
8016/5	D04 Rehab	19/09/2019 09:33	T.Walker	AS3580.10.1	CuSO4	
8016/6	D07 Mullock	19/09/2019 09:48	T.Walker	AS3580.10.1	CuSO4	
8016/7	D01(A) Front Gate	19/09/2019 09:19	T.Walker	AS3580.10.1	CuSO4	Full, sand
8016/8	D11 Goldstien	19/09/2019 08:21	T.Walker	AS3580.10.1	CuSO4	
8016/9	D12 Ram	19/09/2019 08:39	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 30/09/2019
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.

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Report Number: 8150

Date Issued: 28/10/2019

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

The following 9 samples were received on 18/10/2019 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	18/10/2019	8150/1	Dust	
D10 Hearses Rd	312538	6294576	18/10/2019	8150/2	Dust	
D06 School	313518	6296537	18/10/2019	8150/3	Dust	
D05 Bund	313160	6296838	18/10/2019	8150/4	Dust	Acacia in capture zone.
D04 Rehab	312385	6296932	18/10/2019	8150/5	Dust	
D07 Mullock	312579	6296676	18/10/2019	8150/6	Dust	
D01(A) Front Gate	313290	6297176	18/10/2019	8150/7	Dust	
D11 Goldstien	312034	6294213	18/10/2019	8150/8	Dust	
D12 Ram	311750	6294159	18/10/2019	8150/9	Dust	

The samples have been tested 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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8150

Date Issued: 28/10/2019
Tested between: 18/10/19 and 28/10/19

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8150/1	D08&9 Hitchcock Rd Olive Grove	19/09/2019 07:58	18/10/2019 08:08	29	1.5	1.0	0.5	40
8150/2	D10 Hearses Rd	19/09/2019 08:08	18/10/2019 08:18	29	**11.1**	6.2	4.9	30
8150/3	D06 School	19/09/2019 08:51	18/10/2019 09:05	29	1.6	0.7	0.9	36
8150/4	D05 Bund	19/09/2019 09:07	18/10/2019 09:16	29	2.0	1.4	0.6	34
8150/5	D04 Rehab	19/09/2019 09:33	18/10/2019 09:46	29	1.0	0.9	0.1	27
8150/6	D07 Mullock	19/09/2019 09:48	18/10/2019 09:58	29	2.2	1.9	0.3	30
8150/7	D01(A) Front Gate	19/09/2019 09:19	18/10/2019 09:30	29	2.2	2.0	0.2	35
8150/8	D11 Goldstien	19/09/2019 08:21	18/10/2019 08:34	29	1.5	0.8	0.7	33
8150/9	D12 Ram	19/09/2019 08:39	18/10/2019 08:56	29	0.8	0.8	<0.1	36

Results have been approved and report finalised on 28/10/2019

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.

NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8150

Date Issued: 28/10/2019
Sampling Conditions: Fine 14°-18°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8150/1	D08&9 Hitchcock Rd Olive Grove	18/10/2019 08:08	D.Walker	AS3580.10.1	CuSO4	Insects
8150/2	D10 Hearses Rd	18/10/2019 08:18	D.Walker	AS3580.10.1	CuSO4	Bird droppings, minor insects, algae, vegetation, sand
8150/3	D06 School	18/10/2019 09:05	D.Walker	AS3580.10.1	CuSO4	
8150/4	D05 Bund	18/10/2019 09:16	D.Walker	AS3580.10.1	CuSO4	Insects, algae
8150/5	D04 Rehab	18/10/2019 09:46	D.Walker	AS3580.10.1	CuSO4	
8150/6	D07 Mullock	18/10/2019 09:58	D.Walker	AS3580.10.1	CuSO4	
8150/7	D01(A) Front Gate	18/10/2019 09:30	D.Walker	AS3580.10.1	CuSO4	Insects
8150/8	D11 Goldstien	18/10/2019 08:34	D.Walker	AS3580.10.1	CuSO4	Minor insects, vegetation
8150/9	D12 Ram	18/10/2019 08:56	D.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 28/10/2019
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: 8285

Date Issued: 22/11/2019 Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

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

The following 9 samples were received on 15/11/2019 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	15/11/2019	8285/1	Dust	
D10 Hearses Rd	312538	6294576	15/11/2019	8285/2	Dust	
D06 School	313518	6296537	15/11/2019	8285/3	Dust	
D05 Bund	313160	6296838	15/11/2019	8285/4	Dust	
D04 Rehab	312385	6296932	15/11/2019	8285/5	Dust	
D07 Mullock	312579	6296676	15/11/2019	8285/6	Dust	
D01(A) Front Gate	313290	6297176	15/11/2019	8285/7	Dust	
D11 Goldstien	312034	6294213	15/11/2019	8285/8	Dust	
D12 Ram	311750	6294159	15/11/2019	8285/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8285

Date Issued: 22/11/2019
Tested between: 15/11/19 and 22/11/19

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8285/1	D08&9 Hitchcock Rd Olive Grove	18/10/2019 08:08	15/11/2019 08:56	28	1.8	1.2	0.6	9
8285/2	D10 Hearses Rd	18/10/2019 08:18	15/11/2019 09:06	28	**8.5**	4.3	4.2	11
8285/3	D06 School	18/10/2019 09:05	15/11/2019 09:59	28	1.9	1.2	0.7	14
8285/4	D05 Bund	18/10/2019 09:16	15/11/2019 10:12	28	2.5	1.8	0.7	14
8285/5	D04 Rehab	18/10/2019 09:46	15/11/2019 10:40	28	1.5	0.7	0.8	12
8285/6	D07 Mullock	18/10/2019 09:58	15/11/2019 10:50	28	1.3	0.9	0.4	13
8285/7	D01(A) Front Gate	18/10/2019 09:30	15/11/2019 10:25	28	2.1	1.5	0.6	14
8285/8	D11 Goldstien	18/10/2019 08:34	15/11/2019 09:20	28	1.8	0.9	0.9	13
8285/9	D12 Ram	18/10/2019 08:56	15/11/2019 09:40	28	1.2	0.8	0.4	14

Results have been approved and report finalised on 22/11/2019

NATA Accredited Laboratory – 20375

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NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8285

Date Issued: 22/11/2019
Sampling Conditions: Major smoke haze 23°C-25°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8285/1	D08&9 Hitchcock Rd Olive Grove	15/11/2019 08:56	T.Walker	AS3580.10.1	CuSO4	
8285/2	D10 Hearses Rd	15/11/2019 09:06	T.Walker	AS3580.10.1	CuSO4	Major bird droppings, algae - Farming adjacent
8285/3	D06 School	15/11/2019 09:59	T.Walker	AS3580.10.1	CuSO4	
8285/4	D05 Bund	15/11/2019 10:12	T.Walker	AS3580.10.1	CuSO4	Minor insects, algae
8285/5	D04 Rehab	15/11/2019 10:40	T.Walker	AS3580.10.1	CuSO4	Minor insects, vegetation
8285/6	D07 Mullock	15/11/2019 10:50	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
8285/7	D01(A) Front Gate	15/11/2019 10:25	T.Walker	AS3580.10.1	CuSO4	Minor insects, farming adjacent
8285/8	D11 Goldstien	15/11/2019 09:20	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
8285/9	D12 Ram	15/11/2019 09:40	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 22/11/2019
Where method is "unknown" sampling procedures are not endorsed.

NATA Accredited Laboratory – 20375

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Report Number: 8412

Date Issued: 20/12/2019

Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

The following 9 samples were received on 13/12/2019 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	13/12/2019	8412/1	Dust	
D10 Hearses Rd	312538	6294576	13/12/2019	8412/2	Dust	
D06 School	313518	6296537	13/12/2019	8412/3	Dust	
D05 Bund	313160	6296838	13/12/2019	8412/4	Dust	
D04 Rehab	312385	6296932	13/12/2019	8412/5	Dust	
D07 Mullock	312579	6296676	13/12/2019	8412/6	Dust	
D01(A) Front Gate	313290	6297176	13/12/2019	8412/7	Dust	
D11 Goldstien	312034	6294213	13/12/2019	8412/8	Dust	
D12 Ram	311750	6294159	13/12/2019	8412/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8412

Date Issued: 20/12/2019
Tested between: 13/12/19 and 20/12/19

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8412/1	D08&9 Hitchcock Rd Olive Grove	15/11/2019 08:56	13/12/2019 08:58	28	**4.4**	3.5	0.9	23
8412/2	D10 Hearses Rd	15/11/2019 09:06	13/12/2019 09:10	28	**5.6**	3.6	2.0	27
8412/3	D06 School	15/11/2019 09:59	13/12/2019 09:54	28	**4.7**	3.6	1.1	21
8412/4	D05 Bund	15/11/2019 10:12	13/12/2019 10:12	28	**5.9**	4.8	1.1	21
8412/5	D04 Rehab	15/11/2019 10:40	13/12/2019 10:38	28	3.9	3.2	0.7	21
8412/6	D07 Mullock	15/11/2019 10:50	13/12/2019 10:50	28	3.8	3.4	0.4	21
8412/7	D01(A) Front Gate	15/11/2019 10:25	13/12/2019 10:24	28	3.8	3.2	0.6	17
8412/8	D11 Goldstien	15/11/2019 09:20	13/12/2019 09:24	28	**4.1**	3.0	1.1	32
8412/9	D12 Ram	15/11/2019 09:40	13/12/2019 09:42	28	3.5	3.1	0.4	34

Results have been approved and report finalised on 20/12/2019

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.

NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8412

Date Issued: 20/12/2019
Sampling Conditions: Cloudy 22°C, Recent smoke haze

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8412/1	D08&9 Hitchcock Rd Olive Grove	13/12/2019 08:58	T.Walker	AS3580.10.1	CuSO4	Minor insects, ash
8412/2	D10 Hearses Rd	13/12/2019 09:10	T.Walker	AS3580.10.1	CuSO4	Bird droppings, insects, algae, ash
8412/3	D06 School	13/12/2019 09:54	T.Walker	AS3580.10.1	CuSO4	Minor insects, algae, ash
8412/4	D05 Bund	13/12/2019 10:12	T.Walker	AS3580.10.1	CuSO4	Minor insects, algae, ash
8412/5	D04 Rehab	13/12/2019 10:38	T.Walker	AS3580.10.1	CuSO4	Minor vegetation, ash
8412/6	D07 Mullock	13/12/2019 10:50	T.Walker	AS3580.10.1	CuSO4	Ash
8412/7	D01(A) Front Gate	13/12/2019 10:24	T.Walker	AS3580.10.1	CuSO4	Ash
8412/8	D11 Goldstien	13/12/2019 09:24	T.Walker	AS3580.10.1	CuSO4	Minor vegetation, algae, ash
8412/9	D12 Ram	13/12/2019 09:42	T.Walker	AS3580.10.1	CuSO4	Minor insects, algae, ash

Sampling procedures have been approved and report finalised on 20/12/2019
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: 8486

Date Issued: 17/01/2020 Revision Number: 00

Site/Job: Dixon Maroota - Dusts

Client: Dixon Sands
Address PO Box 4019
PITT TOWN NSW 2756
Contact David Dixon

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

The following 9 samples were received on 10/01/2020 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	10/01/2020	8486/1	Dust	
D10 Hearses Rd	312538	6294576	10/01/2020	8486/2	Dust	
D06 School	313518	6296537	10/01/2020	8486/3	Dust	
D05 Bund	313160	6296838	10/01/2020	8486/4	Dust	
D04 Rehab	312385	6296932	10/01/2020	8486/5	Dust	
D07 Mullock	312579	6296676	10/01/2020	8486/6	Dust	
D01(A) Front Gate	313290	6297176	10/01/2020	8486/7	Dust	
D11 Goldstien	312034	6294213	10/01/2020	8486/8	Dust	
D12 Ram	311750	6294159	10/01/2020	8486/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8486

Date Issued: 17/01/2020
Tested between: 10/01/20 and 17/01/20

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8486/1	D08&9 Hitchcock Rd Olive Grove	13/12/2019 08:58	10/01/2020 09:29	28	3.3	2.4	0.9	6
8486/2	D10 Hearses Rd	13/12/2019 09:10	10/01/2020 09:39	28	**9.4**	6.0	3.4	10
8486/3	D06 School	13/12/2019 09:54	10/01/2020 10:30	28	2.6	2.1	0.5	9
8486/4	D05 Bund	13/12/2019 10:12	10/01/2020 10:44	28	3.0	2.3	0.7	9
8486/5	D04 Rehab	13/12/2019 10:38	10/01/2020 11:02	28	2.6	1.9	0.7	8
8486/6	D07 Mullock	13/12/2019 10:50	10/01/2020 11:12	28	1.9	1.7	0.2	8
8486/7	D01(A) Front Gate	13/12/2019 10:24	10/01/2020 10:51	28	2.2	1.9	0.3	10
8486/8	D11 Goldstien	13/12/2019 09:24	10/01/2020 09:51	28	3.3	2.2	1.1	11
8486/9	D12 Ram	13/12/2019 09:42	10/01/2020 10:09	28	3.4	2.3	1.1	11

Results have been approved and report finalised on 17/01/2020

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.

NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8486

Date Issued: 17/01/2020
Sampling Conditions: Smoke haze, 23°-27°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8486/1	D08&9 Hitchcock Rd Olive Grove	10/01/2020 09:29	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
8486/2	D10 Hearses Rd	10/01/2020 09:39	T.Walker	AS3580.10.1	CuSO4	Dust, vegetation, algae, ash
8486/3	D06 School	10/01/2020 10:30	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
8486/4	D05 Bund	10/01/2020 10:44	T.Walker	AS3580.10.1	CuSO4	Minor vegetation, ash
8486/5	D04 Rehab	10/01/2020 11:02	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
8486/6	D07 Mullock	10/01/2020 11:12	T.Walker	AS3580.10.1	CuSO4	Minor isnects
8486/7	D01(A) Front Gate	10/01/2020 10:51	T.Walker	AS3580.10.1	CuSO4	Minor ash
8486/8	D11 Goldstien	10/01/2020 09:51	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
8486/9	D12 Ram	10/01/2020 10:09	T.Walker	AS3580.10.1	CuSO4	Minor vegetation

Sampling procedures have been approved and report finalised on 17/01/2020
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: 8553

Date Issued: 14/02/2020 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

vgt Laboratories Pty Ltd
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 7/02/2020 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	7/02/2020	8553/1	Dust	
D10 Hearses Rd	312538	6294576	7/02/2020	8553/2	Dust	
D06 School	313518	6296537	7/02/2020	8553/3	Dust	
D05 Bund	313160	6296838	7/02/2020	8553/4	Dust	
D04 Rehab	312385	6296932	7/02/2020	8553/5	Dust	
D07 Mullock	312579	6296676	7/02/2020	8553/6	Dust	
D01(A) Front Gate	313290	6297176	7/02/2020	8553/7	Dust	
D11 Goldstien	312034	6294213	7/02/2020	8553/8	Dust	
D12 Ram	311750	6294159	7/02/2020	8553/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8553

Date Issued: 14/02/2020
Tested between: 7/02/20 and 14/02/20

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8553/1	D08&9 Hitchcock Rd Olive Grove	10/01/2020 09:29	7/02/2020 09:48	28	**8.2**	6.9	1.3	99
8553/2	D10 Hearses Rd	10/01/2020 09:39	7/02/2020 09:57	28	**6.9**	5.9	1.0	94
8553/3	D06 School	10/01/2020 10:30	7/02/2020 10:43	28	**6.0**	5.2	0.8	103
8553/4	D05 Bund	10/01/2020 10:44	7/02/2020 10:56	28	**6.5**	5.7	0.8	104
8553/5	D04 Rehab	10/01/2020 11:02	7/02/2020 11:14	28	**5.3**	4.6	0.7	91
8553/6	D07 Mullock	10/01/2020 11:12	7/02/2020 11:26	28	**5.5**	4.9	0.6	92
8553/7	D01(A) Front Gate	10/01/2020 10:51	7/02/2020 11:01	28	**5.3**	5.0	0.3	95
8553/8	D11 Goldstien	10/01/2020 09:51	7/02/2020 10:16	28	**7.6**	6.4	1.2	91
8553/9	D12 Ram	10/01/2020 10:09	7/02/2020 10:33	28	**7.6**	6.7	0.9	96

Results have been approved and report finalised on 14/02/2020

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.

NATA
WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8553

Date Issued: 14/02/2020
Sampling Conditions: Raining 18°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8553/1	D08&9 Hitchcock Rd Olive Grove	7/02/2020 09:48	T.Walker	AS3580.10.1	CuSO4	Ash, minor insects
8553/2	D10 Hearses Rd	7/02/2020 09:57	T.Walker	AS3580.10.1	CuSO4	Ash
8553/3	D06 School	7/02/2020 10:43	T.Walker	AS3580.10.1	CuSO4	Ash
8553/4	D05 Bund	7/02/2020 10:56	T.Walker	AS3580.10.1	CuSO4	Ash
8553/5	D04 Rehab	7/02/2020 11:14	T.Walker	AS3580.10.1	CuSO4	Ash
8553/6	D07 Mullock	7/02/2020 11:26	T.Walker	AS3580.10.1	CuSO4	Ash
8553/7	D01(A) Front Gate	7/02/2020 11:01	T.Walker	AS3580.10.1	CuSO4	Ash
8553/8	D11 Goldstien	7/02/2020 10:16	T.Walker	AS3580.10.1	CuSO4	Ash
8553/9	D12 Ram	7/02/2020 10:33	T.Walker	AS3580.10.1	CuSO4	Minor Ash

Sampling procedures have been approved and report finalised on 14/02/2020
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: 8719

Date Issued: 16/03/2020 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

vgt Laboratories Pty Ltd
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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 6/03/2020 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	6/03/2020	8719/1	Dust	
D10 Hearses Rd	312538	6294576	6/03/2020	8719/2	Dust	
D06 School	313518	6296537	6/03/2020	8719/3	Dust	
D05 Bund	313160	6296838	6/03/2020	8719/4	Dust	
D04 Rehab	312385	6296932	6/03/2020	8719/5	Dust	
D07 Mullock	312579	6296676	6/03/2020	8719/6	Dust	
D01(A) Front Gate	313290	6297176	6/03/2020	8719/7	Dust	
D11 Goldstien	312034	6294213	6/03/2020	8719/8	Dust	
D12 Ram	311750	6294159	6/03/2020	8719/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8719

Date Issued: 16/03/2020
Tested between: 6/03/20 and 16/03/20

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8719/1	D08&9 Hitchcock Rd Olive Grove	07/02/2020 09:48	6/03/2020 07:58	28	1.9	1.5	0.4	288
8719/2	D10 Hearses Rd	07/02/2020 09:57	6/03/2020 08:08	28	1.3	1.0	0.3	287
8719/3	D06 School	07/02/2020 10:43	6/03/2020 08:53	28	1.2	0.8	0.4	288
8719/4	D05 Bund	07/02/2020 10:56	6/03/2020 09:04	28	1.5	1.0	0.5	288
8719/5	D04 Rehab	07/02/2020 11:14	6/03/2020 09:26	28	1.0	0.7	0.3	287
8719/6	D07 Mullock	07/02/2020 11:26	6/03/2020 09:38	28	2.2	1.8	0.4	287
8719/7	D01(A) Front Gate	07/02/2020 11:01	6/03/2020 09:14	28	3.0	2.4	0.6	117
8719/8	D11 Goldstien	07/02/2020 10:16	6/03/2020 08:20	28	1.3	0.5	0.8	287
8719/9	D12 Ram	07/02/2020 10:33	6/03/2020 08:40	28	1.3	0.8	0.5	289

Results have been approved and report finalised on 16/03/2020

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: 8719

Date Issued: 16/03/2020
Sampling Conditions: Fine 21°-23°C

Laboratories Pty Ltd

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8719/1	D08&9 Hitchcock Rd Olive Grove	6/03/2020 07:58	T.Walker	AS3580.10.1	CuSO4	Full
8719/2	D10 Hearses Rd	6/03/2020 08:08	T.Walker	AS3580.10.1	CuSO4	Full
8719/3	D06 School	6/03/2020 08:53	T.Walker	AS3580.10.1	CuSO4	Full
8719/4	D05 Bund	6/03/2020 09:04	T.Walker	AS3580.10.1	CuSO4	Full, minor vegetation
8719/5	D04 Rehab	6/03/2020 09:26	T.Walker	AS3580.10.1	CuSO4	Full
8719/6	D07 Mullock	6/03/2020 09:38	T.Walker	AS3580.10.1	CuSO4	Full
8719/7	D01(A) Front Gate	6/03/2020 09:14	T.Walker	AS3580.10.1	CuSO4	Full, minor insects, vegetation
8719/8	D11 Goldstien	6/03/2020 08:20	T.Walker	AS3580.10.1	CuSO4	Full
8719/9	D12 Ram	6/03/2020 08:40	T.Walker	AS3580.10.1	CuSO4	Full

Sampling procedures have been approved and report finalised on 16/03/2020
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.

NATA
WORLD RECOGNISED ACCREDITATION

Report Number: 8834

Date Issued: 15/04/2020 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

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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 3/04/2020 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	3/04/2020	8834/1	Dust	
D10 Hearses Rd	312538	6294576	3/04/2020	8834/2	Dust	
D06 School	313518	6296537	3/04/2020	8834/3	Dust	
D05 Bund	313160	6296838	3/04/2020	8834/4	Dust	
D04 Rehab	312385	6296932	3/04/2020	8834/5	Dust	
D07 Mullock	312579	6296676	3/04/2020	8834/6	Dust	
D01(A) Front Gate	313290	6297176	3/04/2020	8834/7	Dust	
D11 Goldstien	312034	6294213	3/04/2020	8834/8	Dust	
D12 Ram	311750	6294159	3/04/2020	8834/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8834

Date Issued: 15/04/2020
Tested between: 3/04/20 and 15/04/20

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8834/1	D08&9 Hitchcock Rd Olive Grove	06/03/2020 07:58	03/04/2020 09:15	28	0.7	0.5	0.2	114
8834/2	D10 Hearses Rd	06/03/2020 08:08	03/04/2020 09:22	28	1.2	0.5	0.7	109
8834/3	D06 School	06/03/2020 08:53	03/04/2020 10:00	28	0.8	0.5	0.3	101
8834/4	D05 Bund	06/03/2020 09:04	03/04/2020 10:12	28	0.8	0.6	0.2	105
8834/5	D04 Rehab	06/03/2020 09:26	03/04/2020 10:31	28	0.3	0.3	<0.1	95
8834/6	D07 Mullock	06/03/2020 09:38	03/04/2020 10:39	28	0.5	0.5	<0.1	96
8834/7	D01(A) Front Gate	06/03/2020 09:14	03/04/2020 10:20	28	2.1	1.6	0.5	99
8834/8	D11 Goldstien	06/03/2020 08:20	03/04/2020 09:32	28	0.4	0.3	0.1	118
8834/9	D12 Ram	06/03/2020 08:40	03/04/2020 09:50	28	0.3	0.2	0.1	124

Results have been approved and report finalised on 15/04/2020

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.

NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8834

Date Issued: 15/04/2020
Sampling Conditions: Cloudy, 23°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8834/1	D08&9 Hitchcock Rd Olive Grove	03/04/2020 09:15	T.Walker	AS3580.10.1	CuSO4	Insect (Spider)
8834/2	D10 Hearses Rd	03/04/2020 09:22	T.Walker	AS3580.10.1	CuSO4	Minor veg
8834/3	D06 School	03/04/2020 10:00	T.Walker	AS3580.10.1	CuSO4	
8834/4	D05 Bund	03/04/2020 10:12	T.Walker	AS3580.10.1	CuSO4	
8834/5	D04 Rehab	03/04/2020 10:31	T.Walker	AS3580.10.1	CuSO4	
8834/6	D07 Mullock	03/04/2020 10:39	T.Walker	AS3580.10.1	CuSO4	
8834/7	D01(A) Front Gate	03/04/2020 10:20	T.Walker	AS3580.10.1	CuSO4	Minor algae
8834/8	D11 Goldstien	03/04/2020 09:32	T.Walker	AS3580.10.1	CuSO4	
8834/9	D12 Ram	03/04/2020 09:50	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 15/04/2020
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: 8986

Date Issued: 8/05/2020 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

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www.vgt.com.au ABN 77 621 943 600

The following 9 samples were received on 1/05/2020 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	1/05/2020	8986/1	Dust	
D10 Hearses Rd	312538	6294576	1/05/2020	8986/2	Dust	
D06 School	313518	6296537	1/05/2020	8986/3	Dust	
D05 Bund	313160	6296838	1/05/2020	8986/4	Dust	
D04 Rehab	312385	6296932	1/05/2020	8986/5	Dust	
D07 Mullock	312579	6296676	1/05/2020	8986/6	Dust	
D01(A) Front Gate	313290	6297176	1/05/2020	8986/7	Dust	
D11 Goldstien	312034	6294213	1/05/2020	8986/8	Dust	
D12 Ram	311750	6294159	1/05/2020	8986/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8986

Date Issued: 8/05/2020
Tested between: 1/05/20 and 8/05/20

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
8986/1	D08&9 Hitchcock Rd Olive Grove	03/04/2020 09:15	01/05/2020 10:48	28	0.5	0.4	0.1	38
8986/2	D10 Hearses Rd	03/04/2020 09:22	01/05/2020 10:58	28	1.8	1.2	0.6	37
8986/3	D06 School	03/04/2020 10:00	01/05/2020 11:46	28	0.8	0.4	0.4	37
8986/4	D05 Bund	03/04/2020 10:12	01/05/2020 11:58	28	1.5	1.1	0.4	41
8986/5	D04 Rehab	03/04/2020 10:31	01/05/2020 12:28	28	0.7	0.5	0.2	35
8986/6	D07 Mullock	03/04/2020 10:39	01/05/2020 12:42	28	1.0	0.9	0.1	37
8986/7	D01(A) Front Gate	03/04/2020 10:20	01/05/2020 12:07	28	1.7	1.4	0.3	39
8986/8	D11 Goldstien	03/04/2020 09:32	01/05/2020 11:29	28	0.8	0.2	0.6	39
8986/9	D12 Ram	03/04/2020 09:50	01/05/2020 11:15	28	0.5	0.3	0.2	39

Results have been approved and report finalised on 8/05/2020

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.

NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 8986

Date Issued: 8/05/2020
Sampling Conditions: Cloudy, 14-16°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8986/1	D08&9 Hitchcock Rd Olive Grove	01/05/2020 10:48	T.Walker	AS3580.10.1	CuSO4	
8986/2	D10 Hearses Rd	01/05/2020 10:58	T.Walker	AS3580.10.1	CuSO4	Minor insects
8986/3	D06 School	01/05/2020 11:46	T.Walker	AS3580.10.1	CuSO4	Minor veg
8986/4	D05 Bund	01/05/2020 11:58	T.Walker	AS3580.10.1	CuSO4	Minor insects
8986/5	D04 Rehab	01/05/2020 12:28	T.Walker	AS3580.10.1	CuSO4	
8986/6	D07 Mullock	01/05/2020 12:42	T.Walker	AS3580.10.1	CuSO4	
8986/7	D01(A) Front Gate	01/05/2020 12:07	T.Walker	AS3580.10.1	CuSO4	Minor insects and algae
8986/8	D11 Goldstien	01/05/2020 11:29	T.Walker	AS3580.10.1	CuSO4	Minor veg
8986/9	D12 Ram	01/05/2020 11:15	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 8/05/2020
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: 9086

Date Issued: 5/06/2020 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

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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 29/05/2020 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	29/05/2020	9086/1	Dust	
D10 Hearses Rd	312538	6294576	29/05/2020	9086/2	Dust	
D06 School	313518	6296537	29/05/2020	9086/3	Dust	
D05 Bund	313160	6296838	29/05/2020	9086/4	Dust	
D04 Rehab	312385	6296932	29/05/2020	9086/5	Dust	
D07 Mullock	312579	6296676	29/05/2020	9086/6	Dust	
D01(A) Front Gate	313290	6297176	29/05/2020	9086/7	Dust	
D11 Goldstien	312034	6294213	29/05/2020	9086/8	Dust	
D12 Ram	311750	6294159	29/05/2020	9086/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 9086

Date Issued: 5/06/2020
Tested between: 29/05/20 and 5/06/20

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
9086/1	D08&9 Hitchcock Rd Olive Grove	01/05/2020 10:48	29/05/2020 10:24	28	0.4	0.2	0.2	41
9086/2	D10 Hearses Rd	01/05/2020 10:58	29/05/2020 15:43	28	2.4	2.0	0.4	42
9086/3	D06 School	01/05/2020 11:46	29/05/2020 09:17	28	0.5	0.3	0.2	41
9086/4	D05 Bund	01/05/2020 11:58	29/05/2020 09:28	28	1.7	1.6	0.1	43
9086/5	D04 Rehab	01/05/2020 12:28	29/05/2020 10:05	28	0.2	0.2	<0.1	42
9086/6	D07 Mullock	01/05/2020 12:42	29/05/2020 10:11	28	0.4	0.4	<0.1	39
9086/7	D01(A) Front Gate	01/05/2020 12:07	29/05/2020 09:47	28	1.3	1.0	0.3	42
9086/8	D11 Goldstien	01/05/2020 11:29	29/05/2020 14:37	28	0.4	0.1	0.3	39
9086/9	D12 Ram	01/05/2020 11:15	29/05/2020 09:05	28	0.3	0.1	0.2	41

Results have been approved and report finalised on 5/06/2020

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.

NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 9086

Date Issued: 5/06/2020
Sampling Conditions: 11°-17°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9086/1	D08&9 Hitchcock Rd Olive Grove	29/05/2020 10:24	T.Walker	AS3580.10.1	CuSO4	
9086/2	D10 Hearses Rd	29/05/2020 15:43	T.Walker	AS3580.10.1	CuSO4	Minor sand
9086/3	D06 School	29/05/2020 09:17	T.Walker	AS3580.10.1	CuSO4	
9086/4	D05 Bund	29/05/2020 09:28	T.Walker	AS3580.10.1	CuSO4	Minor insects
9086/5	D04 Rehab	29/05/2020 10:05	T.Walker	AS3580.10.1	CuSO4	
9086/6	D07 Mullock	29/05/2020 10:11	T.Walker	AS3580.10.1	CuSO4	
9086/7	D01(A) Front Gate	29/05/2020 09:47	T.Walker	AS3580.10.1	CuSO4	
9086/8	D11 Goldstien	29/05/2020 14:37	T.Walker	AS3580.10.1	CuSO4	Minor vegetation
9086/9	D12 Ram	29/05/2020 09:05	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 5/06/2020
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: 9252

Date Issued: 3/07/2020 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

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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 26/06/2020 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	26/06/2020	9252/1	Dust	
D10 Hearses Rd	312538	6294576	26/06/2020	9252/2	Dust	
D06 School	313518	6296537	26/06/2020	9252/3	Dust	
D05 Bund	313160	6296838	26/06/2020	9252/4	Dust	
D04 Rehab	312385	6296932	26/06/2020	9252/5	Dust	
D07 Mullock	312579	6296676	26/06/2020	9252/6	Dust	
D01(A) Front Gate	313290	6297176	26/06/2020	9252/7	Dust	
D11 Goldstien	312034	6294213	26/06/2020	9252/8	Dust	
D12 Ram	311750	6294159	26/06/2020	9252/9	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 9252

Date Issued: 3/07/2020
Tested between: 26/06/20 and 3/07/20

vgt Laboratories Pty Ltd

Results

Lab ID	Client Sample Reference	Date On	Date Off Units Method Code Limit of Report	Number of Days days AS 3580.10.1	Insoluble Solids g/m2/mth AS 3580.10.1 0.1	Ash g/m2/mth AS 3580.10.1 0.1	Combustible Matter g/m2/mth AS 3580.10.1 0.1	Calculated Rain mm AS 3580.10.1 1
9252/1	D08&9 Hitchcock Rd Olive Grove	29/05/2020 10:24	26/06/2020 10:52	28	0.4	0.2	0.2	17
9252/2	D10 Hearses Rd	29/05/2020 15:43	26/06/2020 13:28	28	0.7	0.5	0.2	18
9252/3	D06 School	29/05/2020 09:17	26/06/2020 10:45	28	1.3	1.0	0.3	18
9252/4	D05 Bund	29/05/2020 09:28	26/06/2020 10:37	28	2.6	2.1	0.5	19
9252/5	D04 Rehab	29/05/2020 10:05	26/06/2020 10:11	28	0.3	0.2	0.1	17
9252/6	D07 Mullock	29/05/2020 10:11	26/06/2020 10:23	28	0.2	0.1	0.1	18
9252/7	D01(A) Front Gate	29/05/2020 09:47	26/06/2020 09:49	28	1.4	1.1	0.3	18
9252/8	D11 Goldstien	29/05/2020 14:37	26/06/2020 13:15	28	0.5	0.1	0.4	18
9252/9	D12 Ram	29/05/2020 09:05	26/06/2020 11:35	28	0.3	<0.1	0.3	19

Results have been approved and report finalised on 3/07/2020

NATA Accredited Laboratory – 20375

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NATA WORLD RECOGNISED ACCREDITATION

Sampling Report Number: 9252

Date Issued: 3/07/2020
Sampling Conditions: Cloudy 12°-16°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9252/1	D08&9 Hitchcock Rd Olive Grove	26/06/2020 10:52	T.Walker	AS3580.10.1	CuSO4	
9252/2	D10 Hearses Rd	26/06/2020 13:28	T.Walker	AS3580.10.1	CuSO4	
9252/3	D06 School	26/06/2020 10:45	T.Walker	AS3580.10.1	CuSO4	
9252/4	D05 Bund	26/06/2020 10:37	T.Walker	AS3580.10.1	CuSO4	Minor algae
9252/5	D04 Rehab	26/06/2020 10:11	T.Walker	AS3580.10.1	CuSO4	
9252/6	D07 Mullock	26/06/2020 10:23	T.Walker	AS3580.10.1	CuSO4	
9252/7	D01(A) Front Gate	26/06/2020 09:49	T.Walker	AS3580.10.1	CuSO4	
9252/8	D11 Goldstien	26/06/2020 13:15	T.Walker	AS3580.10.1	CuSO4	
9252/9	D12 Ram	26/06/2020 11:35	T.Walker	AS3580.10.1	CuSO4	

Sampling procedures have been approved and report finalised on 3/07/2020
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.

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) (PM_{10}) and Meteorological Data

July 2019

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 21 August 2019

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

1.0 Summary

CBased Environmental Pty Limited (CBE) is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for Fine Particulates (PM_{10}) 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 program includes;

- One continuous TEOM PM_{10} monitor; and
- One continuous Meteorological Station.

This monthly report was prepared by CBased Environmental and includes the following;

- TEOM (PM_{10}) monitoring results for July 2019; and
- Meteorological results for July 2019.

Current year to date annual average for PM_{10} is calculated from the 1st July 2019 for TEOM's coinciding with the Dixon Sand project year.

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

- All TEOM PM_{10} 24-hour average result were below the short-term Dixon Sand Quarry consent, 24-hour impact criteria of 50ug/m^3;
- The current TEOM PM_{10} annual average is below the Dixon Sand Quarry consent, annual average criteria of 30ug/m3.
- Currently, calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.
- All TEOM PM_{10} 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3.

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. Note that an annual amount of data has now been collected.

Approximately 100% of meteorological data was recovered for July 2019.
Approximately 100% of TEOM data was recovered for July 2019.

2.0 Sampling Program

The TEOM is operated to the applicable Australian Standard and OEH (EPA) approved method. All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

The following Australian Standards were used:

AS3580.9.8 (2001) "*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser*."

TEOM PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ corrected to 0 degrees C and 101.3kPa.

The location of the air quality monitoring equipment met the Australian Standard AS 3580.1.1 (2007) "*Methods for sampling and analysis of ambient air Part 1.1 Guide to siting air monitoring equipment*". Air Quality monitoring site descriptions and locations are provided in **Table 1**:

Table 1: Dixon Sands 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 Reporting Period Results

3.1 TEOM PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

The current TEOM PM_{10} annual average runs from the 1st July 2019. At present it is below the Dixon Sand Quarry long term annual average PM_{10} criteria of 30ug/m^3. 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 PM_{10} by 2.5. Note: an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in June 2019. Calibration certificates are provided in **Appendix 1** (when required). Next calibration is scheduled for September 2019.

Table 2: Average Daily 24 Hr TEOM PM_{10} and TSP for July 2019 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019.

Date	TEOM PM_{10} (µg/m^3)	Annual PM_{10} Average (µg/m^3)	TSP* (µg/m3)	TSP Annual** (µg/m3)
1/07/2019	7.2	7.2	18.0	18.0
2/07/2019	7.8	7.5	19.5	18.8
3/07/2019	13.4	9.5	33.5	23.7
4/07/2019	8.8	9.3	22.0	23.3
5/07/2019	5.0	8.4	12.5	21.1
6/07/2019	6.3	8.1	15.8	20.2
7/07/2019	5.4	7.7	13.5	19.3
8/07/2019	4.9	7.4	12.3	18.4
9/07/2019	6.1	7.2	15.3	18.0
10/07/2019	5.0	7.0	12.5	17.5
11/07/2019	10.3	7.3	25.8	18.2
12/07/2019	10.4	7.6	26.0	18.9
13/07/2019	7.1	7.5	17.8	18.8
14/07/2019	4.4	7.3	11.0	18.2
15/07/2019	5.7	7.2	14.3	18.0
16/07/2019	6.2	7.1	15.5	17.8
17/07/2019	6.3	7.1	15.8	17.7
18/07/2019	6.2	7.0	15.5	17.6
19/07/2019	8.7	7.1	21.8	17.8
20/07/2019	10.6	7.3	26.5	18.2
21/07/2019	11.6	7.5	29.0	18.7
22/07/2019	12.4	7.7	31.0	19.3
23/07/2019	11.6	7.9	29.0	19.7
24/07/2019	11.8	8.1	29.5	20.1
25/07/2019	13.8	8.3	34.5	20.7
26/07/2019	17.7	8.6	44.3	21.6
27/07/2019	12.8	8.8	32.0	22.0
28/07/2019	10.6	8.9	26.5	22.2
29/07/2019	10.0	8.9	25.0	22.3
30/07/2019	10.1	8.9	25.3	22.4
31/07/2019	9.9	9.0	24.8	22.4

*Calculated from PM10

**Calculated from PM10 Annual Average

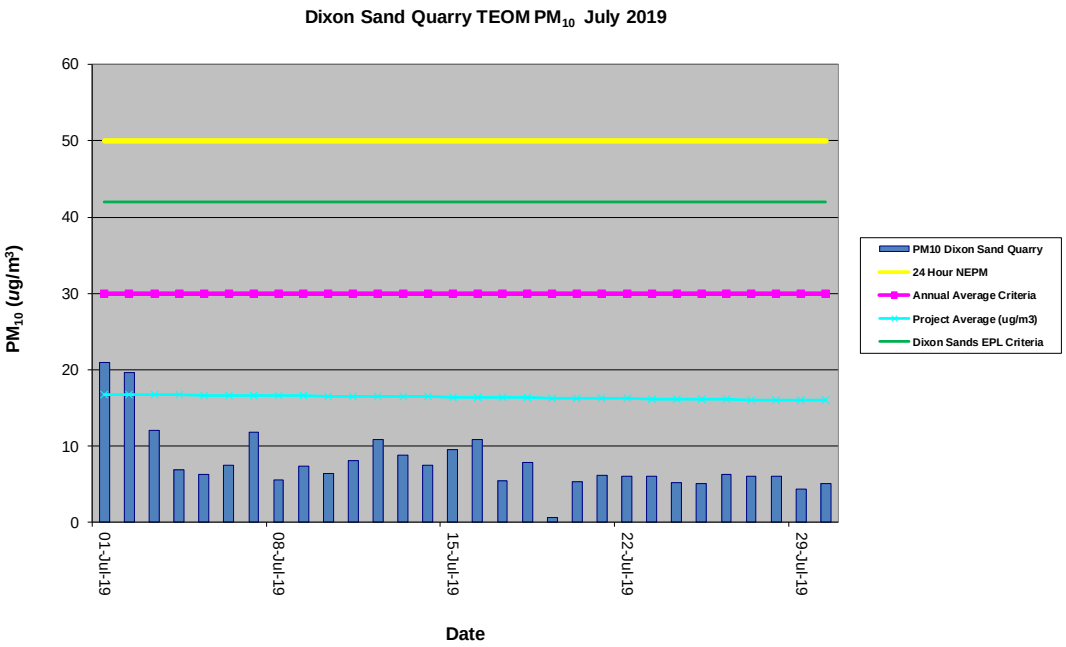


Figure 1: TEOM PM_{10} 24 hr, Annual Average and Criteria

3.2 Meteorological Data

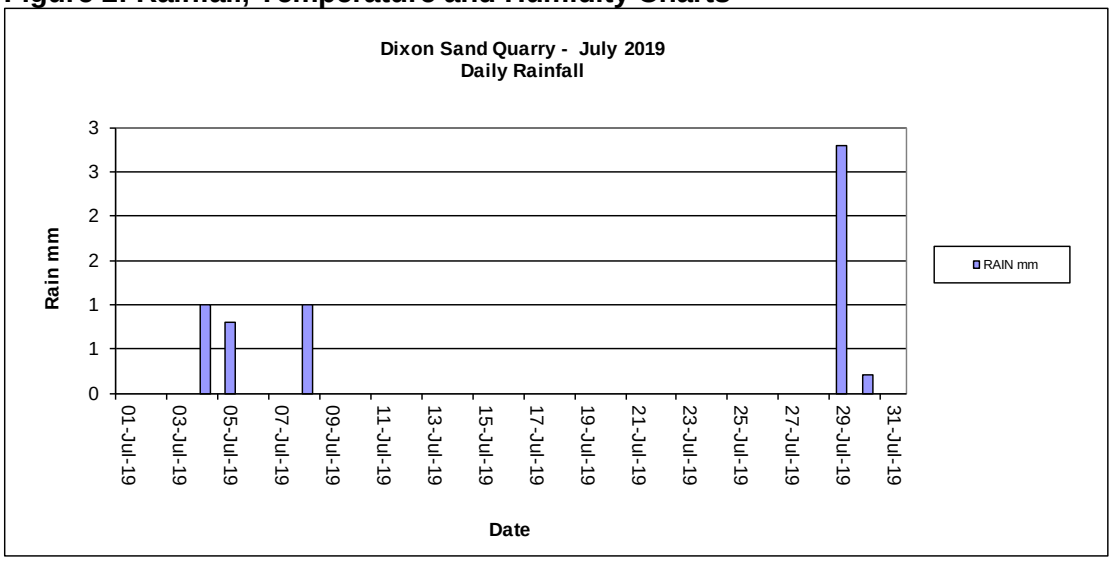
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

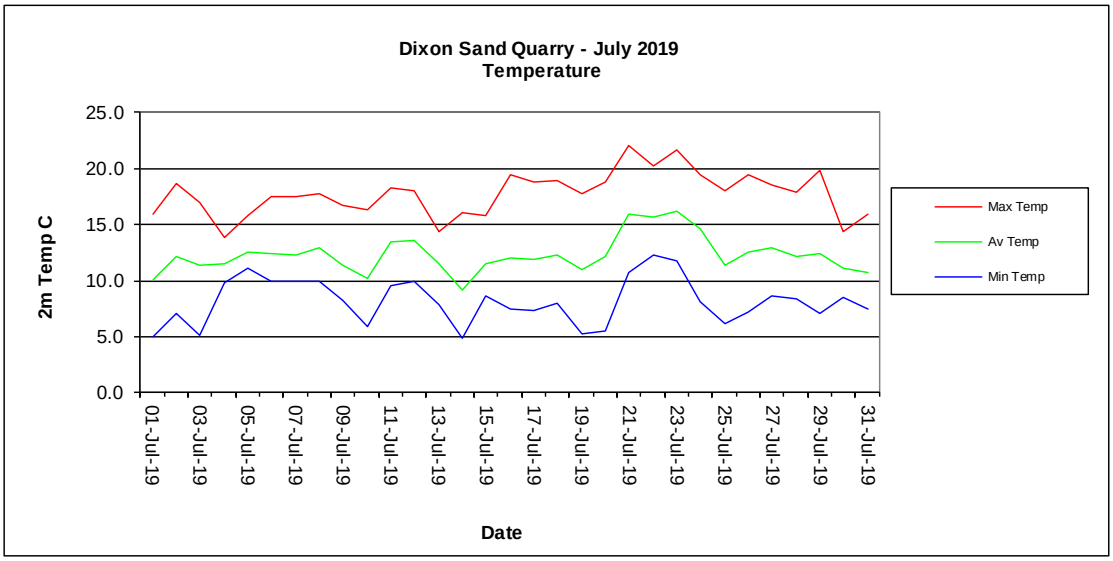
The summary of results is presented in **Table 3. Figure 2 and 3** display the charts of meteorological parameters for the month. A windrose is provided in **Figure 4.** This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

Table 3: Meteorological Data Summary for July 2019

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/07/2019	5.0	10.1	15.9	0.0	0.2	2.8	8.5	43.4	62.4	100.0	998.5	1001.2	1003.8
2/07/2019	7.1	12.2	18.7	0.0	0.1	2.7	9.6	30.4	53.0	71.6	997.0	998.4	1001.3
3/07/2019	5.1	11.4	17.0	0.0	0.3	3.6	11.7	48.1	73.4	99.2	1001.3	1006.2	1010.1
4/07/2019	9.8	11.5	13.9	1.0	0.2	3.8	12.7	89.5	96.8	100.0	1009.8	1011.7	1013.4
5/07/2019	11.1	12.5	15.8	0.8	0.1	2.4	9.7	83.0	97.2	100.0	1011.5	1012.8	1014.3
6/07/2019	9.9	12.4	17.5	0.0	0.2	2.7	10.1	61.5	93.3	100.0	1011.2	1012.6	1014.4
7/07/2019	9.9	12.3	17.5	0.0	0.0	2.4	8.2	72.2	96.0	100.0	1006.1	1009.4	1012.2
8/07/2019	10.0	12.9	17.7	1.0	0.0	3.0	18.0	70.8	92.2	100.0	998.9	1001.7	1006.0
9/07/2019	8.3	11.3	16.7	0.0	0.1	2.3	8.6	45.0	72.2	100.0	995.9	998.2	999.8
10/07/2019	5.9	10.2	16.3	0.0	0.2	3.5	15.7	44.4	68.8	100.0	991.6	995.0	997.5
11/07/2019	9.5	13.5	18.3	0.0	0.6	6.8	23.4	23.4	50.0	100.0	987.5	990.3	994.1
12/07/2019	9.9	13.5	18.0	0.0	0.5	6.6	22.8	40.8	74.4	100.0	988.9	991.6	994.1
13/07/2019	7.8	11.6	14.3	0.0	0.5	6.5	27.6	30.4	52.6	100.0	987.0	992.4	998.5
14/07/2019	4.8	9.1	16.1	0.0	0.1	5.0	26.9	29.8	49.9	62.6	992.0	996.7	1000.2
15/07/2019	8.6	11.6	15.8	0.0	0.1	5.2	31.2	28.8	48.1	58.2	989.4	994.2	997.6
16/07/2019	7.4	12.1	19.5	0.0	0.1	3.5	12.4	29.5	52.1	66.9	994.4	996.2	998.0
17/07/2019	7.3	11.9	18.8	0.0	0.1	3.9	12.6	34.1	53.8	74.3	991.5	994.8	997.5
18/07/2019	8.0	12.2	18.9	0.0	0.4	3.5	12.7	27.3	47.3	64.2	991.4	993.8	996.9
19/07/2019	5.2	10.9	17.8	0.0	0.1	3.1	13.9	35.5	53.2	72.0	996.0	998.3	1001.4
20/07/2019	5.5	12.2	18.8	0.0	0.4	4.4	15.6	34.6	56.5	87.7	997.0	999.5	1002.2
21/07/2019	10.7	15.9	22.1	0.0	0.1	6.2	24.6	21.4	34.2	50.0	992.1	994.5	996.9
22/07/2019	12.3	15.6	20.2	0.0	0.6	5.3	19.0	36.4	46.0	58.9	992.7	994.3	996.4
23/07/2019	11.8	16.2	21.7	0.0	0.4	6.6	24.5	13.6	37.6	67.1	992.0	994.0	995.8
24/07/2019	8.1	14.7	19.5	0.0	0.2	4.2	21.1	28.6	45.8	83.3	992.4	997.4	1002.9
25/07/2019	6.2	11.3	18.0	0.0	0.0	2.7	12.1	37.3	62.5	83.2	1001.5	1002.6	1004.8
26/07/2019	7.2	12.6	19.4	0.0	0.2	2.6	9.0	42.9	71.7	96.2	997.0	999.3	1001.8
27/07/2019	8.6	12.9	18.5	0.0	0.0	2.9	10.2	44.3	70.2	90.2	999.2	1000.5	1002.2
28/07/2019	8.4	12.2	17.9	0.0	0.0	2.7	13.8	34.5	70.5	99.8	1000.4	1001.8	1003.8
29/07/2019	7.1	12.5	19.8	2.8	0.0	3.3	8.7	36.4	65.2	99.9	996.1	998.7	1001.0
30/07/2019	8.5	11.1	14.3	0.2	0.0	3.2	11.4	60.9	80.5	100.0	998.7	1002.1	1005.8
31/07/2019	7.5	10.7	15.9	0.0	0.2	4.5	13.0	58.1	78.6	99.2	1005.3	1007.1	1008.9
Monthly	4.8	12.3	22.1	5.8	0.0	3.9	31.2	13.6	64.7	100.0	987.0	999.6	1014.4

Figure 2: Rainfall, Temperature and Humidity Charts





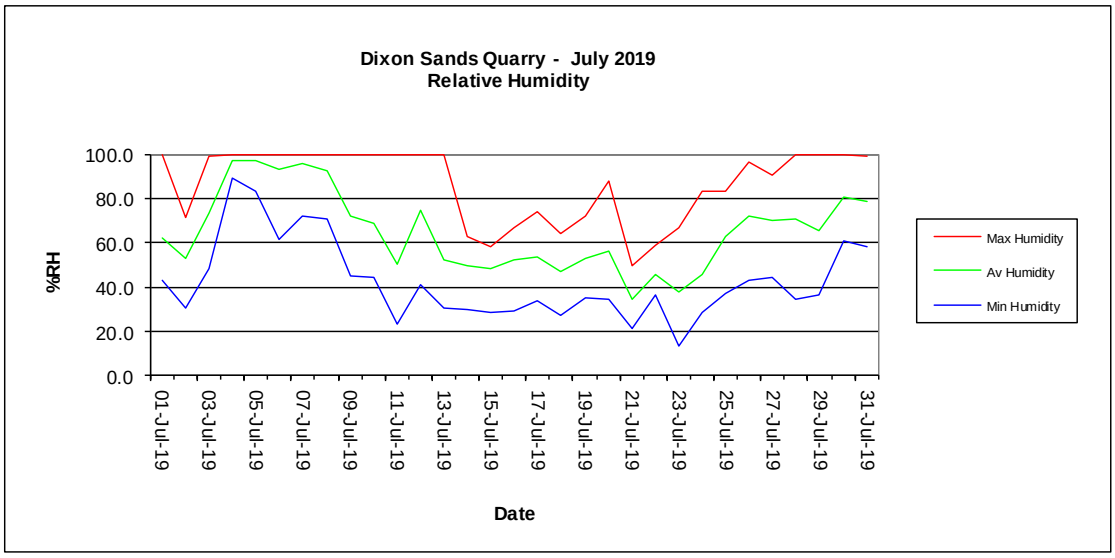
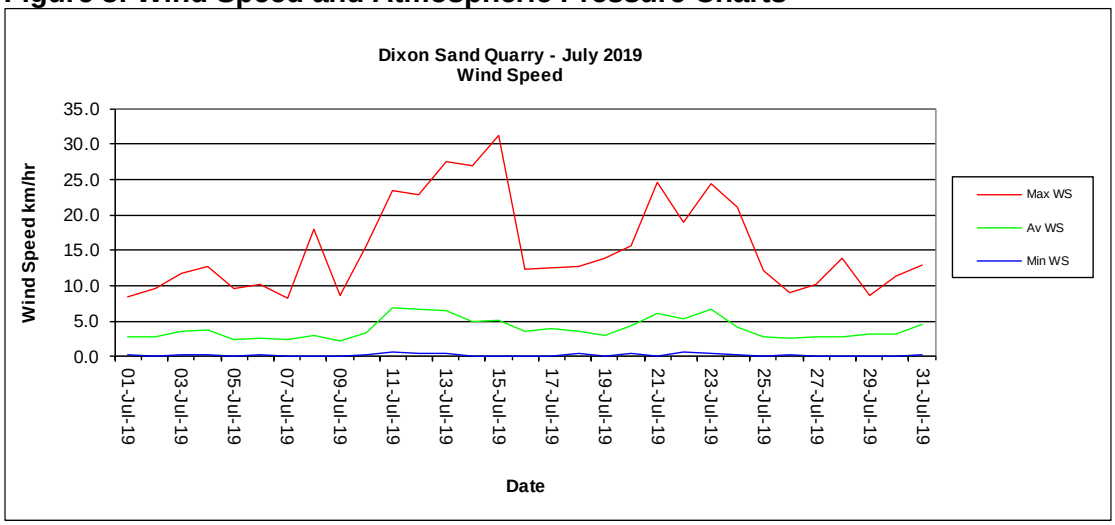


Figure 3: Wind Speed and Atmospheric Pressure Charts



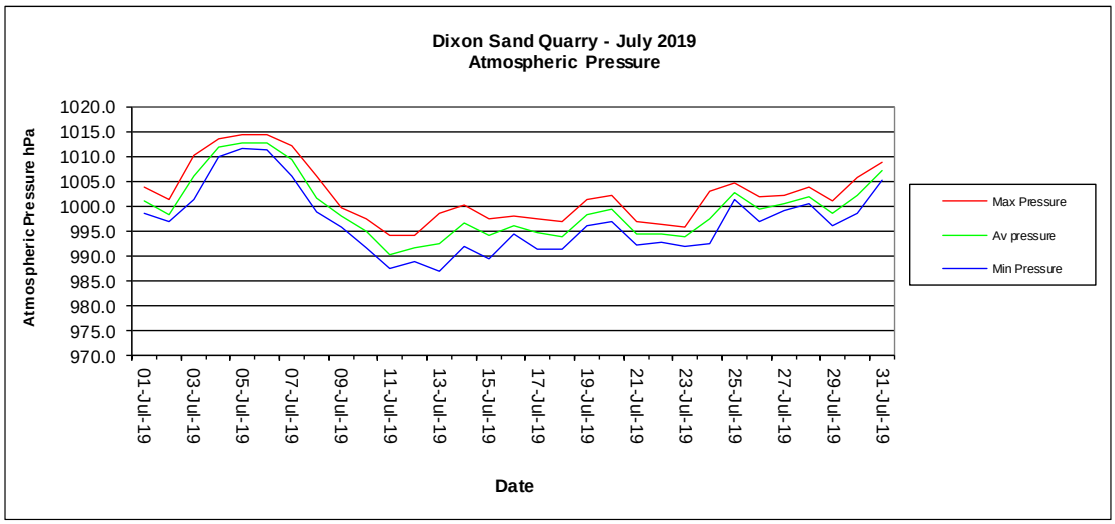
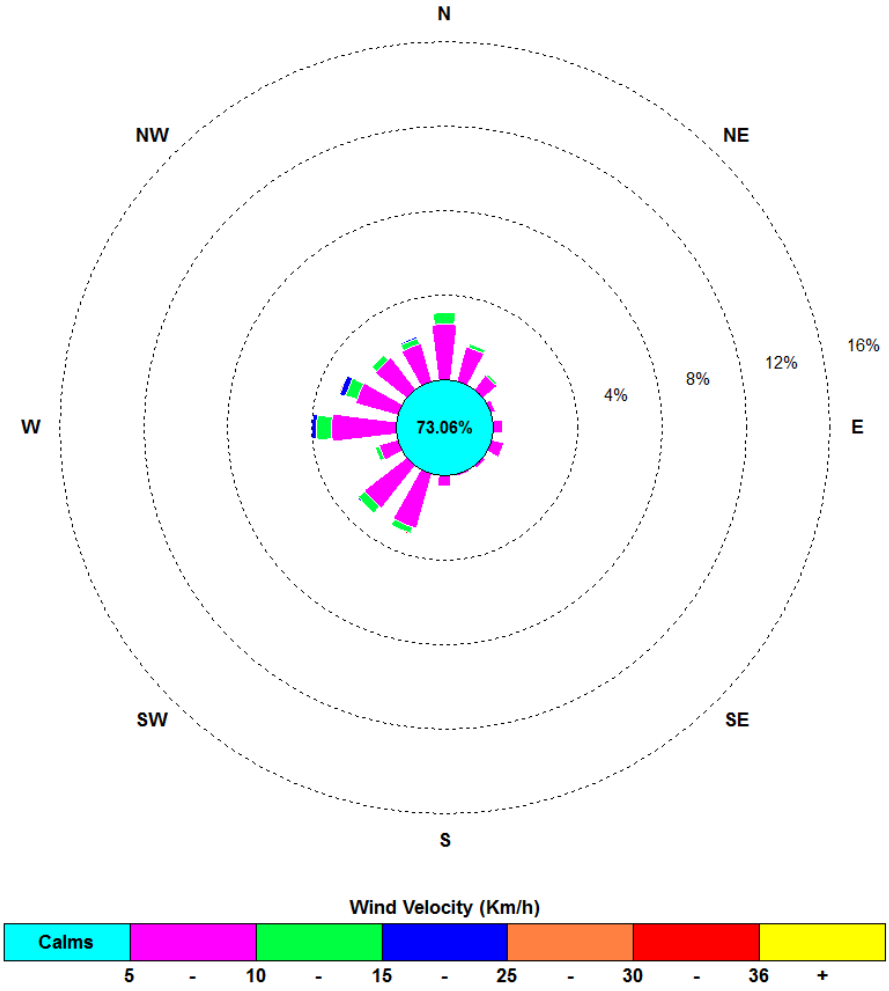


Figure 4: Windrose Plot (km/h)

00:00 1 July 2019 – 23:55 31 July 2019



CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

August 2019

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 24 September 2019

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

1.0 Summary

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The monitoring program includes;

- One continuous TEOM PM_{10} monitor; and
- One continuous Meteorological Station.

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- Meteorological results for August 2019.

Current year to date annual average for PM_{10} is calculated from the 1st July 2019 for TEOM's coinciding with the Dixon Sand project year.

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

- All TEOM PM_{10} 24-hour average result were below the short-term Dixon Sand Quarry consent, 24-hour impact criteria of 50ug/m^3;
- The current TEOM PM_{10} annual average is below the Dixon Sand Quarry consent, annual average criteria of 30ug/m3.
- Currently, calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.
- All TEOM PM_{10} 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3.

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. Note that an annual amount of data has now been collected.

Approximately 100% of meteorological data was recovered for August 2019.
Approximately 100% of TEOM data was recovered for August 2019.

2.0 Sampling Program

The TEOM is operated to the applicable Australian Standard and OEH (EPA) approved method. All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

The following Australian Standards were used:

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TEOM PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ corrected to 0 degrees C and 101.3kPa.

The location of the air quality monitoring equipment met the Australian Standard AS 3580.1.1 (2007) "*Methods for sampling and analysis of ambient air Part 1.1 Guide to siting air monitoring equipment*". Air Quality monitoring site descriptions and locations are provided in **Table 1**:

Table 1: Dixon Sands 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 Reporting Period Results

3.1 TEOM PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

The current TEOM PM_{10} annual average runs from the 1st July 2019. At present it is below the Dixon Sand Quarry long term annual average PM_{10} criteria of 30ug/m^3. 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 PM_{10} by 2.5. Note: an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in June 2019. Calibration certificates are provided in **Appendix 1** (when required). Next calibration is scheduled for September 2019.

Table 2: Average Daily 24 Hr TEOM PM_{10} and TSP for August 2019 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019.

Date	TEOM PM_{10} (µg/m^3)	Annual PM_{10} Average (µg/m^3)	TSP* (µg/m3)	TSP Annual** (µg/m3)
1/08/2019	10.3	9.0	25.8	22.5
2/08/2019	11.1	9.1	27.8	22.7
3/08/2019	11.3	9.1	28.3	22.9
4/08/2019	12.9	9.2	32.3	23.1
5/08/2019	14.7	9.4	36.8	23.5
6/08/2019	10.4	9.4	26.0	23.6
7/08/2019	9.0	9.4	22.5	23.5
8/08/2019	18.8	9.7	47.0	24.1
9/08/2019	38.3	10.4	95.8	25.9
10/08/2019	10.7	10.4	26.8	26.0
11/08/2019	5.0	10.3	12.5	25.6
12/08/2019	8.8	10.2	22.0	25.5
13/08/2019	8.2	10.2	20.5	25.4
14/08/2019	20.3	10.4	50.8	26.0
15/08/2019	11.2	10.4	28.0	26.0
16/08/2019	9.9	10.4	24.8	26.0
17/08/2019	12.1	10.4	30.3	26.1
18/08/2019	11.2	10.5	28.0	26.1
19/08/2019	26.9	10.8	67.3	27.0
20/08/2019	9.8	10.8	24.5	26.9
21/08/2019	15.2	10.9	38.0	27.1
22/08/2019	15.6	10.9	39.0	27.3
23/08/2019	16.9	11.1	42.3	27.6
24/08/2019	19.7	11.2	49.3	28.0
25/08/2019	20.6	11.4	51.5	28.4
26/08/2019	12.1	11.4	30.3	28.5
27/08/2019	7.1	11.3	17.8	28.3
28/08/2019	8.9	11.3	22.3	28.2
29/08/2019	8.9	11.2	22.3	28.1
30/08/2019	5.2	11.1	13.0	27.8
31/08/2019	7.2	11.1	18.0	27.7

*Calculated from PM10

**Calculated from PM10 Annual Average

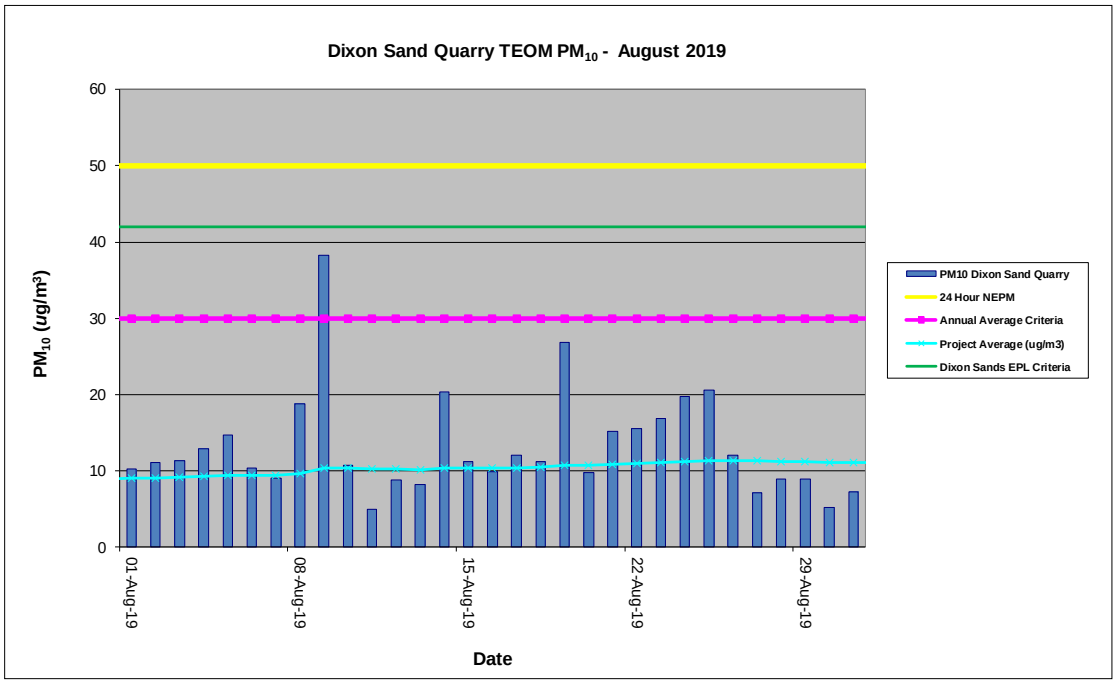


Figure 1: TEOM PM_{10} 24 hr, Annual Average and Criteria

3.2 Meteorological Data

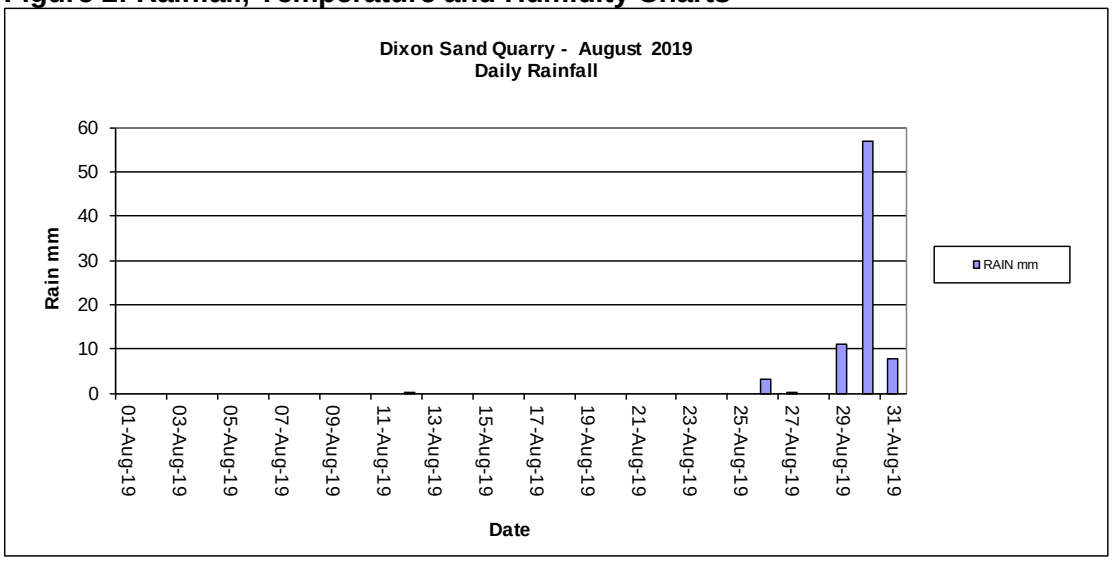
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

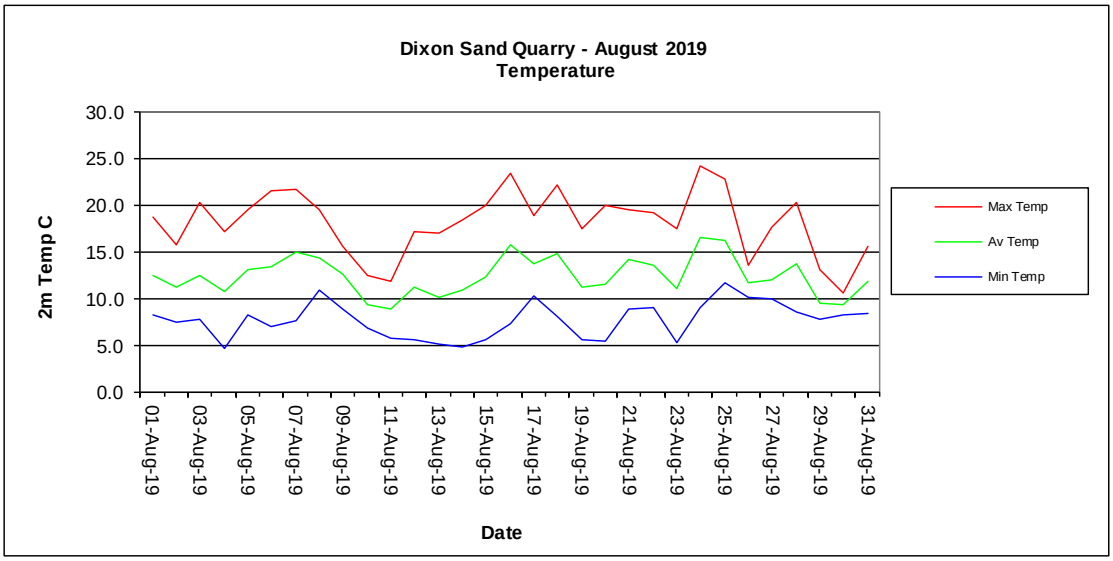
The summary of results is presented in **Table 3. Figure 2 and 3** display the charts of meteorological parameters for the month. A windrose is provided in **Figure 4.** This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

Table 3: Meteorological Data Summary for August 2019

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/08/2019	8.3	12.5	18.8	0.0	0.2	2.7	10.0	41.6	77.4	99.5	1005.1	1006.8	1008.3
2/08/2019	7.5	11.3	15.9	0.0	0.2	2.8	8.3	62.4	83.9	99.9	1006.3	1007.8	1009.8
3/08/2019	7.9	12.6	20.4	0.0	0.2	3.4	14.7	25.7	64.8	95.3	1002.1	1004.7	1006.6
4/08/2019	4.8	10.8	17.3	0.0	0.0	3.5	15.8	53.2	76.3	97.9	1003.7	1005.4	1007.3
5/08/2019	8.3	13.1	19.6	0.0	0.0	3.1	13.1	39.0	76.2	100.0	999.1	1001.9	1005.2
6/08/2019	7.1	13.5	21.6	0.0	0.2	3.3	11.5	12.4	39.0	55.4	994.0	996.9	999.9
7/08/2019	7.7	15.0	21.7	0.0	0.1	4.6	18.3	15.5	27.3	43.4	987.4	990.9	994.6
8/08/2019	11.0	14.5	19.5	0.0	0.5	7.6	32.0	26.5	35.0	42.5	978.8	982.8	987.4
9/08/2019	9.0	12.7	15.6	0.0	0.8	8.4	32.5	26.5	37.0	45.2	979.0	981.1	984.6
10/08/2019	7.0	9.4	12.5	0.0	0.4	6.3	24.2	33.4	45.1	59.7	979.4	981.4	984.4
11/08/2019	5.9	9.0	12.0	0.0	0.2	6.6	19.2	37.9	48.6	58.0	981.2	983.8	990.0
12/08/2019	5.7	11.2	17.2	0.2	0.0	4.3	20.5	28.5	50.0	76.5	990.1	996.4	1000.7
13/08/2019	5.2	10.3	17.1	0.0	0.2	2.6	9.4	21.4	51.2	75.1	1000.4	1002.7	1005.5
14/08/2019	4.9	11.0	18.5	0.0	0.1	3.2	13.1	18.8	59.1	87.1	1002.7	1004.9	1007.3
15/08/2019	5.6	12.4	20.1	0.0	0.0	3.1	16.2	20.3	38.0	78.5	999.3	1002.2	1004.4
16/08/2019	7.4	15.8	23.5	0.0	0.1	4.2	14.9	11.4	27.6	49.6	993.2	996.4	1000.8
17/08/2019	10.4	13.8	19.0	0.0	0.3	4.2	15.4	18.9	48.4	83.1	993.1	996.8	1000.2
18/08/2019	8.2	15.0	22.3	0.0	0.2	4.4	16.7	31.9	65.2	92.5	985.9	993.9	999.8
19/08/2019	5.6	11.3	17.5	0.0	0.1	6.6	29.5	24.3	37.9	51.8	987.6	995.2	1002.1
20/08/2019	5.5	11.6	20.0	0.0	0.2	5.4	22.0	18.0	40.8	58.1	997.2	999.7	1002.0
21/08/2019	9.0	14.3	19.6	0.0	0.4	5.7	20.4	29.6	44.9	60.3	992.0	994.0	997.4
22/08/2019	9.1	13.6	19.3	0.0	0.3	6.0	33.4	28.5	46.4	53.6	988.8	993.6	1001.4
23/08/2019	5.3	11.1	17.5	0.0	0.2	4.4	12.4	29.4	49.9	63.8	1000.6	1002.6	1005.7
24/08/2019	9.1	16.6	24.2	0.0	0.5	6.6	26.2	13.3	28.5	51.4	993.2	996.4	1000.5
25/08/2019	11.7	16.2	22.8	0.0	0.0	4.2	29.0	13.6	42.1	81.5	992.8	995.6	999.6
26/08/2019	10.2	11.8	13.6	3.0	0.0	3.9	13.3	79.8	88.1	100.0	998.6	999.9	1001.1
27/08/2019	10.1	12.1	17.7	0.2	0.1	3.9	17.1	60.3	89.4	100.0	998.4	1000.0	1001.4
28/08/2019	8.6	13.8	20.3	0.0	0.0	2.7	10.8	32.3	66.5	100.0	994.3	997.4	1000.0
29/08/2019	7.8	9.6	13.2	11.0	0.2	5.5	20.1	48.0	77.9	100.0	997.5	1000.5	1002.9
30/08/2019	8.4	9.5	10.7	56.8	0.1	7.0	20.6	82.9	97.9	100.0	1001.5	1002.6	1004.1
31/08/2019	8.5	11.9	15.7	7.8	0.1	6.0	21.0	70.2	86.7	100.0	999.5	1001.5	1003.5
Monthly	4.8	12.5	24.2	79.0	0.0	4.7	33.4	11.4	56.4	100.0	978.8	997.3	1009.8

Figure 2: Rainfall, Temperature and Humidity Charts





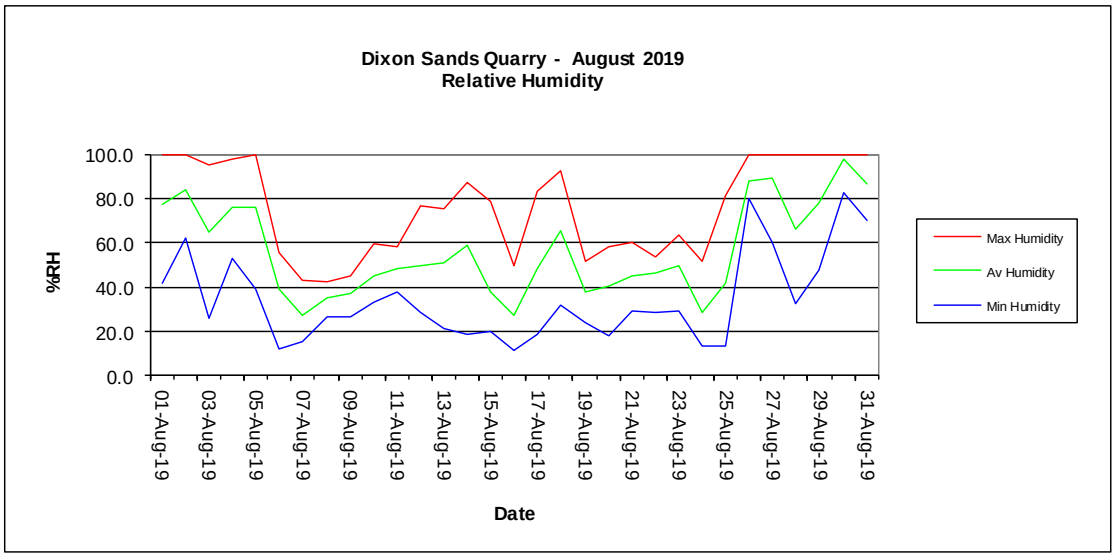
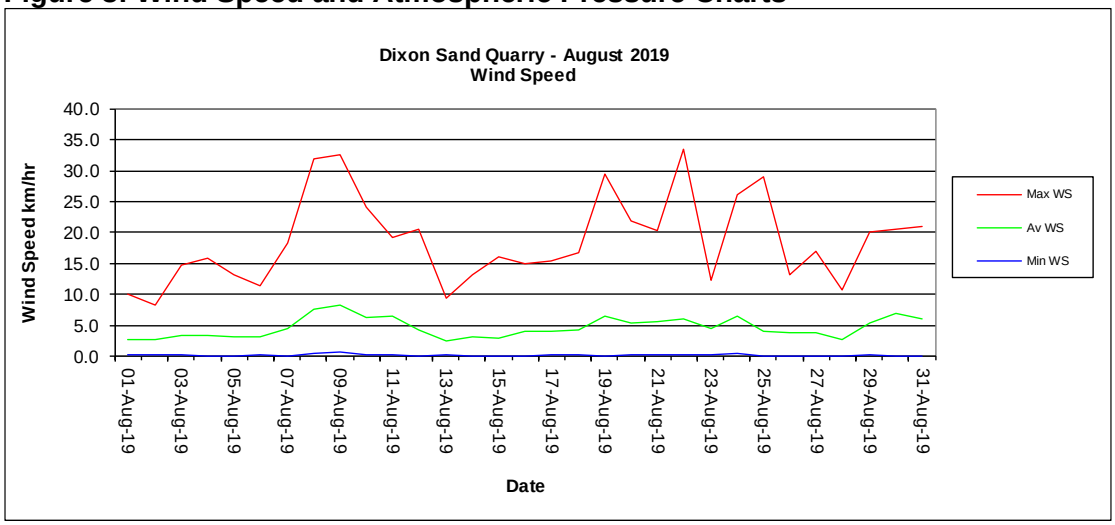


Figure 3: Wind Speed and Atmospheric Pressure Charts



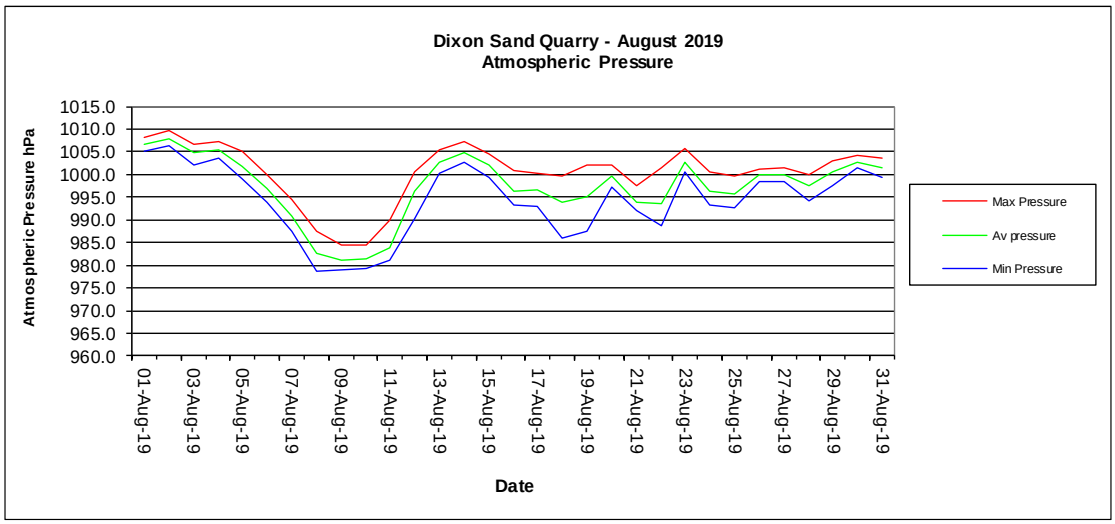
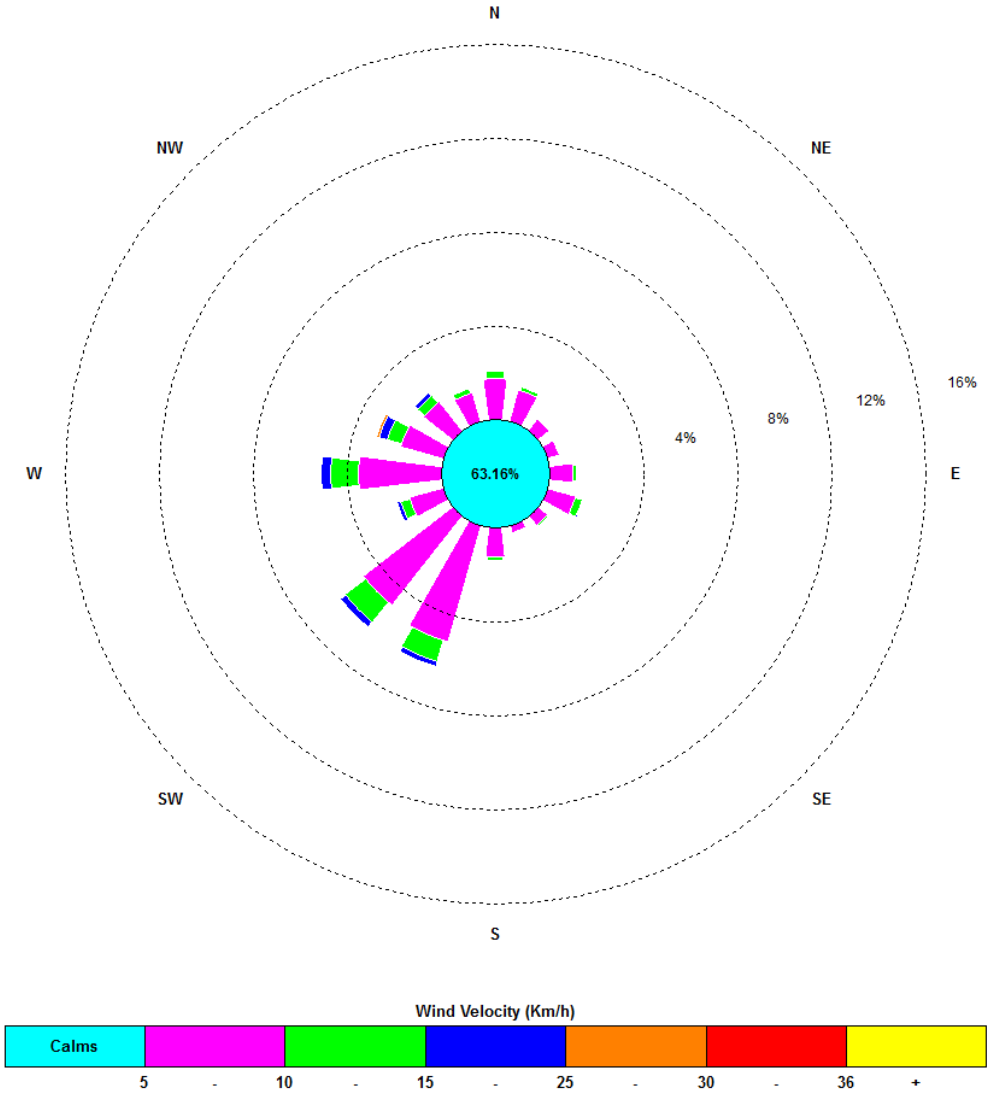


Figure 4: Windrose Plot (km/h)

00:00 1 August 2019 – 23:55 31 August 2019



CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

September 2019

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 24 October 2019

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

1.0 Summary

CBased Environmental Pty Limited (CBE) is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for Fine Particulates (PM_{10}) 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 program includes;

- One continuous TEOM PM_{10} monitor; and
- One continuous Meteorological Station.

This monthly report was prepared by CBased Environmental and includes the following;

- TEOM (PM_{10}) monitoring results for September 2019; and
- Meteorological results for September 2019.

Current year to date annual average for PM_{10} is calculated from the 1st July 2019 for TEOM's coinciding with the Dixon Sand project year.

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

- All TEOM PM_{10} 24-hour average result were below the short-term Dixon Sand Quarry consent, 24-hour impact criteria of 50ug/m^3;
- The current TEOM PM_{10} annual average is below the Dixon Sand Quarry consent, annual average criteria of 30ug/m3.
- Currently, calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.
- All TEOM PM_{10} 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3.

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. Note that an annual amount of data has now been collected.

Approximately 100% of meteorological data was recovered for September 2019.
Approximately 100% of TEOM data was recovered for September 2019.

2.0 Sampling Program

The TEOM is operated to the applicable Australian Standard and OEH (EPA) approved method. All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

The following Australian Standards were used:

AS3580.9.8 (2001) "*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser*."

TEOM PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ corrected to 0 degrees C and 101.3kPa.

The location of the air quality monitoring equipment met the Australian Standard AS 3580.1.1 (2007) "*Methods for sampling and analysis of ambient air Part 1.1 Guide to siting air monitoring equipment*". Air Quality monitoring site descriptions and locations are provided in **Table 1**:

Table 1: Dixon Sands 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 Reporting Period Results

3.1 TEOM PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

The current TEOM PM_{10} annual average runs from the 1st July 2019. At present it is below the Dixon Sand Quarry long term annual average PM_{10} criteria of 30ug/m^3. 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 PM_{10} by 2.5. Note: an annual amount of data has not yet been collected.

A quarterly calibration was undertaken on 19 September 2019. Calibration certificates are provided in **Appendix 1** (when required). Next calibration is scheduled for December 2019.

Table 2: Average Daily 24 Hr TEOM PM_{10} and TSP for September 2019 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019.

Date	TEOM PM_{10} (µg/m^3)	Annual PM_{10} Average (µg/m^3)	TSP* (µg/m3)	TSP Annual** (µg/m3)
1/09/2019	7.2	11.0	18.0	27.5
2/09/2019	10.0	11.0	25.0	27.5
3/09/2019	10.0	11.0	25.0	27.4
4/09/2019	10.9	11.0	27.3	27.4
5/09/2019	18.3	11.1	45.8	27.7
6/09/2019	39.8	11.5	99.6	28.8
7/09/2019	12.6	11.5	31.5	28.8
8/09/2019	4.5	11.4	11.3	28.6
9/09/2019	9.2	11.4	22.9	28.5
10/09/2019	11.6	11.4	29.0	28.5
11/09/2019	14.4	11.4	36.0	28.6
12/09/2019	13.6	11.5	34.0	28.7
13/09/2019	24.3	11.6	60.8	29.1
14/09/2019	18.7	11.7	46.8	29.3
15/09/2019	13.6	11.8	34.0	29.4
16/09/2019	16.6	11.8	41.5	29.5
17/09/2019	3.9	11.7	9.8	29.3
18/09/2019	3.7	11.6	9.3	29.0
19/09/2019	12.4	11.6	31.0	29.1
20/09/2019	15.4	11.7	38.5	29.2
21/09/2019	18.6	11.8	46.5	29.4
22/09/2019	27.1	11.9	67.8	29.8
23/09/2019	11.0	11.9	27.5	29.8
24/09/2019	9.5	11.9	23.8	29.7
25/09/2019	11.7	11.9	29.3	29.7
26/09/2019	16.3	11.9	40.8	29.9
27/09/2019	13.5	12.0	33.8	29.9
28/09/2019	15.6	12.0	39.0	30.0
29/09/2019	17.0	12.1	42.5	30.1
30/09/2019	16.5	12.1	41.3	30.3

*Calculated from PM10

**Calculated from PM10 Annual Average

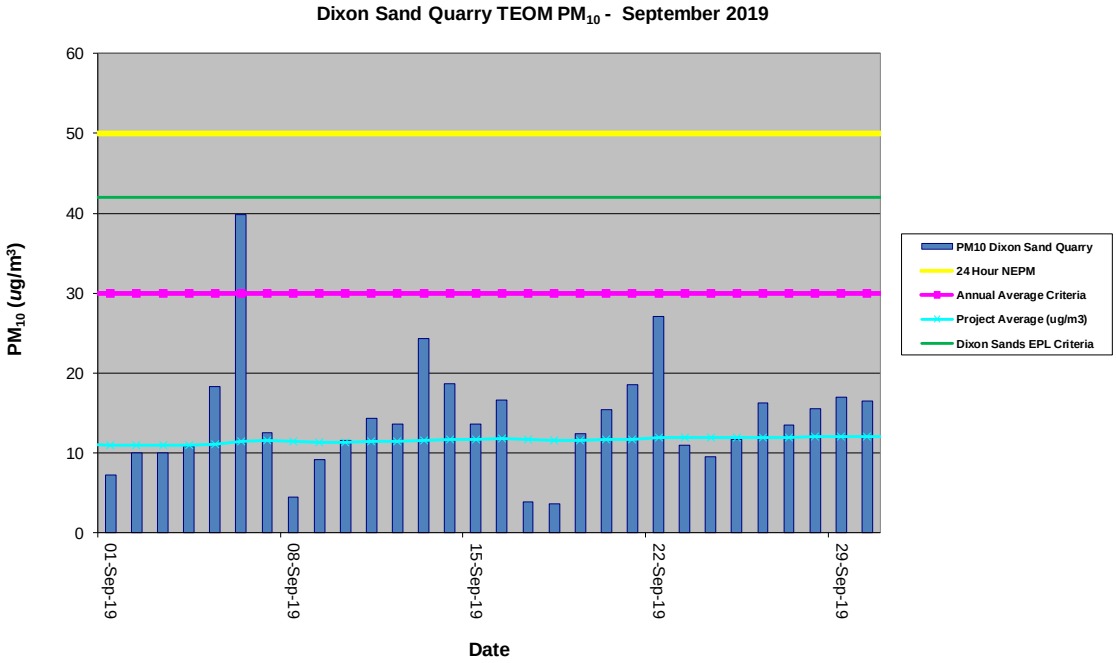


Figure 1: TEOM PM_{10} 24 hr, Annual Average and Criteria

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.

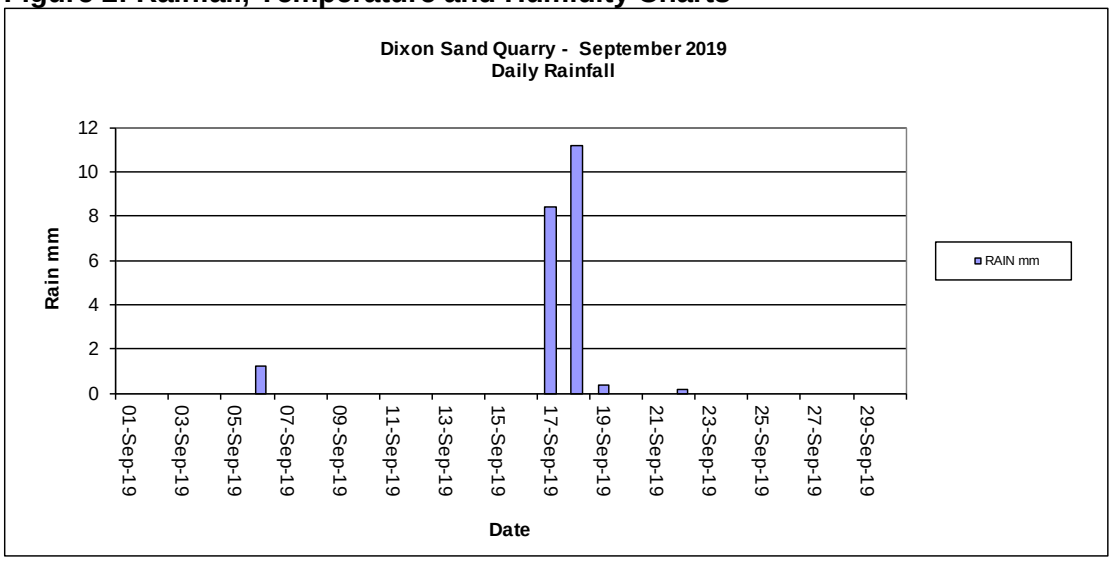
The summary of results is presented in **Table 3. Figure 2 and 3** display the charts of meteorological parameters for the month. A windrose is provided in **Figure 4.** This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

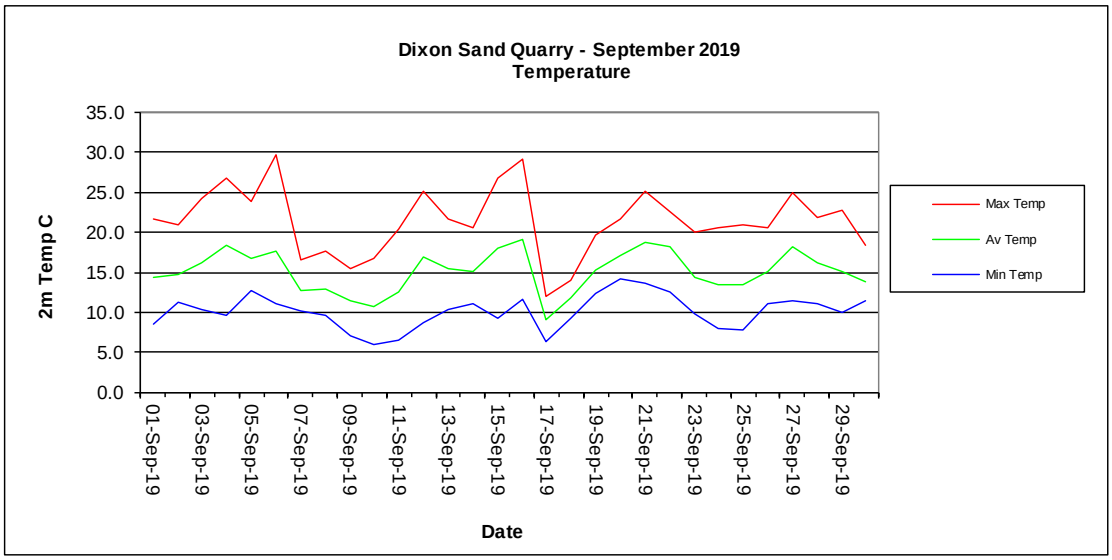
Table 3: Meteorological Data Summary for September 2019

Summary **Sep-19** **Dixon Sands**

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/09/2019	8.5	14.4	21.6	0.0	0.1	3.1	9.2	26.7	70.1	100.0	996.0	998.4	1000.7
2/09/2019	11.3	14.7	21.0	0.0	0.3	4.6	27.9	26.2	60.6	83.0	994.9	996.4	998.1
3/09/2019	10.3	16.2	24.3	0.0	0.2	3.7	16.3	19.7	52.5	89.0	991.8	994.6	997.5
4/09/2019	9.7	18.4	26.8	0.0	0.1	4.0	18.2	14.8	41.9	75.0	989.8	992.8	994.3
5/09/2019	12.7	16.7	23.9	0.0	0.1	4.2	22.9	29.7	63.2	95.4	990.5	993.1	995.9
6/09/2019	11.0	17.6	29.7	1.2	0.0	7.2	35.7	7.5	61.6	100.0	975.6	983.8	991.8
7/09/2019	10.1	12.8	16.6	0.0	1.0	9.1	28.0	24.5	41.1	55.1	982.4	986.6	989.5
8/09/2019	9.7	12.8	17.7	0.0	0.2	6.0	18.8	24.0	40.3	55.9	988.0	989.7	991.6
9/09/2019	7.0	11.4	15.5	0.0	0.6	8.0	39.7	28.7	45.6	62.7	986.8	991.2	998.5
10/09/2019	6.0	10.8	16.8	0.0	0.2	4.9	18.5	40.8	53.9	77.3	998.5	1002.8	1007.7
11/09/2019	6.6	12.6	20.4	0.0	0.1	3.8	15.3	25.1	66.5	90.1	1004.9	1006.8	1009.5
12/09/2019	8.7	16.9	25.2	0.0	0.0	3.5	21.3	10.7	39.4	86.7	995.7	999.6	1005.2
13/09/2019	10.4	15.5	21.7	0.0	0.2	5.3	21.3	20.2	56.7	86.4	996.5	999.3	1003.1
14/09/2019	11.0	15.1	20.6	0.0	0.1	4.6	19.1	31.6	55.2	85.2	996.9	1000.1	1002.6
15/09/2019	9.2	18.1	26.7	0.0	0.2	4.3	12.1	13.0	47.4	96.4	996.2	998.9	1001.8
16/09/2019	11.7	19.2	29.1	0.0	0.2	5.0	14.7	9.4	38.6	99.8	990.8	995.2	999.5
17/09/2019	6.3	9.2	12.0	8.4	0.7	8.3	22.5	99.7	100.0	100.0	998.2	999.6	1001.9
18/09/2019	9.3	11.9	14.0	11.2	0.3	8.3	23.1	100.0	100.0	100.0	1000.8	1002.6	1004.1
19/09/2019	12.4	15.4	19.6	0.4	0.4	4.1	15.6	69.0	91.9	100.0	1002.5	1003.9	1005.5
20/09/2019	14.1	17.1	21.7	0.0	0.2	5.0	19.3	60.4	85.6	99.2	1000.2	1002.9	1005.4
21/09/2019	13.7	18.7	25.1	0.0	0.3	4.6	20.0	40.1	73.3	100.0	995.9	998.4	1000.9
22/09/2019	12.5	18.3	22.6	0.2	0.2	4.6	19.8	53.4	67.8	99.2	995.4	998.4	1000.8
23/09/2019	9.8	14.4	20.1	0.0	0.1	4.7	20.5	23.1	58.8	100.0	998.3	1001.1	1004.2
24/09/2019	7.9	13.5	20.6	0.0	0.0	3.6	14.7	22.9	47.9	75.3	1000.9	1003.6	1005.7
25/09/2019	7.8	13.5	20.9	0.0	0.0	3.2	20.8	25.1	66.8	96.4	1002.5	1004.7	1006.4
26/09/2019	11.1	15.2	20.5	0.0	0.2	4.0	26.9	49.5	81.4	99.2	999.3	1002.5	1005.4
27/09/2019	11.5	18.1	25.0	0.0	0.3	3.8	16.5	17.0	52.3	100.0	992.4	996.0	1000.3
28/09/2019	11.0	16.2	21.8	0.0	0.1	4.8	23.9	22.0	46.2	74.0	991.0	994.5	998.5
29/09/2019	9.9	15.0	22.7	0.0	0.1	3.7	17.3	32.8	65.7	84.8	993.3	996.6	999.9
30/09/2019	11.4	13.9	18.3	0.0	0.0	3.4	18.6	60.2	78.6	97.3	999.0	1002.7	1007.7
Monthly	6.0	15.1	29.7	21.4	0.0	4.9	39.7	7.5	61.7	100.0	975.6	997.9	1009.5

Figure 2: Rainfall, Temperature and Humidity Charts





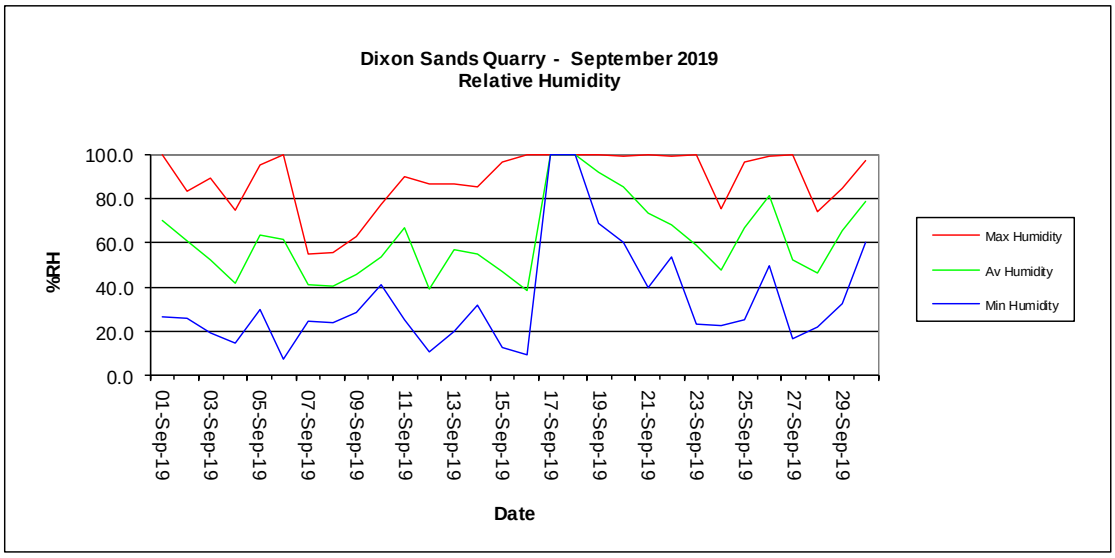
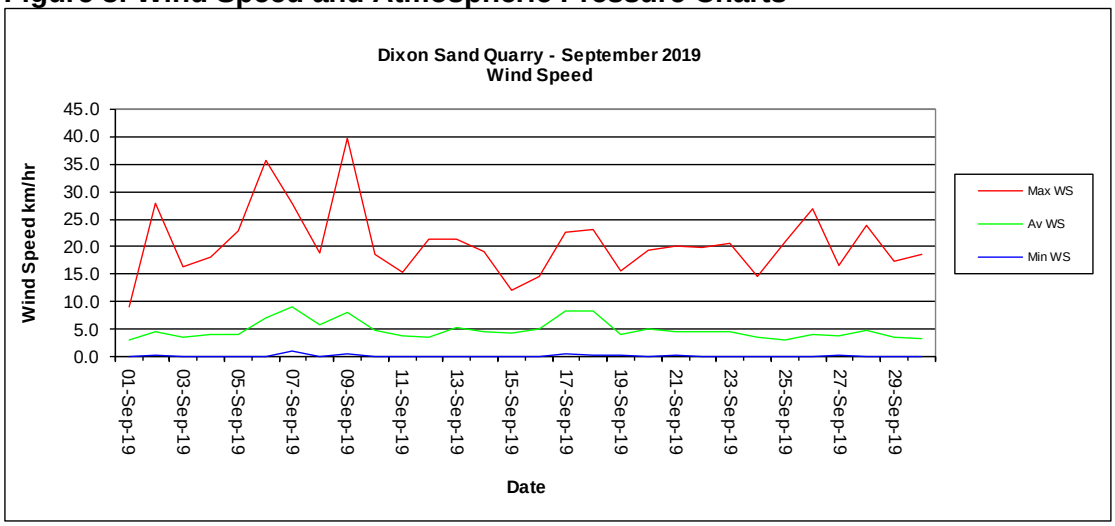


Figure 3: Wind Speed and Atmospheric Pressure Charts



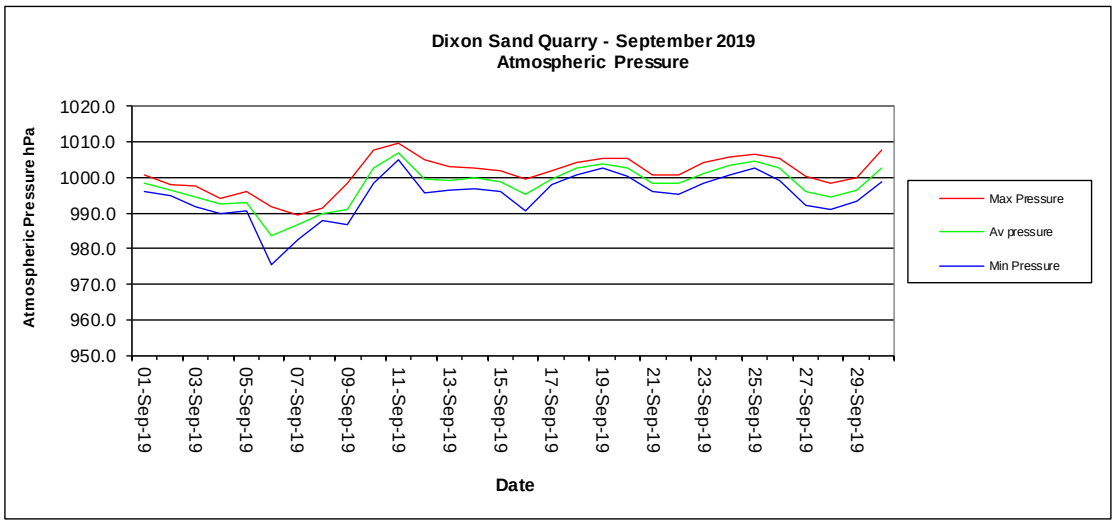
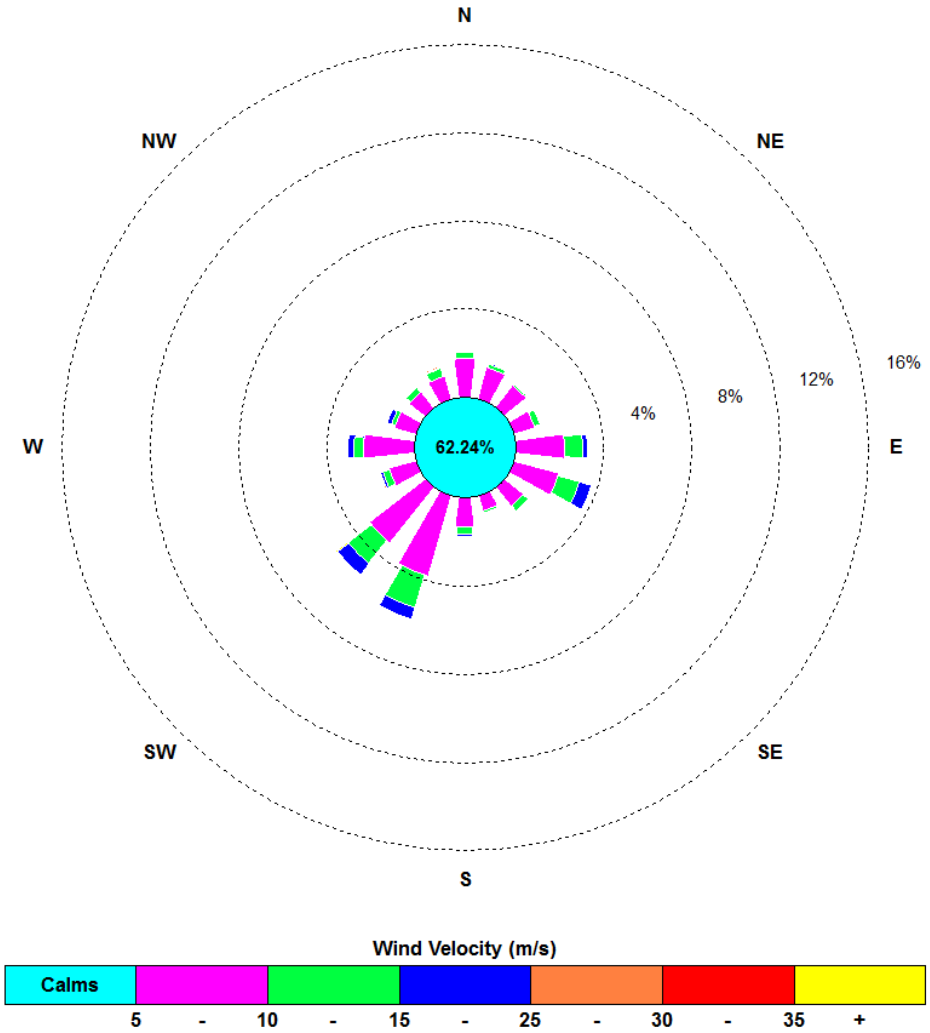


Figure 4: Windrose Plot (km/h)

00:00 1 September 2019 – 23:55 30 September 2019



Appendix 1

Calibration Documents (when required)

CARBON BASED ENVIRONMENTAL

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

teledata

TEOM Client/Site: Dixon Sands / TEOM 1 **Date:** 19/9/19

1. TEOM Data Screen

SERIAL No: 25570 **Firmware:** N/A

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	OL 4 ✓	Green - Normal	OK ✓	
Date/time	TEOM: 19/9/19 9:30 Actual: 19/9/19 9:34	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	6.1	Positive values	✓	
Filter loading PM10	36	<80 %	✓	
Frequency PM-10	252 · 18359	200-300 Hz	✓	
Noise PM-10	0.027	<0.100ug	✓	

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

Comments:

Temp range on min/max Remote MAX 25°C min 20°C ✓ OK reset.

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	0.4	<0.50 atm	✓	
Warnings	NIL	No Warnings	✓	
If any warnings list:				

Comments:

Data Downloaded: YES/(NO) (circle)

Technician Name : COLIN DANIEL **Signed**

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	14.6	-10 to 50 C	✓	
Ambient Dew Point	N/A	-10 to 50 C	–	–
Ambient Pressure	0.968	0.9-1.1 atm	✓	
Ambient Relative Humidity	N/A	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	16.65	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	20	254.04396	254.04397	254.04396	254.04397

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: low cool 4

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

(Quarterly or Six Monthly Calibration

1. Flow Verification – Conducted (YES)/NO

PM10 Flow verified Flow l/min 2.91 Error % 3.0 (allowed error <6%) (PASS)/FAIL Final 3.00 Fadj 1.05

Bypass Flow verified Flow l/min 13.49 Error % 1.3 (allowed error <6%) (PASS)/FAIL Final 13.67 Fadj 1.01
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 0.24 < Limit 0.60

Leak check (PASS)/FAIL – If fail then find leak and retest.
Comments:
OK

Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO
Reference Temperature: _____C TEOM Temperature_____C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

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

Note: 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 = _____ TEOM stated K0_____ Error %:_____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % =_____ PASS/FAIL. Comments:
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO
Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____Finish date/time:_____
Standard deviation of all recorded data (min 30 min averages) = _____ug/m^3
Noise was less than 5ug/m^3 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) (PM_{10}) and Meteorological Data

October 2019

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 15 November 2019

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

1.0 Summary

CBased Environmental Pty Limited (CBE) is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for Fine Particulates (PM_{10}) 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 program includes;

- One continuous TEOM PM_{10} monitor; and
- One continuous Meteorological Station.

This monthly report was prepared by CBased Environmental and includes the following;

- TEOM (PM_{10}) monitoring results for October 2019; and
- Meteorological results for October 2019.

Current year to date annual average for PM_{10} is calculated from the 1st July 2019 for TEOM's coinciding with the Dixon Sand project year.

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

- All TEOM PM_{10} 24-hour average results were below the short-term Dixon Sand Quarry consent, 24-hour impact criteria of 50ug/m^3, except for 3 occurrences;
- The current TEOM PM_{10} annual average is below the Dixon Sand Quarry consent, annual average criteria of 30ug/m3.
- Currently, calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.
- All TEOM PM_{10} 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3, except for 3 occurrences.

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. Note that an annual amount of data has now been collected.

Approximately 100% of meteorological data was recovered for October 2019.
Approximately 100% of TEOM data was recovered for October 2019.

2.0 Sampling Program

The TEOM is operated to the applicable Australian Standard and OEH (EPA) approved method. All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

The following Australian Standards were used:

AS3580.9.8 (2001) "*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser*."

TEOM PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ corrected to 0 degrees C and 101.3kPa.

The location of the air quality monitoring equipment met the Australian Standard AS 3580.1.1 (2007) "*Methods for sampling and analysis of ambient air Part 1.1 Guide to siting air monitoring equipment*". Air Quality monitoring site descriptions and locations are provided in **Table 1**:

Table 1: Dixon Sands 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 Reporting Period Results

3.1 TEOM PM_{10}

24-hour average TEOM PM_{10} 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 three individual 24-hour TEOM PM_{10} results were above the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3, highlighted yellow in **Table 2**.

The current TEOM PM_{10} annual average runs from the 1st July 2019. At present it is below the Dixon Sand Quarry long term annual average PM_{10} criteria of 30ug/m^3. 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 PM_{10} by 2.5. Note: an annual amount of data has not yet been collected.

A quarterly calibration was undertaken on 19 September 2019. Calibration certificates are provided in **Appendix 1** (when required). Next calibration is scheduled for December 2019.

Table 2: Average Daily 24 Hr TEOM PM_{10} and TSP for October 2019 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019.

Date	TEOM PM_{10} ($\mu g/m^3$)	Annual PM_{10} Average ($\mu g/m^3$)	TSP* ($\mu g/m3$)	TSP Annual** ($\mu g/m3$)
1/10/2019	13.6	12.1	34.0	30.3
2/10/2019	15.6	12.2	39.0	30.4
3/10/2019	23.5	12.3	58.8	30.7
4/10/2019	33.6	12.5	84.0	31.3
5/10/2019	12.4	12.5	31.0	31.3
6/10/2019	12.6	12.5	31.5	31.3
7/10/2019	30.5	12.7	76.3	31.7
8/10/2019	19.4	12.8	48.5	31.9
9/10/2019	9.6	12.7	24.0	31.8
10/10/2019	15.0	12.7	37.5	31.9
11/10/2019	7.1	12.7	17.8	31.7
12/10/2019	7.0	12.6	17.5	31.6
13/10/2019	7.3	12.6	18.3	31.5
14/10/2019	9.8	12.6	24.5	31.4
15/10/2019	20.5	12.6	51.3	31.6
16/10/2019	26.1	12.8	65.3	31.9
17/10/2019	22.8	12.8	57.0	32.1
18/10/2019	15.3	12.9	38.3	32.2
19/10/2019	19.7	12.9	49.3	32.3
20/10/2019	13.3	12.9	33.3	32.3
21/10/2019	18.4	13.0	46.0	32.5
22/10/2019	18.5	13.0	46.3	32.6
23/10/2019	19.6	13.1	49.0	32.7
24/10/2019	33.5	13.3	83.8	33.2
25/10/2019	33.3	13.4	83.3	33.6
26/10/2019	**99.3**	14.2	248.3	35.4
27/10/2019	25.2	14.3	63.0	35.6
28/10/2019	23.7	14.3	59.3	35.8
29/10/2019	34.5	14.5	86.3	36.3
30/10/2019	**67.3**	14.9	168.3	37.3
31/10/2019	**96.5**	15.6	241.3	39.0

*Calculated from PM10

**Calculated from PM10 Annual Average

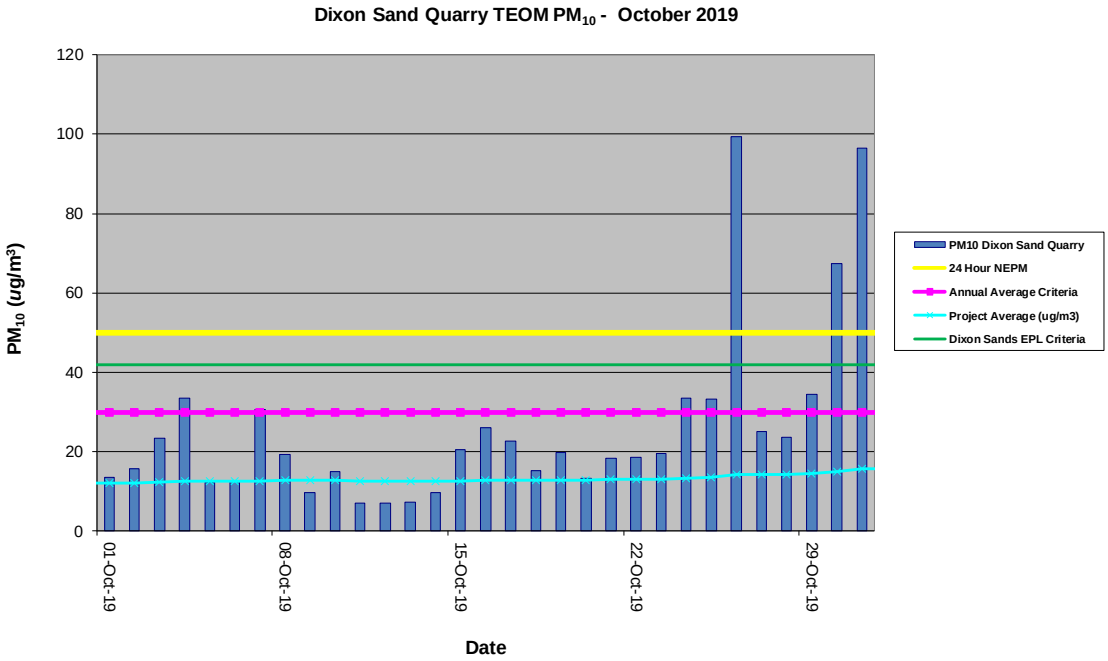


Figure 1: TEOM PM_{10} 24 hr, Annual Average and Criteria

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.

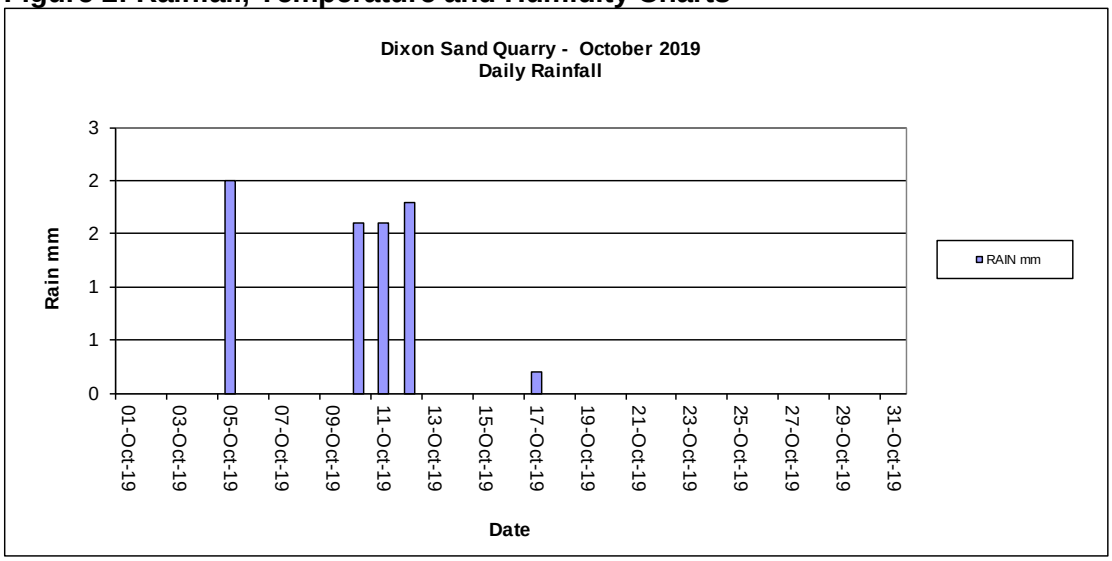
The summary of results is presented in **Table 3. Figure 2 and 3** display the charts of meteorological parameters for the month. A windrose is provided in **Figure 4.** This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

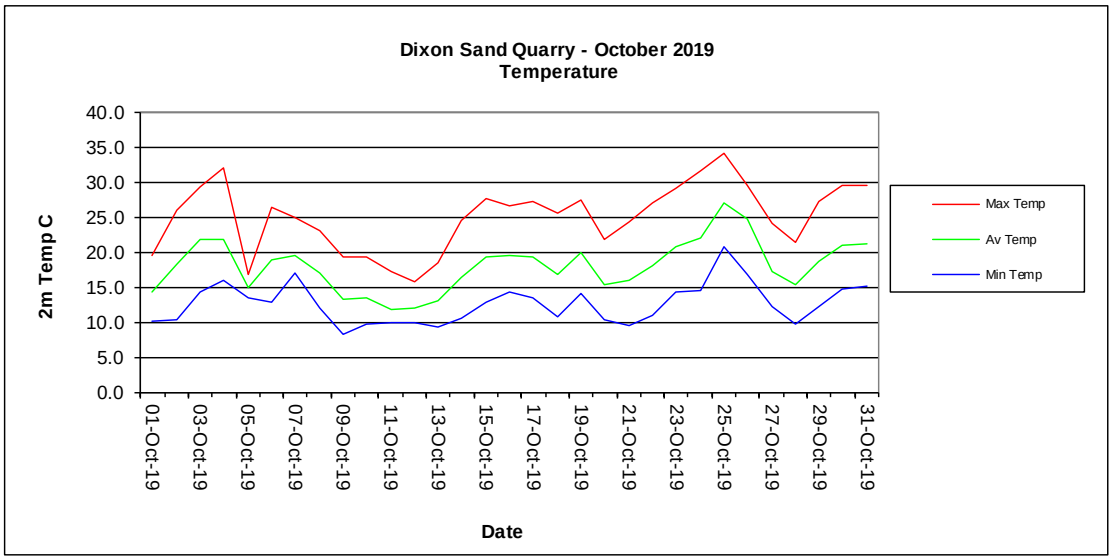
Table 3: Meteorological Data Summary for October 2019

Summary **Oct-19** **Dixon Sands**

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/10/2019	10.2	14.3	19.5	0.0	0.4	4.2	16.9	51.1	74.4	89.9	1005.9	1007.8	1009.8
2/10/2019	10.3	18.3	26.1	0.0	0.4	4.4	14.2	24.1	55.0	96.7	1002.0	1004.7	1007.6
3/10/2019	14.3	21.8	29.3	0.0	0.1	4.1	13.8	17.4	35.5	59.7	998.0	1000.8	1003.6
4/10/2019	16.0	21.9	32.1	0.0	0.2	5.8	21.7	11.9	44.8	81.7	993.3	997.1	1000.3
5/10/2019	13.6	15.0	16.9	2.0	0.0	3.0	13.1	78.9	92.9	100.0	998.8	1000.6	1002.7
6/10/2019	12.9	19.0	26.5	0.0	0.2	4.4	13.4	44.7	73.4	100.0	987.8	993.2	1000.1
7/10/2019	17.0	19.5	24.9	0.0	0.2	5.4	21.5	52.8	78.6	99.2	987.4	989.3	991.3
8/10/2019	12.0	17.1	23.1	0.0	0.0	4.7	30.4	19.7	60.6	100.0	987.5	990.6	997.0
9/10/2019	8.3	13.2	19.3	0.0	0.4	4.6	16.5	35.1	56.3	72.0	997.0	999.7	1002.2
10/10/2019	9.8	13.6	19.3	1.6	0.1	5.2	26.2	44.9	68.4	99.2	998.0	1000.1	1002.0
11/10/2019	9.9	11.9	17.3	1.6	0.2	3.1	15.9	54.6	92.5	100.0	994.8	997.0	999.3
12/10/2019	10.0	12.0	15.7	1.8	0.5	4.9	22.0	56.5	88.7	100.0	995.2	996.7	999.6
13/10/2019	9.4	13.1	18.6	0.0	0.2	4.3	18.8	45.0	78.5	100.0	996.5	998.4	1000.1
14/10/2019	10.5	16.5	24.5	0.0	0.2	4.9	17.9	26.0	67.1	94.9	991.2	994.4	998.4
15/10/2019	12.8	19.4	27.6	0.0	0.0	4.3	21.7	30.3	69.5	99.2	986.8	990.2	992.8
16/10/2019	14.4	19.5	26.7	0.0	0.2	3.4	12.8	35.7	73.2	100.0	987.2	989.3	991.6
17/10/2019	13.5	19.4	27.2	0.2	0.5	5.8	28.2	14.5	47.7	91.7	983.8	987.1	993.5
18/10/2019	10.7	16.8	25.7	0.0	0.4	3.9	15.9	13.3	37.5	57.8	991.3	993.8	996.5
19/10/2019	14.2	19.9	27.4	0.0	0.4	6.3	21.8	13.7	25.4	54.0	989.1	992.9	997.6
20/10/2019	10.4	15.3	21.9	0.0	0.2	4.7	23.8	14.7	47.7	71.2	997.6	999.8	1004.1
21/10/2019	9.6	15.9	24.4	0.0	0.0	3.7	18.4	31.5	62.0	79.9	1001.5	1003.7	1005.5
22/10/2019	11.0	18.0	27.1	0.0	0.0	4.8	22.4	19.5	65.3	99.2	998.8	1002.3	1004.5
23/10/2019	14.3	20.8	29.2	0.0	0.0	3.7	18.0	25.2	60.9	96.3	995.3	999.3	1003.2
24/10/2019	14.5	22.1	31.7	0.0	0.1	3.9	16.8	13.2	59.0	99.4	993.1	995.4	997.7
25/10/2019	20.8	27.1	34.1	0.0	0.4	7.7	34.0	12.1	24.8	46.2	985.4	989.7	994.2
26/10/2019	16.8	24.7	29.5	0.0	0.6	7.9	47.3	9.7	24.0	41.1	981.1	984.6	991.6
27/10/2019	12.2	17.2	24.1	0.0	0.1	4.8	28.7	7.0	32.2	64.5	990.5	993.0	996.5
28/10/2019	9.7	15.5	21.5	0.0	0.1	5.0	24.6	43.9	69.1	89.2	996.5	999.6	1003.0
29/10/2019	12.3	18.8	27.2	0.0	0.0	3.9	25.1	23.5	67.1	99.8	995.7	999.6	1002.9
30/10/2019	14.7	20.9	29.6	0.0	0.0	4.1	15.9	27.4	65.2	90.6	993.3	995.5	997.5
31/10/2019	15.2	21.2	29.6	0.0	0.1	4.7	21.7	35.4	66.6	94.0	992.8	994.6	996.6
Monthly	8.3	18.1	34.1	7.2	0.0	4.7	47.3	7.0	60.1	100.0	981.1	996.2	1009.8

Figure 2: Rainfall, Temperature and Humidity Charts





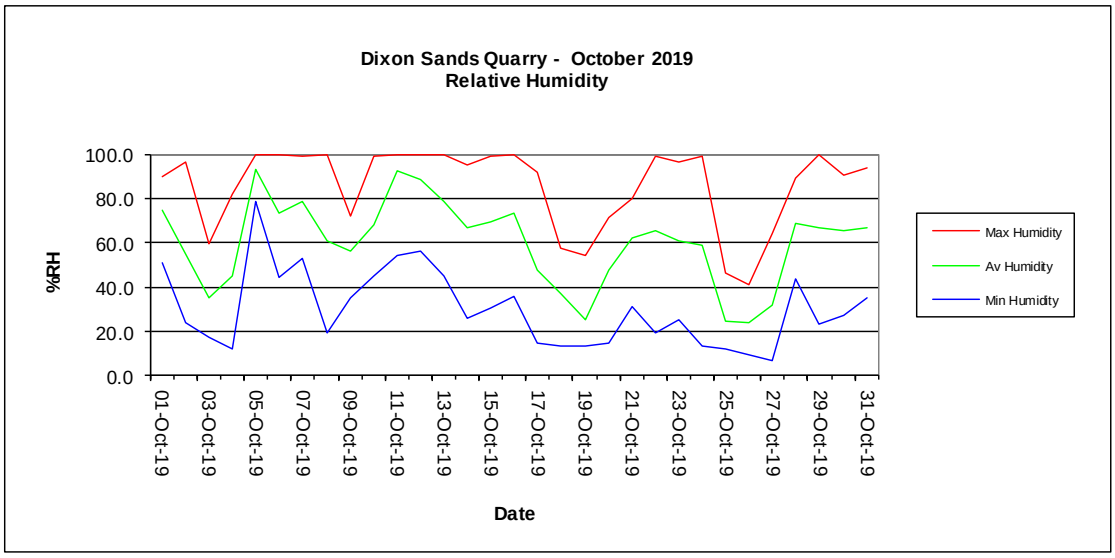
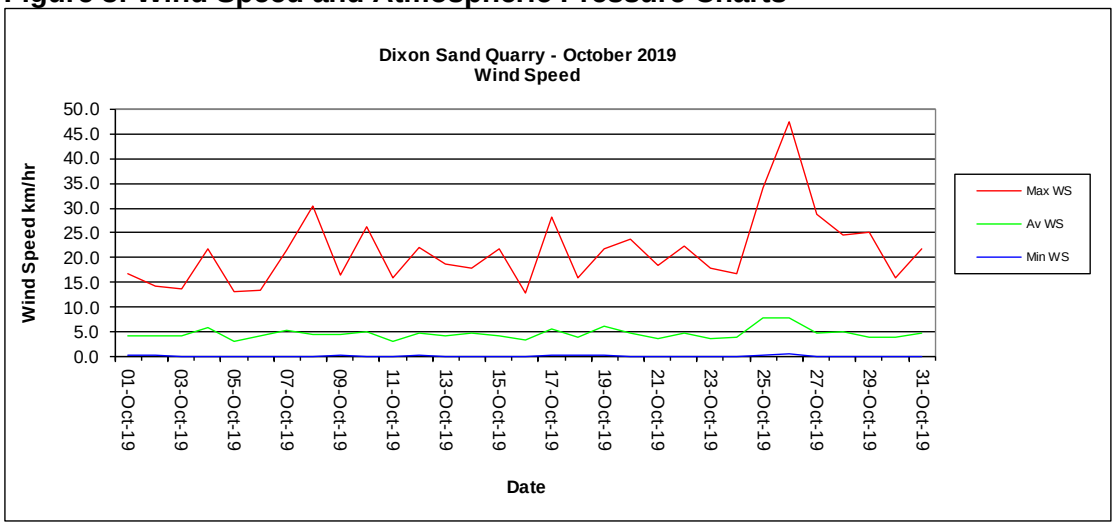


Figure 3: Wind Speed and Atmospheric Pressure Charts



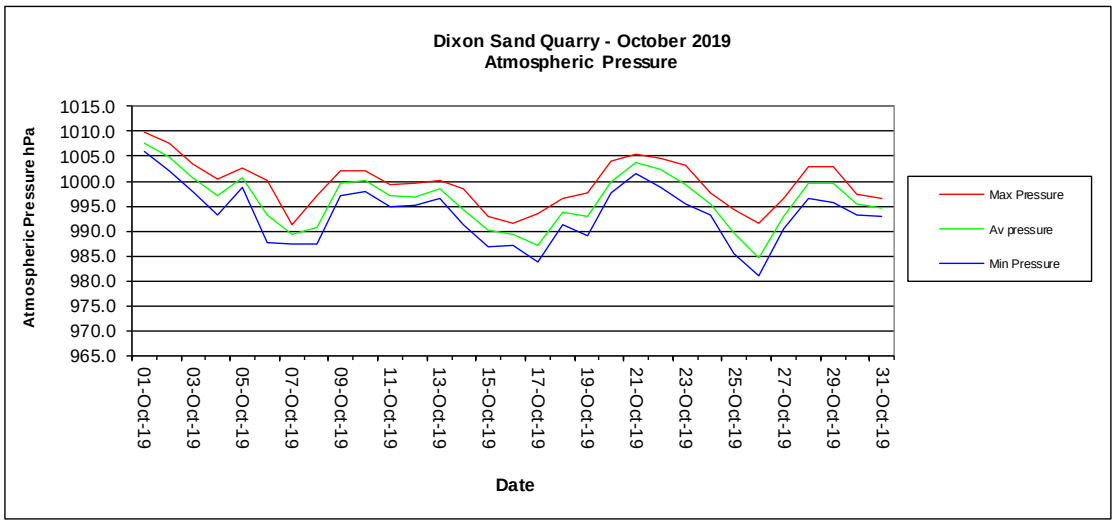
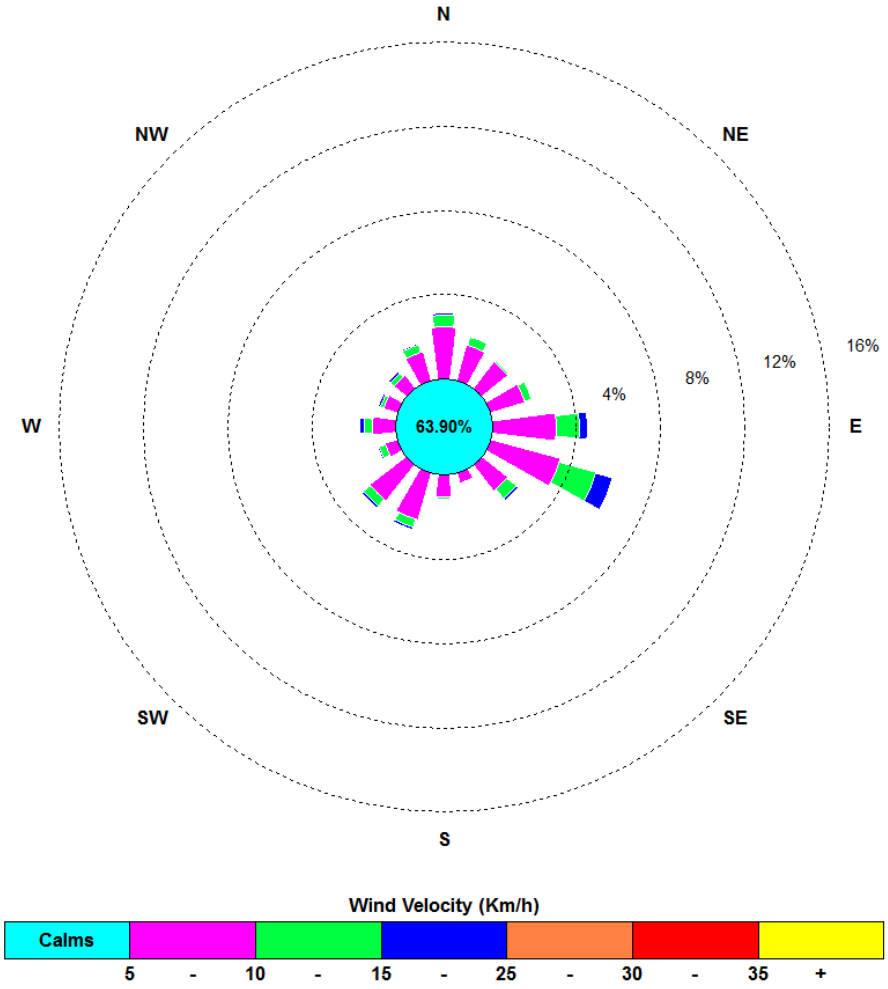


Figure 4: Windrose Plot (km/h)

00:00 1 October 2019 – 23:55 31 October 2019



CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

November 2019

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 16 December 2019

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

1.0 Summary

CBased Environmental Pty Limited (CBE) is contracted by Dixon Sand to conduct continuous Tapered Element Oscillating Microbalance (TEOM) for Fine Particulates (PM_{10}) 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 program includes;

- One continuous TEOM PM_{10} monitor; and
- One continuous Meteorological Station.

This monthly report was prepared by CBased Environmental and includes the following;

- TEOM (PM_{10}) monitoring results for November 2019; and
- Meteorological results for November 2019.

Current year to date annual average for PM_{10} is calculated from the 1st July 2019 for TEOM's coinciding with the Dixon Sand project year.

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

- All valid TEOM PM_{10} 24-hour average results were below the short-term Dixon Sand Quarry consent, 24-hour impact criteria of 50ug/m^3, except for 6 occurrences;
- The current TEOM PM_{10} annual average is below the Dixon Sand Quarry consent, annual average criteria of 30ug/m3.
- Currently, calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.
- All valid TEOM PM_{10} 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3, except for 8 occurrences.

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. Note that an annual amount of data has now been collected.

Approximately 100% of meteorological data was recovered for November 2019.
Approximately 100% of TEOM data was recovered for November 2019, but only 65% of data was deemed valid due to excessive filter loading and reduced flow capacity of TEOM monitor.

2.0 Sampling Program

The TEOM is operated to the applicable Australian Standard and OEH (EPA) approved method. All laboratory analysis was conducted by a National Association of Testing Authorities (NATA) accredited laboratory.

The following Australian Standards were used:

AS3580.9.8 (2001) "*Methods for Sampling and Analysis of Ambient Air. Determination of Suspended Particulates—PM_{10} continuous direct mass method using a tapered element oscillating microbalance analyser*."

TEOM PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ corrected to 0 degrees C and 101.3kPa.

The location of the air quality monitoring equipment met the Australian Standard AS 3580.1.1 (2007) "*Methods for sampling and analysis of ambient air Part 1.1 Guide to siting air monitoring equipment*". Air Quality monitoring site descriptions and locations are provided in **Table 1**:

Table 1: Dixon Sands 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 Reporting Period Results

3.1 TEOM PM_{10}

24-hour average TEOM PM_{10} 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, 35% of data was deemed invalid due to excessive filter loading and reduced flow capacity with the TEOM monitor which was a direct cause of high winds, dry conditions and bush fires in the area during the monitoring period. Valid data indicated there were 6 individual 24-hour TEOM PM_{10} results above the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and 8 occurrences above the Dixon Sand Quarry EPL limit of 42ug/m^3, highlighted yellow in **Table 2**.

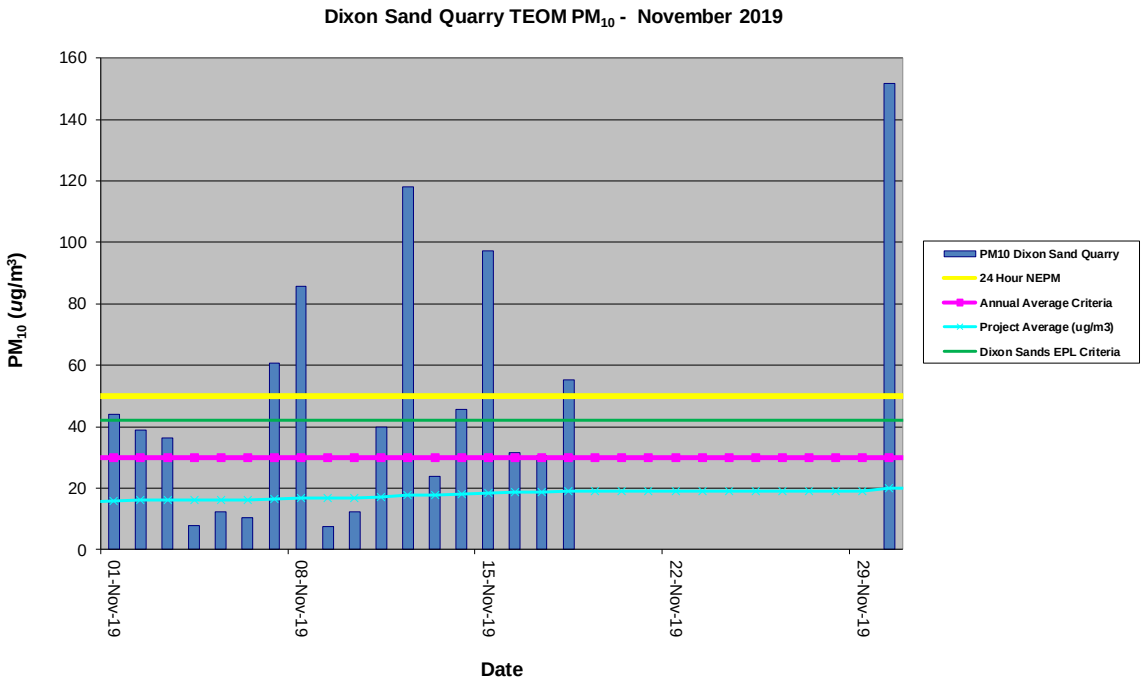
The current TEOM PM_{10} annual average runs from the 1st July 2019. At present it is below the Dixon Sand Quarry long term annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in September 2019 and a non-routine filter change and calibration was conducted on 29 November 2019. Calibration certificates are provided in **Appendix 1** (when required). Next calibration is scheduled for December 2019.

Table 2: Average Daily 24 Hr TEOM PM_{10} and TSP for November 2019 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019.

Date	TEOM PM_{10} (µg/m^3)	Annual PM_{10} Average (µg/m^3)	TSP* (µg/m3)	TSP Annual** (µg/m3)
1/11/2019	**43.9**	15.8	109.8	39.6
2/11/2019	39.0	16.0	97.5	40.0
3/11/2019	36.2	16.2	90.5	40.4
4/11/2019	7.9	16.1	19.8	40.3
5/11/2019	12.4	16.1	31.1	40.2
6/11/2019	10.5	16.0	26.3	40.1
7/11/2019	**60.7**	16.4	151.8	40.9
8/11/2019	**85.8**	16.9	214.5	42.3
9/11/2019	7.4	16.8	18.5	42.1
10/11/2019	12.3	16.8	30.8	42.0
11/11/2019	39.8	17.0	99.5	42.4
12/11/2019	**118.1**	17.7	295.3	44.3
13/11/2019	23.8	17.8	59.6	44.4
14/11/2019	**45.5**	18.0	113.8	44.9
15/11/2019	**97.1**	18.5	242.8	46.4
16/11/2019	31.6	18.6	79.0	46.6
17/11/2019	30.6	18.7	76.5	46.8
18/11/2019	**55.4**	19.0	138.5	47.5
19/11/2019	Invalid Data	19.0	0.0	0.0
20/11/2019	Invalid Data	19.0	0.0	0.0
21/11/2019	Invalid Data	19.0	0.0	0.0
22/11/2019	Invalid Data	19.0	0.0	0.0
23/11/2019	Invalid Data	19.0	0.0	0.0
24/11/2019	Invalid Data	19.0	0.0	0.0
25/11/2019	Invalid Data	19.0	0.0	0.0
26/11/2019	Invalid Data	19.0	0.0	0.0
27/11/2019	Invalid Data	19.0	0.0	0.0
28/11/2019	Invalid Data	19.0	0.0	0.0
29/11/2019	Invalid Data	19.0	0.0	0.0
30/11/2019	**151.8**	19.9	379.5	49.8

Figure 1: TEOM PM_{10} 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.

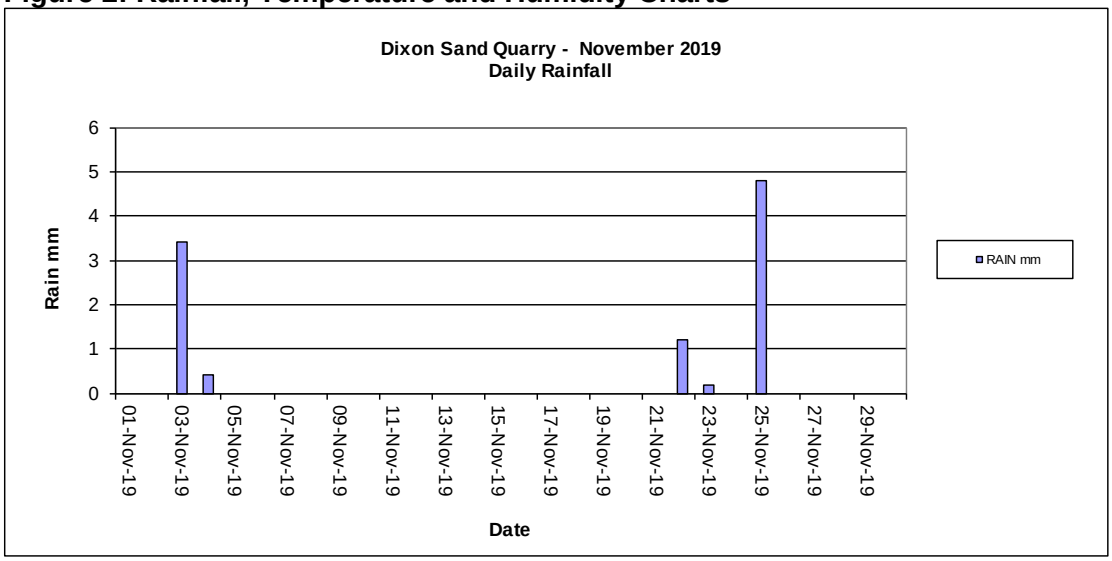
The summary of results is presented in **Table 3. Figure 2 and 3** display the charts of meteorological parameters for the month. A windrose is provided in **Figure 4.** This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

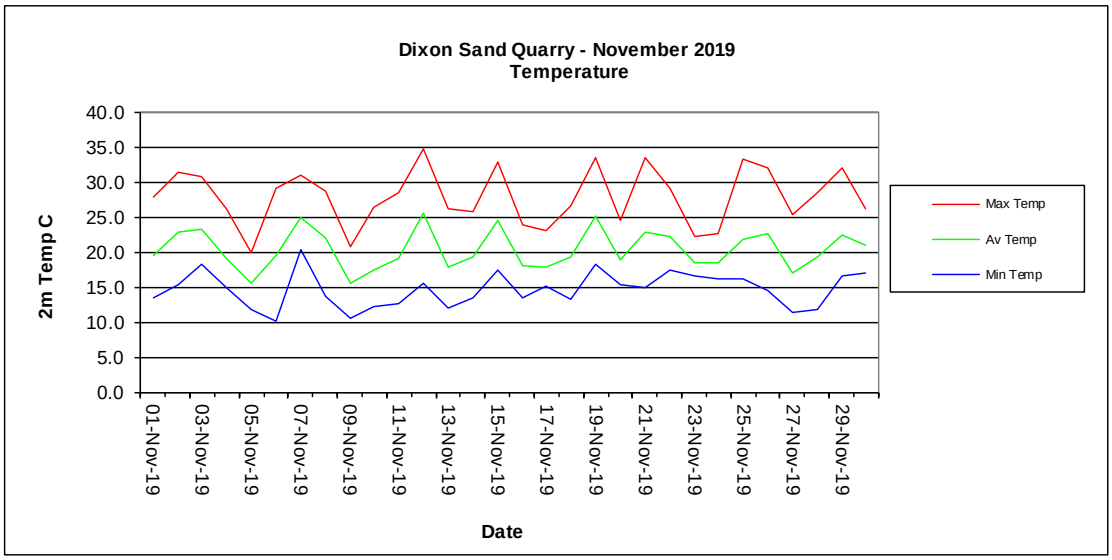
Table 3: Meteorological Data Summary for November 2019

Summary **Nov-19** **Dixon Sands**

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/11/2019	13.6	19.6	28.0	0.0	0.1	5.1	26.6	36.7	77.7	100.0	991.5	994.4	996.9
2/11/2019	15.4	22.8	31.5	0.0	0.1	6.1	22.1	25.6	60.7	100.0	990.1	993.0	995.4
3/11/2019	18.2	23.4	30.8	3.4	0.5	5.8	30.3	31.5	58.6	100.0	987.8	991.0	992.8
4/11/2019	14.9	19.1	26.3	0.4	0.3	4.7	17.0	28.4	75.6	100.0	989.8	991.5	993.6
5/11/2019	11.9	15.5	19.9	0.0	0.2	4.4	22.2	42.1	64.9	100.0	990.5	993.0	995.3
6/11/2019	10.2	19.5	29.2	0.0	0.1	4.5	18.6	11.1	42.5	86.1	984.4	989.6	995.1
7/11/2019	20.4	25.0	31.0	0.0	0.1	7.8	30.0	7.3	17.8	25.0	981.4	983.2	985.9
8/11/2019	13.8	22.1	28.7	0.0	0.4	6.8	34.4	15.4	28.4	52.3	977.1	981.7	987.2
9/11/2019	10.6	15.5	20.7	0.0	0.2	5.5	26.7	14.5	31.0	56.1	987.2	989.3	991.5
10/11/2019	12.2	17.4	26.4	0.0	0.2	4.8	26.5	21.7	42.5	78.1	988.4	990.9	995.0
11/11/2019	12.7	19.2	28.5	0.0	0.5	5.3	21.5	19.0	59.0	84.7	989.0	992.6	995.4
12/11/2019	15.6	25.5	34.8	0.0	0.2	6.9	32.9	5.6	27.4	74.0	979.6	985.3	990.6
13/11/2019	12.0	17.9	26.2	0.0	0.0	3.9	16.1	6.8	42.0	91.0	988.0	990.5	992.8
14/11/2019	13.5	19.3	25.8	0.0	0.0	4.1	18.6	20.4	32.8	49.0	988.3	991.6	994.8
15/11/2019	17.4	24.5	32.9	0.0	0.2	4.7	26.7	6.7	23.4	41.5	984.0	988.0	990.6
16/11/2019	13.6	18.2	24.0	0.0	0.1	5.0	22.2	16.4	66.5	92.0	989.8	992.9	995.3
17/11/2019	15.1	17.9	23.2	0.0	0.2	5.0	22.5	48.0	73.0	89.2	992.5	994.6	999.2
18/11/2019	13.3	19.3	26.6	0.0	0.2	4.6	18.4	29.5	63.9	89.6	990.0	994.6	998.9
19/11/2019	18.3	25.2	33.5	0.0	0.4	4.6	20.4	11.4	30.1	80.0	986.0	989.8	993.8
20/11/2019	15.4	18.8	24.6	0.0	0.0	5.2	19.9	46.4	68.9	91.8	993.3	995.1	997.2
21/11/2019	15.0	22.8	33.5	0.0	0.0	5.3	25.4	22.2	66.0	95.3	987.1	991.8	997.2
22/11/2019	17.4	22.3	29.2	1.2	0.3	6.6	19.5	34.8	71.0	100.0	987.1	990.7	994.5
23/11/2019	16.7	18.4	22.2	0.2	0.1	3.2	14.3	72.5	91.4	100.0	990.4	993.5	996.9
24/11/2019	16.2	18.5	22.7	0.0	0.3	4.2	15.8	57.5	78.4	95.5	992.8	995.8	998.4
25/11/2019	16.2	21.8	33.4	4.8	0.4	4.9	18.8	23.9	72.0	100.0	985.1	989.3	994.6
26/11/2019	14.6	22.6	32.1	0.0	0.1	6.1	34.2	18.2	51.0	99.0	978.1	984.4	991.1
27/11/2019	11.4	17.1	25.3	0.0	0.0	4.3	23.6	14.4	42.2	76.2	991.0	993.1	995.5
28/11/2019	11.8	19.3	28.6	0.0	0.0	5.2	33.1	30.1	67.0	97.6	990.9	994.0	995.9
29/11/2019	16.7	22.6	32.0	0.0	0.1	4.5	23.5	22.3	68.6	99.2	986.9	991.0	994.6
30/11/2019	17.0	21.0	26.3	0.0	0.1	4.6	26.7	26.3	65.5	89.7	983.9	986.3	988.3
Monthly	10.2	20.4	34.8	10.0	0.0	5.1	34.4	5.6	55.3	100.0	977.1	990.7	999.2

Figure 2: Rainfall, Temperature and Humidity Charts





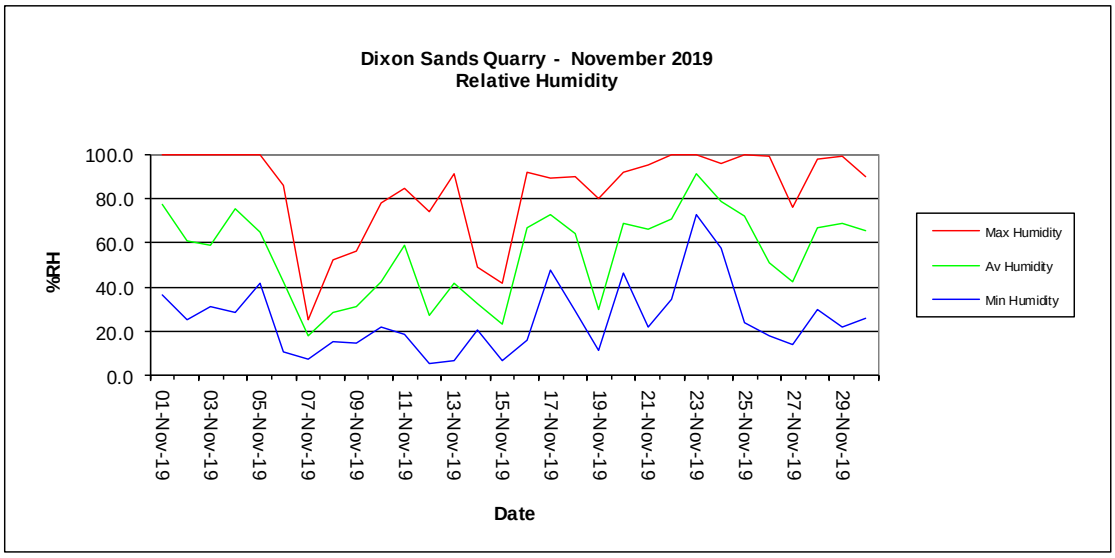
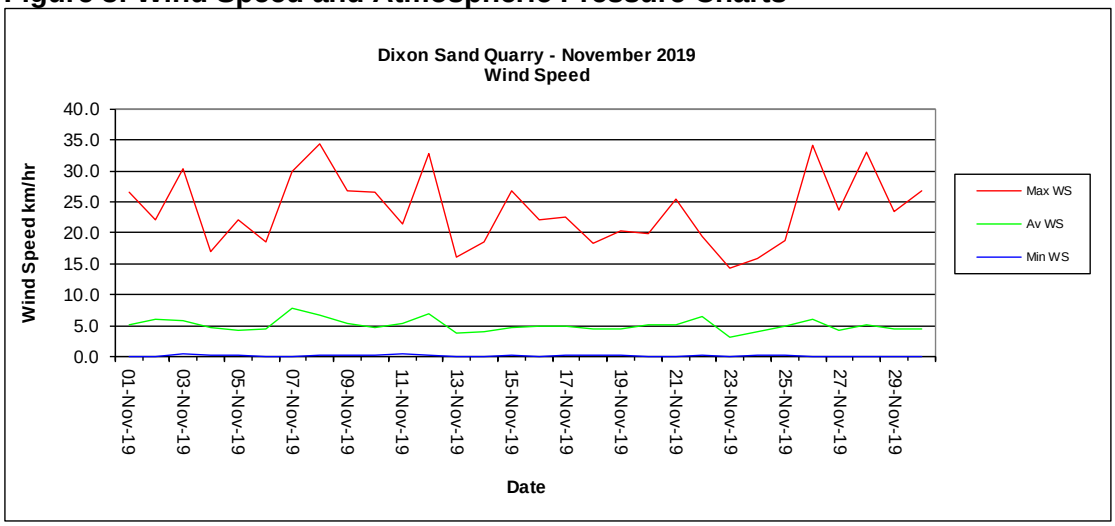


Figure 3: Wind Speed and Atmospheric Pressure Charts



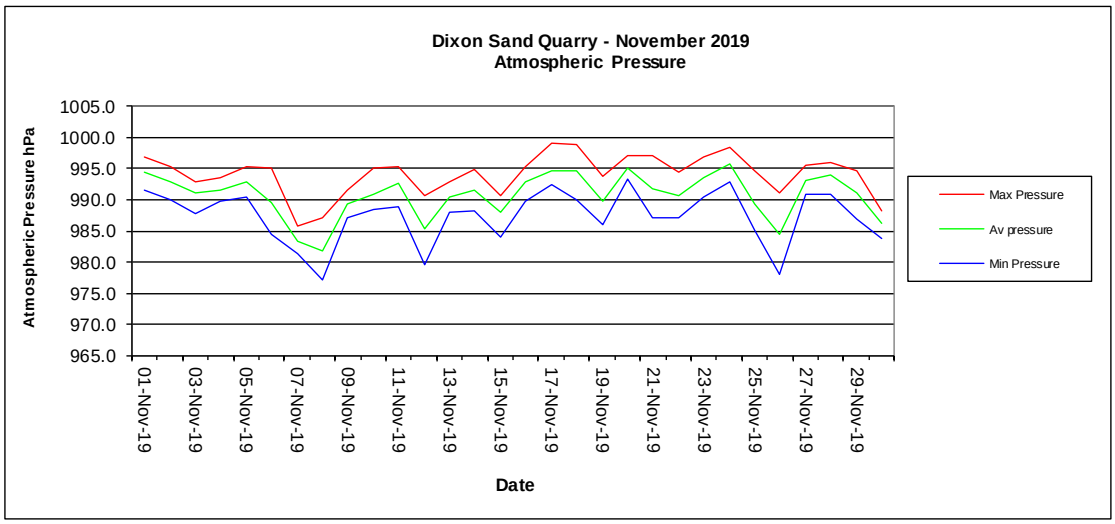
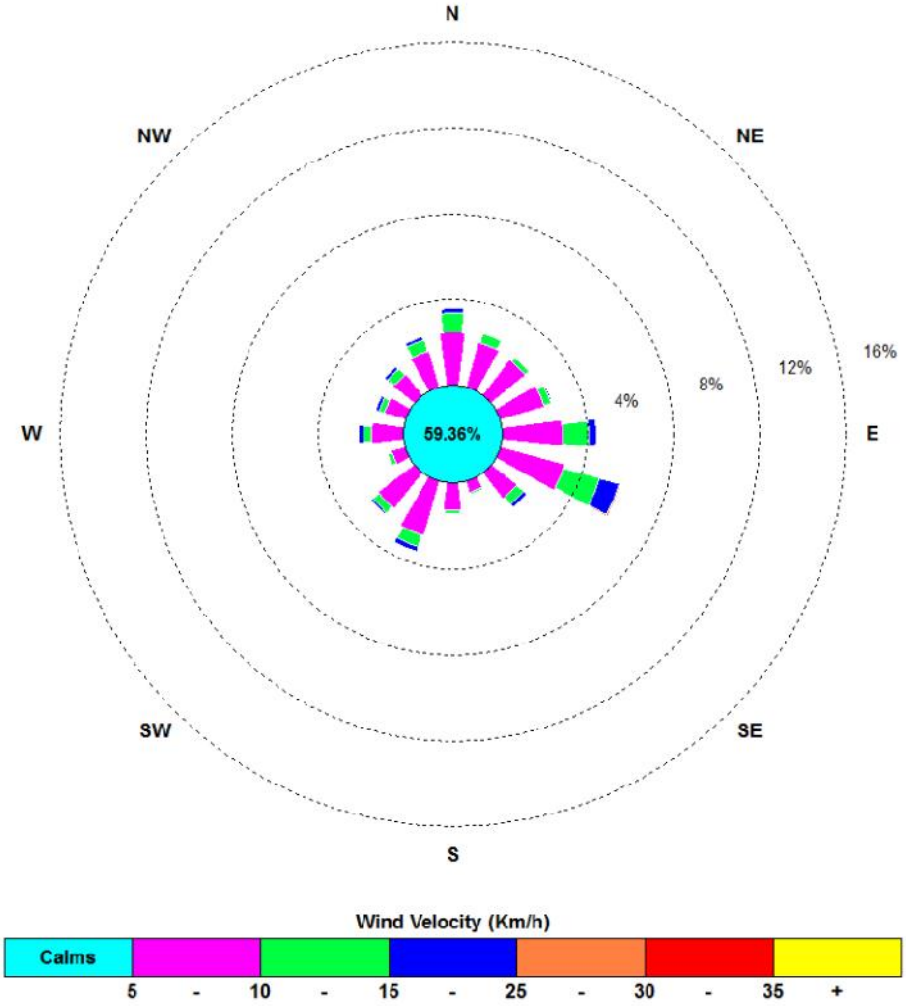


Figure 4: Windrose Plot (km/h)

00:00 1 November 2019 – 23:55 30 November 2019



Appendix 1

Calibration Documents (when required)

CARBON BASED ENVIRONMENTAL

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

teledata

CV3000

TEOM Client/Site: Dixon Sands / 1400a room **Date:** 29/11/19

1. TEOM Data Screen **SERIAL No:** 25570 **Firmware:** —

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	FX – Faults	Green - Normal		✓
Date/time	TEOM: 29.11.19 9.42 Actual: 29.11.19 10.47	Current Date/time correct within 5 minutes	✓ EST	
PM-10 24hr av	0	Positive values		✓
Filter loading PM10	110	<80 %		✓
Frequency PM-10	247.2468	200-300 Hz	✓	
Noise PM-10	0	<0.100ug	✓	✓

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

Comments: Faulty conditions → replaced bypass, replaced filter to test.

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	−25 milly. meter	<0.50 atm	✓	
Warnings	Yes.	No Warnings		✓
If any warnings list:				
Flow, filter-load warnings				

Comments: Changed filter + bypass filter etc.

Data Downloaded: YES/(NO) (circle)

Technician Name : Colin Daniel **Signed** CDL

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	26.3	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	–	–
Ambient Pressure	0.971	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	–	–
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.03	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: 29/11/19 DS. ✓OL

Comments/Action Required:

Calibration/Maintenance

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

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	17	253.92770	253.92768	253.92755	253.92750

✓ one

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. NA .
Comments if changed:

6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: Low Cool 4

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

Quarterly or Six Monthly Calibration

1. Flow Verification – Conducted (YES)/NO

Final 3.00

PM10 Flow verified Flow l/min 3.03 Error % 1.0 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.43 Error % 1.8 (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:** Final 13.62

2. Leak Check – Conducted (YES)/NO

PM10 actual 0.10 . < Limit 0.15 Small leak in MT OK ✓

Bypass actual 0.0 < 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: 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 MA -
PM10
Set point 2.4 Actual:_____
Set point 3.6 Actual:_____
Set point 3.0 Actual:_____ After calibration Final:_____l/min

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

3. Mass calibration (K0) Verification – Conducted YES/NO
Actual measured KO = _____ TEOM stated K0_____ Error %:_____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % =_____ PASS/FAIL. Comments:
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO
Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____Finish date/time:_____
Standard deviation of all recorded data (min 30 min averages) = _____ug/m^3
Noise was less than 5ug/m^3 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) (PM_{10}) and Meteorological Data

December 2019

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 29 January 2020

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 (PM_{10}) 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 PM_{10} monitor; and
- One continuous Meteorological Station.

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

- TEOM (PM_{10}) monitoring results for December 2019; and
- Meteorological results for December 2019.

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/m^3 with the exception of 12 occurrences;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3 with the exception of 13 occurrences;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 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 2019.

Approximately 100% of TEOM data was recovered for December 2019, but only 84% of data was deemed valid due to excessive filter loading and reduced flow capacity of TEOM monitor.

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—PM_{10} 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 PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ 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 PM_{10}

24-hour average TEOM PM_{10} 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, 16% of data was deemed invalid due to excessive filter loading and reduced flow capacity within the TEOM monitor. CBased Environmental considers this to have been caused by high winds, dry conditions and bushfire smoke in the area during the monitoring period.

Valid data indicated there were 12 individual 24-hour TEOM PM_{10} results above the National Environment Protection Measure (NEPM) short-term (24-hour) impact criteria of 50ug/m^3 and 13 occurrences above the Dixon Sand Quarry EPL limit of 42ug/m^3, highlighted yellow in **Table 2**.

At present it is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken on 13 December 2019. The calibration certificate is provided in **Appendix 1**. Next calibration is scheduled for March 2020.

Table 2: Average Daily 24-hr TEOM PM_{10} and TSP Results for December 2019 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	TEOM PM_{10} ($\mu g/m^3$)	Annual PM_{10} Average ($\mu g/m^3$)	TSP* ($\mu g/m3$)	TSP Annual** ($\mu g/m3$)
1/12/2019	28.4	20.0	71.0	49.9
2/12/2019	**57.1**	20.2	142.8	50.6
3/12/2019	33.5	20.3	83.8	50.8
4/12/2019	**60.4**	20.6	151.0	51.5
5/12/2019	**117.1**	21.3	292.8	53.1
6/12/2019	**99.8**	21.8	249.5	54.5
7/12/2019	**135.6**	22.6	339.0	56.4
8/12/2019	**61.7**	22.8	154.3	57.0
9/12/2019	Invalid Data	22.8	0.0	0.0
10/12/2019	Invalid Data	22.8	0.0	0.0
11/12/2019	Invalid Data	22.8	0.0	0.0
12/12/2019	Invalid Data	22.8	0.0	0.0
13/12/2019	Invalid Data	22.8	0.0	0.0
14/12/2019	41.8	22.9	104.5	57.3
15/12/2019	**66.7**	23.2	166.8	58.1
16/12/2019	37.7	23.3	94.3	58.3
17/12/2019	15.6	23.3	39.0	58.2
18/12/2019	**45.4**	23.4	113.5	58.5
19/12/2019	**149.2**	24.2	373.0	60.5
20/12/2019	29.3	24.3	73.3	60.6
21/12/2019	**86.0**	24.6	215.0	61.6
22/12/2019	37.1	24.7	92.8	61.8
23/12/2019	32.0	24.8	80.0	61.9
24/12/2019	26.1	24.8	65.3	61.9
25/12/2019	21.5	24.8	53.8	61.9
26/12/2019	18.8	24.7	47.0	61.8
27/12/2019	17.1	24.7	42.8	61.7
28/12/2019	21.7	24.7	54.3	61.6
29/12/2019	**62.6**	24.9	156.5	62.2
30/12/2019	**73.6**	25.2	184.0	62.9
31/12/2019	**115.3**	25.7	288.3	64.3

*Calculated from PM10

**Calculated from PM10 Annual Average

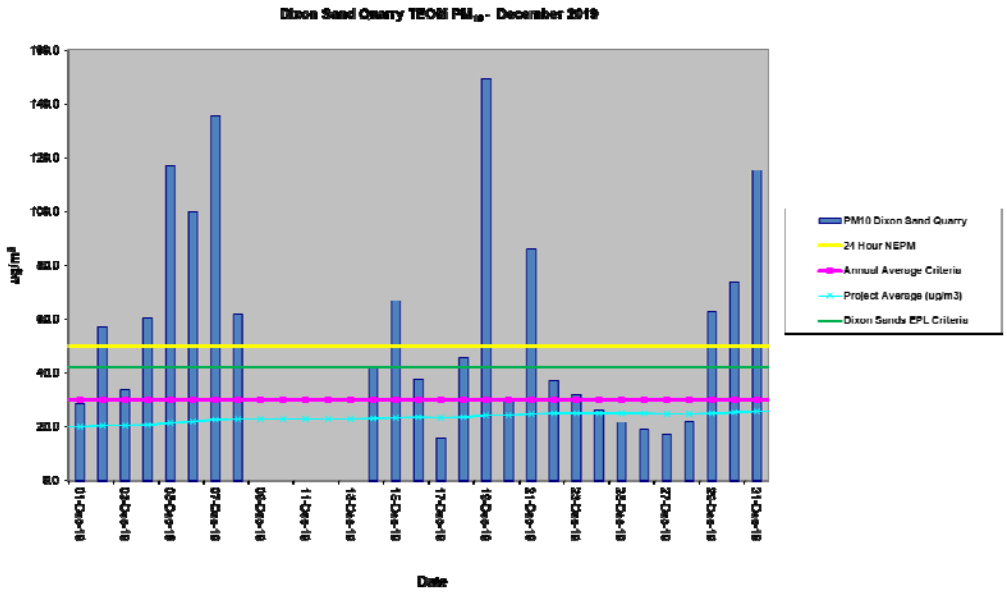


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

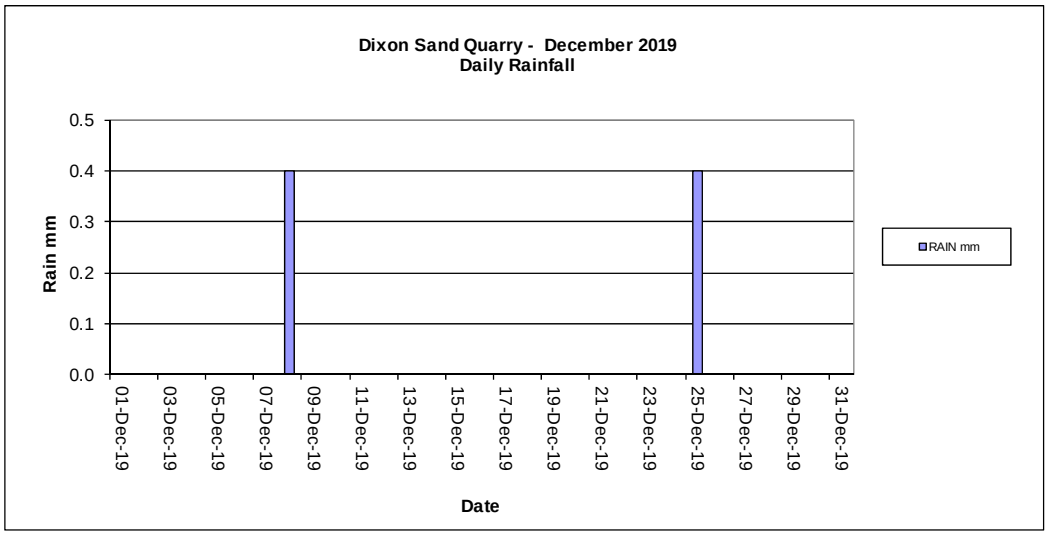
3.2 Meteorological Data

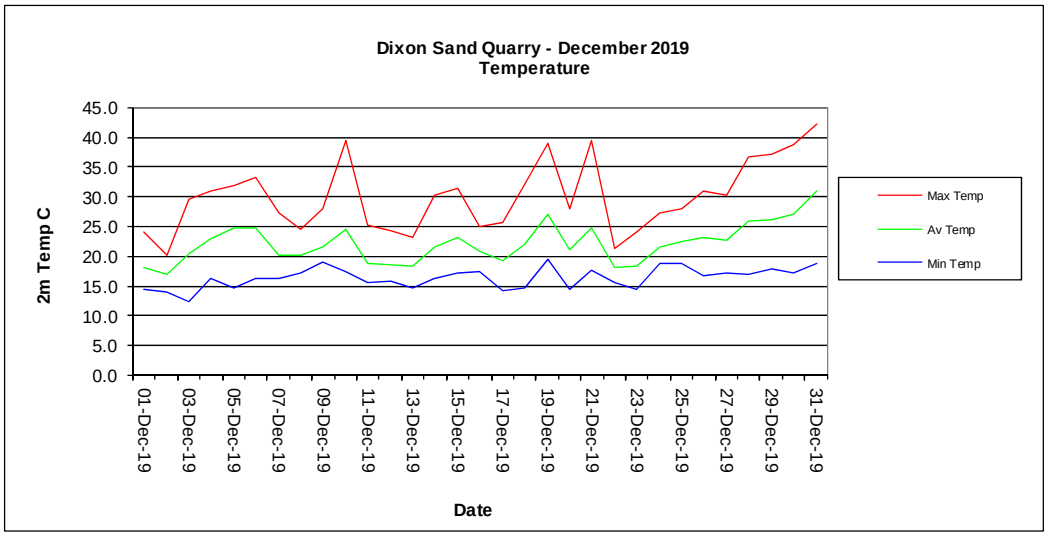
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

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.

Table 3: Meteorological Data Summary for December 2019

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/12/2019	14.5	18.2	24.0	0.0	0.1	4.4	21.5	35.2	74.6	99.2	975.2	981.6	988.2
2/12/2019	14.1	16.9	20.2	0.0	0.6	6.1	29.5	26.4	39.6	56.5	973.6	976.1	983.0
3/12/2019	12.5	20.5	29.5	0.0	0.4	4.5	24.2	14.1	28.8	50.5	981.3	983.6	987.3
4/12/2019	16.2	23.0	31.0	0.0	0.3	4.5	26.4	7.1	31.7	82.0	984.3	987.0	989.4
5/12/2019	14.7	24.8	32.0	0.0	0.0	3.9	25.7	9.1	30.7	91.4	983.0	986.6	989.4
6/12/2019	16.2	24.8	33.2	0.0	0.1	4.5	16.9	4.3	40.1	95.2	982.6	985.4	990.2
7/12/2019	16.2	20.3	27.4	0.0	0.2	4.5	22.3	23.1	68.4	100.0	987.9	990.8	995.8
8/12/2019	17.2	20.1	24.5	0.4	0.5	7.4	26.3	51.4	72.8	99.3	995.3	997.3	1000.3
9/12/2019	19.1	21.6	28.0	0.0	0.1	5.0	19.9	50.0	74.3	94.4	993.6	997.3	1000.5
10/12/2019	17.5	24.5	39.5	0.0	0.1	4.7	18.4	7.8	67.8	100.0	987.4	991.8	995.8
11/12/2019	15.7	18.8	25.3	0.0	0.1	4.9	21.3	47.8	69.0	83.5	989.9	993.4	995.8
12/12/2019	15.9	18.6	24.3	0.0	0.4	5.3	26.1	46.8	72.0	89.9	990.0	992.5	995.6
13/12/2019	14.7	18.4	23.2	0.0	0.2	5.0	28.0	51.3	74.7	100.0	989.6	992.7	995.5
14/12/2019	16.2	21.5	30.3	0.0	0.0	4.0	24.8	24.0	68.6	93.3	985.4	989.5	992.2
15/12/2019	17.3	23.2	31.5	0.0	0.1	4.4	16.7	25.6	69.3	100.0	983.4	987.5	991.7
16/12/2019	17.4	20.8	25.1	0.0	0.4	4.5	27.3	19.5	58.6	87.3	985.0	991.1	997.8
17/12/2019	14.2	19.2	25.6	0.0	0.1	5.3	26.3	38.2	63.7	87.7	996.4	998.0	1000.3
18/12/2019	14.8	21.9	32.2	0.0	0.2	5.4	21.1	21.1	58.8	91.6	993.3	996.7	1000.0
19/12/2019	19.4	27.1	39.1	0.0	0.1	4.5	16.4	10.2	36.9	75.7	989.9	993.2	998.4
20/12/2019	14.5	21.0	28.1	0.0	0.2	5.4	26.9	37.7	65.4	96.7	994.5	997.2	999.6
21/12/2019	17.6	24.9	39.4	0.0	0.3	5.1	22.6	21.2	66.0	100.0	986.2	992.2	996.8
22/12/2019	15.5	18.1	21.3	0.0	0.4	3.9	16.9	48.4	66.5	76.8	996.8	999.2	1001.6
23/12/2019	14.5	18.3	24.0	0.0	0.2	3.6	12.8	56.0	73.6	95.2	993.8	997.4	1001.2
24/12/2019	18.9	21.6	27.2	0.0	0.0	4.9	27.0	59.5	85.3	99.7	991.1	993.0	995.4
25/12/2019	18.8	22.4	28.0	0.4	0.2	5.9	24.4	41.5	71.9	99.3	993.0	994.9	996.7
26/12/2019	16.8	23.1	30.9	0.0	0.0	5.2	24.2	31.8	61.8	99.6	993.8	996.3	998.3
27/12/2019	17.2	22.7	30.2	0.0	0.0	5.2	27.0	28.8	64.5	96.6	994.7	997.3	999.3
28/12/2019	17.0	25.9	36.7	0.0	0.2	5.6	21.2	12.1	51.4	92.8	991.8	995.3	997.9
29/12/2019	18.0	26.1	37.1	0.0	0.2	3.6	13.9	21.8	50.8	84.0	991.5	993.7	995.8
30/12/2019	17.2	27.1	38.8	0.0	0.0	4.3	20.8	12.7	53.4	100.0	986.6	990.6	993.8
31/12/2019	18.8	31.0	42.3	0.0	0.3	7.1	26.2	5.0	29.8	73.0	982.8	986.8	993.0
Monthly	12.5	22.1	42.3	0.8	0.0	4.9	29.5	4.3	59.4	100.0	973.6	991.8	1001.6





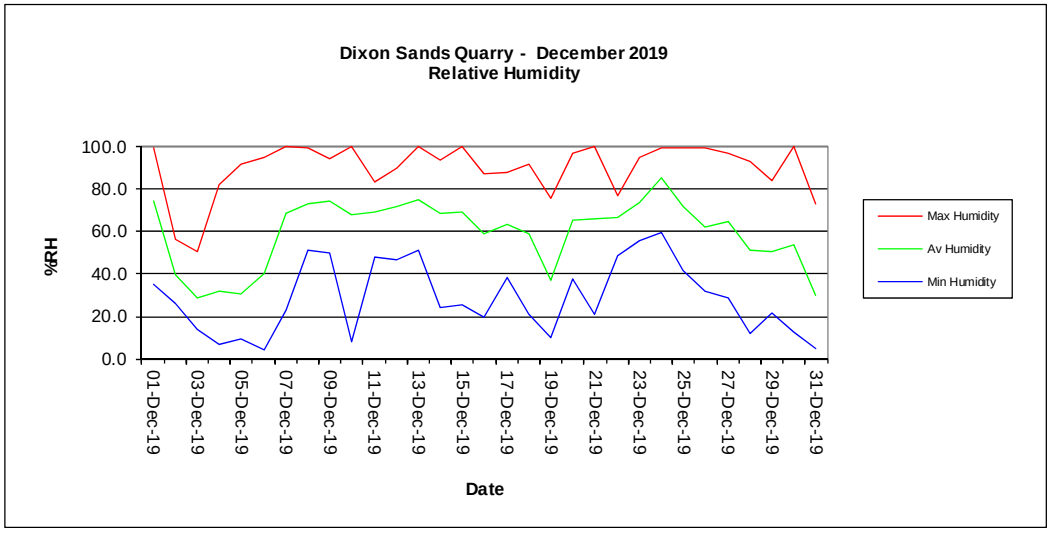


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*

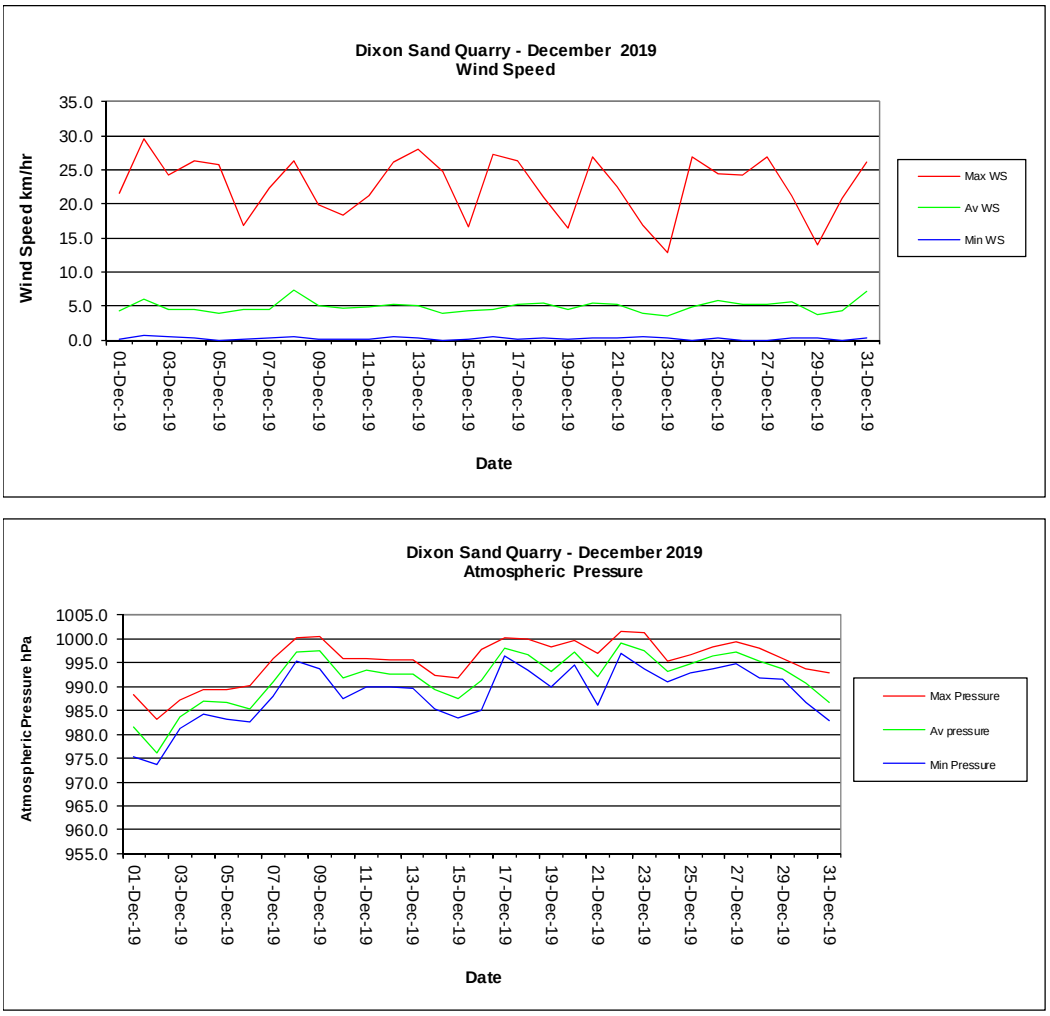


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

00:00 1 December 2019 – 23:55 31 December 2019

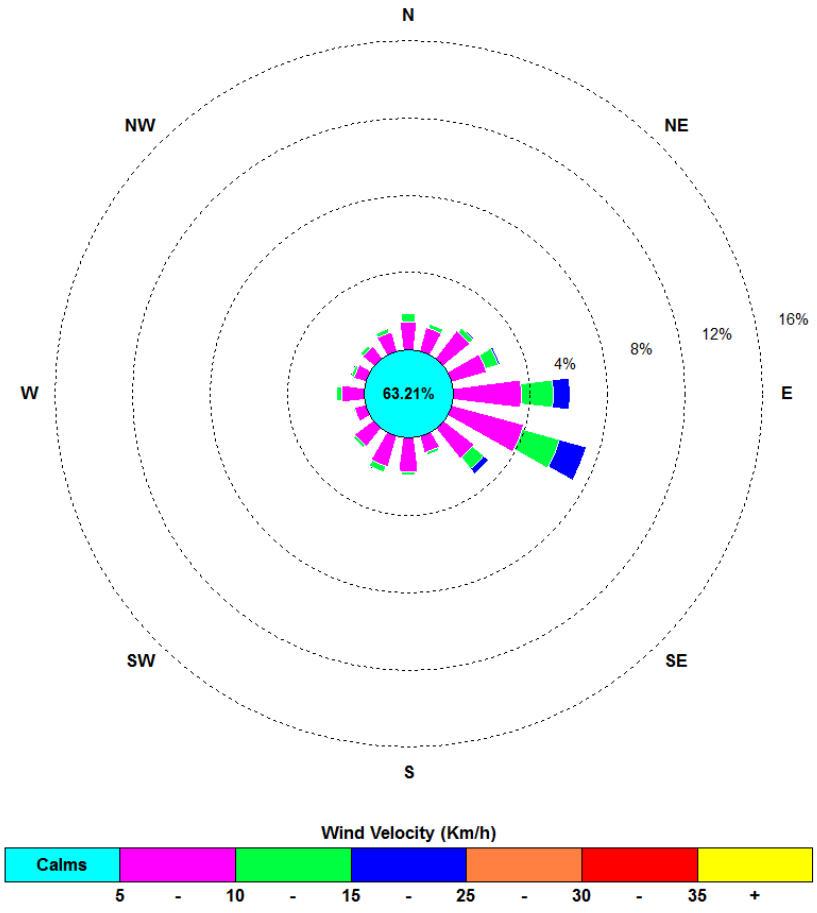


Figure 4: *Windrose Plot (km/h)*

Appendix 1

Calibration Documents (when required)

CARBON BASED ENVIRONMENTAL

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

teledata

TEOM Client/Site: Dixon Sandy TEOM **Date:** 13.12.19

1. TEOM Data Screen **SERIAL No:** **Firmware:** -

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	Red - fault	Green - Normal		✓
Date/time	TEOM: 13.12.19 17.01 Actual: 13.12.19 14.05	Current Date/time correct within 5 minutes	✓ EST	
PM-10 24hr av	1.7	Positive values	✓	
Filter loading PM10	106	<80 %		✓
Frequency PM-10	251.64028	200-300 Hz	✓	
Noise PM-10	0.028	<0.100ug	✓	

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

Comments: high filter load, low results

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	21" Hg	<0.50 atm 15" Hg	✓	
Warnings	Yes	No Warnings		✓
If any warnings list:				
N/A				

Comments:

Data Downloaded: YES/NO (circle)

Technician Name : COLIN DAVIES **Signed**

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	28.1	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	—	—
Ambient Pressure	0.970	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	—	—
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:

Fadj Main 1.005

Fadj Aux 1.000

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	0.26	2.82 – 3.18 lpm		✓
Bypass Flow rate	13.68	12.95 – 14.39 lpm	✓	
Total Flow rate	13.93	15.67 – 17.67 lpm		✓

Comments: low main flow

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: 13/11/19

Comments/Action Required:

Calibration/Maintenance

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

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	16	254.89335	254.89328	254.89329	254.89

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: low cool 4 → moved to low cool 5

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

Quarterly or Six Monthly Calibration Annual

1. Flow Verification – Conducted (YES)/NO

PM10 Flow verified Flow l/min 13.02 Error % 0.7 (allowed error <6%) (PASS)/FAIL

Bypass Flow verified Flow l/min 13.28 Error % 2.9 (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:**

Final
Fadj ~~ABX~~
1.0020 final
13.65 L/M

2. Leak Check – Conducted (YES)/NO

PM10 actual 0.14 < Limit 0.15

Bypass actual 0.53 < Limit 0.60

Slight leak in MC can't fix onsite.... OK for now

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: 24.8 C TEOM Temperature 26.5 C
if difference +/- 1 C recalibrate sensor. Sensor recalibrated YES/NO

Reference Pressure: 0.971 atm TEOM Pressure 0.970 0.978 atm
if difference +/- 0.010 atm recalibrate sensor. Sensor recalibrated YES/NO ✓ OK

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.

Pres
738.0 mmHg
0.971 atm

2. Flow Calibration – Conducted YES/NO
PM10
Set point 2.4 Actual: NA
Set point 3.6 Actual:
Set point 3.0 Actual: After calibration Final: 3.02 l/min

	Main	Bypass
Fadj int	1.05	1.000
Fadj final	1.05	1.020

BYPASS
Set point 10.9 Actual: NA.
Set point 16.4 Actual:
Set point 13.67 Actual: After calibration Final: 13.58 l/min

3. Mass calibration (K0) Verification – Conducted YES/NO filter 6354
Actual measured K0 = 13855 TEOM stated K0 13748 Error %: 1.0
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. NA.

4. Annual Noise check - Conducted YES/NO
Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: 13/12/19 9PM Finish date/time: 14/12/19 9AM
Standard deviation of all recorded data (min 30 min averages) = 2.8 ug/m³
Noise was less than 5ug/m³ YES/NO
30 min
OK

1 hr AV stdev = 2.6 µg/m³
Not much difference!
Averages = 30 min = −0.4 µg/m³
1 hr = −0.5 µg/m³

5. Maintenance
Air Inlet system cleaned YES/NO
Pump Reconditioned YES/NO Pump OK
Check Waterproofing YES/NO OK
Comments:
Slight leak found in mass transducer → can't fix onsite OK for now.
✓ OK

CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

January 2020

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 21 February 2020

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 (PM_{10}) 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 PM_{10} monitor; and
- One continuous Meteorological Station.

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

- TEOM (PM_{10}) monitoring results for January 2020; and
- Meteorological results for January 2020.

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/m^3 with the exception of 6 occurrences;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3 with the exception of 10 occurrences;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 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 January 2020.

Approximately 100% of TEOM data was recovered for January 2020, but only 87% of data was deemed valid due bushfire smoke causing bypass coalescing filter and TEOM mass transducer to block, plus excessive filter loading.

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—PM_{10} 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 PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ 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 PM_{10}

24-hour average TEOM PM_{10} 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, 13% of data was deemed invalid when a bypass coalescing filter and TEOM mass transducer became blocked plus excessive filter loading. CBased Environmental considers this to have been caused by bushfire smoke in the area during the monitoring period.

Valid data indicated there were 5 individual 24-hour TEOM PM_{10} results above the National Environment Protection Measure (NEPM) short-term (24-hour) impact criteria of 50ug/m^3 and 10 occurrences above the Dixon Sand Quarry EPL limit of 42ug/m^3, highlighted yellow in **Table 2**.

At present it is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in December 2019 and next calibration is scheduled for February 2020. The calibration certificate is provided in **Appendix 1**.

Table 2: Average Daily 24-hr TEOM PM_{10} and TSP Results for January 2020 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	TEOM PM_{10} (µg/m^3)	Annual PM_{10} Average (µg/m^3)	TSP* (µg/m3)	TSP Annual** (µg/m3)
1/01/2020	**44.1**	25.8	110.3	64.5
2/01/2020	31.2	25.9	78.0	64.6
3/01/2020	38.4	25.9	96.0	64.8
4/01/2020	**49.4**	26.1	123.5	65.2
5/01/2020	**71.9**	26.3	179.8	65.8
6/01/2020	35.1	26.4	87.8	65.9
7/01/2020	22.2	26.4	55.5	65.9
8/01/2020	**62.2**	26.6	155.5	66.4
9/01/2020	33.2	26.6	83.0	66.5
10/01/2020	31.6	26.6	79.0	66.6
11/01/2020	**50.6**	26.8	126.5	66.9
12/01/2020	**52.1**	26.9	130.3	67.2
13/01/2020	35.8	26.9	89.5	67.4
14/01/2020	20.4	26.9	51.0	67.3
15/01/2020	16.3	26.9	40.8	67.1
16/01/2020	21.5	26.8	53.8	67.1
17/01/2020	33.4	26.9	83.5	67.1
18/01/2020	24.6	26.8	61.5	67.1
19/01/2020	15.1	26.8	37.8	67.0
20/01/2020	15.8	26.7	39.5	66.8
21/01/2020	28.3	26.7	70.8	66.8
22/01/2020	32.0	26.8	80.1	66.9
23/01/2020	**151.8**	27.4	379.5	68.5
24/01/2020	**80.5**	27.7	201.3	69.2
25/01/2020	**49.5**	27.8	123.8	69.5
26/01/2020	25.2	27.8	62.9	69.5
27/01/2020	**45.4**	27.9	113.5	69.7
28/01/2020	Invalid Data	27.9	0.0	69.7
29/01/2020	Invalid Data	27.9	0.0	69.7
30/01/2020	Invalid Data	27.9	0.0	69.7
31/01/2020	Invalid Data	27.9	0.0	69.7

*Calculated from PM10

**Calculated from PM10 Annual Average

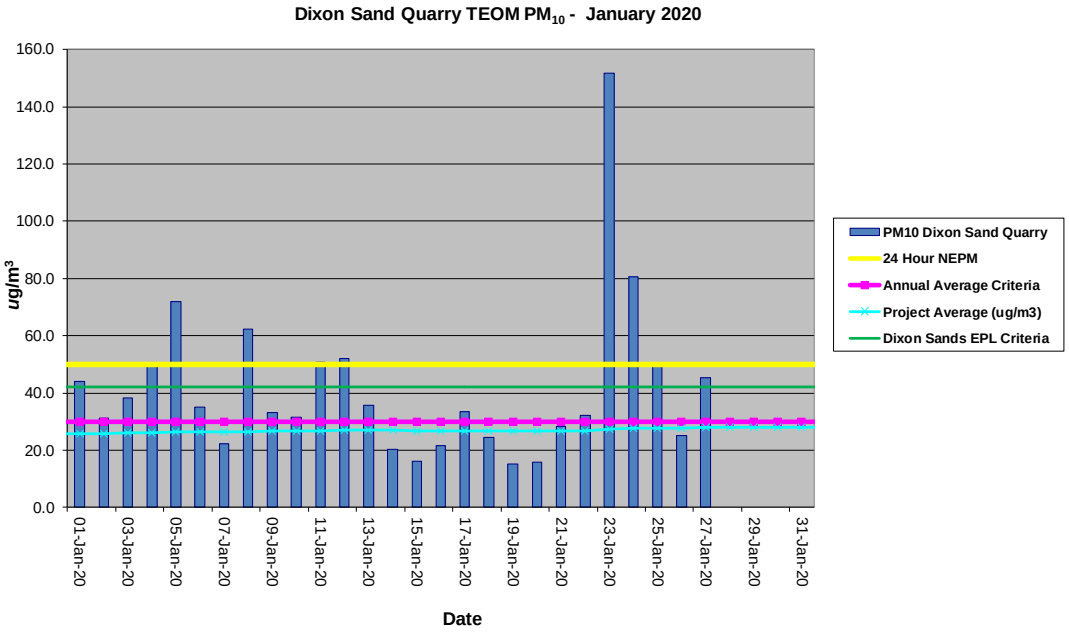


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

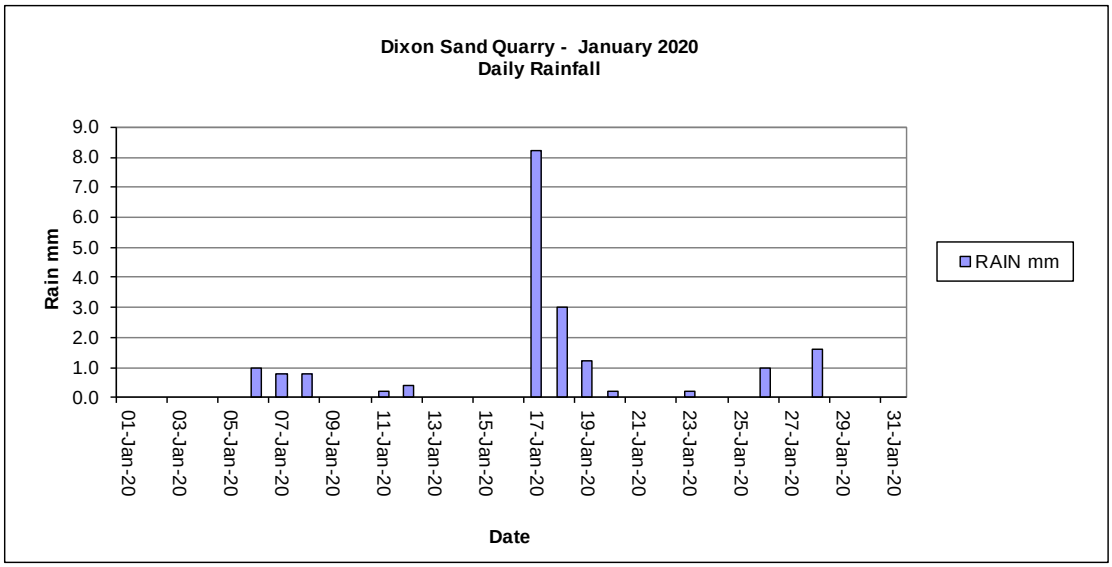
3.2 Meteorological Data

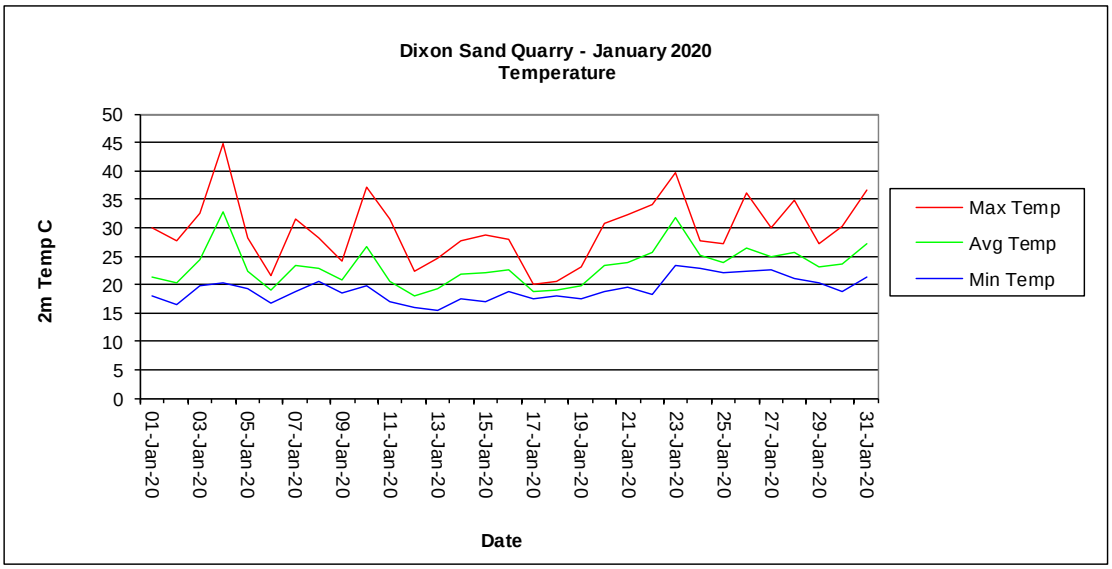
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

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.

Table 3: Meteorological Data Summary for January 2020

Date	Min Temp	Av Temp	Max Temp	RAIN mm	Min WS	Av WS	Max WS	Min Humidity	Av Humidity	Max Humidity	Min Pressure	Av pressure	Max Pressure
1/01/2020	17.9	21.3	30.1	0.0	0.5	5.9	30.5	38.3	66.6	89.5	990.1	992.8	997.2
2/01/2020	16.6	20.4	27.8	0.0	0.5	5.0	22.4	54.8	94.4	100.0	993.7	996.7	998.7
3/01/2020	19.7	24.4	32.6	0.0	0.3	5.5	27.0	42.9	72.3	100.0	988.8	993.3	997.5
4/01/2020	20.2	32.8	44.8	0.0	0.2	5.4	22.6	9.1	41.5	86.2	983.7	987.7	990.6
5/01/2020	19.2	22.5	28.2	0.0	0.2	4.7	26.7	35.2	51.0	64.8	990.6	996.5	1002.0
6/01/2020	16.7	19.0	21.5	1.0	0.1	3.2	14.2	61.2	80.1	100.0	995.5	998.2	1001.1
7/01/2020	18.7	23.4	31.6	0.8	0.2	4.9	17.8	50.4	81.3	100.0	988.3	992.7	997.8
8/01/2020	20.5	22.8	28.3	0.8	0.1	3.5	16.2	57.2	83.4	100.0	991.6	993.6	996.9
9/01/2020	18.5	20.9	24.2	0.0	0.2	3.0	15.0	66.0	83.4	100.0	994.2	995.6	997.2
10/01/2020	19.8	26.8	37.2	0.0	0.0	5.4	26.5	29.4	68.8	100.0	981.7	988.4	994.9
11/01/2020	16.9	20.7	31.5	0.2	0.1	4.0	16.3	42.2	71.0	97.4	981.4	990.5	995.7
12/01/2020	16.1	18.0	22.3	0.4	0.4	3.9	19.8	52.2	81.7	100.0	994.7	996.8	999.1
13/01/2020	15.5	19.2	24.7	0.0	0.2	5.3	24.7	49.5	80.2	100.0	994.7	997.2	998.9
14/01/2020	17.4	21.8	27.8	0.0	0.0	5.4	29.1	50.6	76.1	100.0	993.0	995.3	997.0
15/01/2020	17.1	22.2	28.7	0.0	0.0	4.4	24.3	46.0	79.5	100.0	987.4	991.1	995.1
16/01/2020	18.7	22.7	28.0	0.0	0.0	4.0	16.5	42.6	80.7	100.0	983.5	986.5	988.3
17/01/2020	17.5	18.8	20.0	8.2	0.4	4.7	19.5	81.8	96.5	100.0	985.8	987.9	989.8
18/01/2020	18.0	19.2	20.7	3.0	0.1	3.5	13.9	86.3	97.4	100.0	987.2	988.4	989.7
19/01/2020	17.4	19.7	23.1	1.2	0.1	2.2	9.9	78.5	95.3	100.0	983.8	986.4	988.8
20/01/2020	18.9	23.4	30.7	0.2	0.1	5.0	22.2	53.7	79.9	100.0	977.2	981.7	985.1
21/01/2020	19.6	23.9	32.2	0.0	0.0	5.2	23.2	22.3	56.1	89.3	983.4	986.0	990.5
22/01/2020	18.3	25.6	34.2	0.0	0.0	4.8	22.4	21.7	59.7	93.5	983.6	987.7	991.0
23/01/2020	23.3	31.7	39.7	0.2	0.3	8.1	33.5	14.9	35.0	72.0	977.9	981.9	985.6
24/01/2020	22.9	25.1	27.8	0.0	0.3	6.3	24.6	54.3	67.4	85.4	982.5	987.8	992.7
25/01/2020	22.1	24.0	27.2	0.0	0.1	5.5	19.6	66.4	84.7	99.5	990.0	992.2	994.2
26/01/2020	22.4	26.6	36.1	1.0	0.1	3.9	17.9	34.6	75.9	100.0	987.5	990.2	992.1
27/01/2020	22.5	24.9	30.1	0.0	0.2	5.2	26.4	60.6	80.8	92.2	989.5	991.9	994.0
28/01/2020	21.2	25.6	34.9	1.6	0.1	3.6	17.4	46.4	81.8	100.0	987.0	990.7	993.7
29/01/2020	20.4	23.0	27.3	0.0	0.9	5.5	21.3	61.6	83.3	100.0	993.2	994.9	997.2
30/01/2020	18.9	23.5	30.2	0.0	0.0	4.6	21.6	49.4	79.6	100.0	991.8	995.0	997.3
31/01/2020	21.3	27.3	36.7	0.0	0.1	5.0	30.2	38.2	75.1	100.0	989.3	992.4	995.4
Monthly	15.5	23.3	44.8	18.6	0.0	4.7	33.5	9.1	75.5	100.0	977.2	991.2	1002.0





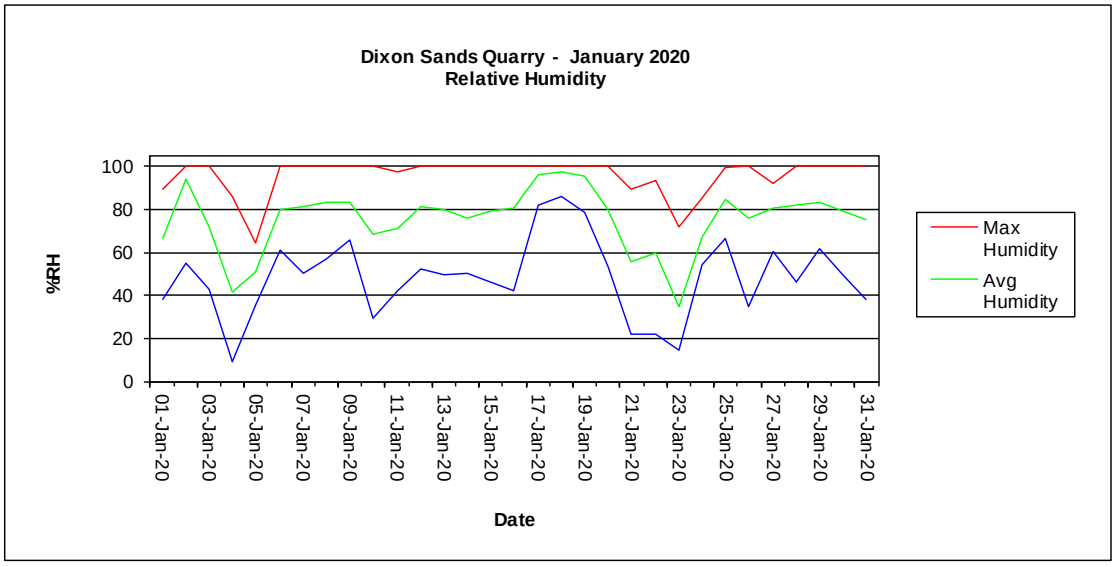
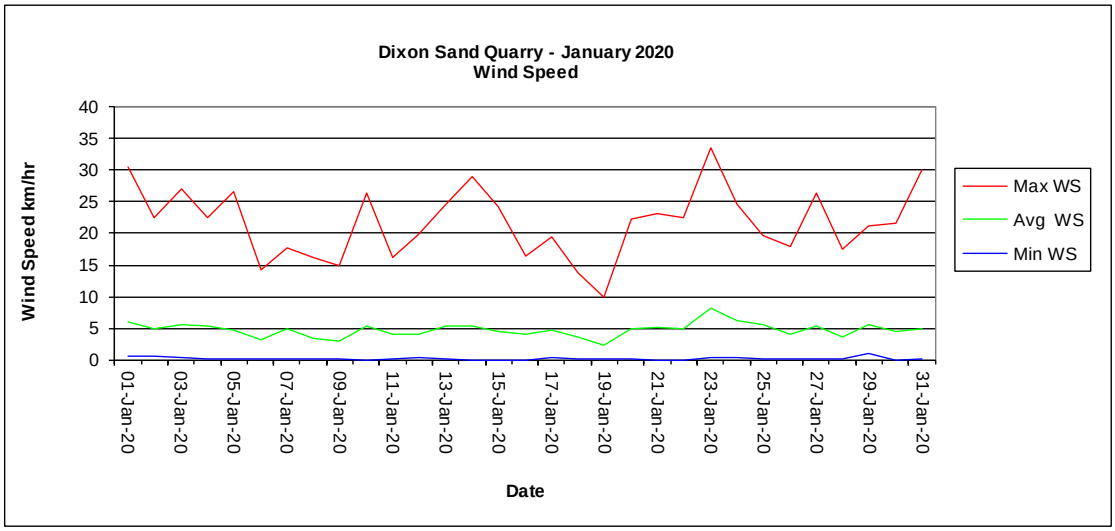


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*



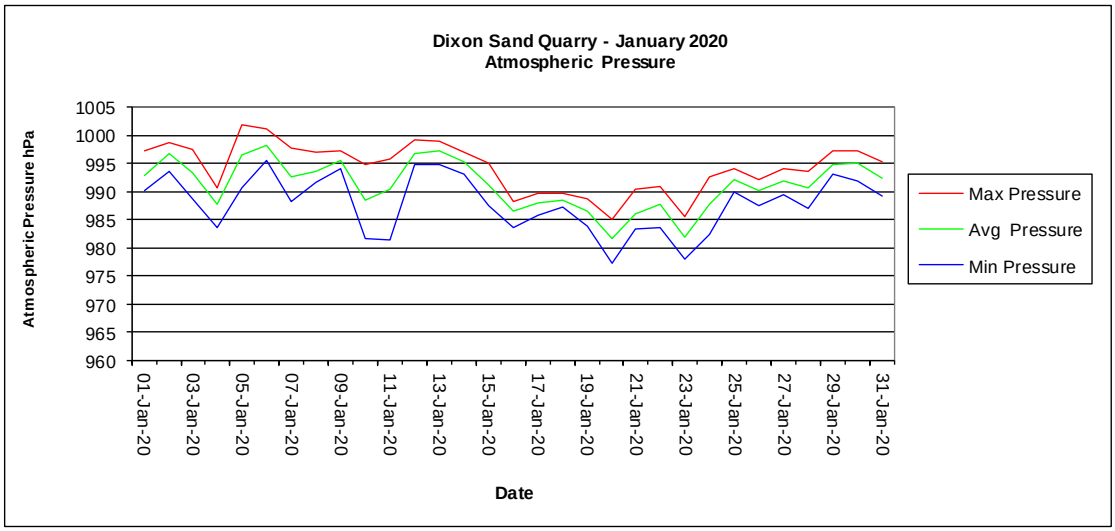


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

00:00 1 January 2020 – 23:55 31 January 2020

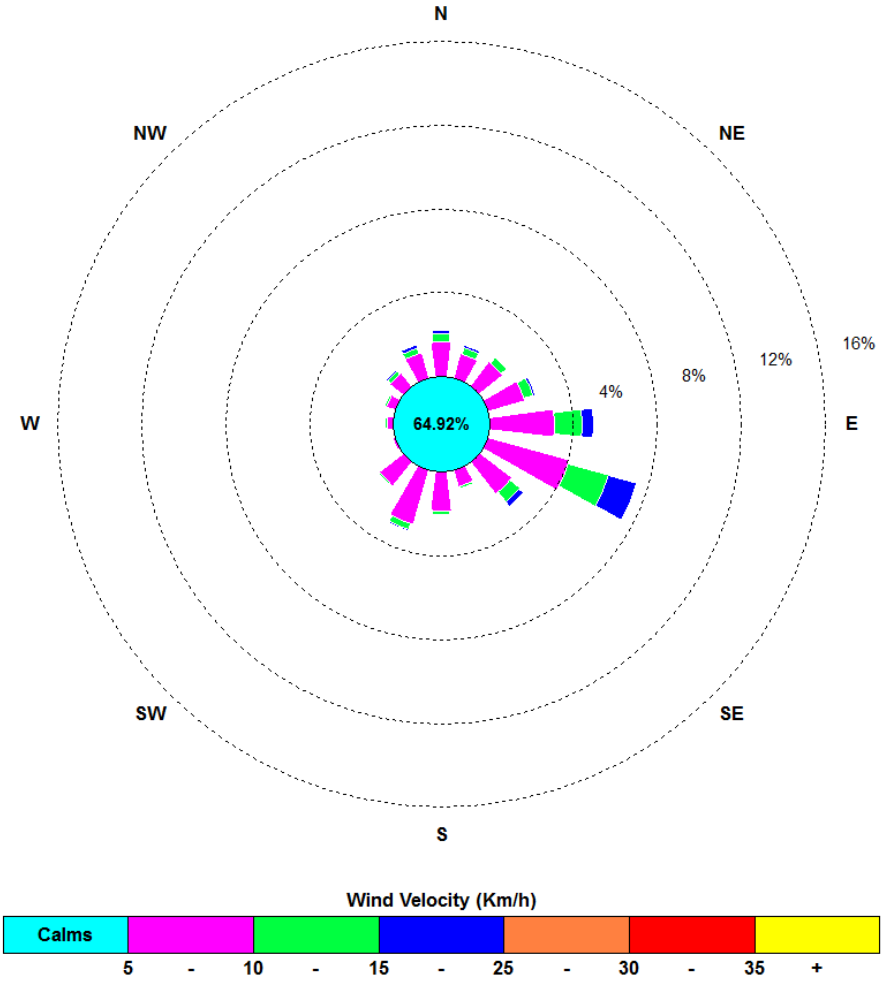


Figure 4: *Windrose Plot (km/h)*

CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

February 2020

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 27 March 2020

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 (PM_{10}) 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 PM_{10} monitor; and
- One continuous Meteorological Station.

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

- TEOM (PM_{10}) monitoring results for February 2020; and
- Meteorological results for February 2020.

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/m^3 with the exception of 6 occurrences;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3 with the exception of 10 occurrences;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 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 2020.

Approximately 100% of TEOM data was recovered for February 2020, but only 84% of data was deemed valid due bushfire smoke causing bypass coalescing filter and TEOM mass transducer to block, plus excessive filter loading.

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—PM_{10} 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 PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ 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 PM_{10}

24-hour average TEOM PM_{10} 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, 16% of data was deemed invalid when a bypass coalescing filter and TEOM mass transducer became blocked plus excessive filter loading. CBased Environmental considers this to have been caused by bushfire smoke in the area during the monitoring period.

At present, the current TEOM PM_{10} annual average is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken on 5 February 2020 and the next calibration is scheduled for May 2020. The calibration certificate is provided in **Appendix 1**.

Table 2: Average Daily 24-hr TEOM PM_{10} and TSP Results for February 2020 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	TEOM PM_{10} ($\mu g/m^3$)	Annual PM_{10} Average ($\mu g/m^3$)	TSP* ($\mu g/m3$)	TSP Annual** ($\mu g/m3$)
1/02/2020	Invalid data	27.9		69.7
2/02/2020	Invalid data	27.9		69.7
3/02/2020	Invalid data	27.9		69.7
4/02/2020	Invalid data	27.9		69.7
5/02/2020	Invalid data	27.9		69.7
6/02/2020	7.7	27.8	19.3	69.4
7/02/2020	3.7	27.7	9.3	69.1
8/02/2020	8.5	27.6	21.3	68.9
9/02/2020	5.0	27.4	12.5	68.6
10/02/2020	8.2	27.4	20.5	68.4
11/02/2020	13.8	27.3	34.5	68.2
12/02/2020	10.9	27.2	27.3	68.0
13/02/2020	11.6	27.1	29.0	67.8
14/02/2020	15.0	27.1	37.5	67.7
15/02/2020	17.1	27.0	42.8	67.5
16/02/2020	14.2	27.0	35.5	67.4
17/02/2020	15.7	26.9	39.3	67.3
18/02/2020	13.6	26.8	34.0	67.1
19/02/2020	31.7	26.9	79.3	67.1
20/02/2020	15.3	26.8	38.3	67.0
21/02/2020	18.5	26.8	46.3	66.9
22/02/2020	10.7	26.7	26.8	66.7
23/02/2020	13.6	26.6	34.0	66.6
24/02/2020	14.0	26.6	35.0	66.4
25/02/2020	16.5	26.5	41.3	66.3
26/02/2020	13.4	26.5	33.5	66.2
27/02/2020	32.7	26.5	81.8	66.2
28/02/2020	18.6	26.5	46.5	66.1
29/02/2020	18.0	26.4	45.0	66.0

*Calculated from PM10

**Calculated from PM10 Annual Average

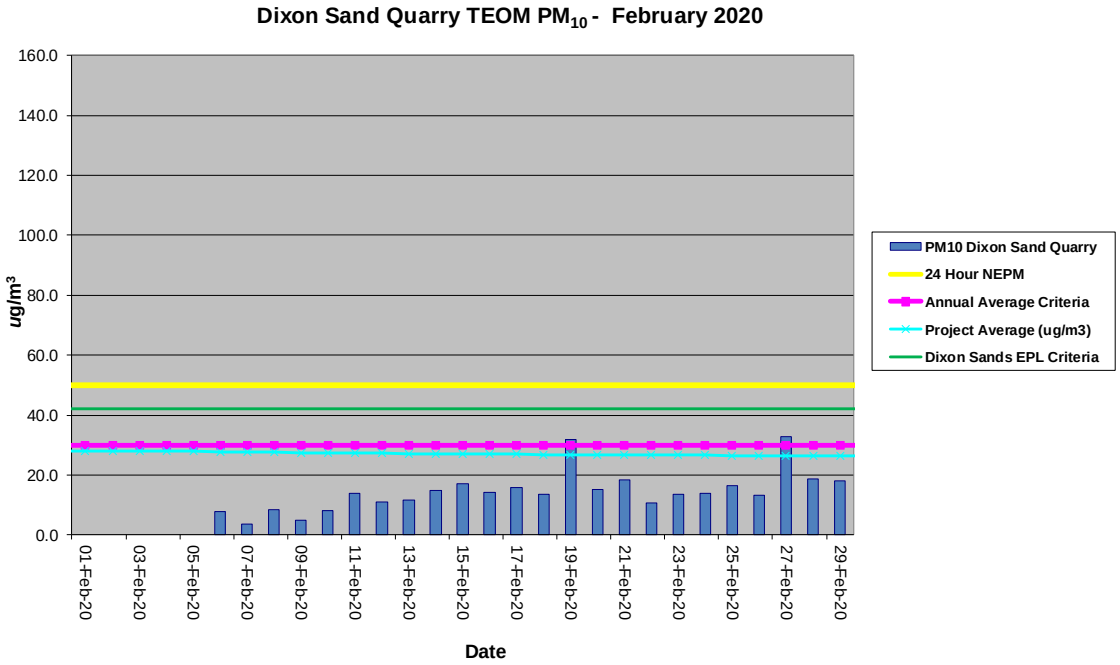


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

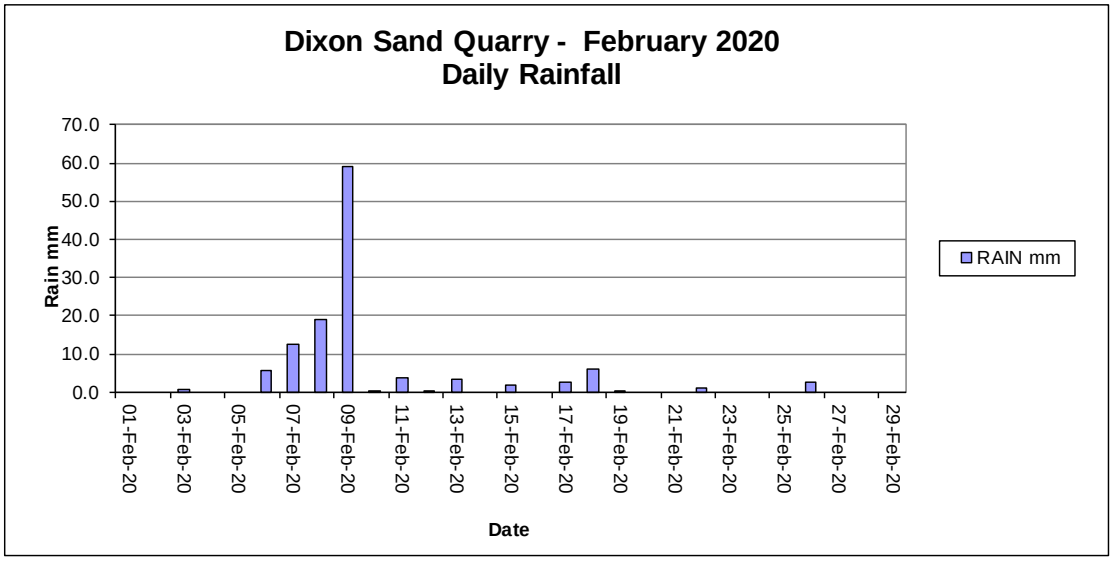
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

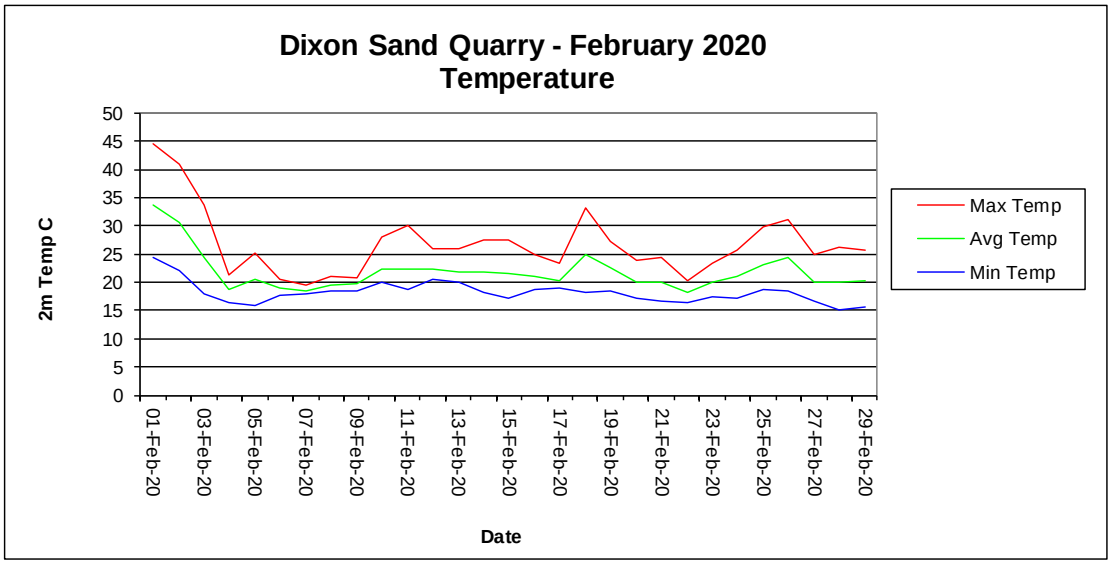
A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

An annual physical screening and system check of the meteorological station was conducted on 5 February 2020 and is next due in February 2021. The screening and system check certificates are provided in **Appendix 1**.

Table 3: Meteorological Data Summary for February 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
1/02/2020	24.3	33.6	44.6	0.0	0.7	6.1	24.8	15.6	47.7	84.7	985.1	988.2	991.1
2/02/2020	22.0	30.6	40.8	0.0	0.1	5.5	40.4	23.6	57.0	100.0	982.2	985.4	989.2
3/02/2020	17.9	24.4	33.6	0.8	0.3	3.9	17.2	16.8	75.9	100.0	982.3	986.1	995.1
4/02/2020	16.5	18.6	21.3	0.0	0.3	5.5	29.9	48.0	57.5	74.0	995.1	998.3	1000.9
5/02/2020	16.0	20.4	25.3	0.0	0.1	5.1	22.2	50.6	65.2	80.7	996.2	998.3	1000.3
6/02/2020	17.8	18.9	20.5	5.8	0.2	4.3	18.3	69.8	93.7	100.0	997.8	999.7	1001.1
7/02/2020	18.0	18.6	19.4	12.4	0.3	6.5	30.2	99.2	100.0	100.0	996.6	998.0	999.6
8/02/2020	18.5	19.6	21.0	19.2	0.3	10.5	31.5	89.3	99.3	100.0	994.7	996.1	997.4
9/02/2020	18.5	19.8	20.8	59.0	0.0	12.1	40.4	99.5	100.0	100.0	984.5	989.4	995.2
10/02/2020	19.9	22.2	28.1	0.4	0.0	4.1	18.5	61.0	93.2	100.0	985.8	987.6	989.4
11/02/2020	18.6	22.3	30.0	3.8	0.0	3.6	17.8	86.8	99.9	100.0	985.5	987.6	989.1
12/02/2020	20.5	22.3	26.0	0.2	0.1	3.8	18.2	80.3	97.8	100.0	986.7	988.6	990.9
13/02/2020	19.9	21.8	25.9	3.2	0.0	4.5	19.4	87.5	99.3	100.0	989.1	990.1	991.6
14/02/2020	18.3	21.8	27.4	0.0	0.2	3.0	15.6	44.3	79.4	100.0	984.4	987.6	990.8
15/02/2020	17.1	21.5	27.4	2.0	0.1	3.6	18.2	56.7	82.9	100.0	983.9	986.1	990.5
16/02/2020	18.6	21.0	24.8	0.0	0.0	3.3	13.1	61.4	88.3	100.0	990.3	992.9	995.0
17/02/2020	19.0	20.3	23.3	2.6	0.2	2.2	8.5	84.7	98.5	100.0	990.2	992.7	994.8
18/02/2020	18.1	25.0	33.1	6.0	0.0	4.3	18.4	43.0	77.0	100.0	981.1	986.5	990.9
19/02/2020	18.5	22.6	27.3	0.2	0.4	4.2	20.5	32.0	56.2	100.0	981.5	983.4	986.9
20/02/2020	17.1	19.9	23.8	0.0	0.1	4.5	22.0	47.5	61.0	75.9	986.2	989.5	994.0
21/02/2020	16.6	20.1	24.3	0.0	0.0	4.2	27.7	62.7	79.4	99.3	992.9	995.2	999.3
22/02/2020	16.5	18.3	20.2	1.0	0.0	3.5	12.2	84.0	97.4	100.0	999.3	1001.7	1003.6
23/02/2020	17.5	20.1	23.5	0.0	0.0	2.6	12.3	59.8	82.8	100.0	1000.4	1002.3	1003.9
24/02/2020	17.3	21.0	25.8	0.0	0.1	2.5	13.3	55.4	83.0	100.0	997.3	999.2	1001.4
25/02/2020	18.8	23.2	29.9	0.0	0.1	4.0	18.9	34.9	76.7	100.0	990.2	993.9	998.1
26/02/2020	18.4	24.3	31.1	2.6	0.2	4.9	18.9	40.6	68.9	99.4	982.8	986.5	990.2
27/02/2020	16.7	20.1	25.0	0.0	0.2	3.7	15.3	58.1	76.6	91.6	985.0	988.7	991.1
28/02/2020	15.1	19.9	26.3	0.0	0.0	3.8	21.2	21.5	68.7	100.0	986.5	990.6	996.3
29/02/2020	15.6	20.2	25.7	0.0	0.1	3.9	22.6	51.3	75.7	95.8	992.2	994.8	996.9
Monthly	15.1	21.8	44.6	119.2	0.0	4.6	40.4	15.6	80.7	100.0	981.1	991.9	1003.9





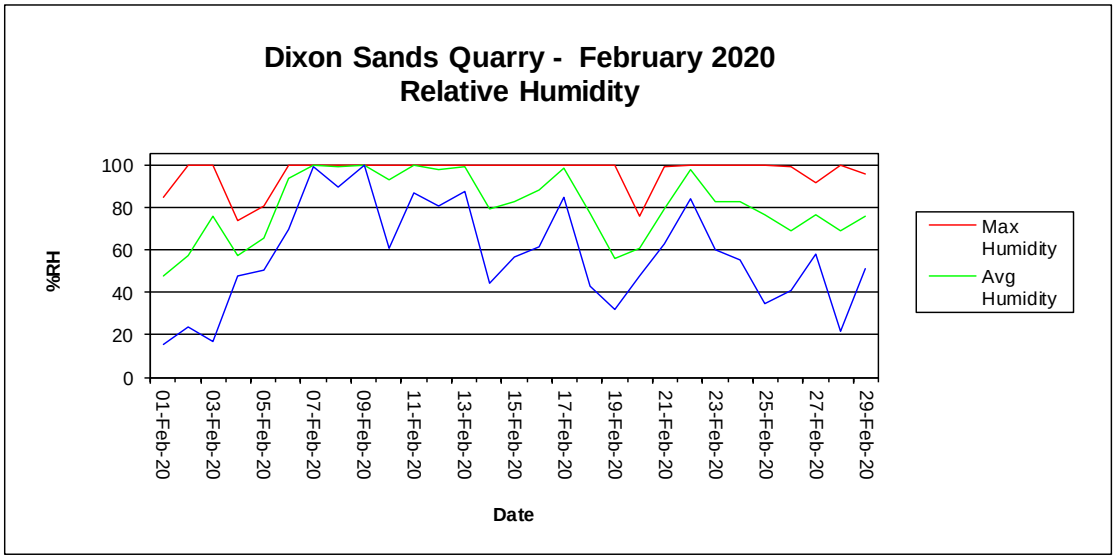
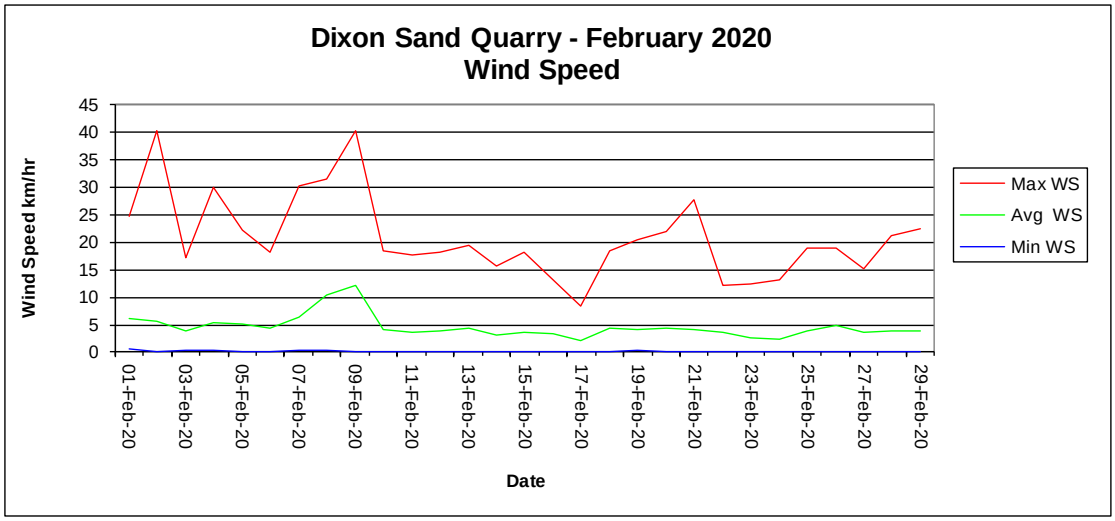


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*



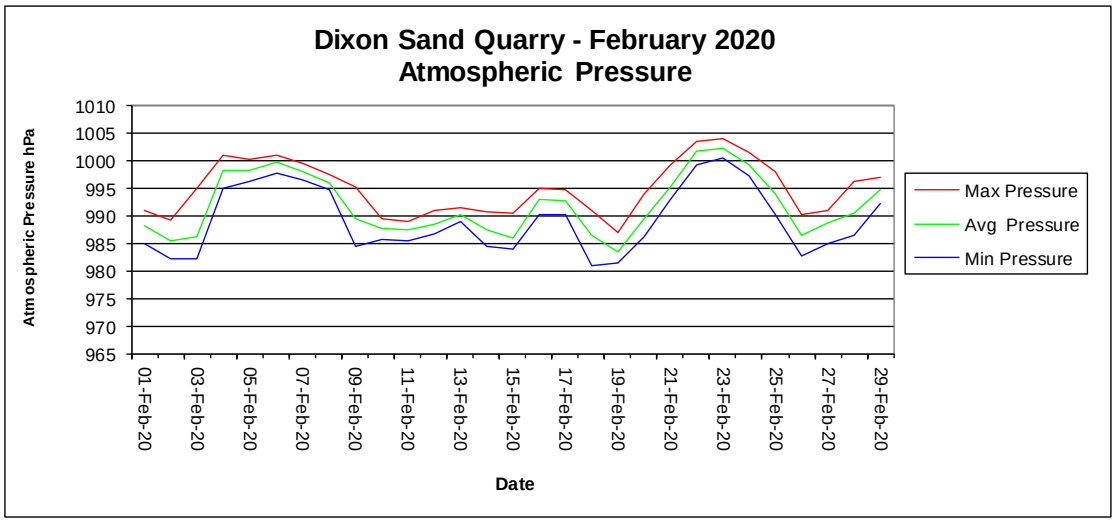


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

00:00 1 February 2020 – 23:55 29 February 2020

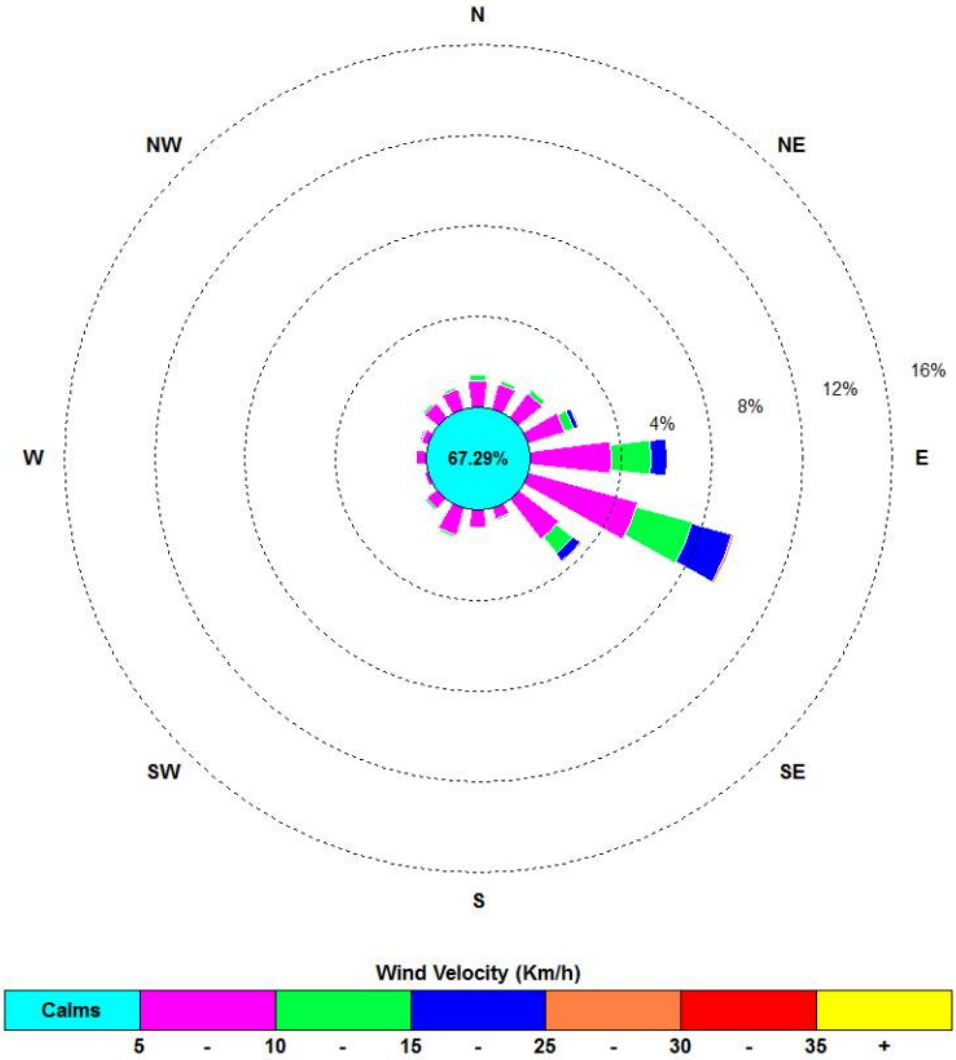


Figure 4: *Windrose Plot (km/h)*

Appendix 1

Calibration Documents (when required)

CARBON BASED ENVIRONMENTAL

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

teledata

TEOM Client/Site: Dixon Sodi / Maroota **Date:** 5/2/20

1. TEOM Data Screen **SERIAL No:** _____ **Firmware:** N/A

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	ALARM Red	Green - Normal		✓
Date/time	TEOM: 5/2/20 12:30 Actual: 5/2/20 12:31	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	0	Positive values		✓
Filter loading PM10	119	<80 %		✓
Frequency PM-10	246.25683	200-300 Hz		
Noise PM-10	0	<0.100ug		

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

Comments: Filter load high / flows low → suspect data. Blocked coalescing filter + mass transducer filter → replaced and flows OK reset + then fully operational

2. System Status

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Vacuum pump pressure	0-36	<0.50 atm	✓	
Warnings	ALARMS	No Warnings		✓
If any warnings list:				

Comments:

Data Downloaded: YES / NO (circle)

Technician Name : COLIN DAVIES **Signed** _____

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	24.0	-10 to 50 C	✓	
Ambient Dew Point	13.2	-10 to 50 C	✓	
Ambient Pressure	0.998	0.9-1.1 atm	✓	
Ambient Relative Humidity	N/A.	10-100 %RH	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: OK.

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	2.72	12.95 – 14.39 lpm	~~✓~~	✓
Total Flow rate	5.73	15.67 – 17.67 lpm		✓

Comments:

FLOWS FAILED

Fadj main = 1.050
Fadj bypass = 1.020

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: 5/2/20

Comments/Action Required:

After filter change + clean TEOM real operational checked data 9:00 PM all OK only

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	19	253.37081	253.37064	253.37064	253.37044

✓ OK

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

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

5. Were TEOM in line and rear TEOM filters checked for cleanliness and replaced if necessary. YES/NO.
Comments if changed: Bypass coalescing + mass transducer blocked → flow recovered after changing the filter

6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: OK ✓

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

Quarterly or Six Monthly Calibration After filter change

1. Flow Verification – Conducted YES/NO

PM10 Flow verified Flow l/min 300 Error % 0 (allowed error <6%) PASS/FAIL

Bypass Flow verified Flow l/min 13.68 Error % 0 (allowed error <6%) PASS/FAIL
If fail then complete a full multipoint recalibration and review previous data from last good flow check. **Comments if Flows recalibrated:**

2. Leak Check – Conducted YES/NO

PM10 actual 0.13 < Limit 0.15

Bypass actual 0.31 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.
Comments: slight leak ok ✓

Annual Calibration/Maintenance

1. Temperature and Pressure Calibration – Conducted YES/NO
Reference Temperature: _____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: 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.

MA

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 K0_____ Error %:_____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % =_____ PASS/FAIL. Comments:
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO
Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____Finish date/time:_____
Standard deviation of all recorded data (min 30 min averages) = _____ug/m^3
Noise was less than 5ug/m^3 YES/NO

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

CBased Environmental Pty Limited
ABN 62 611 924 264

Weather Station Field Check

Site: Dixon Sands

Date/Time: 5/02/2020 12:30 -13:45

Measured Against Certified Sensors

Parameter	Units	Measured	Reference	Difference	Pass/Fail	Reference Description
Temperature 10m	°C	23.1	23.3	-0.2	Pass	Ref Thermometer
Humidity	%RH	54	52	2.0	Pass	Ref RH sensor
Rainfall	mm	3.0	3.2	-0.2	Pass	Glass Pipette
Wind Speed	km/hr	6.1	6.5	-0.4	Pass	Ref Anemometer
Wind Direction	Degrees	116	118	-2.0	Pass	Sighting compass

Reference Instruments Specifications: NA=Not Applicable

Sensor	Serial Number	Specifications	Accuracy
*Temperature	190320N01	-10 to 5°C	+/- 0.3°C
		5 to 15°C	+/- 0.3°C
		15 to 35°C	+/- 0.3°C
*Humidity	190320N01	10 to 90%RH	+/- 2%RH
*Anemometer	190320N03	0 to 64km/hr	+/- 3.2km/hr
*Barometer	BE190318031	680 - 1016hPa	+/- 1hPa
**Rainfall	Standard number of tips	3.2mm	+/- 0.2mm
Compass	Sighting Compass	0 to 360 degrees	+/- 5 Deg

*Calibration expires: 20/03/2020
** standard tips

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. 3.0mm of rain should be deleted from site records on the 5/2/2020.

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-21

Checked by: Colin Davies 5/02/2020

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

CBased Environmental Pty Limited
ABN 62 611 924 264

Weather Station Field Check
Annual Physical Screening

Site: **Dixon Sands Met Station**
Date: 5/02/2020 Time: 12:30-13:45

Check	Comments
Visual inspection for damage	No issues found
Water or insect damage to equipment	No issues found
Anemometer and wind vane	Operating normally, no damage
Temperature and Humidity shields	No issues found
Rain gauge	No issues found
Battery and Solar panel condition	No issues found
Battery Storage level	No issues found
Logger system	Operating normally
Time and Date	Correct +/- 5 minute EST, date correct
Mast and guy wires	No issues found
Cabinet and wiring	No issues found

No issues found

The weather station has **PASSED** the field check. Next field check due/type:		Feb-20
Describe any remedial action required:	Nil	Col Davies
Checked by:	Colin Davies	

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

CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

March 2020

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 29 April 2020

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 (PM_{10}) 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 PM_{10} monitor; and
- One continuous Meteorological Station.

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

- TEOM (PM_{10}) monitoring results for March 2020; and
- Meteorological results for March 2020.

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/m^3;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 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 2020.

Approximately 100% of TEOM data was recovered for March 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—PM_{10} 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 PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ 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 PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

At present the current TEOM PM_{10} annual average is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has not yet been collected.

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

Table 2: Average Daily 24-hr TEOM PM_{10} and TSP Results for March 2020 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	TEOM PM_{10} (µg/m^3)	Annual PM_{10} Average (µg/m^3)	TSP* (µg/m3)	TSP Annual** (µg/m3)
1/03/2020	17.3	26.4	43.3	65.9
2/03/2020	32.7	26.4	81.8	66.0
3/03/2020	24.2	26.4	60.5	66.0
4/03/2020	13.7	26.3	34.3	65.8
5/03/2020	12.9	26.3	32.3	65.7
6/03/2020	10.9	26.2	27.3	65.5
7/03/2020	13.0	26.1	32.5	65.4
8/03/2020	8.8	26.1	22.0	65.2
9/03/2020	10.5	26.0	26.3	65.0
10/03/2020	8.5	25.9	21.3	64.8
11/03/2020	8.7	25.9	21.8	64.6
12/03/2020	8.3	25.8	20.8	64.4
13/03/2020	12.1	25.7	30.3	64.3
14/03/2020	11.1	25.7	27.8	64.1
15/03/2020	11.2	25.6	28.0	64.0
16/03/2020	7.6	25.5	19.0	63.8
17/03/2020	9.8	25.5	24.5	63.6
18/03/2020	10.5	25.4	26.3	63.5
19/03/2020	16.8	25.4	42.0	63.4
20/03/2020	21.8	25.3	54.5	63.3
21/03/2020	24.4	25.3	61.0	63.3
22/03/2020	18.9	25.3	47.3	63.3
23/03/2020	16.2	25.3	40.5	63.2
24/03/2020	16.9	25.2	42.3	63.1
25/03/2020	15.2	25.2	37.9	63.0
26/03/2020	10.3	25.1	25.8	62.8
27/03/2020	12.8	25.1	32.0	62.7
28/03/2020	14.8	25.0	37.0	62.6
29/03/2020	6.1	25.0	15.1	62.4
30/03/2020	7.3	24.9	18.3	62.2
31/03/2020	12.4	24.8	31.0	62.1

*Calculated from PM10

**Calculated from PM10 Annual Average

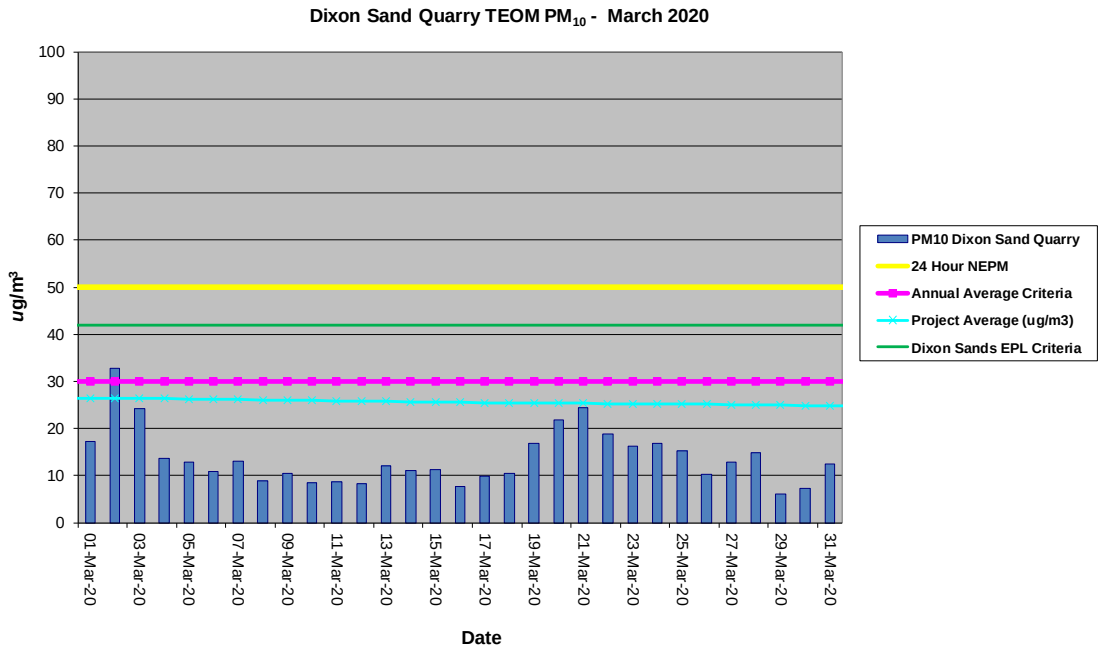


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

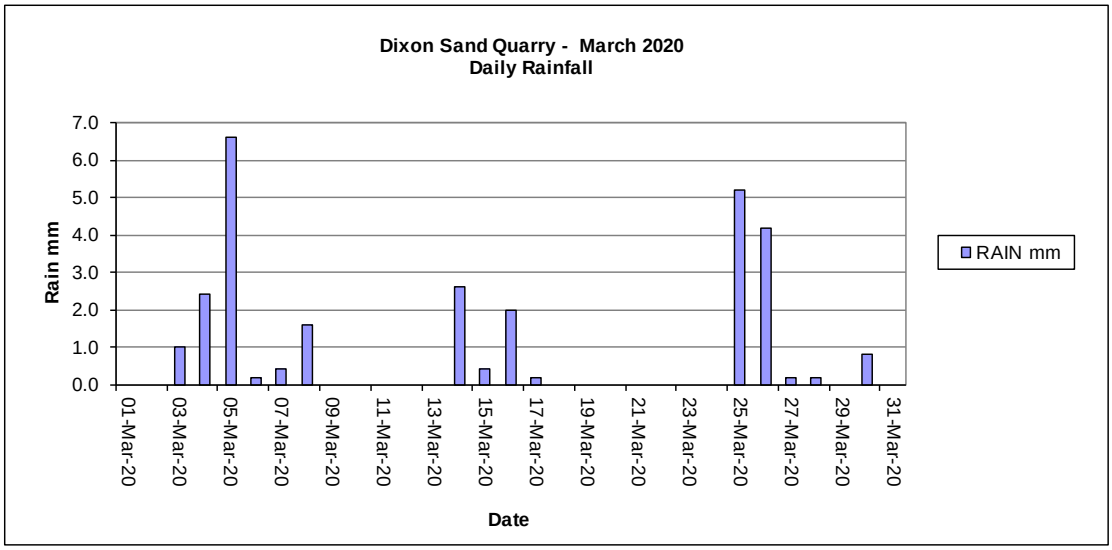
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

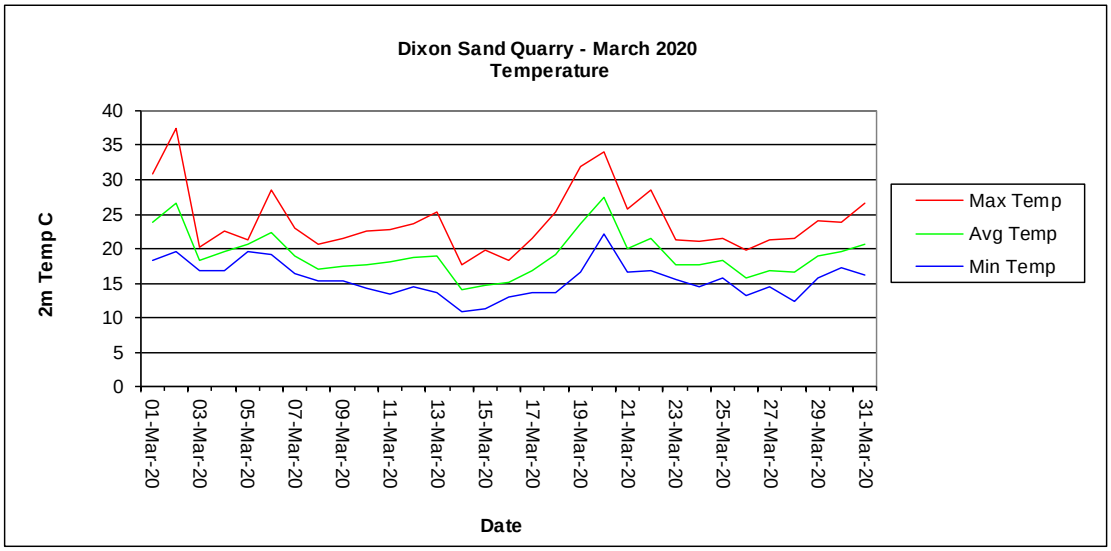
A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

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 March 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
1/03/2020	18.4	23.9	30.9	0.0	0.2	4.4	17.7	37.7	73.5	99.9	987.3	991.0	993.8
2/03/2020	19.6	26.6	37.5	0.0	0.3	4.9	21.7	10.1	46.1	78.6	986.9	989.7	995.9
3/03/2020	16.8	18.4	20.2	1.0	0.0	3.1	8.9	73.3	86.9	100.0	995.7	998.0	1000.3
4/03/2020	16.9	19.6	22.5	2.4	0.1	3.7	16.7	73.2	91.6	100.0	994.2	996.7	999.3
5/03/2020	19.5	20.5	21.2	6.6	0.2	3.2	12.4	87.2	97.4	100.0	985.3	989.2	994.8
6/03/2020	19.2	22.3	28.4	0.2	0.2	3.6	16.1	59.9	86.5	100.0	984.4	988.3	995.1
7/03/2020	16.5	18.9	23.0	0.4	0.1	3.6	11.9	62.4	84.6	99.7	994.8	997.8	1000.6
8/03/2020	15.4	17.1	20.6	1.6	0.0	3.1	12.8	72.0	94.6	100.0	997.5	999.0	1000.6
9/03/2020	15.4	17.5	21.6	0.0	0.2	3.7	19.0	65.8	87.9	100.0	997.8	999.4	1000.7
10/03/2020	14.3	17.7	22.6	0.0	0.0	3.6	15.0	49.0	81.4	100.0	998.2	999.9	1001.4
11/03/2020	13.5	18.0	22.8	0.0	0.1	4.0	20.8	52.0	78.9	100.0	1000.2	1001.7	1003.6
12/03/2020	14.5	18.7	23.7	0.0	0.2	4.9	23.4	42.6	74.9	100.0	1000.8	1002.6	1004.6
13/03/2020	13.7	18.9	25.4	0.0	0.1	3.2	18.1	35.9	70.9	95.4	993.0	997.2	1002.0
14/03/2020	10.8	14.1	17.7	2.6	0.7	5.0	21.4	76.9	95.4	100.0	990.6	995.5	999.4
15/03/2020	11.3	14.7	19.9	0.4	0.4	4.0	11.9	63.0	84.0	100.0	998.1	1000.4	1002.8
16/03/2020	13.1	15.1	18.3	2.0	0.1	4.4	13.6	82.6	98.0	100.0	1001.2	1003.6	1006.1
17/03/2020	13.7	16.7	21.4	0.2	0.0	4.4	13.4	66.5	87.5	100.0	1004.6	1005.7	1007.2
18/03/2020	13.7	19.1	25.4	0.0	0.0	3.2	14.2	35.5	70.0	99.7	1000.2	1003.4	1006.0
19/03/2020	16.6	23.5	32.0	0.0	0.1	3.4	13.7	23.8	50.9	84.0	997.8	999.7	1002.2
20/03/2020	22.1	27.5	34.1	0.0	0.5	5.3	18.5	22.6	36.5	53.7	990.1	993.8	997.8
21/03/2020	16.6	20.0	25.8	0.0	0.1	4.3	24.9	40.1	80.2	100.0	994.3	997.8	999.9
22/03/2020	16.8	21.4	28.6	0.0	0.0	3.2	16.8	31.3	71.3	99.2	994.9	997.6	1001.6
23/03/2020	15.5	17.7	21.2	0.0	0.1	3.9	16.9	64.0	76.3	94.8	1001.5	1003.1	1004.5
24/03/2020	14.4	17.7	21.1	0.0	0.1	3.6	14.4	67.0	86.7	100.0	999.2	1001.5	1004.1
25/03/2020	15.8	18.3	21.6	5.2	0.2	3.3	16.7	73.2	89.0	100.0	996.0	998.3	1000.6
26/03/2020	13.3	15.7	19.8	4.2	0.1	3.7	15.3	74.4	97.1	100.0	1000.3	1003.3	1005.2
27/03/2020	14.5	16.8	21.2	0.2	0.0	2.8	14.3	57.1	85.3	100.0	1003.5	1004.6	1006.3
28/03/2020	12.4	16.6	21.4	0.2	0.1	3.1	16.5	57.8	85.7	100.0	1001.0	1002.9	1004.7
29/03/2020	15.7	18.9	24.0	0.0	0.1	2.6	10.8	63.6	90.7	100.0	994.9	997.9	1001.1
30/03/2020	17.2	19.7	23.8	0.8	0.0	3.7	12.6	65.1	87.6	100.0	990.9	993.0	994.9
31/03/2020	16.2	20.6	26.6	0.0	0.0	3.7	13.3	49.8	80.7	99.3	992.9	995.1	997.9
Monthly	10.8	19.1	37.5	28.0	0.0	3.8	24.9	10.1	80.9	100.0	984.4	998.3	1007.2





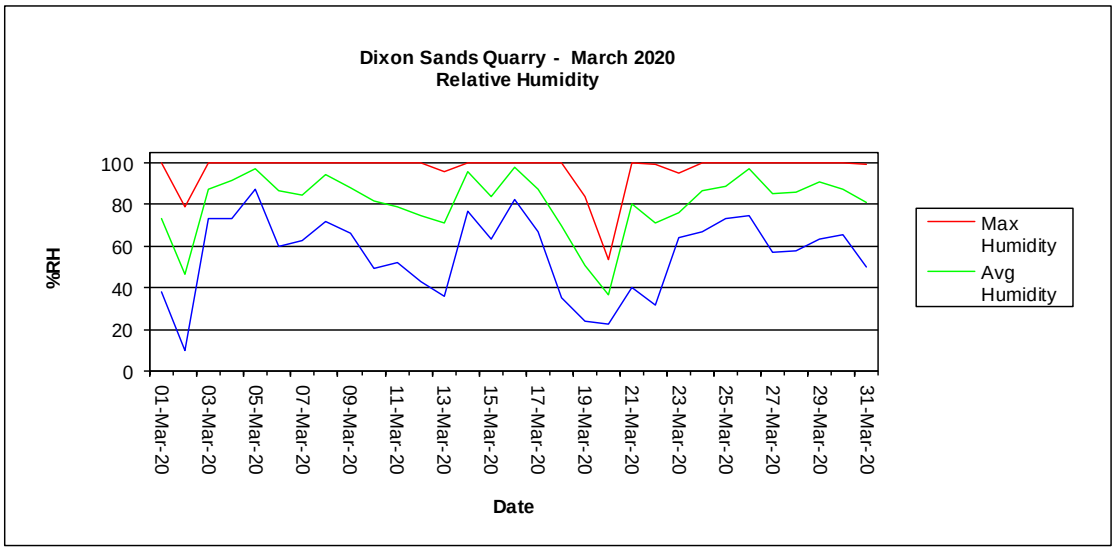
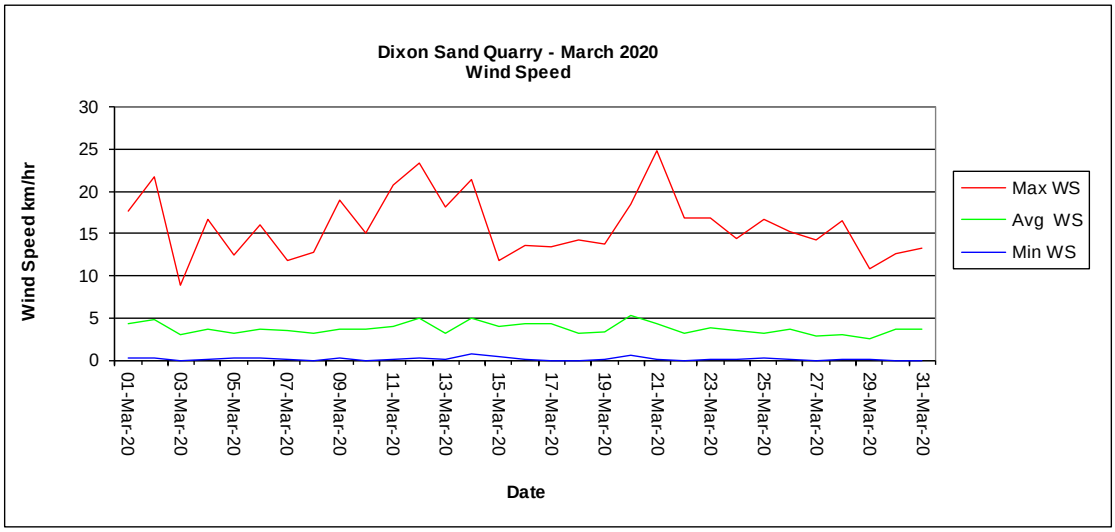


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*



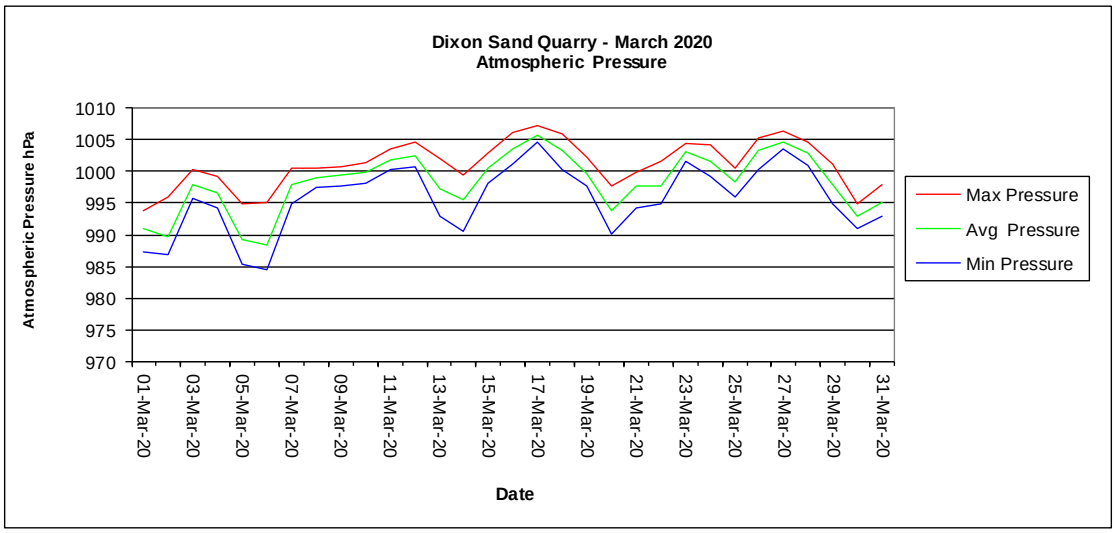


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

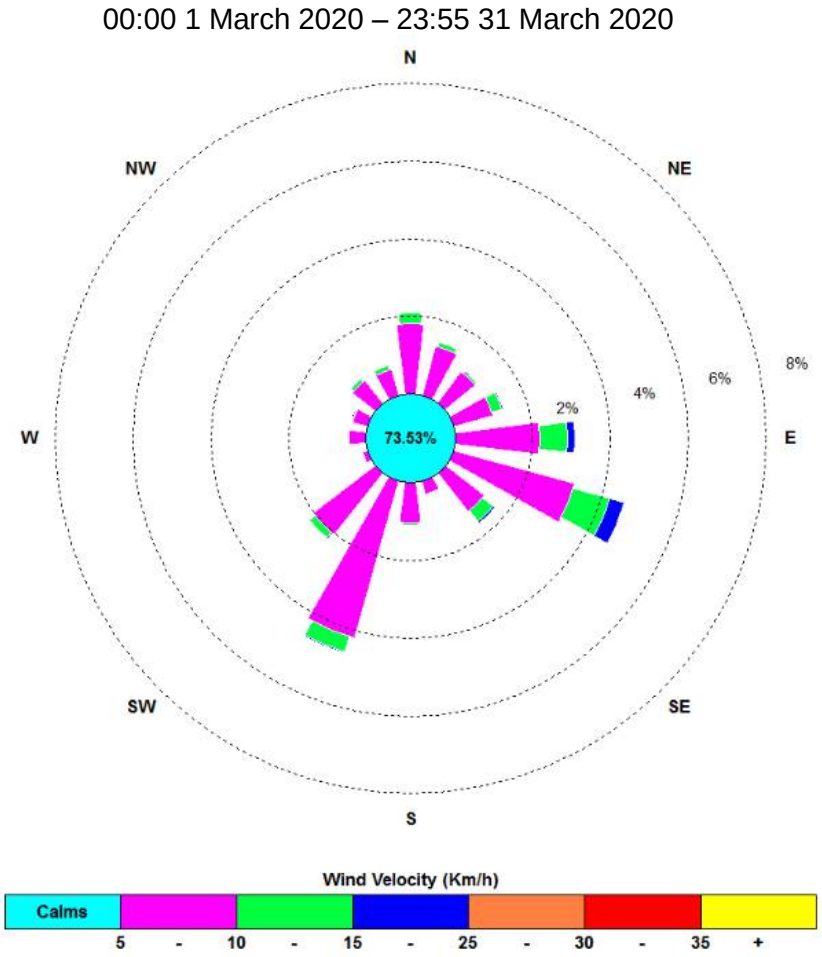


Figure 4: *Windrose Plot (km/h)*

CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

April 2020

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 29 May April 2020

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 (PM_{10}) 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.

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- One continuous TEOM PM_{10} monitor; and
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- TEOM (PM_{10}) monitoring results for April 2020; and
- Meteorological results for April 2020.

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/m^3;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 for TEOM's coinciding with the Dixon Sand project year. An annual amount of data has not yet been collected.

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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 PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

At present the current TEOM PM_{10} annual average is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has not yet been collected.

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

Table 2: Average Daily 24-hr TEOM PM_{10} and TSP Results for April 2020 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	TEOM PM_{10} ($\mu g/m^3$)	Annual PM_{10} Average ($\mu g/m^3$)	TSP* ($\mu g/m3$)	TSP Annual** ($\mu g/m3$)
1/04/2020	12.5	24.8	31.3	62.0
2/04/2020	11.4	24.7	28.5	61.9
3/04/2020	7.7	24.7	19.3	61.7
4/04/2020	8.2	24.6	20.5	61.5
5/04/2020	15.0	24.6	37.5	61.4
6/04/2020	10.7	24.5	26.8	61.3
7/04/2020	10.9	24.5	27.3	61.2
8/04/2020	13.0	24.4	32.5	61.0
9/04/2020	11.3	24.4	28.3	60.9
10/04/2020	4.8	24.3	12.0	60.7
11/04/2020	8.4	24.2	21.0	60.6
12/04/2020	12.7	24.2	31.8	60.5
13/04/2020	20.2	24.2	50.5	60.4
14/04/2020	23.1	24.2	57.8	60.4
15/04/2020	19.0	24.1	47.5	60.4
16/04/2020	17.9	24.1	44.8	60.3
17/04/2020	16.3	24.1	40.8	60.2
18/04/2020	14.4	24.1	36.0	60.2
19/04/2020	18.3	24.0	45.8	60.1
20/04/2020	15.4	24.0	38.5	60.0
21/04/2020	17.1	24.0	42.8	60.0
22/04/2020	16.1	24.0	40.3	59.9
23/04/2020	21.3	23.9	53.3	59.9
24/04/2020	28.2	24.0	70.5	59.9
25/04/2020	20.0	23.9	50.0	59.9
26/04/2020	20.3	23.9	50.8	59.8
27/04/2020	14.7	23.9	36.8	59.7
28/04/2020	16.1	23.9	40.3	59.7
29/04/2020	11.0	23.8	27.5	59.6
30/04/2020	7.5	23.8	18.8	59.4

*Calculated from PM10

**Calculated from PM10 Annual Average

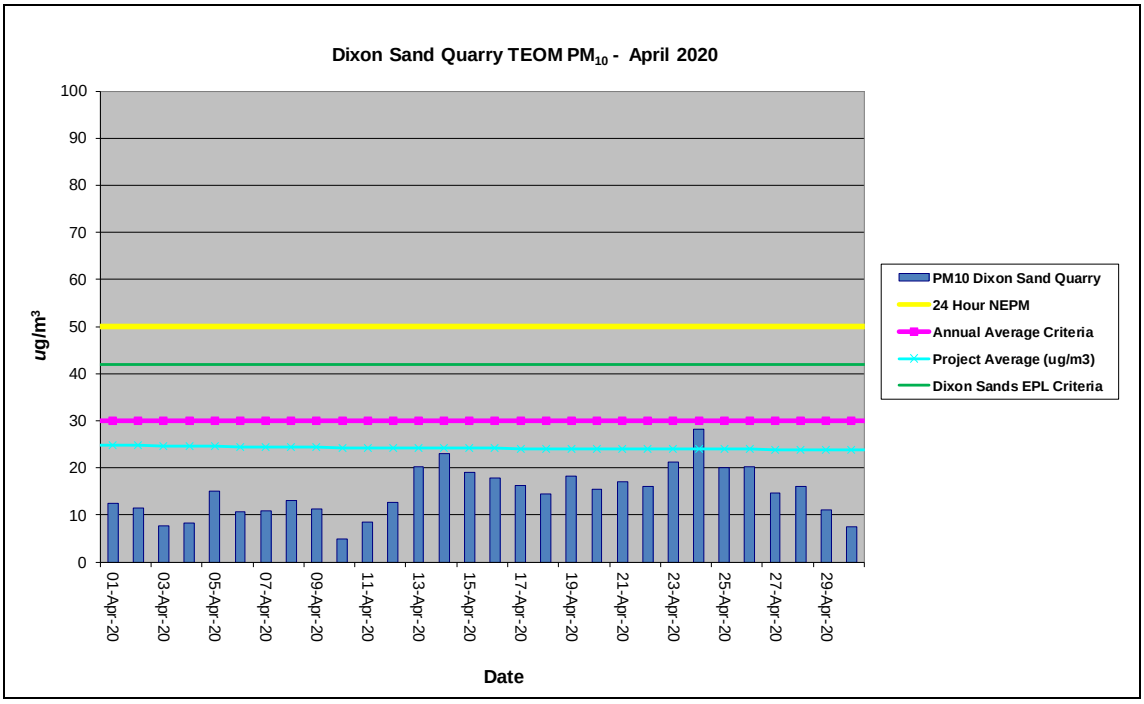


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

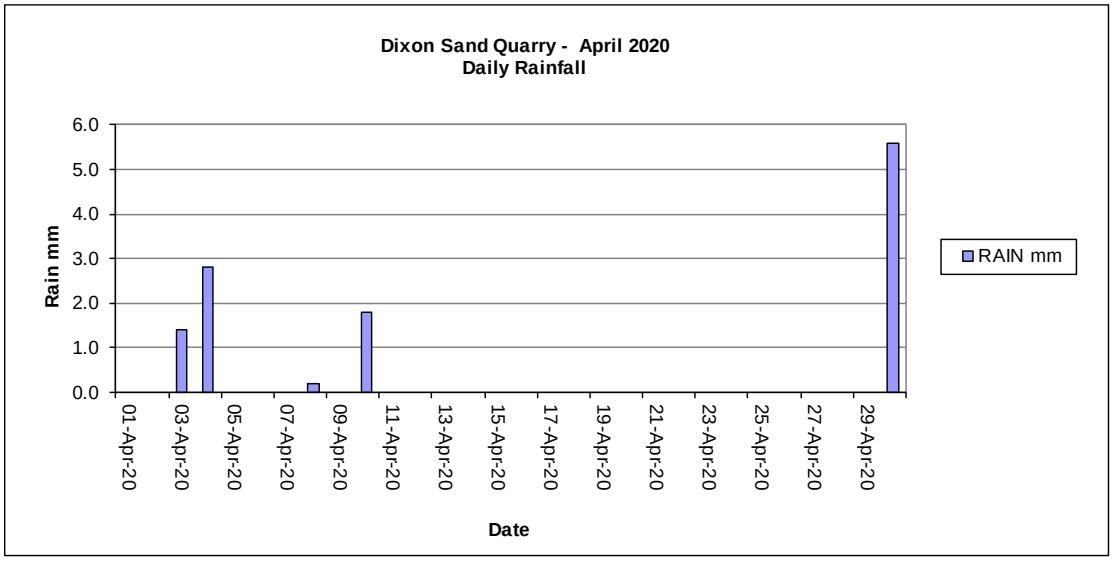
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

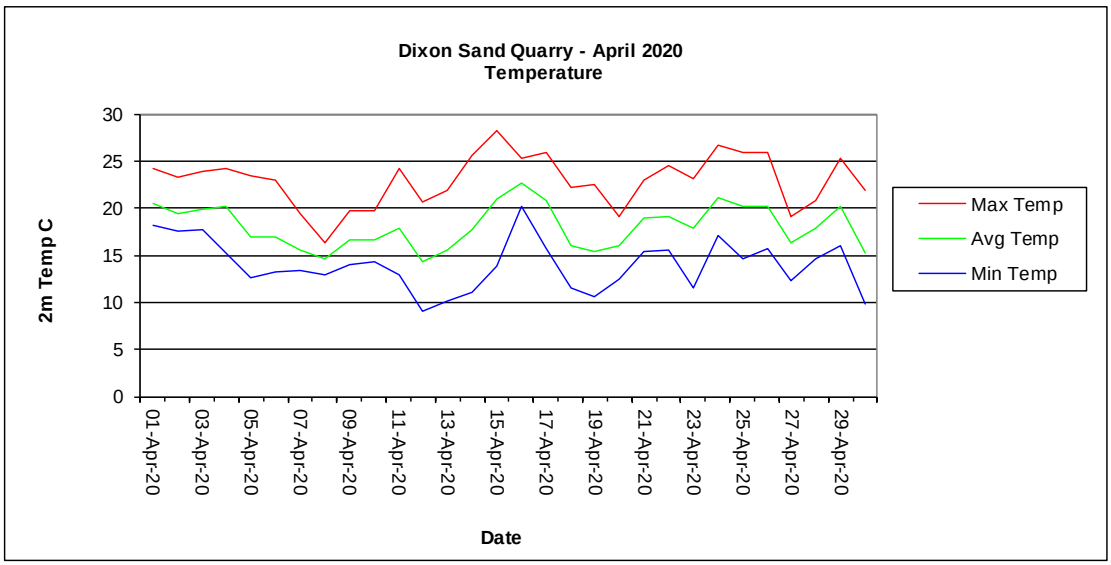
A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

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 April 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
1/04/2020	18.2	20.5	24.3	0.0	0.0	4.1	19.2	66.4	91.8	100.0	995.6	997.4	999.4
2/04/2020	17.6	19.5	23.3	0.0	0.2	3.8	16.1	71.5	93.9	100.0	990.0	992.7	996.9
3/04/2020	17.7	19.8	23.9	1.4	0.1	4.7	15.0	66.6	88.0	100.0	982.3	987.2	990.2
4/04/2020	15.3	20.3	24.2	2.8	0.4	7.5	35.7	26.7	62.4	100.0	977.2	981.8	989.4
5/04/2020	12.7	17.0	23.5	0.0	0.0	3.4	14.3	31.7	50.2	64.6	989.5	992.3	995.7
6/04/2020	13.3	17.0	23.0	0.0	0.2	3.6	15.1	42.2	65.1	95.1	994.5	996.8	999.9
7/04/2020	13.4	15.6	19.5	0.0	0.1	2.5	10.2	58.9	82.2	100.0	999.0	1000.1	1001.8
8/04/2020	13.0	14.7	16.3	0.2	0.0	2.2	9.4	87.1	96.5	100.0	998.4	1001.0	1004.2
9/04/2020	14.0	16.7	19.8	0.0	0.1	2.7	12.6	69.4	90.3	100.0	1002.7	1004.2	1006.1
10/04/2020	14.4	16.7	19.8	1.8	0.2	3.8	20.1	76.4	92.6	100.0	989.4	995.8	1002.6
11/04/2020	12.9	17.9	24.2	0.0	0.0	6.2	34.7	29.7	52.3	83.1	980.0	985.3	989.7
12/04/2020	9.0	14.3	20.7	0.0	0.1	3.0	13.6	28.3	52.0	75.5	989.7	994.2	998.0
13/04/2020	10.1	15.6	22.0	0.0	0.0	2.8	17.4	48.4	68.6	88.6	997.3	999.2	1001.2
14/04/2020	11.1	17.7	25.7	0.0	0.0	2.8	12.5	26.4	72.9	100.0	1000.5	1002.0	1004.2
15/04/2020	13.8	20.9	28.3	0.0	0.2	4.2	12.3	29.9	58.8	95.8	995.3	999.7	1002.9
16/04/2020	20.2	22.7	25.4	0.0	0.4	6.1	17.2	42.7	48.7	58.0	988.5	991.8	995.3
17/04/2020	15.8	20.8	26.0	0.0	0.2	3.0	14.2	19.5	41.5	80.6	988.0	989.7	991.5
18/04/2020	11.6	16.0	22.2	0.0	0.0	2.9	13.8	30.3	48.5	70.5	989.9	991.3	993.0
19/04/2020	10.6	15.5	22.5	0.0	0.0	2.7	15.8	44.3	75.7	99.2	991.0	992.6	995.0
20/04/2020	12.5	16.1	19.1	0.0	0.2	3.8	10.7	45.6	66.5	99.3	991.9	994.0	996.3
21/04/2020	15.4	19.0	23.0	0.0	0.3	3.3	17.1	38.8	50.8	65.8	993.4	995.9	998.4
22/04/2020	15.5	19.1	24.5	0.0	0.2	3.0	12.3	34.6	51.2	66.1	995.0	996.7	998.5
23/04/2020	11.5	17.9	23.2	0.0	0.0	3.1	14.4	32.4	48.5	78.0	995.0	997.5	1000.8
24/04/2020	17.1	21.1	26.8	0.0	0.2	3.2	17.7	30.0	45.6	76.8	994.4	996.3	999.4
25/04/2020	14.7	20.3	25.9	0.0	0.2	3.5	20.9	34.7	51.9	77.8	996.1	998.5	1001.1
26/04/2020	15.8	20.2	25.9	0.0	0.4	5.1	18.6	32.2	50.0	69.2	992.0	994.7	998.6
27/04/2020	12.3	16.3	19.1	0.0	0.2	2.8	8.1	62.0	81.5	99.3	998.8	1001.8	1004.1
28/04/2020	14.7	17.8	20.9	0.0	0.0	2.3	14.7	67.1	87.5	100.0	998.2	1001.4	1003.6
29/04/2020	16.0	20.2	25.3	0.0	0.2	5.5	20.0	50.2	74.9	100.0	988.5	993.7	998.2
30/04/2020	9.9	15.3	22.0	5.6	0.2	5.4	21.6	63.5	82.2	100.0	983.8	986.5	988.6
Monthly	9.0	18.1	28.3	11.8	0.0	3.8	35.7	19.5	67.4	100.0	977.2	995.1	1006.1





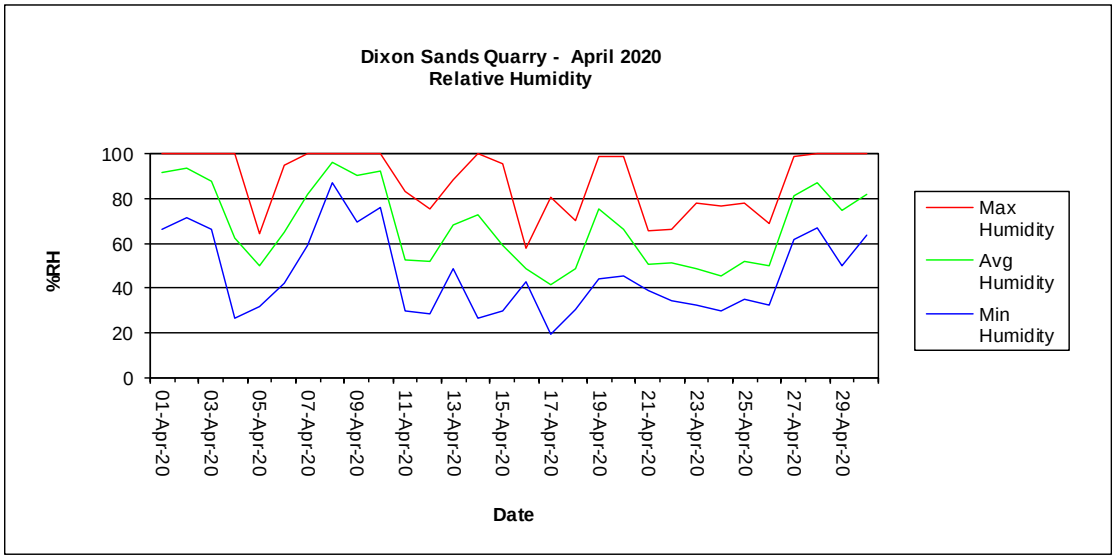
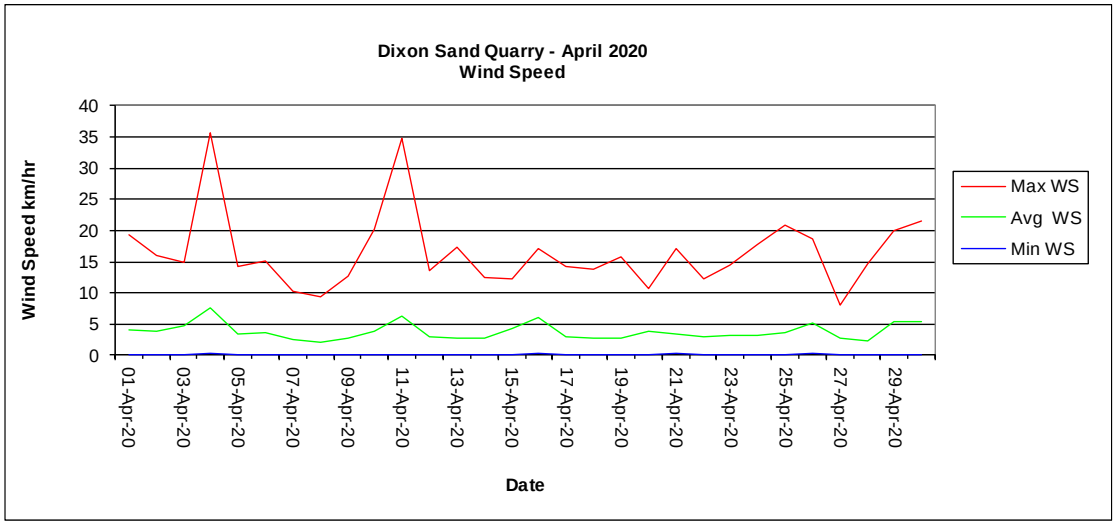


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*



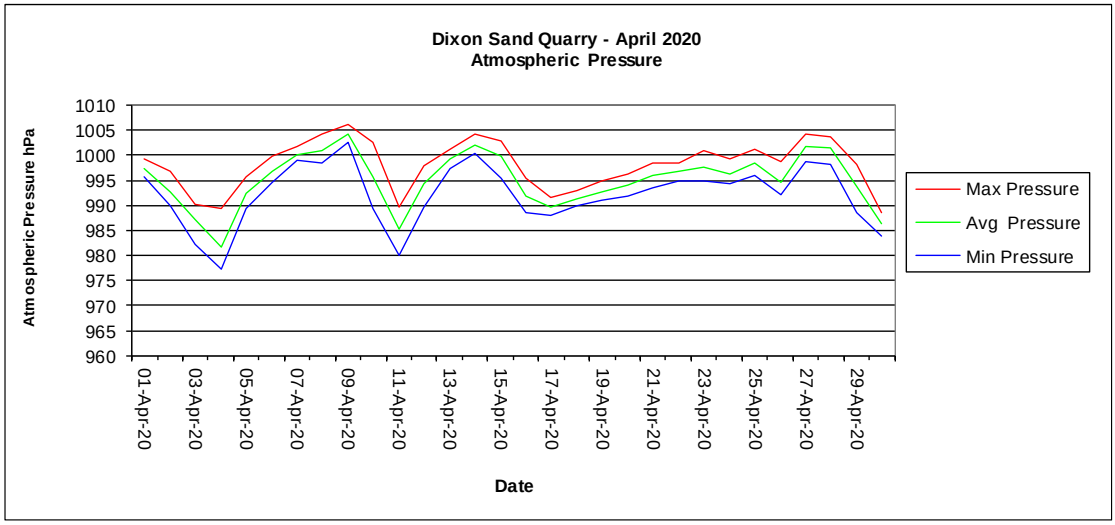


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

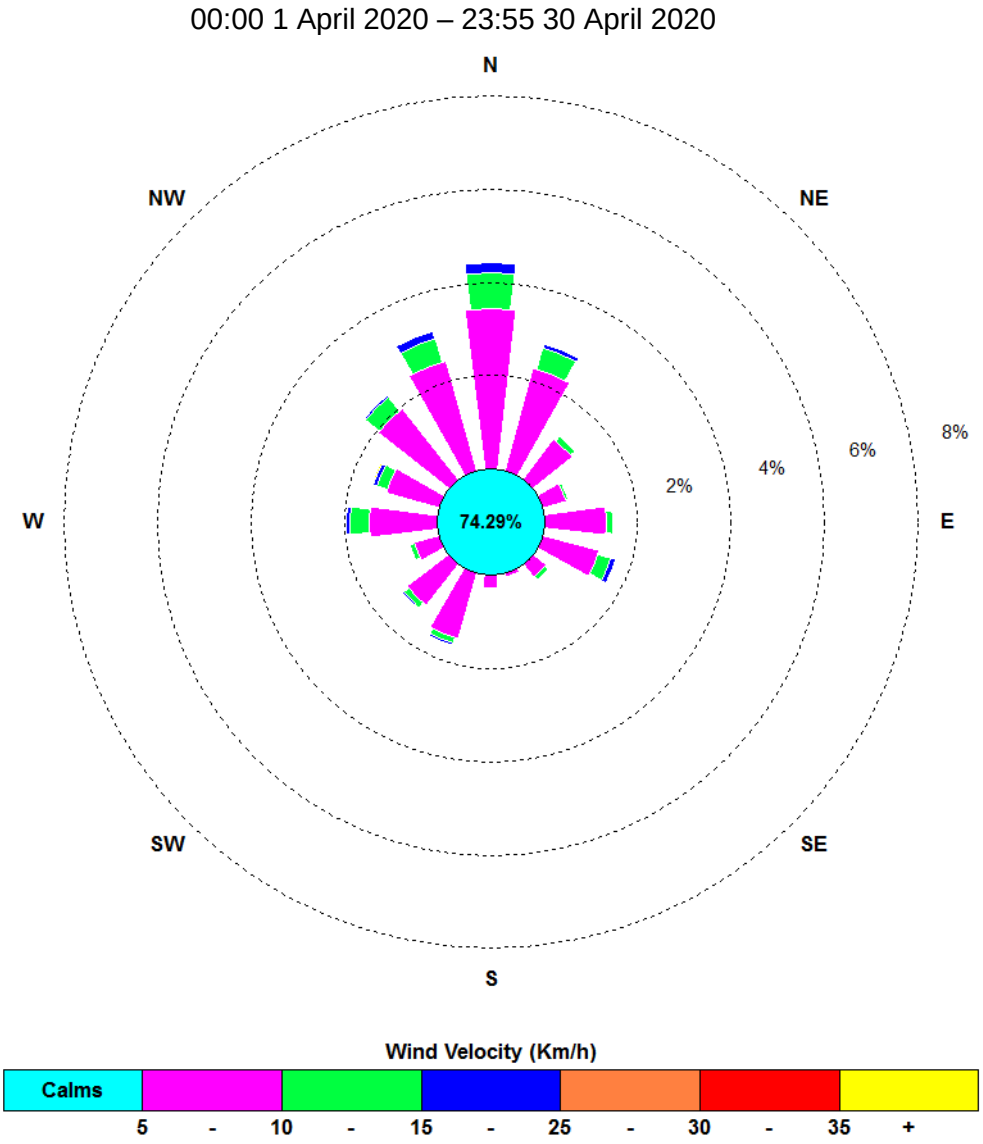


Figure 4: *Windrose Plot (km/h)*

CBased Environmental Pty Limited
ABN 62 611 924 264

Dixon Sand Quarry

Environmental Monitoring
Air Quality

Tapered Element Oscillating Microbalance (TEOM) (PM_{10}) and Meteorological Data

May 2020

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 1 July 2020

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 (PM_{10}) 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 PM_{10} monitor; and
- One continuous Meteorological Station.

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

- TEOM (PM_{10}) monitoring results for May 2020; and
- Meteorological results for May 2020.

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/m^3;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 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 2020.

Approximately 100% of TEOM data was recovered for May 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—PM_{10} 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 PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ 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 PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

At present the current TEOM PM_{10} annual average is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has not yet been collected.

A quarterly calibration was undertaken in 28 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 PM_{10} and TSP Results for May 2020 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	TEOM PM_{10} ($\mu g/m^3$)	Annual PM_{10} Average ($\mu g/m^3$)	TSP* ($\mu g/m3$)	TSP Annual** ($\mu g/m3$)
1/05/2020	6.1	23.7	15.3	59.3
2/05/2020	8.5	23.6	21.3	59.1
3/05/2020	10.8	23.6	27.0	59.0
4/05/2020	14.0	23.6	35.0	58.9
5/05/2020	11.5	23.5	28.8	58.8
6/05/2020	9.3	23.5	23.3	58.7
7/05/2020	12.2	23.4	30.5	58.6
8/05/2020	13.1	23.4	32.8	58.5
9/05/2020	15.8	23.4	39.5	58.4
10/05/2020	6.1	23.3	15.3	58.3
11/05/2020	17.4	23.3	43.5	58.2
12/05/2020	16.0	23.3	40.0	58.2
13/05/2020	20.0	23.3	50.0	58.1
14/05/2020	13.5	23.2	33.8	58.1
15/05/2020	11.5	23.2	28.8	58.0
16/05/2020	7.3	23.1	18.3	57.8
17/05/2020	12.1	23.1	30.3	57.7
18/05/2020	13.2	23.1	33.0	57.7
19/05/2020	8.0	23.0	20.0	57.5
20/05/2020	7.4	23.0	18.5	57.4
21/05/2020	6.4	22.9	16.0	57.3
22/05/2020	7.7	22.9	19.3	57.1
23/05/2020	6.3	22.8	15.8	57.0
24/05/2020	5.7	22.7	14.3	56.9
25/05/2020	7.7	22.7	19.3	56.7
26/05/2020	9.7	22.7	24.3	56.6
27/05/2020	10.3	22.6	25.8	56.5
28/05/2020	10.8	22.6	27.0	56.4
29/05/2020	9.5	22.5	23.8	56.3
30/05/2020	8.5	22.5	21.3	56.2
31/05/2020	6.6	22.4	16.5	56.1

*Calculated from PM10

**Calculated from PM10 Annual Average

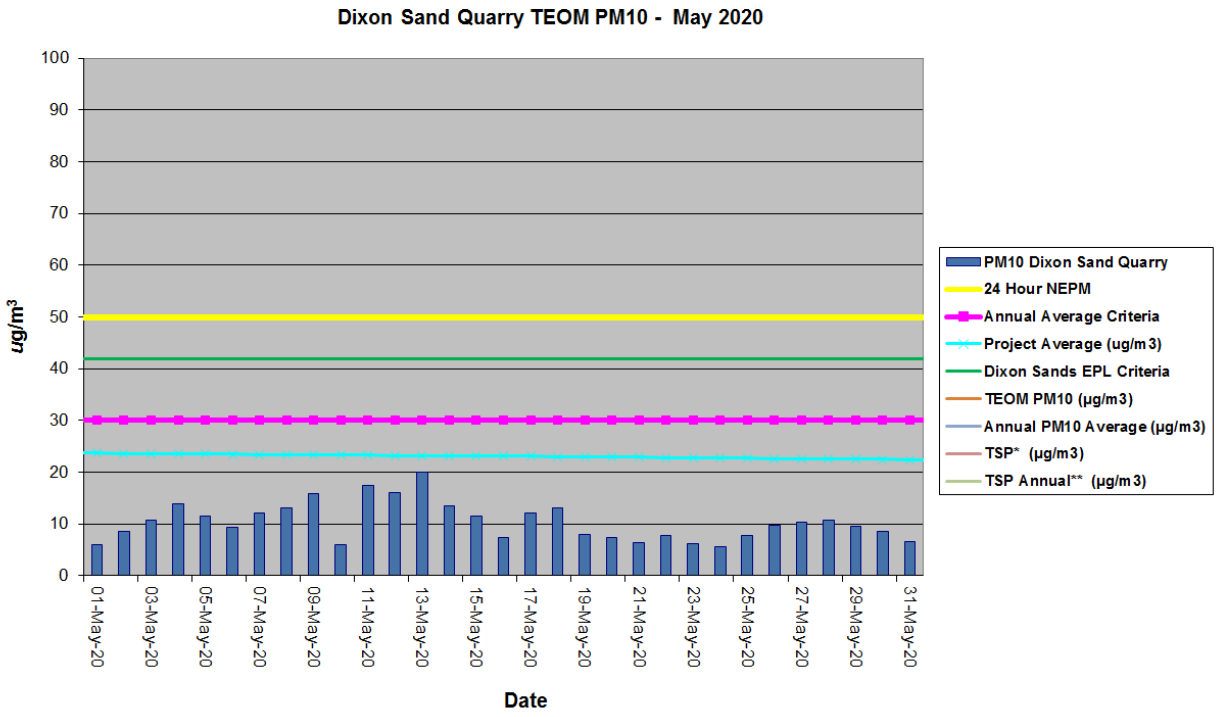


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

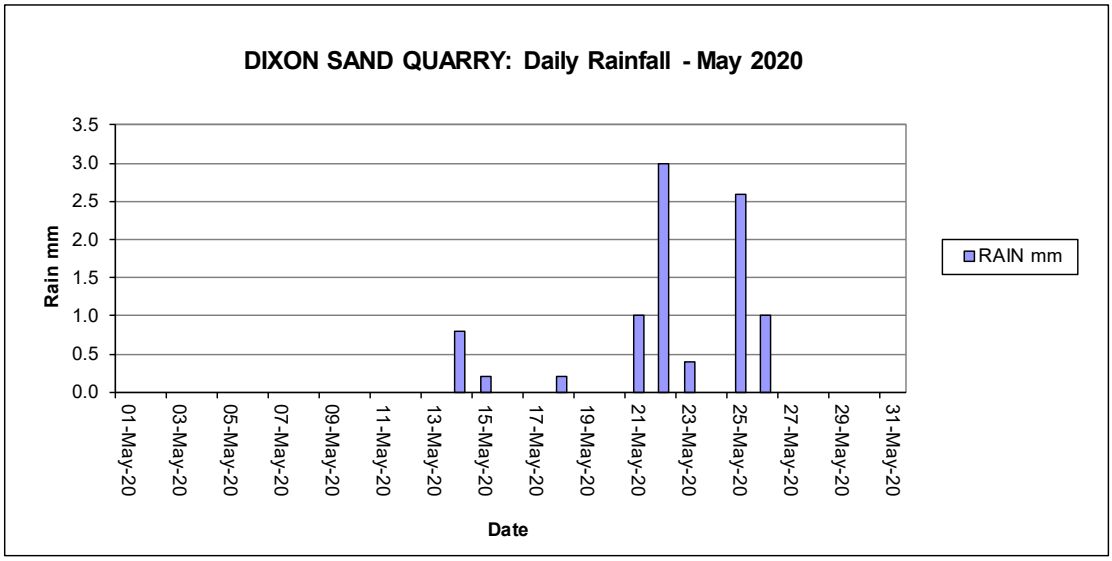
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

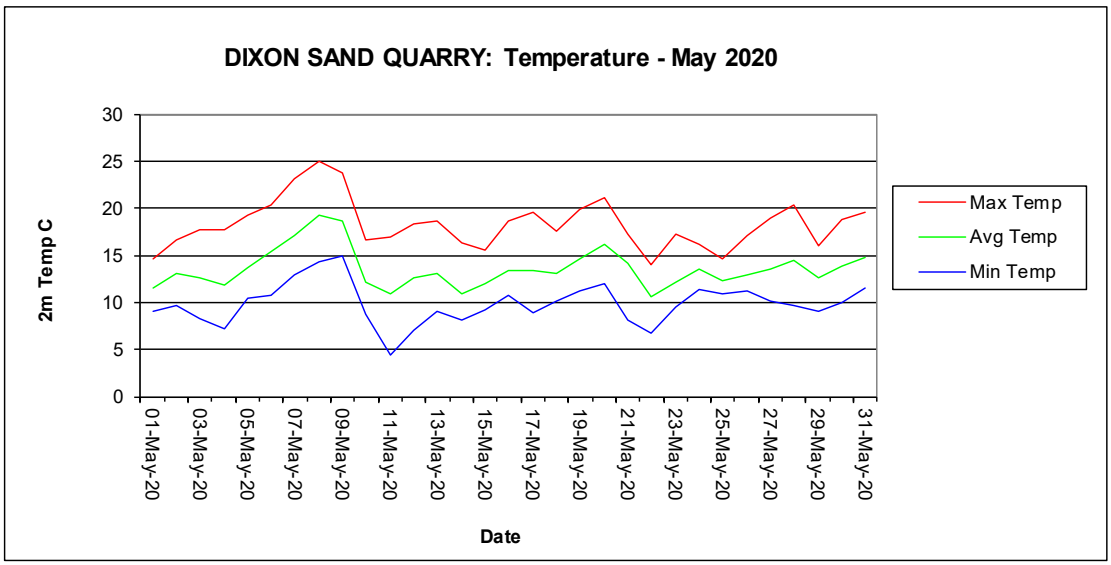
A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

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 May 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
1/05/2020	9.0	11.6	14.6	0.0	0.6	6.7	33.0	36.7	54.5	70.7	984.5	987.0	988.8
2/05/2020	9.7	13.1	16.6	0.0	0.6	7.6	44.2	33.8	49.3	64.9	983.4	985.3	989.5
3/05/2020	8.3	12.7	17.7	0.0	0.2	3.3	17.4	38.4	53.0	70.9	989.3	996.0	1002.0
4/05/2020	7.2	11.9	17.8	0.0	0.1	2.4	11.9	41.9	67.8	84.6	1001.4	1003.9	1007.0
5/05/2020	10.4	13.8	19.3	0.0	0.2	3.9	11.4	53.5	79.7	97.1	1006.7	1008.0	1009.6
6/05/2020	10.8	15.4	20.4	0.0	0.4	3.8	18.4	48.6	72.8	98.8	1002.8	1006.0	1008.8
7/05/2020	13.0	17.1	23.1	0.0	0.2	5.3	21.3	45.7	60.5	73.9	998.0	1000.0	1002.7
8/05/2020	14.3	19.3	25.0	0.0	0.6	6.3	16.4	34.8	53.7	74.0	994.5	996.6	998.6
9/05/2020	14.9	18.6	23.8	0.0	0.3	6.5	37.9	39.8	54.0	71.2	989.1	992.0	994.6
10/05/2020	8.7	12.2	16.6	0.0	0.0	3.5	13.6	20.8	43.1	59.7	994.4	998.9	1003.6
11/05/2020	4.4	11.0	16.9	0.0	0.0	2.6	11.3	34.2	55.2	75.3	1003.0	1004.9	1006.5
12/05/2020	7.1	12.7	18.4	0.0	0.0	2.8	11.4	42.3	63.1	82.1	1001.6	1004.0	1006.2
13/05/2020	9.1	13.0	18.6	0.0	0.1	2.4	9.3	39.6	65.2	99.2	1000.1	1001.5	1003.2
14/05/2020	8.2	11.0	16.3	0.8	0.2	3.7	21.3	65.7	84.2	99.2	1002.7	1005.2	1007.6
15/05/2020	9.2	12.1	15.6	0.2	0.5	4.6	13.7	62.4	81.6	100.0	1006.2	1007.6	1009.1
16/05/2020	10.8	13.4	18.7	0.0	0.2	2.5	10.5	55.5	84.8	100.0	1007.7	1008.9	1010.4
17/05/2020	8.9	13.4	19.6	0.0	0.2	2.3	9.9	52.8	83.1	100.0	1008.0	1009.2	1010.7
18/05/2020	10.2	13.2	17.6	0.2	0.0	1.7	7.1	71.0	95.2	100.0	1009.2	1010.3	1012.2
19/05/2020	11.2	14.7	19.9	0.0	0.0	2.4	10.8	57.2	88.4	100.0	1001.6	1006.2	1009.5
20/05/2020	12.0	16.2	21.1	0.0	0.3	5.2	17.0	56.8	75.8	99.3	994.8	997.5	1001.7
21/05/2020	8.2	14.2	17.2	1.0	0.2	4.8	23.2	69.0	84.1	99.6	987.9	991.4	994.9
22/05/2020	6.7	10.6	14.0	3.0	0.5	4.5	20.2	60.2	80.2	100.0	988.0	989.2	990.6
23/05/2020	9.6	12.2	17.2	0.4	0.5	3.4	16.7	54.9	85.3	100.0	986.0	987.2	988.6
24/05/2020	11.4	13.5	16.2	0.0	1.1	7.9	23.0	51.0	64.9	92.1	988.2	991.2	994.9
25/05/2020	11.0	12.3	14.7	2.6	1.5	8.7	22.9	61.4	79.5	100.0	994.0	996.3	999.5
26/05/2020	11.2	13.0	17.1	1.0	0.4	5.8	20.6	67.4	93.8	100.0	999.3	1000.7	1002.4
27/05/2020	10.2	13.5	19.0	0.0	0.3	3.1	9.7	54.1	89.5	100.0	998.3	1000.3	1002.0
28/05/2020	9.7	14.5	20.3	0.0	0.0	2.3	8.2	50.7	82.3	100.0	998.3	999.9	1002.6
29/05/2020	9.1	12.7	16.1	0.0	0.1	2.9	11.5	79.1	91.5	100.0	1002.3	1005.1	1007.1
30/05/2020	10.0	13.8	18.8	0.0	0.1	2.7	12.4	60.4	88.5	100.0	1000.0	1004.1	1006.9
31/05/2020	11.6	14.9	19.6	0.0	0.1	4.7	19.0	49.4	79.2	100.0	993.1	996.8	999.8
Monthly	4.4	13.6	25.0	9.2	0.0	4.2	44.2	20.8	73.7	100.0	983.4	999.7	1012.2





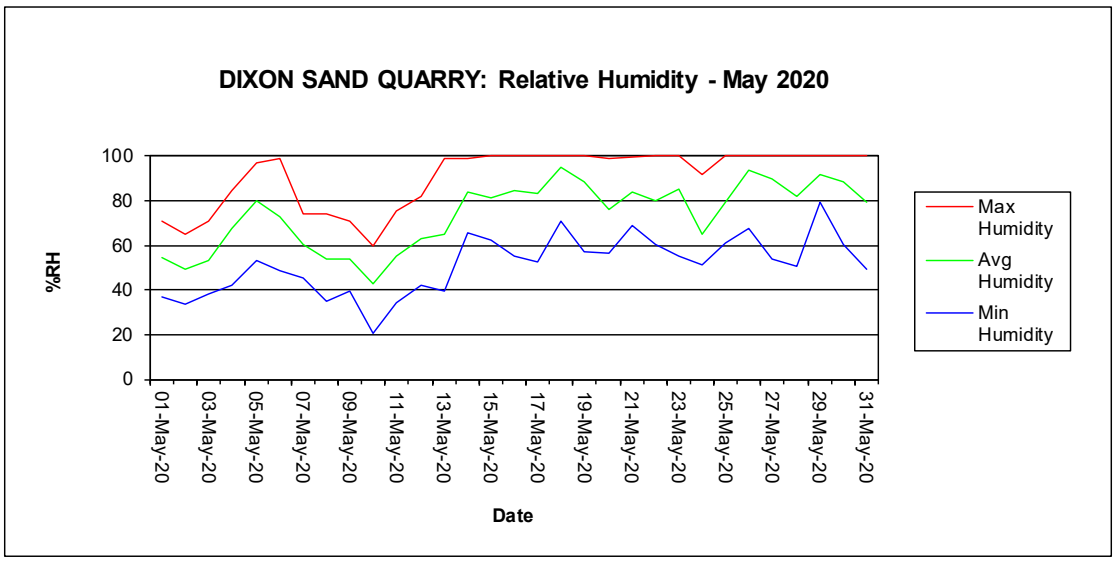
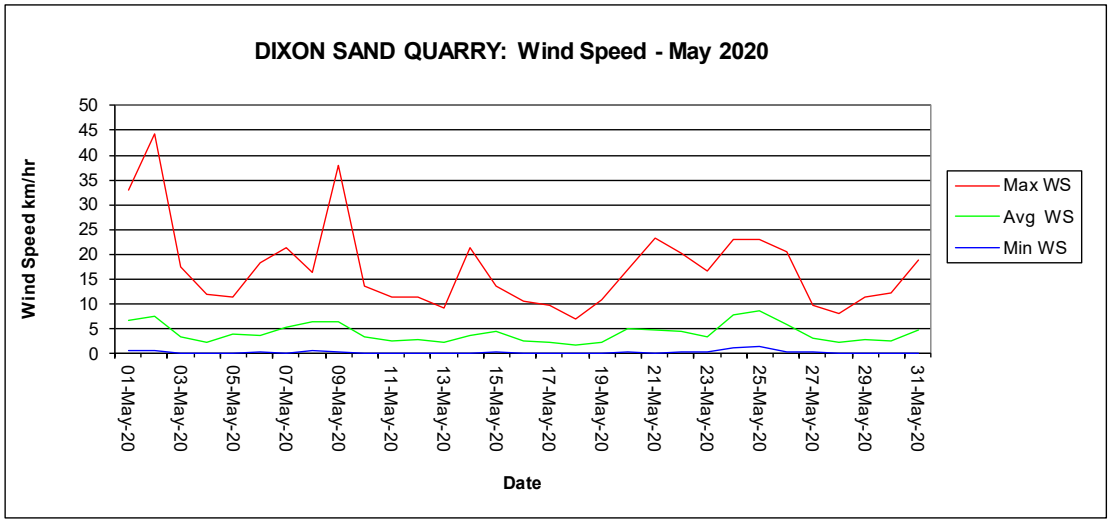


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*



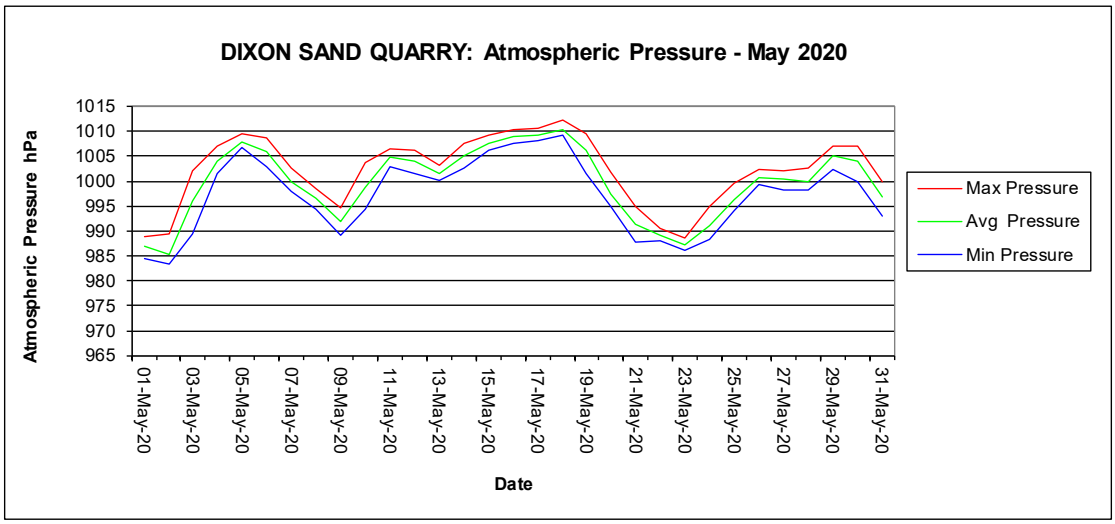


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

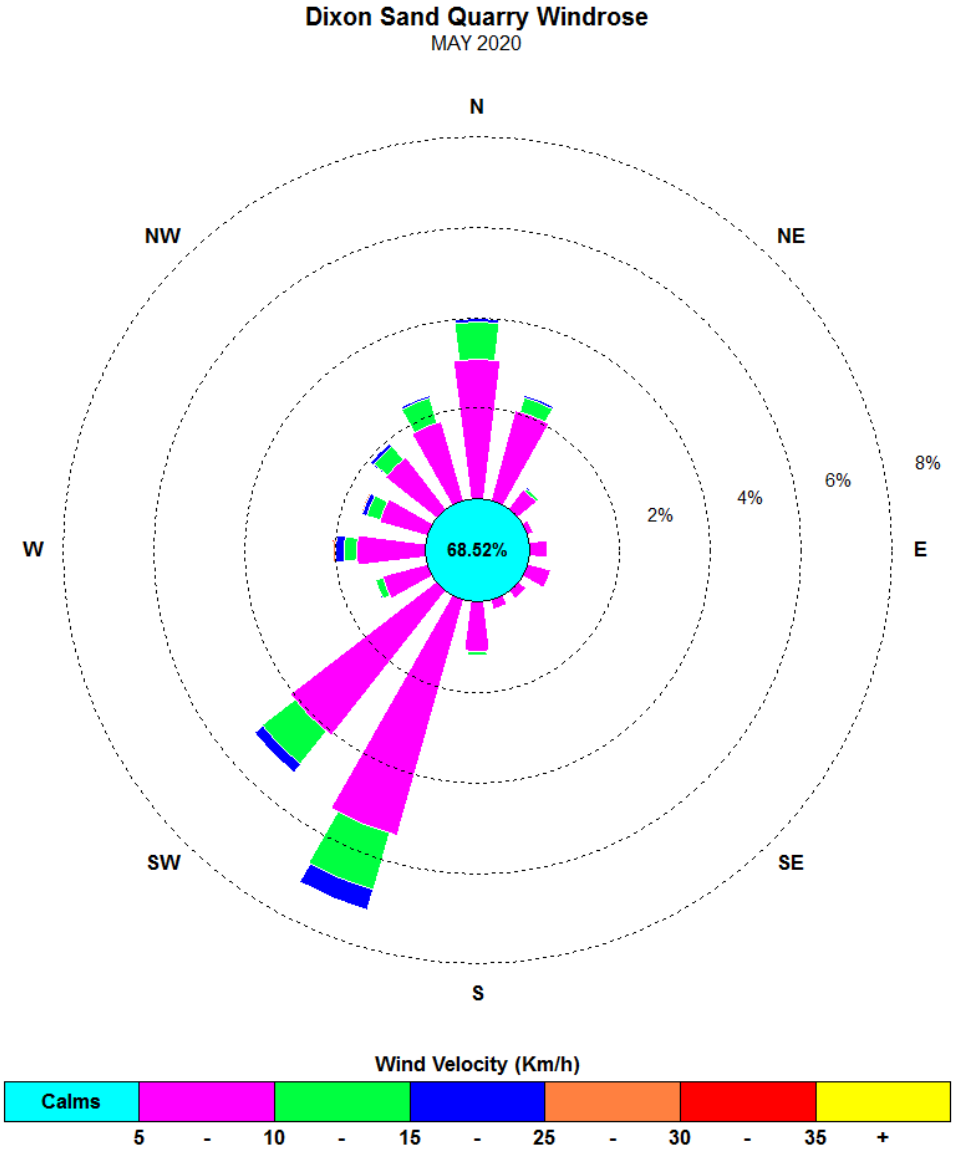


Figure 4: *Windrose Plot (km/h)*

Appendix 1

Calibration Documents (when required)

CARBON BASED ENVIRONMENTAL

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

teledata

TEOM Client/Site: Dixon Sundry TEOM 1 **Date:** 28/5/20

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

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Operating Condition	Fully op (4)	Green - Normal	✓	
Date/time	TEOM: 28/5/20 11:46 Actual: 28/5/20 11:50	Current Date/time correct within 5 minutes	✓	
PM-10 24hr av	12.9	Positive values	✓	
Filter loading PM10	61	<80 %	✓	
Frequency PM-10	250.96885	200-300 Hz	✓	
Noise PM-10	0.065	<0.100ug	✓	

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

Comments:

2. System Status

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

Comments:

Data Downloaded: YES/(NO) (circle)

Technician Name : COLIN DAVID **Signed**

3. Instrument Conditions Ambient Conditions and Temperatures

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Ambient Temperature	24.7	-10 to 50 C	✓	
Ambient Dew Point	NA	-10 to 50 C	—	—
Ambient Pressure	0.977	0.9-1.1 atm	✓	
Ambient Relative Humidity	NA	10-100 %RH	—	—
Cap temperature	50.00	50.00 +/- 0.10 C	✓	
Case temperature	50.00	50.00 +/- 0.10 C	✓	
Main (PM-10) Air Tube temp	50.00	50.00 +/- 0.10 C	✓	

Comments:

4. Instrument Conditions – Flows

Condition	Current Data	Acceptable Data	Pass (Tick)	Fail (Tick)
Main (PM-10) Flow rate	3.00	2.82 – 3.18 lpm	✓	
Bypass Flow rate	13.68	12.95 – 14.39 lpm	✓	
Total Flow rate	NA	15.67 – 17.67 lpm	NA	

Comments:

Results: (Tick box)

☑ **There were NO equipment faults found. No action required – (file report)**

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

Comments/Action Required:

Calibration/Maintenance

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

Channel	Filter Load %	Frequency Hz initial	Frequency check 1min	Frequency check 3min	Frequency check 5min
PM10	16	254.55499	254.55508	254.55517	254.55514

✓OK

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

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

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

6. TEOM Cleaned and Air Conditioner checked YES/NO. Air Conditioner settings or operational status: Auto ✓

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

Quarterly or Six Monthly Calibration

	Init Fadj	Final Fadj
1. Flow Verification – Conducted YES/NO		
PM10 Flow verified Flow l/min 2.96 Error % 1.3 (allowed error <6%) PASS/FAIL	1.05	1.06
Bypass Flow verified Flow l/min 13.45 Error % 1.6 (allowed error <6%) PASS/FAIL	1.02	1.03

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 0.12 < Limit 0.15

Bypass actual 0.45 < Limit 0.60

Leak check PASS/FAIL – If fail then find leak and retest.
Comments: Slight leak → in mass transducer OK for now

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: 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 KO = _____ TEOM stated K0_____ Error %:_____
Allowed Error +/- 2.5%. PASS/FAIL
If Error +/- 2.5% repeat. If confirmed consult manufacturer.
Second Error % =_____ PASS/FAIL. Comments:
If second test fails consult manufacturer.

4. Annual Noise check - Conducted YES/NO
Zero filter applied to TEOM and TEOM operated for at least 12 hours:
Start date/time: _____Finish date/time:_____
Standard deviation of all recorded data (min 30 min averages) = _____ug/m^3
Noise was less than 5ug/m^3 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) (PM_{10}) and Meteorological Data

June 2020

Colin Davies BSc MEIA CENVP
Environmental Scientist
Date: 31 July 2020

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 (PM_{10}) 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 PM_{10} monitor; and
- One continuous Meteorological Station.

This monthly report for June 2020 was prepared by CBased Environmental and includes the following:

- TEOM (PM_{10}) 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/m^3;
- 24-hour average results were below the Dixon Sand Quarry EPL limit of 42ug/m^3;
- The annual average is below the Dixon Sand Quarry consent annual average criteria of 30ug/m^3; and
- The calculated TSP is below the Dixon Sand Quarry annual average criteria of 90ug/m^3.

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 PM_{10} is calculated from the 1st July 2019 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 2020.

Approximately 100% of TEOM data was recovered for June 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—PM_{10} 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 PM_{10} results are 24-hour averages at midnight and are reported as $\mu g/m^3$ 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 PM_{10}

24-hour average TEOM PM_{10} 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 PM_{10} results were below the National Environment Protection Measure (NEPM) short-term (24hr) impact criteria of 50ug/m^3 and the Dixon Sand Quarry EPL limit of 42ug/m^3.

At present the current TEOM PM_{10} annual average is below the Dixon Sand Quarry annual average PM_{10} criteria of 30ug/m^3. The current annual average for calculated Total Suspended Particulates (TSP) is below the annual average criterion of 90ug/m^3. The TSP is calculated by multiplying the PM_{10} by 2.5. Note: the annual average is calculated from 1 July 2019 and therefore an annual amount of data has now 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 PM_{10} and TSP Results for June 2020 from AQMS and Annual Average PM_{10} calculated from the 1 July 2019

Date	PM_{10} 24-hr Average ($\mu g/m^3$)	PM_{10} Annual Average ($\mu g/m^3$)	24-hr Average TSP* ($\mu g/m^3$)	Annual Average TSP** ($\mu g/m^3$)
1/06/2020	10.0	22.4	25.0	56.0
2/06/2020	5.0	22.3	12.5	55.8
3/06/2020	8.8	22.3	22.0	55.7
4/06/2020	12.0	22.3	30.0	55.7
5/06/2020	14.3	22.2	35.8	55.6
6/06/2020	15.0	22.2	37.5	55.5
7/06/2020	15.1	22.2	37.8	55.5
8/06/2020	10.8	22.2	27.0	55.4
9/06/2020	9.1	22.1	22.8	55.3
10/06/2020	10.5	22.1	26.3	55.2
11/06/2020	10.3	22.0	25.8	55.1
12/06/2020	11.3	22.0	28.3	55.0
13/06/2020	10.6	22.0	26.5	54.9
14/06/2020	6.7	21.9	16.8	54.8
15/06/2020	8.9	21.9	22.3	54.7
16/06/2020	9.6	21.9	24.0	54.6
17/06/2020	11.8	21.8	29.5	54.5
18/06/2020	9.3	21.8	23.3	54.5
19/06/2020	7.8	21.7	19.5	54.3
20/06/2020	7.5	21.7	18.8	54.2
21/06/2020	6.2	21.6	15.5	54.1
22/06/2020	8.4	21.6	21.0	54.0
23/06/2020	7.0	21.6	17.5	53.9
24/06/2020	7.0	21.5	17.5	53.8
25/06/2020	8.5	21.5	21.3	53.7
26/06/2020	15.5	21.5	38.8	53.7
27/06/2020	13.5	21.4	33.8	53.6
28/06/2020	12.7	21.4	31.8	53.5
29/06/2020	11.6	21.4	29.0	53.5
30/06/2020	8.2	21.3	20.5	53.4

*Calculated from PM10

**Calculated from PM10 Annual Average

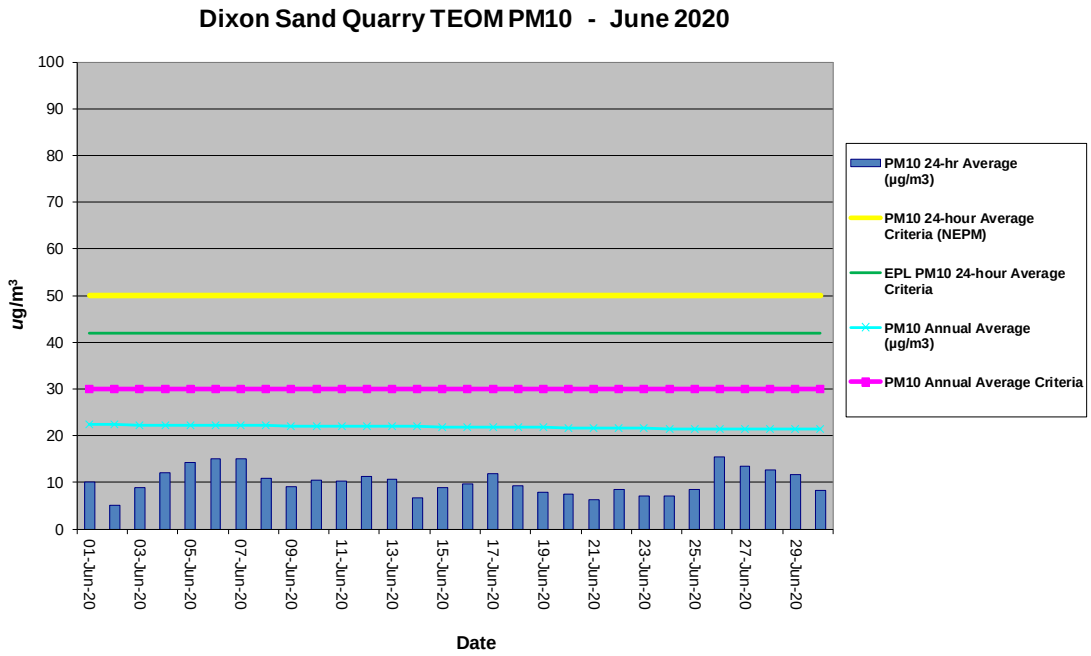


Figure 1: *TEOM PM_{10} 24 hr, Annual Average and Criteria*

3.2 Meteorological Data

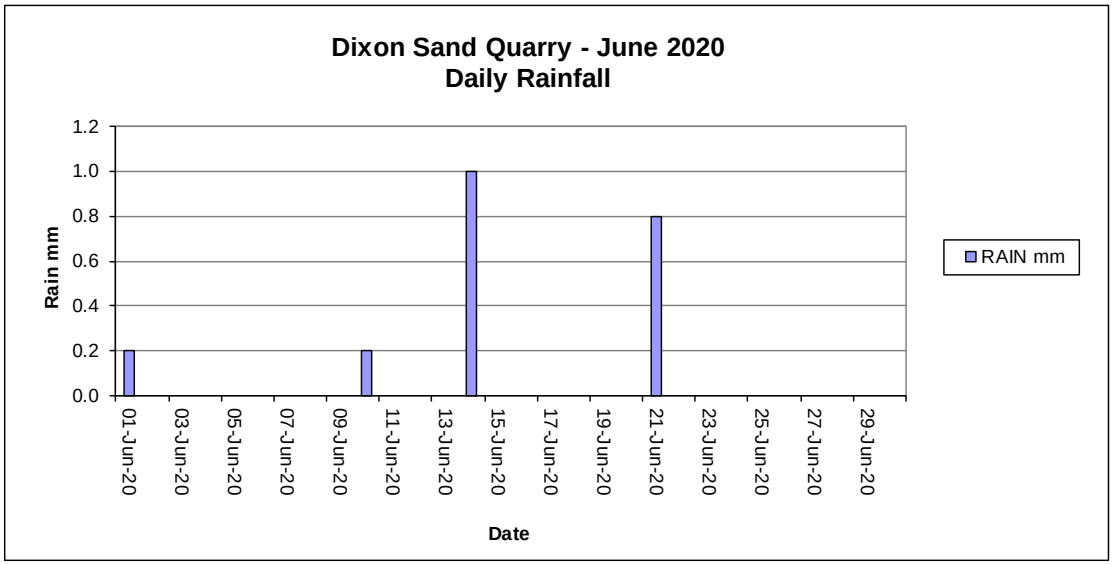
The weather station logs data at 5-minute intervals and sends the data to a web database by NextG telemetry. The data is accessible from the web site http://console.teledata.com.au/index.html.

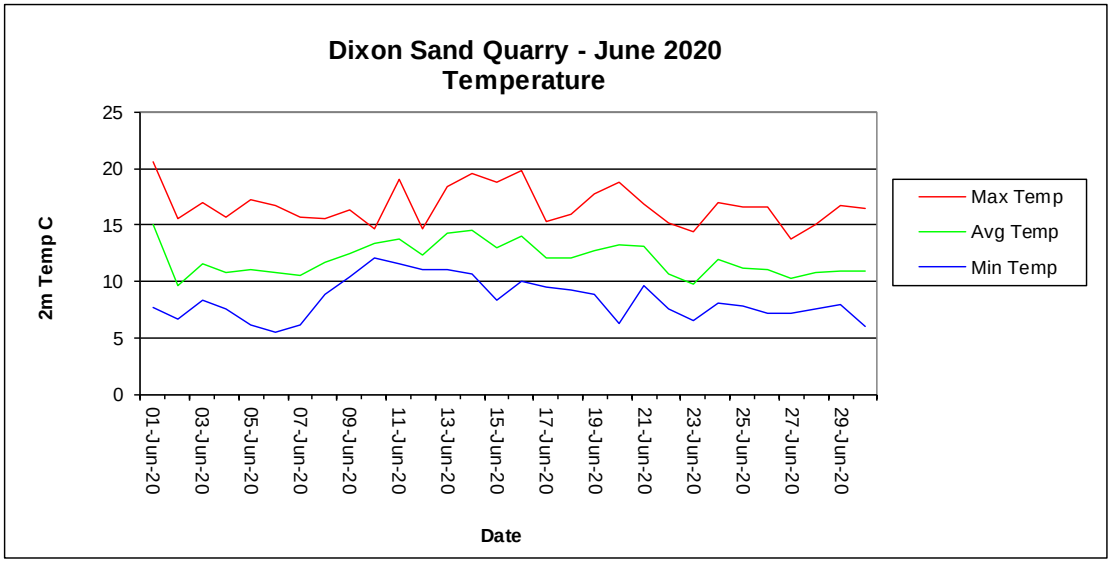
A summary of monthly results is presented in **Table 3**. Charts of meteorological parameters are presented in **Figures 2** and **3**. A windrose is provided in **Figure 4**. This provides the frequency distribution of wind speed and direction during the month to display dominant wind directions.

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 June 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
1/06/2020	7.7	15.1	20.6	0.2	0.6	6.9	21.7	34.1	54.6	76.2	985.0	989.4	993.1
2/06/2020	6.6	9.7	15.5	0.0	0.1	3.7	16.5	42.6	59.2	70.0	990.5	993.8	997.1
3/06/2020	8.3	11.6	17.0	0.0	0.1	3.6	19.1	36.3	58.1	75.1	996.4	1001.6	1008.2
4/06/2020	7.6	10.7	15.7	0.0	0.2	4.4	13.1	50.9	67.0	82.9	1008.0	1009.6	1011.5
5/06/2020	6.2	11.0	17.3	0.0	0.1	2.1	7.3	47.4	75.9	99.3	1003.7	1006.5	1009.4
6/06/2020	5.5	10.8	16.7	0.0	0.2	2.6	8.0	54.5	81.3	100.0	1000.7	1002.7	1004.8
7/06/2020	6.2	10.6	15.7	0.0	0.1	2.5	11.4	66.3	90.9	100.0	1000.0	1001.6	1003.9
8/06/2020	8.8	11.7	15.6	0.0	0.3	5.6	23.2	57.8	82.9	100.0	1003.8	1006.6	1009.9
9/06/2020	10.4	12.4	16.3	0.0	0.2	3.3	12.0	83.6	97.7	100.0	1009.4	1010.3	1012.1
10/06/2020	12.1	13.3	14.7	0.2	0.0	2.2	9.5	100.0	100.0	100.0	1003.5	1006.4	1009.8
11/06/2020	11.5	13.7	19.0	0.0	0.3	3.1	9.9	63.5	95.1	100.0	1000.9	1002.4	1003.9
12/06/2020	11.0	12.3	14.6	0.0	0.1	4.1	14.9	86.4	97.6	100.0	1002.5	1003.6	1005.3
13/06/2020	11.0	14.3	18.4	0.0	0.0	2.7	11.7	76.8	93.8	100.0	995.1	999.6	1002.6
14/06/2020	10.6	14.6	19.6	1.0	0.3	4.6	14.1	54.9	99.3	100.0	991.7	994.8	999.4
15/06/2020	8.3	12.9	18.8	0.0	0.2	3.7	13.1	65.9	99.5	100.0	999.3	1001.3	1002.9
16/06/2020	10.0	14.1	19.8	0.0	0.0	3.3	14.5	100.0	100.0	100.0	1000.5	1002.6	1004.7
17/06/2020	9.5	12.1	15.3	0.0	0.1	3.5	11.3	93.2	100.0	100.0	1004.7	1010.3	1015.0
18/06/2020	9.2	12.0	16.0	0.0	0.0	2.7	9.4	57.7	83.8	100.0	1012.1	1014.3	1016.8
19/06/2020	8.9	12.7	17.8	0.0	0.1	2.3	11.9	63.3	86.1	99.3	1005.5	1008.5	1012.1
20/06/2020	6.3	13.2	18.8	0.0	0.1	4.3	13.3	50.7	78.9	100.0	996.2	1000.9	1005.5
21/06/2020	9.6	13.1	16.9	0.8	0.2	4.2	15.8	59.9	76.8	100.0	987.6	991.2	996.1
22/06/2020	7.5	10.7	15.2	0.0	0.2	3.7	12.7	47.4	65.5	85.2	987.4	989.0	990.8
23/06/2020	6.5	9.7	14.4	0.0	0.2	3.0	13.2	45.3	64.4	76.7	989.7	991.1	993.0
24/06/2020	8.1	11.9	17.0	0.0	0.4	4.5	19.9	48.3	63.2	83.8	991.4	993.7	996.8
25/06/2020	7.8	11.2	16.6	0.0	0.0	2.1	8.1	53.8	77.0	99.2	996.5	998.0	1000.1
26/06/2020	7.2	11.0	16.6	0.0	0.0	2.5	11.2	50.9	69.4	100.0	999.6	1001.9	1004.5
27/06/2020	7.2	10.3	13.7	0.0	0.0	2.6	13.9	75.0	95.9	100.0	1004.0	1005.5	1006.7
28/06/2020	7.5	10.7	15.0	0.0	0.0	2.5	9.4	64.0	84.0	100.0	1004.6	1005.9	1007.1
29/06/2020	8.0	11.0	16.7	0.0	0.0	2.7	10.6	58.5	89.3	100.0	1004.0	1005.6	1007.3
30/06/2020	6.0	10.9	16.4	0.0	0.2	3.0	13.5	66.5	95.8	100.0	1000.5	1003.0	1005.7
Monthly	5.5	12.0	20.6	2.2	0.0	3.4	23.2	34.1	82.8	100.0	985.0	1001.7	1016.8





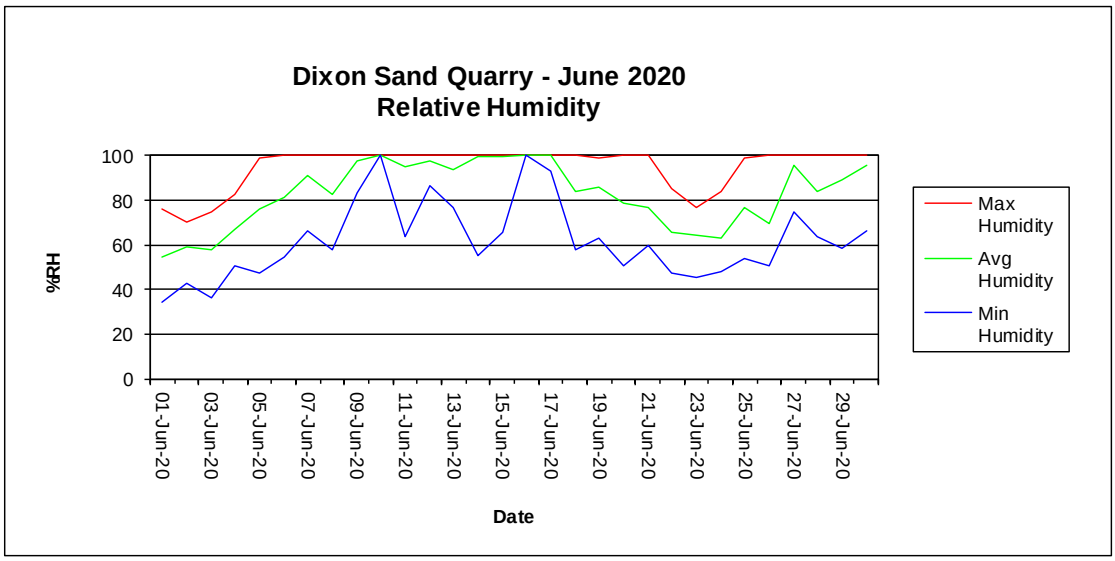
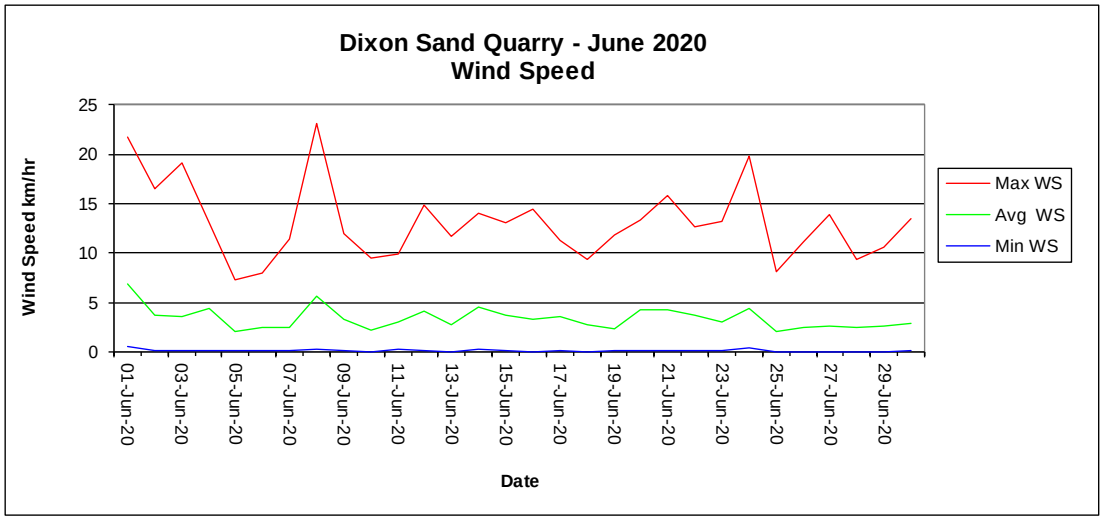


Figure 2: *Daily Rainfall, Temperature and Relative Humidity Charts*



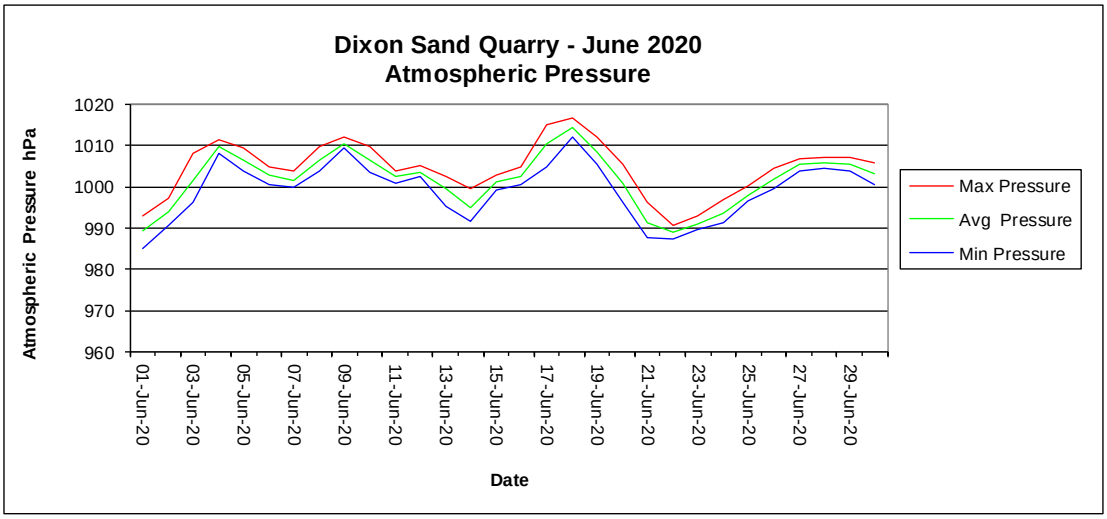


Figure 3: *Wind Speed and Atmospheric Pressure Charts*

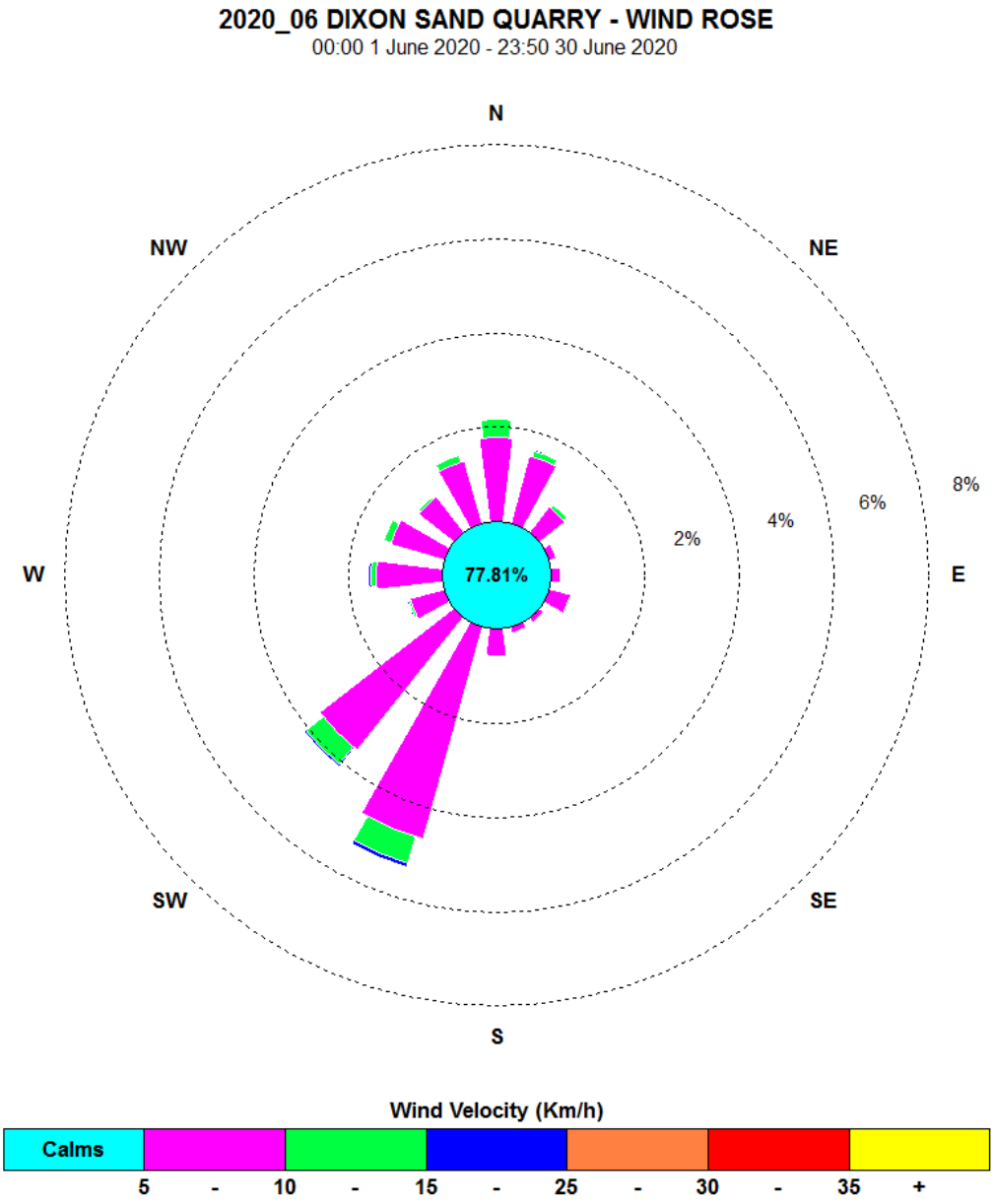


Figure 4: *Windrose Plot (km/h)*

Appendix 1

Calibration Documents (when required)

Appendix C – Groundwater and Surface Water Monitoring Data

Groundwater Monitoring Data

Report Number: 8354

Date Issued: 11/12/2019 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

vgt Laboratories Pty Ltd
PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 800

The following 8 samples were received on 3/12/2019

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
H6		3/12/2019	8354/1	Water	
H7		3/12/2019	8354/2	Water	
H9		3/12/2019	8354/3	Water	
H12		3/12/2019	8354/4	Water	
BH4		3/12/2019	8354/5	Water	
H14		3/12/2019	8354/6	Water	
BH5		3/12/2019	8354/7	Water	
H2		3/12/2019	8354/8	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8354

Date Issued: 11/12/2019 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8354/1 H6 3/12/2019	8354/2 H7 3/12/2019	8354/3 H9 3/12/2019	8354/4 H12 3/12/2019	8354/5 BH4 3/12/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	14.43	14.05	9.18	12.23	37.83
Temperature	℃	Temp	*0.1*	17.7	18.2	17.5	20.8	22.2
pH	pH Units	APHA 4500-H B	*0.1*	**4.2**	**4.4**	**4.4**	**4.6**	**5.6**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	173	88	140	182	153

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8354/6 H14 3/12/2019	8354/7 BH5 3/12/2019	8354/8 H2 3/12/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	10.61	30.37	3.48
Temperature	℃	Temp	*0.1*	21.2	19.9	19.1
pH	pH Units	APHA 4500-H B	*0.1*	**4.7**	**4.9**	**4.3**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	97	216	77

Total Dissolved Solids	Units	Method	Limit (LOR)	8354/1 H6 3/12/2019	8354/2 H7 3/12/2019	8354/3 H9 3/12/2019	8354/4 H12 3/12/2019	8354/5 BH4 3/12/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	3,080	508	77	97	66

Total Dissolved Solids	Units	Method	Limit (LOR)	8354/6 H14 3/12/2019	8354/7 BH5 3/12/2019	8354/8 H2 3/12/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	46	127	33

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

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.

Results have been approved and report finalised on 11/12/2019

Sampling Report Number: 8354

Date Issued: 11/12/2019 Revision No: 00
Sampling Conditions: Fine 18°-24°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8354/1	H6	3/12/2019 9:34 AM	D.Walker	AS5667.11, Bail	AS5667.1	
8354/2	H7	3/12/2019 9:53 AM	D.Walker	AS5667.11, Pump	AS5667.1	
8354/3	H9	3/12/2019 10:17 AM	D.Walker	AS5667.11, Pump	AS5667.1	
8354/4	H12	3/12/2019 12:02 PM	D.Walker	AS5667.11, Pump	AS5667.1	
8354/5	BH4	3/12/2019 10:48 AM	D.Walker	AS5667.11, Pump	AS5667.1	
8354/6	H14	3/12/2019 11:15 AM	D.Walker	AS5667.11, Pump	AS5667.1	
8354/7	BH5	3/12/2019 11:43 AM	D.Walker	AS5667.11, Pump	AS5667.1	
8354/8	H2	3/12/2019 12:20 PM	D.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 11/12/2019
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 6 Mnth Ground Water

Well ID	GPS location (Easting)	GPS location (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			
BH5	312159	6293753			
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
BH5	28/10/2019	0.57	>60	Fast	>60
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.

Laboratories Pty Ltd
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Report Number: 9251

Date Issued: 6/07/2020 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 samples were received on 26/06/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
H6		26/06/2020	9251/1	Water	
H7		26/06/2020	9251/2	Water	
H9		26/06/2020	9251/3	Water	
H12		26/06/2020	9251/4	Water	
BH4		26/06/2020	9251/5	Water	
H14		26/06/2020	9251/6	Water	
H2		26/06/2020	9251/7	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

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.

NATA
WORLD RECOGNISED ACCREDITATION

Test Report Number: 9251

Date Issued: 6/07/2020 Revision No: 00

Laboratories Pty Ltd

Results

Field Tests	Units	Method	Limit (LOR)	9251/1 H6 26/06/2020	9251/2 H7 26/06/2020	9251/3 H9 26/06/2020	9251/4 H12 26/06/2020	9251/5 BH4 26/06/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	11.94	12.97	8.68	10.04	37.89
Temperature	℃	Temp	*0.1*	20.2	20.3	19.9	21.1	20.7
pH	pH Units	APHA 4500-H B	*0.1*	4.2	4.3	4.4	4.4	5.7
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	122	134	128	311	151

Field Tests	Units	Method	Limit (LOR)	9251/6 H14 26/06/2020	9251/7 H2 26/06/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	9.90	2.98
Temperature	℃	Temp	*0.1*	21.2	20.1
pH	pH Units	APHA 4500-H B	*0.1*	4.4	4.5
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	81	71

Total Dissolved Solids	Units	Method	Limit (LOR)	9251/1 H6 26/06/2020	9251/2 H7 26/06/2020	9251/3 H9 26/06/2020	9251/4 H12 26/06/2020	9251/5 BH4 26/06/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	120	103	113	214	107

Total Dissolved Solids	Units	Method	Limit (LOR)	9251/6 H14 26/06/2020	9251/7 H2 26/06/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	65	45

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

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NATA WORLD RECOGNISED ACCREDITATION

Results have been approved and report finalised on 6/07/2020

Sampling Report Number: 9251

Date Issued: 6/07/2020 Revision No: 00
Sampling Conditions: Cloudy 13°-16°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9251/1	H6	26/06/2020 10:54 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9251/2	H7	26/06/2020 11:14 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9251/3	H9	26/06/2020 11:43 AM	T.Walker	AS5667.11, Pump	AS5667.1	
9251/4	H12	26/06/2020 12:01 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9251/5	BH4	26/06/2020 12:23 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9251/6	H14	26/06/2020 1:03 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9251/7	H2	26/06/2020 1:38 PM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 6/07/2020
Where method is "unknown" sampling procedures are not endorsed

NATA Accredited Laboratory – 20375

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Well Parameters:

Client: Dixon Sand (No.1) Pty Ltd
Site/Job: Haerses Road 6 Mnth Ground Water

Well ID	GPS location (Easting)	GPS location (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.

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Report Number: 7698

Date Issued: 22/07/2019 Revision Number: 01

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 13 samples were received on 12/07/2019

Client Sample Reference	Licence Ref /GPS	Date Sampled	Laboratory ID	Matrix	General Comments
BH01A		12/07/2019	7698/1	Water	
BH01B		12/07/2019	7698/2	Water	
BH01C		12/07/2019	7698/3	Water	
BH02A		12/07/2019	7698/4	Water	
BH02B		12/07/2019	7698/5	Water	
BH02C		12/07/2019	7698/6	Water	
BH03A		12/07/2019	7698/7	Water	
BH03B		12/07/2019	7698/8	Water	
BH03C		12/07/2019	7698/9	Water	
BH05B		12/07/2019	7698/10	Water	
BH06A		12/07/2019	7698/11	Water	
BH06B		12/07/2019	7698/12	Water	
BH06C		12/07/2019	7698/13	Water	

The samples have been tested and the following reports are included:

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

Anthony Crane
Laboratory Manager

NATA Accredited Laboratory – 20375

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Test Report Number: 7698

Date Issued: 22/07/2019 Revision No: 01

Results

Water Sampling and Field Tests	Units	Method	Limit of Report	7698/1 BH01A 12/07/2019	7698/2 BH01B 12/07/2019	7698/3 BH01C 12/07/2019	7698/4 BH02A 12/07/2019	7698/5 BH02B 12/07/2019
Depth to Water (TOC)	m	Depth	*0.01*	13.49	15.24	7.61	27.70	27.94
Temperature	℃	Temp	*0.1*	18.2	17.6	17.1	17.4	17.1
pH	pH Units	APHA 4500-H B	*0.1*	5.1	4.7	4.7	5.5	4.8
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	190	172	188	176	148

Water Sampling and Field Tests	Units	Method	Limit of Report	7698/6 BH02C 12/07/2019	7698/7 BH03A 12/07/2019	7698/8 BH03B 12/07/2019	7698/9 BH03C 12/07/2019	7698/10 BH05B 12/07/2019
Depth to Water (TOC)	m	Depth	*0.01*	15.30	57.79	22.14	13.54	20.22
Temperature	℃	Temp	*0.1*	17.5	18.0	17.4	17.7	18.6
pH	pH Units	APHA 4500-H B	*0.1*	5.6	6.6	4.8	4.2	5.1
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	178	297	135	160	183

Water Sampling and Field Tests	Units	Method	Limit of Report	7698/11 BH06A 12/07/2019	7698/12 BH06B 12/07/2019	7698/13 BH06C 12/07/2019
Depth to Water (TOC)	m	Depth	*0.01*	37.75	35.33	11.92
Temperature	℃	Temp	*0.1*	17.7	17.4	17.5
pH	pH Units	APHA 4500-H B	*0.1*	11.0	5.0	4.8
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	550	132	100

Total Dissolved Solids	Units	Method	Limit of Report	7698/1 BH01A 12/07/2019	7698/2 BH01B 12/07/2019	7698/3 BH01C 12/07/2019	7698/4 BH02A 12/07/2019	7698/5 BH02B 12/07/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	70	122	150	170	77

Total Dissolved Solids	Units	Method	Limit of Report	7698/6 BH02C 12/07/2019	7698/7 BH03A 12/07/2019	7698/8 BH03B 12/07/2019	7698/9 BH03C 12/07/2019	7698/10 BH05B 12/07/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	182	266	219	158	103

Total Dissolved Solids	Units	Method	Limit of Report	7698/11 BH06A 12/07/2019	7698/12 BH06B 12/07/2019	7698/13 BH06C 12/07/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	216	136	122

COMMENTS:

Depth measured to water from Top of bore PVC (m)

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 22/07/2019

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Sampling Report Number: 7698

Date Issued: 22/07/2019
Sampling Conditions: Fine 12°-18°C

Revision No: 01

Sample #	Description	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
7698/1	BH01A	12/07/2019 2:10 PM	T.Walker	AS5667.11, Pump		
7698/2	BH01B	12/07/2019 2:32 PM	T.Walker	AS5667.11, Pump		
7698/3	BH01C	12/07/2019 2:50 PM	T.Walker	AS5667.11, Bail		
7698/4	BH02A	12/07/2019 1:10 PM	T.Walker	AS5667.11, Pump		
7698/5	BH02B	12/07/2019 1:26 PM	T.Walker	AS5667.11, Bail		
7698/6	BH02C	12/07/2019 1:44 PM	T.Walker	AS5667.11, Bail		
7698/7	BH03A	12/07/2019 11:52 AM	T.Walker	AS5667.11, Bail		
7698/8	BH03B	12/07/2019 12:23 PM	T.Walker	AS5667.11, Bail		
7698/9	BH03C	12/07/2019 12:36 PM	T.Walker	AS5667.11, Bail		
7698/10	BH05B	12/07/2019 12:52 PM	T.Walker	AS5667.11, Pump		
7698/11	BH06A	12/07/2019 10:24 AM	T.Walker	AS5667.11, Pump		
7698/12	BH06B	12/07/2019 11:09 AM	T.Walker	AS5667.11, Bail		
7698/13	BH06C	12/07/2019 11:23 AM	T.Walker	AS5667.11, Bail		

Sampling procedures have been approved and report finalised on 22/07/2019
Where method is "unknown" sampling procedures are not endorsed

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Report Number: 7806

Date Issued: 13/08/2019 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 13 samples were received on 5/08/2019

Client Sample Reference	Licence Ref /GPS	Date Sampled	Laboratory ID	Matrix	General Comments
BH01A		5/08/2019	7806/1	Water	
BH01B		5/08/2019	7806/2	Water	
BH01C		5/08/2019	7806/3	Water	
BH02A		5/08/2019	7806/4	Water	
BH02B		5/08/2019	7806/5	Water	
BH02C		5/08/2019	7806/6	Water	
BH03A		5/08/2019	7806/7	Water	
BH03B		5/08/2019	7806/8	Water	
BH03C		5/08/2019	7806/9	Water	
BH05B		5/08/2019	7806/10	Water	
BH06A		5/08/2019	7806/11	Water	
BH06B		5/08/2019	7806/12	Water	
BH06C		5/08/2019	7806/13	Water	

The samples have been tested 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.

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Test Report Number: 7806

Date Issued: 13/08/2019 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit of Report	7806/1 BH01A 5/08/2019	7806/2 BH01B 5/08/2019	7806/3 BH01C 5/08/2019	7806/4 BH02A 5/08/2019	7806/5 BH02B 5/08/2019
Depth to Water (TOC)	m	Depth	*0.01*	13.90	15.57	8.05	27.99	28.15
Temperature	℃	Temp	*0.1*	17.5	17.0	16.6	17.6	17.6
pH	pH Units	APHA 4500-H B	*0.1*	5.2	4.6	5.5	5.2	4.9
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	201	173	191	169	158

Water Sampling and Field Tests	Units	Method	Limit of Report	7806/6 BH02C 5/08/2019	7806/7 BH03A 5/08/2019	7806/8 BH03B 5/08/2019	7806/9 BH03C 5/08/2019	7806/10 BH05B 5/08/2019
Depth to Water (TOC)	m	Depth	*0.01*	15.62	57.93	22.38	13.94	20.37
Temperature	℃	Temp	*0.1*	17.7	18.2	17.3	17.7	17.5
pH	pH Units	APHA 4500-H B	*0.1*	5.5	6.3	4.7	3.9	4.7
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	176	239	139	159	193

Water Sampling and Field Tests	Units	Method	Limit of Report	7806/11 BH06A 5/08/2019	7806/12 BH06B 5/08/2019	7806/13 BH06C 5/08/2019
Depth to Water (TOC)	m	Depth	*0.01*	37.88	35.45	13.15
Temperature	℃	Temp	*0.1*	17.9	17.8	18.2
pH	pH Units	APHA 4500-H B	*0.1*	10.7	4.9	4.5
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	381	137	103

Total Dissolved Solids	Units	Method	Limit of Report	7806/1 BH01A 5/08/2019	7806/2 BH01B 5/08/2019	7806/3 BH01C 5/08/2019	7806/4 BH02A 5/08/2019	7806/5 BH02B 5/08/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	126	79	127	82	83

Total Dissolved Solids	Units	Method	Limit of Report	7806/6 BH02C 5/08/2019	7806/7 BH03A 5/08/2019	7806/8 BH03B 5/08/2019	7806/9 BH03C 5/08/2019	7806/10 BH05B 5/08/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	111	164	89	92	93

Total Dissolved Solids	Units	Method	Limit of Report	7806/11 BH06A 5/08/2019	7806/12 BH06B 5/08/2019	7806/13 BH06C 5/08/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	156	81	54

COMMENTS:

Depth measured to water from Top of bore PVC (m)

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 13/08/2019

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Sampling Report Number: 7806

Date Issued: 13/08/2019
Sampling Conditions: Fine 8°-18°C

Revision No: 00

Sample #	Description	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
7806/1	BH01A	5/08/2019 1:36 PM	T.Walker	AS5667.11, Bail		
7806/2	BH01B	5/08/2019 1:49 PM	T.Walker	AS5667.11, Bail		
7806/3	BH01C	5/08/2019 2:04 PM	T.Walker	AS5667.11, Bail		
7806/4	BH02A	5/08/2019 12:54 PM	T.Walker	AS5667.11, Bail		
7806/5	BH02B	5/08/2019 1:10 PM	T.Walker	AS5667.11, Bail		
7806/6	BH02C	5/08/2019 1:21 PM	T.Walker	AS5667.11, Bail		
7806/7	BH03A	5/08/2019 11:45 AM	T.Walker	AS5667.11, Bail		
7806/8	BH03B	5/08/2019 12:08 PM	T.Walker	AS5667.11, Bail		
7806/9	BH03C	5/08/2019 12:18 PM	T.Walker	AS5667.11, Bail		
7806/10	BH05B	5/08/2019 12:40 PM	T.Walker	AS5667.11, Bail		
7806/11	BH06A	5/08/2019 10:46 AM	T.Walker	AS5667.11, Bail		
7806/12	BH06B	5/08/2019 11:08 AM	T.Walker	AS5667.11, Bail		
7806/13	BH06C	5/08/2019 11:24 AM	T.Walker	AS5667.11, Bail		

Sampling procedures have been approved and report finalised on 13/08/2019
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: 7927

Laboratories Pty Ltd
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Date Issued: 9/09/2019 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 13 samples were received on 2/09/2019

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		2/09/2019	7927/1	Water	
BH01B		2/09/2019	7927/2	Water	
BH01C		2/09/2019	7927/3	Water	
BH02A		2/09/2019	7927/4	Water	
BH02B		2/09/2019	7927/5	Water	
BH02C		2/09/2019	7927/6	Water	
BH03A		2/09/2019	7927/7	Water	
BH03B		2/09/2019	7927/8	Water	
BH03C		2/09/2019	7927/9	Water	
BH05B		2/09/2019	7927/10	Water	
BH06A		2/09/2019	7927/11	Water	
BH06B		2/09/2019	7927/12	Water	
BH06C		2/09/2019	7927/13	Water	

The samples have been tested 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.

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WORLD RECOGNISED ACCREDITATION

Test Report Number: 7927

Date Issued: 9/09/2019 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	7927/1 BH01A 2/09/2019	7927/2 BH01B 2/09/2019	7927/3 BH01C 2/09/2019	7927/4 BH02A 2/09/2019	7927/5 BH02B 2/09/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	14.25	15.50	8.12	27.93	28.10
Temperature	℃	Temp	*0.1*	18.0	17.9	16.6	18.1	18.2
pH	pH Units	APHA 4500-H B	*0.1*	5.0	4.7	4.7	5.4	5.0
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	192	181	193	181	159

Water Sampling and Field Tests	Units	Method	Limit (LOR)	7927/6 BH02C 2/09/2019	7927/7 BH03A 2/09/2019	7927/8 BH03B 2/09/2019	7927/9 BH03C 2/09/2019	7927/10 BH05B 2/09/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.64	57.93	22.35	13.92	20.38
Temperature	℃	Temp	*0.1*	17.6	18.0	17.5	17.6	18.2
pH	pH Units	APHA 4500-H B	*0.1*	5.5	6.4	4.6	4.2	4.9
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	174	235	142	162	180

Water Sampling and Field Tests	Units	Method	Limit (LOR)	7927/11 BH06A 2/09/2019	7927/12 BH06B 2/09/2019	7927/13 BH06C 2/09/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	37.91	35.38	13.09
Temperature	℃	Temp	*0.1*	17.9	17.8	17.7
pH	pH Units	APHA 4500-H B	*0.1*	11.1	5.0	4.6
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	446	138	106

Total Dissolved Solids	Units	Method	Limit (LOR)	7927/1 BH01A 2/09/2019	7927/2 BH01B 2/09/2019	7927/3 BH01C 2/09/2019	7927/4 BH02A 2/09/2019	7927/5 BH02B 2/09/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	98	89	96	109	92

Total Dissolved Solids	Units	Method	Limit (LOR)	7927/6 BH02C 2/09/2019	7927/7 BH03A 2/09/2019	7927/8 BH03B 2/09/2019	7927/9 BH03C 2/09/2019	7927/10 BH05B 2/09/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	130	139	74	73	78

Total Dissolved Solids	Units	Method	Limit (LOR)	7927/11 BH06A 2/09/2019	7927/12 BH06B 2/09/2019	7927/13 BH06C 2/09/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	136	78	35

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

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.

Results have been approved and report finalised on 9/09/2019

Sampling Report Number: 7927

Date Issued: 9/09/2019 Revision No: 00
Sampling Conditions: Fine 14°-19°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
7927/1	BH01A	2/09/2019 12:05 PM	T.Walker	AS5667.11, Pump	AS5667.1	
7927/2	BH01B	2/09/2019 12:21 PM	T.Walker	AS5667.11, Pump	AS5667.1	
7927/3	BH01C	2/09/2019 12:36 PM	T.Walker	AS5667.11, Bail	AS5667.1	
7927/4	BH02A	2/09/2019 10:56 AM	T.Walker	AS5667.11, Pump	AS5667.1	
7927/5	BH02B	2/09/2019 11:16 AM	T.Walker	AS5667.11, Pump	AS5667.1	
7927/6	BH02C	2/09/2019 11:32 AM	T.Walker	AS5667.11, Bail	AS5667.1	
7927/7	BH03A	2/09/2019 9:44 AM	T.Walker	AS5667.11, Bail	AS5667.1	
7927/8	BH03B	2/09/2019 10:01 AM	T.Walker	AS5667.11, Bail	AS5667.1	
7927/9	BH03C	2/09/2019 10:16 AM	T.Walker	AS5667.11, Bail	AS5667.1	
7927/10	BH05B	2/09/2019 10:38 AM	T.Walker	AS5667.11, Pump	AS5667.1	
7927/11	BH06A	2/09/2019 8:27 AM	T.Walker	AS5667.11, Pump	AS5667.1	
7927/12	BH06B	2/09/2019 8:50 AM	T.Walker	AS5667.11, Bail	AS5667.1	
7927/13	BH06C	2/09/2019 9:12 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 9/09/2019
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					
BH01B					
BH01C					
BH02A					
BH02B					
BH02C					
BH03A					
BH03B					
BH03C					
BH05B					
BH06A					
BH06B					
BH06C					

Well ID	Date Well Measured	Case Height (m)	Depth to bottom (m)	Recharge Rate	Approx Volume (L)
BH01A					
BH01B					
BH01C					
BH02A					
BH02B					
BH02C					
BH03A					
BH03B					
BH03C					
BH05B					
BH06A					
BH06B					
BH06C					

Note: NATA accreditation does not cover information provided in this section.

* Where indicated AHD from ground level (m) estimated based on handheld GPS.

vgt Laboratories Pty Ltd
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Report Number: 8219

Date Issued: 31/10/2019 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 13 samples were received on 28/10/2019

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		28/10/2019	8219/1	Water	
BH01B		28/10/2019	8219/2	Water	
BH01C		28/10/2019	8219/3	Water	
BH02A		28/10/2019	8219/4	Water	
BH02B		28/10/2019	8219/5	Water	
BH02C		28/10/2019	8219/6	Water	
BH03A		28/10/2019	8219/7	Water	
BH03B		28/10/2019	8219/8	Water	
BH03C		28/10/2019	8219/9	Water	
BH05B		28/10/2019	8219/10	Water	
BH06A		28/10/2019	8219/11	Water	
BH06B		28/10/2019	8219/12	Water	
BH06C		28/10/2019	8219/13	Water	

The samples have been tested 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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8219

Date Issued: 31/10/2019 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8219/1 BH01A 28/10/2019	8219/2 BH01B 28/10/2019	8219/3 BH01C 28/10/2019	8219/4 BH02A 28/10/2019	8219/5 BH02B 28/10/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	13.37	15.52	8.06	27.92	28.08
Temperature	℃	Temp	*0.1*	18.9	18.9	16.7	19.3	19.8
pH	pH Units	APHA 4500-H B	*0.1*	**4.8**	**4.9**	**4.6**	**5.3**	**4.8**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	185	177	182	172	157

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8219/6 BH02C 28/10/2019	8219/7 BH03A 28/10/2019	8219/8 BH03B 28/10/2019	8219/9 BH03C 28/10/2019	8219/10 BH05B 28/10/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.74	57.95	22.40	13.93	20.44
Temperature	℃	Temp	*0.1*	18.7	18.5	18.1	17.9	19.8
pH	pH Units	APHA 4500-H B	*0.1*	**5.4**	**6.2**	**4.6**	**4.2**	**4.7**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	167	233	137	154	179

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8219/11 BH06A 28/10/2019	8219/12 BH06B 28/10/2019	8219/13 BH06C 28/10/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.09	35.41	13.24
Temperature	℃	Temp	*0.1*	18.4	18.4	18.5
pH	pH Units	APHA 4500-H B	*0.1*	**11.1**	**4.9**	**4.8**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	508	136	103

Total Dissolved Solids	Units	Method	Limit (LOR)	8219/1 BH01A 28/10/2019	8219/2 BH01B 28/10/2019	8219/3 BH01C 28/10/2019	8219/4 BH02A 28/10/2019	8219/5 BH02B 28/10/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	68	79	113	89	78

Total Dissolved Solids	Units	Method	Limit (LOR)	8219/6 BH02C 28/10/2019	8219/7 BH03A 28/10/2019	8219/8 BH03B 28/10/2019	8219/9 BH03C 28/10/2019	8219/10 BH05B 28/10/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	107	118	84	70	84

Total Dissolved Solids	Units	Method	Limit (LOR)	8219/11 BH06A 28/10/2019	8219/12 BH06B 28/10/2019	8219/13 BH06C 28/10/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	170	67	45

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

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.

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

Results have been approved and report finalised on 31/10/2019

Sampling Report Number: 8219

Date Issued: 31/10/2019 Revision No: 00
Sampling Conditions: Cloudy 17°-22°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8219/1	BH01A	28/10/2019 1:14 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8219/2	BH01B	28/10/2019 1:31 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8219/3	BH01C	28/10/2019 1:48 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8219/4	BH02A	28/10/2019 12:15 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8219/5	BH02B	28/10/2019 12:34 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8219/6	BH02C	28/10/2019 12:52 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8219/7	BH03A	28/10/2019 10:56 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8219/8	BH03B	28/10/2019 11:12 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8219/9	BH03C	28/10/2019 11:27 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8219/10	BH05B	28/10/2019 11:55 AM	T.Walker	AS5667.11, Pump	AS5667.1	
8219/11	BH06A	28/10/2019 9:56 AM	T.Walker	AS5667.11, Bail	AS5667.1	No vehicle access
8219/12	BH06B	28/10/2019 10:10 AM	T.Walker	AS5667.11, Bail	AS5667.1	No vehicle access
8219/13	BH06C	28/10/2019 10:26 AM	T.Walker	AS5667.11, Bail	AS5667.1	No vehicle access

Sampling procedures have been approved and report finalised on 31/10/2019
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			

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

Note: NATA accreditation does not cover information provided in this section.

* Where indicated AHD from ground level (m) estimated based on handheld GPS.

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Report Number: 8334

Date Issued: 29/11/2019 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 13 samples were received on 25/11/2019

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		25/11/2019	8334/1	Water	
BH01B		25/11/2019	8334/2	Water	
BH01C		25/11/2019	8334/3	Water	
BH02A		25/11/2019	8334/4	Water	
BH02B		25/11/2019	8334/5	Water	
BH02C		25/11/2019	8334/6	Water	
BH03A		25/11/2019	8334/7	Water	
BH03B		25/11/2019	8334/8	Water	
BH03C		25/11/2019	8334/9	Water	
BH05B		25/11/2019	8334/10	Water	
BH06A		25/11/2019	8334/11	Water	
BH06B		25/11/2019	8334/12	Water	
BH06C		25/11/2019	8334/13	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.

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WORLD RECOGNISED ACCREDITATION

Test Report Number: 8334

Date Issued: 29/11/2019 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8334/1 BH01A 25/11/2019	8334/2 BH01B 25/11/2019	8334/3 BH01C 25/11/2019	8334/4 BH02A 25/11/2019	8334/5 BH02B 25/11/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	13.21	15.63	7.94	27.87	28.05
Temperature	℃	Temp	*0.1*	21.3	19.9	17.6	20.5	20.8
pH	pH Units	APHA 4500-H B	*0.1*	**5.0**	**4.7**	**4.7**	**5.3**	**5.0**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	202	182	187	184	164

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8334/6 BH02C 25/11/2019	8334/7 BH03A 25/11/2019	8334/8 BH03B 25/11/2019	8334/9 BH03C 25/11/2019	8334/10 BH05B 25/11/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.84	58.05	22.32	13.85	20.34
Temperature	℃	Temp	*0.1*	20.6	19.4	18.8	18.6	21.8
pH	pH Units	APHA 4500-H B	*0.1*	**5.5**	**6.1**	**4.6**	**4.2**	**5.1**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	216	226	141	165	194

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8334/11 BH06A 25/11/2019	8334/12 BH06B 25/11/2019	8334/13 BH06C 25/11/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.14	35.33	13.18
Temperature	℃	Temp	*0.1*	20.9	19.0	18.6
pH	pH Units	APHA 4500-H B	*0.1*	**11.3**	**4.9**	**4.9**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	640	139	105

Total Dissolved Solids	Units	Method	Limit (LOR)	8334/1 BH01A 25/11/2019	8334/2 BH01B 25/11/2019	8334/3 BH01C 25/11/2019	8334/4 BH02A 25/11/2019	8334/5 BH02B 25/11/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	112	110	93	97	93

Total Dissolved Solids	Units	Method	Limit (LOR)	8334/6 BH02C 25/11/2019	8334/7 BH03A 25/11/2019	8334/8 BH03B 25/11/2019	8334/9 BH03C 25/11/2019	8334/10 BH05B 25/11/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	147	139	87	90	104

Total Dissolved Solids	Units	Method	Limit (LOR)	8334/11 BH06A 25/11/2019	8334/12 BH06B 25/11/2019	8334/13 BH06C 25/11/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	216	70	63

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

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.

Results have been approved and report finalised on 29/11/2019

Sampling Report Number: 8334

Date Issued: 29/11/2019 Revision No: 00
Sampling Conditions: Cloudy 22°-33°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8334/1	BH01A	25/11/2019 1:39 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8334/2	BH01B	25/11/2019 2:01 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8334/3	BH01C	25/11/2019 2:16 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8334/4	BH02A	25/11/2019 12:26 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8334/5	BH02B	25/11/2019 12:41 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8334/6	BH02C	25/11/2019 12:56 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8334/7	BH03A	25/11/2019 11:14 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8334/8	BH03B	25/11/2019 11:42 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8334/9	BH03C	25/11/2019 11:52 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8334/10	BH05B	25/11/2019 12:10 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8334/11	BH06A	25/11/2019 10:21 AM	T.Walker	AS5667.11, Pump	AS5667.1	
8334/12	BH06B	25/11/2019 10:42 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8334/13	BH06C	25/11/2019 10:54 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 29/11/2019
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			

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

Note: NATA accreditation does not cover information provided in this section.

* Where indicated AHD from ground level (m) estimated based on handheld GPS.

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Report Number: 8408

Date Issued: 20/12/2019 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 13 samples were received on 12/12/2019

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		12/12/2019	8408/1	Water	
BH01B		12/12/2019	8408/2	Water	
BH01C		12/12/2019	8408/3	Water	
BH02A		12/12/2019	8408/4	Water	
BH02B		12/12/2019	8408/5	Water	
BH02C		12/12/2019	8408/6	Water	
BH03A		12/12/2019	8408/7	Water	
BH03B		12/12/2019	8408/8	Water	
BH03C		12/12/2019	8408/9	Water	
BH05B		12/12/2019	8408/10	Water	
BH06A		12/12/2019	8408/11	Water	
BH06B		12/12/2019	8408/12	Water	
BH06C		12/12/2019	8408/13	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8408

Date Issued: 20/12/2019 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8408/1 BH01A 12/12/2019	8408/2 BH01B 12/12/2019	8408/3 BH01C 12/12/2019	8408/4 BH02A 12/12/2019	8408/5 BH02B 12/12/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	13.38	15.70	8.02	27.89	28.05
Temperature	℃	Temp	*0.1*	20.7	19.4	17.8	19.7	20.1
pH	pH Units	APHA 4500-H B	*0.1*	**4.9**	**4.6**	**4.6**	**5.3**	**5.0**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	189	174	183	173	154

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8408/6 BH02C 12/12/2019	8408/7 BH03A 12/12/2019	8408/8 BH03B 12/12/2019	8408/9 BH03C 12/12/2019	8408/10 BH05B 12/12/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.91	58.10	22.36	13.91	20.39
Temperature	℃	Temp	*0.1*	21.1	19.1	18.8	18.1	20.2
pH	pH Units	APHA 4500-H B	*0.1*	**5.8**	**6.2**	**4.8**	**4.2**	**5.2**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	202	225	135	151	185

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8408/11 BH06A 12/12/2019	8408/12 BH06B 12/12/2019	8408/13 BH06C 12/12/2019
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.06	35.34	13.19
Temperature	℃	Temp	*0.1*	20.1	18.8	18.5
pH	pH Units	APHA 4500-H B	*0.1*	**11.0**	**4.8**	**4.4**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	396	131	101

Total Dissolved Solids	Units	Method	Limit (LOR)	8408/1 BH01A 12/12/2019	8408/2 BH01B 12/12/2019	8408/3 BH01C 12/12/2019	8408/4 BH02A 12/12/2019	8408/5 BH02B 12/12/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	80	102	121	104	103

Total Dissolved Solids	Units	Method	Limit (LOR)	8408/6 BH02C 12/12/2019	8408/7 BH03A 12/12/2019	8408/8 BH03B 12/12/2019	8408/9 BH03C 12/12/2019	8408/10 BH05B 12/12/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	576	817	116	136	135

Total Dissolved Solids	Units	Method	Limit (LOR)	8408/11 BH06A 12/12/2019	8408/12 BH06B 12/12/2019	8408/13 BH06C 12/12/2019
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	204	119	72

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

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.

Results have been approved and report finalised on 20/12/2019

Sampling Report Number: 8408

Date Issued: 20/12/2019 Revision No: 00
Sampling Conditions: Cloudy 19°-23°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8408/1	BH01A	12/12/2019 1:27 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8408/2	BH01B	12/12/2019 1:47 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8408/3	BH01C	12/12/2019 2:02 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8408/4	BH02A	12/12/2019 12:17 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8408/5	BH02B	12/12/2019 12:33 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8408/6	BH02C	12/12/2019 12:48 PM	T.Walker	AS5667.11, Bail	AS5667.1	Almost empty, not recharging
8408/7	BH03A	12/12/2019 11:13 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8408/8	BH03B	12/12/2019 11:29 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8408/9	BH03C	12/12/2019 11:43 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8408/10	BH05B	12/12/2019 12:01 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8408/11	BH06A	12/12/2019 10:28 AM	T.Walker	AS5667.11, Pump	AS5667.1	
8408/12	BH06B	12/12/2019 10:43 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8408/13	BH06C	12/12/2019 10:58 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 20/12/2019
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			

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

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: 8523

vgt Laboratories Pty Ltd
PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 800

Date Issued: 28/01/2020 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 13 samples were received on 20/01/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		20/01/2020	8523/1	Water	
BH01B		20/01/2020	8523/2	Water	
BH01C		20/01/2020	8523/3	Water	
BH02A		20/01/2020	8523/4	Water	
BH02B		20/01/2020	8523/5	Water	
BH02C		20/01/2020	8523/6	Water	
BH03A		20/01/2020	8523/7	Water	
BH03B		20/01/2020	8523/8	Water	
BH03C		20/01/2020	8523/9	Water	
BH05B		20/01/2020	8523/10	Water	
BH06A		20/01/2020	8523/11	Water	
BH06B		20/01/2020	8523/12	Water	
BH06C		20/01/2020	8523/13	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8523

Date Issued: 28/01/2020 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8523/1 BH01A 20/01/2020	8523/2 BH01B 20/01/2020	8523/3 BH01C 20/01/2020	8523/4 BH02A 20/01/2020	8523/5 BH02B 20/01/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	13.51	15.66	7.98	27.46	19.75
Temperature	℃	Temp	*0.1*	19.7	19.7	19.1	20.8	20.4
pH	pH Units	APHA 4500-H B	*0.1*	**4.8**	**4.7**	**4.5**	**5.4**	**4.8**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	191	177	193	185	162

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8523/6 BH02C 20/01/2020	8523/7 BH03A 20/01/2020	8523/8 BH03B 20/01/2020	8523/9 BH03C 20/01/2020	8523/10 BH05B 20/01/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.94	58.19	22.28	13.88	20.33
Temperature	℃	Temp	*0.1*	[NT]	19.4	18.8	18.6	22.3
pH	pH Units	APHA 4500-H B	*0.1*	[NT]	**6.1**	**4.6**	**4.1**	**5.2**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	[NT]	222	141	158	205

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8523/11 BH06A 20/01/2020	8523/12 BH06B 20/01/2020	8523/13 BH06C 20/01/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.13	35.26	13.16
Temperature	℃	Temp	*0.1*	22.7	20.1	18.9
pH	pH Units	APHA 4500-H B	*0.1*	**11.2**	**5.0**	**4.4**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	639	150	113

Total Dissolved Solids	Units	Method	Limit (LOR)	8523/1 BH01A 20/01/2020	8523/2 BH01B 20/01/2020	8523/3 BH01C 20/01/2020	8523/4 BH02A 20/01/2020	8523/5 BH02B 20/01/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	97	135	106	119	80

Total Dissolved Solids	Units	Method	Limit (LOR)	8523/7 BH03A 20/01/2020	8523/8 BH03B 20/01/2020	8523/9 BH03C 20/01/2020	8523/10 BH05B 20/01/2020	8523/11 BH06A 20/01/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	133	42	96	123	208

Total Dissolved Solids	Units	Method	Limit (LOR)	8523/12 BH06B 20/01/2020	8523/13 BH06C 20/01/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	82	57

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

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.

Results have been approved and report finalised on 28/01/2020

Sampling Report Number: 8523

Date Issued: 28/01/2020 Revision No: 00
Sampling Conditions: Cloudy 24°-29°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8523/1	BH01A	20/01/2020 1:46 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8523/2	BH01B	20/01/2020 2:06 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8523/3	BH01C	20/01/2020 2:18 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8523/4	BH02A	20/01/2020 12:52 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8523/5	BH02B	20/01/2020 1:10 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8523/6	BH02C	20/01/2020 1:22 PM	T.Walker	AS5667.11, Bail	AS5667.1	Insufficient Water
8523/7	BH03A	20/01/2020 11:45 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8523/8	BH03B	20/01/2020 12:01 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8523/9	BH03C	20/01/2020 12:13 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8523/10	BH05B	20/01/2020 12:32 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8523/11	BH06A	20/01/2020 10:52 AM	T.Walker	AS5667.11, Pump	AS5667.1	String was knotted for logger
8523/12	BH06B	20/01/2020 11:10 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8523/13	BH06C	20/01/2020 11:20 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 28/01/2020
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			

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

Note: NATA accreditation does not cover information provided in this section.

* Where indicated AHD from ground level (m) estimated based on handheld GPS.

vgt Laboratories Pty Ltd
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www.vgt.com.au ABN 77 621 943 800

Report Number: 8611

Date Issued: 24/02/2020 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 13 samples were received on 17/02/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		17/02/2020	8611/1	Water	
BH01B		17/02/2020	8611/2	Water	
BH01C		17/02/2020	8611/3	Water	
BH02A		17/02/2020	8611/4	Water	
BH02B		17/02/2020	8611/5	Water	
BH02C		17/02/2020	8611/6	Water	
BH03A		17/02/2020	8611/7	Water	
BH03B		17/02/2020	8611/8	Water	
BH03C		17/02/2020	8611/9	Water	
BH05B		17/02/2020	8611/10	Water	
BH06A		17/02/2020	8611/11	Water	
BH06B		17/02/2020	8611/12	Water	
BH06C		17/02/2020	8611/13	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8611

Date Issued: 24/02/2020 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8611/1 BH01A 17/02/2020	8611/2 BH01B 17/02/2020	8611/3 BH01C 17/02/2020	8611/4 BH02A 17/02/2020	8611/5 BH02B 17/02/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	12.07	15.67	8.07	27.58	20.10
Temperature	℃	Temp	*0.1*	20.3	18.2	19.4	19.0	19.0
pH	pH Units	APHA 4500-H B	*0.1*	6.6	4.6	4.6	5.3	4.9
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	272	170	189	176	157

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8611/6 BH02C 17/02/2020	8611/7 BH03A 17/02/2020	8611/8 BH03B 17/02/2020	8611/9 BH03C 17/02/2020	8611/10 BH05B 17/02/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	16.05	58.25	22.37	13.96	20.43
Temperature	℃	Temp	*0.1*	[NT]	18.5	18.1	18.1	19.0
pH	pH Units	APHA 4500-H B	*0.1*	[NT]	6.3	4.6	4.2	5.0
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	[NT]	275	137	156	175

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8611/11 BH06A 17/02/2020	8611/12 BH06B 17/02/2020	8611/13 BH06C 17/02/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.31	35.39	13.14
Temperature	℃	Temp	*0.1*	19.2	18.9	18.9
pH	pH Units	APHA 4500-H B	*0.1*	11.3	4.9	4.4
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	664	142	108

Total Dissolved Solids	Units	Method	Limit (LOR)	8611/1 BH01A 17/02/2020	8611/2 BH01B 17/02/2020	8611/3 BH01C 17/02/2020	8611/4 BH02A 17/02/2020	8611/5 BH02B 17/02/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	194	73	82	68	56

Total Dissolved Solids	Units	Method	Limit (LOR)	8611/7 BH03A 17/02/2020	8611/8 BH03B 17/02/2020	8611/9 BH03C 17/02/2020	8611/10 BH05B 17/02/2020	8611/11 BH06A 17/02/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	188	59	58	79	240

Total Dissolved Solids	Units	Method	Limit (LOR)	8611/12 BH06B 17/02/2020	8611/13 BH06C 17/02/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	76	82

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

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.

Results have been approved and report finalised on 24/02/2020

Sampling Report Number: 8611

Date Issued: 24/02/2020 Revision No: 00
Sampling Conditions: Showers 19°-21°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8611/1	BH01A	17/02/2020 1:35 PM	T.Walker	AS5667.11, Bail	AS5667.1	No vehicle access for pumping
8611/2	BH01B	17/02/2020 1:52 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/3	BH01C	17/02/2020 2:05 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/4	BH02A	17/02/2020 12:41 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8611/5	BH02B	17/02/2020 12:59 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8611/6	BH02C	17/02/2020 1:12 PM	T.Walker	AS5667.11, Bail	AS5667.1	Insufficient water for sample
8611/7	BH03A	17/02/2020 11:20 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/8	BH03B	17/02/2020 11:38 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/9	BH03C	17/02/2020 11:52 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/10	BH05B	17/02/2020 12:21 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8611/11	BH06A	17/02/2020 10:19 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/12	BH06B	17/02/2020 10:43 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8611/13	BH06C	17/02/2020 10:58 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 24/02/2020
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			

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

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: 8777

vgt Laboratories Pty Ltd
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Date Issued: 23/03/2020 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 13 samples were received on 16/03/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		16/03/2020	8777/1	Water	
BH01B		16/03/2020	8777/2	Water	
BH01C		16/03/2020	8777/3	Water	
BH02A		16/03/2020	8777/4	Water	
BH02B		16/03/2020	8777/5	Water	
BH02C		16/03/2020	8777/6	Water	No water to ssample.
BH03A		16/03/2020	8777/7	Water	
BH03B		16/03/2020	8777/8	Water	
BH03C		16/03/2020	8777/9	Water	
BH05B		16/03/2020	8777/10	Water	
BH06A		16/03/2020	8777/11	Water	
BH06B		16/03/2020	8777/12	Water	
BH06C		16/03/2020	8777/13	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8777

Date Issued: 23/03/2020 Revision No: 00

Results

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8777/1 BH01A 16/03/2020	8777/2 BH01B 16/03/2020	8777/3 BH01C 16/03/2020	8777/4 BH02A 16/03/2020	8777/5 BH02B 16/03/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	12.97	15.67	7.78	27.59	20.08
Temperature	℃	Temp	*0.1*	20.9	19.8	21.8	20.6	20.6
pH	pH Units	APHA 4500-H B	*0.1*	6.7	**4.8**	**4.9**	**5.4**	**4.8**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	293	158	192	166	154

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8777/6 BH02C 16/03/2020	8777/7 BH03A 16/03/2020	8777/8 BH03B 16/03/2020	8777/9 BH03C 16/03/2020	8777/10 BH05B 16/03/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	16.07	58.27	22.45	13.89	20.46
Temperature	℃	Temp	*0.1*	[NT]	20.7	21.0	20.5	20.5
pH	pH Units	APHA 4500-H B	*0.1*	[NT]	**6.4**	**4.8**	**4.4**	**4.7**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	[NT]	293	138	164	177

Water Sampling and Field Tests	Units	Method	Limit (LOR)	8777/11 BH06A 16/03/2020	8777/12 BH06B 16/03/2020	8777/13 BH06C 16/03/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.47	35.50	13.15
Temperature	℃	Temp	*0.1*	21.0	21.1	21.1
pH	pH Units	APHA 4500-H B	*0.1*	**11.3**	**4.8**	**4.2**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	694	135	110

Total Dissolved Solids	Units	Method	Limit (LOR)	8777/1 BH01A 16/03/2020	8777/2 BH01B 16/03/2020	8777/3 BH01C 16/03/2020	8777/4 BH02A 16/03/2020	8777/5 BH02B 16/03/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	88	108	133	117	102

Total Dissolved Solids	Units	Method	Limit (LOR)	8777/7 BH03A 16/03/2020	8777/8 BH03B 16/03/2020	8777/9 BH03C 16/03/2020	8777/10 BH05B 16/03/2020	8777/11 BH06A 16/03/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	225	83	83	101	111

Total Dissolved Solids	Units	Method	Limit (LOR)	8777/12 BH06B 16/03/2020	8777/13 BH06C 16/03/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	80	80

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

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.

Results have been approved and report finalised on 23/03/2020

Sampling Report Number: 8777

Date Issued: 23/03/2020 Revision No: 00
Sampling Conditions: Showers, 15-19°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8777/1	BH01A	16/03/2020 1:29 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/2	BH01B	16/03/2020 1:41 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/3	BH01C	16/03/2020 1:53 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/4	BH02A	16/03/2020 12:40 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/5	BH02B	16/03/2020 12:58 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/6	BH02C	16/03/2020 1:10 PM	T.Walker	AS5667.11, Bail	AS5667.1	No water to bail.
8777/7	BH03A	16/03/2020 11:18 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/8	BH03B	16/03/2020 11:37 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/9	BH03C	16/03/2020 11:54 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/10	BH05B	16/03/2020 12:18 PM	T.Walker	AS5667.11, Bail	AS5667.1	Some slack in logger string- approx 10cm-sitting on bottom?
8777/11	BH06A	16/03/2020 10:32 AM	T.Walker	AS5667.11, Bail	AS5667.1	Was approx 0.5m tangle in string.
8777/12	BH06B	16/03/2020 10:50 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8777/13	BH06C	16/03/2020 11:04 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 23/03/2020
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			

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

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: 8933

vgt Laboratories Pty Ltd
PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 800

Date Issued: 22/04/2020 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 13 samples were received on 16/04/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		16/04/2020	8933/1	Water	
BH01B		16/04/2020	8933/2	Water	
BH01C		16/04/2020	8933/3	Water	
BH02A		16/04/2020	8933/4	Water	
BH02B		16/04/2020	8933/5	Water	
BH02C		16/04/2020	8933/6	Water	Insufficient water to sample
BH03A		16/04/2020	8933/7	Water	
BH03B		16/04/2020	8933/8	Water	
BH03C		16/04/2020	8933/9	Water	
BH05B		16/04/2020	8933/10	Water	
BH06A		16/04/2020	8933/11	Water	
BH06B		16/04/2020	8933/12	Water	
BH06C		16/04/2020	8933/13	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 8933

Date Issued: 22/04/2020 Revision No: 00

Results

Field Tests	Units	Method	Limit (LOR)	8933/1 BH01A 16/04/2020	8933/2 BH01B 16/04/2020	8933/3 BH01C 16/04/2020	8933/4 BH02A 16/04/2020	8933/5 BH02B 16/04/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	12.28	15.51	7.18	27.27	19.84
Temperature	℃	Temp	*0.1*	21.2	20.6	21.9	21.9	21.8
pH	pH Units	APHA 4500-H B	*0.1*	**5.0**	**5.2**	**4.3**	**5.2**	**4.6**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	205	200	209	188	164

Field Tests	Units	Method	Limit (LOR)	8933/6 BH02C 16/04/2020	8933/7 BH03A 16/04/2020	8933/8 BH03B 16/04/2020	8933/9 BH03C 16/04/2020	8933/10 BH05B 16/04/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.80	58.12	22.29	13.50	20.33
Temperature	℃	Temp	*0.1*	[NT]	21.2	21.1	21.0	22.4
pH	pH Units	APHA 4500-H B	*0.1*	[NT]	**6.2**	**4.5**	**4.1**	**4.9**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	[NT]	255	148	176	193

Field Tests	Units	Method	Limit (LOR)	8933/11 BH06A 16/04/2020	8933/12 BH06B 16/04/2020	8933/13 BH06C 16/04/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.32	35.37	12.77
Temperature	℃	Temp	*0.1*	22.2	21.2	21.4
pH	pH Units	APHA 4500-H B	*0.1*	**11.3**	**4.8**	**4.1**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	680	143	121

Total Dissolved Solids	Units	Method	Limit (LOR)	8933/1 BH01A 16/04/2020	8933/2 BH01B 16/04/2020	8933/3 BH01C 16/04/2020	8933/4 BH02A 16/04/2020	8933/5 BH02B 16/04/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	94	96	112	106	76

Total Dissolved Solids	Units	Method	Limit (LOR)	8933/7 BH03A 16/04/2020	8933/8 BH03B 16/04/2020	8933/9 BH03C 16/04/2020	8933/10 BH05B 16/04/2020	8933/11 BH06A 16/04/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	150	80	88	101	192

Total Dissolved Solids	Units	Method	Limit (LOR)	8933/12 BH06B 16/04/2020	8933/13 BH06C 16/04/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	84	24

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.

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.

Results have been approved and report finalised on 22/04/2020

Sampling Report Number: 8933

Date Issued: 22/04/2020 Revision No: 00
Sampling Conditions: Cloudy, 23-26°C

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
8933/1	BH01A	16/04/2020 1:49 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8933/2	BH01B	16/04/2020 2:05 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8933/3	BH01C	16/04/2020 2:31 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8933/4	BH02A	16/04/2020 12:49 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8933/5	BH02B	16/04/2020 1:06 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8933/6	BH02C	16/04/2020 1:21 PM	T.Walker	AS5667.11, Bail	AS5667.1	Insufficient water to sample
8933/7	BH03A	16/04/2020 11:32 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8933/8	BH03B	16/04/2020 11:50 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8933/9	BH03C	16/04/2020 12:05 PM	T.Walker	AS5667.11, Bail	AS5667.1	
8933/10	BH05B	16/04/2020 12:25 PM	T.Walker	AS5667.11, Pump	AS5667.1	
8933/11	BH06A	16/04/2020 10:32 AM	T.Walker	AS5667.11, Pump	AS5667.1	
8933/12	BH06B	16/04/2020 10:58 AM	T.Walker	AS5667.11, Bail	AS5667.1	
8933/13	BH06C	16/04/2020 11:14 AM	T.Walker	AS5667.11, Bail	AS5667.1	

Sampling procedures have been approved and report finalised on 22/04/2020
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			

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

Note: NATA accreditation does not cover information provided in this section.

* Where indicated AHD from ground level (m) estimated based on handheld GPS.

vgt Laboratories Pty Ltd
PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 800

Report Number: 9004

Date Issued: 5/06/2020 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 samples were received on 29/05/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		29/05/2020	9004/1	Water	
BH01B		29/05/2020	9004/2	Water	
BH01C		29/05/2020	9004/3	Water	
BH02A		29/05/2020	9004/4	Water	
BH02B		29/05/2020	9004/5	Water	
BH02C		29/05/2020	9004/6	Water	
BH03A		29/05/2020	9004/7	Water	
BH03B		29/05/2020	9004/8	Water	
BH03C		29/05/2020	9004/9	Water	
BH05B		29/05/2020	9004/10	Water	
BH06A		29/05/2020	9004/11	Water	
BH06B		29/05/2020	9004/12	Water	
BH06C		29/05/2020	9004/13	Water	
BH5		29/05/2020	9004/14	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 9004

Date Issued: 5/06/2020 Revision No: 00

Results

Field Tests	Units	Method	Limit (LOR)	9004/1 BH01A 29/05/2020	9004/2 BH01B 29/05/2020	9004/3 BH01C 29/05/2020	9004/4 BH02A 29/05/2020	9004/5 BH02B 29/05/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	11.90	15.64	7.24	27.14	19.78
Temperature	℃	Temp	*0.1*	20.1	20.0	20.7	20.8	20.8
pH	pH Units	APHA 4500-H B	*0.1*	**5.6**	**4.6**	**4.6**	**5.2**	**4.6**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	211	172	196	172	156

Field Tests	Units	Method	Limit (LOR)	9004/6 BH02C 29/05/2020	9004/7 BH03A 29/05/2020	9004/8 BH03B 29/05/2020	9004/9 BH03C 29/05/2020	9004/10 BH05B 29/05/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.61	58.19	22.43	13.81	20.30
Temperature	℃	Temp	*0.1*	20.5	20.7	20.4	20.6	20.5
pH	pH Units	APHA 4500-H B	*0.1*	**5.1**	**6.2**	**4.5**	**4.1**	**4.7**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	164	244	142	170	174

Field Tests	Units	Method	Limit (LOR)	9004/11 BH06A 29/05/2020	9004/12 BH06B 29/05/2020	9004/13 BH06C 29/05/2020	9004/14 BH5 29/05/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.49	35.47	12.99	30.23
Temperature	℃	Temp	*0.1*	20.8	20.9	21.1	20.8
pH	pH Units	APHA 4500-H B	*0.1*	**11.3**	**5.0**	**4.2**	**5.5**
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	641	154	122	223

Total Dissolved Solids	Units	Method	Limit (LOR)	9004/1 BH01A 29/05/2020	9004/2 BH01B 29/05/2020	9004/3 BH01C 29/05/2020	9004/4 BH02A 29/05/2020	9004/5 BH02B 29/05/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	184	101	122	123	132

Total Dissolved Solids	Units	Method	Limit (LOR)	9004/6 BH02C 29/05/2020	9004/7 BH03A 29/05/2020	9004/8 BH03B 29/05/2020	9004/9 BH03C 29/05/2020	9004/10 BH05B 29/05/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	136	173	98	105	107

Total Dissolved Solids	Units	Method	Limit (LOR)	9004/11 BH06A 29/05/2020	9004/12 BH06B 29/05/2020	9004/13 BH06C 29/05/2020	9004/14 BH5 29/05/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	278	98	237	126

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

Please note: Results **bold** indicate an exceedance of the relevant guideline.
NEPM SCHEDULE B1 - Groundwater Investigation Limits (GILs) for Freshwater.
When considering the pass or fail of tests against guidelines, the measurement of unc

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NATA
WORLD RECOGNISED ACCREDITATION

Results have been approved and report finalised on 5/06/2020

Sampling Report Number: 9004

Date Issued: 5/06/2020 Revision No: 00
Sampling Conditions: Cloudy 13°-17°C

vgt Laboratories Pty Ltd

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9004/1	BH01A	29/05/2020 2:48 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9004/2	BH01B	29/05/2020 3:17 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9004/3	BH01C	29/05/2020 3:33 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/4	BH02A	29/05/2020 1:36 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9004/5	BH02B	29/05/2020 2:01 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9004/6	BH02C	29/05/2020 2:21 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/7	BH03A	29/05/2020 12:14 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/8	BH03B	29/05/2020 12:30 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/9	BH03C	29/05/2020 12:45 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/10	BH05B	29/05/2020 1:14 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9004/11	BH06A	29/05/2020 11:17 AM	T.Walker	AS5667.11, Pump	AS5667.1	
9004/12	BH06B	29/05/2020 11:43 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/13	BH06C	29/05/2020 11:58 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9004/14	BH5	29/05/2020 12:59 PM	T.Walker	AS5667.11, Pump	AS5667.1	

Sampling procedures have been approved and report finalised on 5/06/2020
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.

NATA WORLD RECOGNISED ACCREDITATION

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.

vgt Laboratories Pty Ltd
PO Box 2335 Greenhills NSW 2323
P (02)4028 6412 E mail@vgt.com.au
www.vgt.com.au ABN 77 621 943 800

Report Number: 9250

Date Issued: 3/07/2020 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

The following 14 samples were received on 25/06/2020

Client Sample Reference	Licence Reference	Date Sampled	Lab ID	Matrix	General Comments
BH01A		25/06/2020	9250/1	Water	
BH01B		25/06/2020	9250/2	Water	
BH01C		25/06/2020	9250/3	Water	
BH02A		25/06/2020	9250/4	Water	
BH02B		25/06/2020	9250/5	Water	
BH02C		25/06/2020	9250/6	Water	
BH03A		25/06/2020	9250/7	Water	
BH03B		25/06/2020	9250/8	Water	
BH03C		25/06/2020	9250/9	Water	
BH05B		25/06/2020	9250/10	Water	
BH06A		25/06/2020	9250/11	Water	
BH06B		25/06/2020	9250/12	Water	
BH06C		25/06/2020	9250/13	Water	
BH5		25/06/2020	9250/14	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.

NATA WORLD RECOGNISED ACCREDITATION

Test Report Number: 9250

Date Issued: 3/07/2020 Revision No: 00

Results

Field Tests	Units	Method	Limit (LOR)	9250/1 BH01A 25/06/2020	9250/2 BH01B 25/06/2020	9250/3 BH01C 25/06/2020	9250/4 BH02A 25/06/2020	9250/5 BH02B 25/06/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	11.27	15.60	7.12	26.93	19.25
Temperature	℃	Temp	*0.1*	20.2	20.1	20.3	20.9	20.7
pH	pH Units	APHA 4500-H B	*0.1*	5.4	4.8	4.6	5.0	4.3
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	212	183	202	175	163

Field Tests	Units	Method	Limit (LOR)	9250/6 BH02C 25/06/2020	9250/7 BH03A 25/06/2020	9250/8 BH03B 25/06/2020	9250/9 BH03C 25/06/2020	9250/10 BH05B 25/06/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	15.49	57.99	22.34	13.74	20.20
Temperature	℃	Temp	*0.1*	20.6	20.7	20.4	20.6	21.1
pH	pH Units	APHA 4500-H B	*0.1*	5.1	6.2	4.4	4.1	4.8
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	169	227	148	169	188

Field Tests	Units	Method	Limit (LOR)	9250/11 BH06A 25/06/2020	9250/12 BH06B 25/06/2020	9250/13 BH06C 25/06/2020	9250/14 BH5 25/06/2020
Depth to Water	m(bTOC)	AS5667.11	*0.01*	38.31	35.37	13.04	30.14
Temperature	℃	Temp	*0.1*	20.8	20.4	20.8	21.1
pH	pH Units	APHA 4500-H B	*0.1*	11.3	5.0	4.2	5.3
Electrical Conductivity	µS/cm	APHA 2510 B	*50*	541	147	118	221

Total Dissolved Solids	Units	Method	Limit (LOR)	9250/1 BH01A 25/06/2020	9250/2 BH01B 25/06/2020	9250/3 BH01C 25/06/2020	9250/4 BH02A 25/06/2020	9250/5 BH02B 25/06/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	130	86	114	95	97

Total Dissolved Solids	Units	Method	Limit (LOR)	9250/6 BH02C 25/06/2020	9250/7 BH03A 25/06/2020	9250/8 BH03B 25/06/2020	9250/9 BH03C 25/06/2020	9250/10 BH05B 25/06/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	87	101	53	60	98

Total Dissolved Solids	Units	Method	Limit (LOR)	9250/11 BH06A 25/06/2020	9250/12 BH06B 25/06/2020	9250/13 BH06C 25/06/2020	9250/14 BH5 25/06/2020
Total Dissolved Solids	mg/L @105°C	AS3550.4	*20*	140	69	50	122

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

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.

Results have been approved and report finalised on 3/07/2020

Sampling Report Number: 9250

Date Issued: 3/07/2020 Revision No: 00
Sampling Conditions: Cloudy 12°-17C

vgt Laboratories Pty Ltd

Lab ID	Client Sample Reference	Date Sampled	Sampler	Method of Sampling	Pre-treatment / Preservation	Comments
9250/1	BH01A	25/06/2020 1:54 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9250/2	BH01B	25/06/2020 2:11 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9250/3	BH01C	25/06/2020 2:28 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/4	BH02A	25/06/2020 12:59 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9250/5	BH02B	25/06/2020 1:14 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9250/6	BH02C	25/06/2020 1:30 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/7	BH03A	25/06/2020 11:36 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/8	BH03B	25/06/2020 11:51 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/9	BH03C	25/06/2020 12:07 PM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/10	BH05B	25/06/2020 12:43 PM	T.Walker	AS5667.11, Pump	AS5667.1	
9250/11	BH06A	25/06/2020 10:36 AM	T.Walker	AS5667.11, Pump	AS5667.1	
9250/12	BH06B	25/06/2020 10:58 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/13	BH06C	25/06/2020 11:10 AM	T.Walker	AS5667.11, Bail	AS5667.1	
9250/14	BH5	25/06/2020 12:25 PM	T.Walker	AS5667.11, Pump	AS5667.1	

Sampling procedures have been approved and report finalised on 3/07/2020
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.

NATA WORLD RECOGNISED ACCREDITATION

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)
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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)
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BH01C	28/10/2019	1.01	11.02	Medium	6
BH02A	28/10/2019	0.81	>60	Slow	>65
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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

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2004438**	Page	: 1 of 2
Client	: **DIXON SAND (PENRITH) PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: HUNNY CHURCHER	Contact	: Customer Services ES
Address	:	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: 02 4566 8348	Telephone	: +61-2-8784 8555
Project	: Haerses Road Quarry	Date Samples Received	: 10-Feb-2020 17:00
Order number	: ----	Date Analysis Commenced	: 11-Feb-2020
C-O-C number	: ----	Issue Date	: 17-Feb-2020 11:09
Sampler	: David Dixon / Mick Munnoch		
Site	: ----		
Quote number	: EN/333		
No. of samples received	: 2		
No. of samples analysed	: 2		

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*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by 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-Feb-2020 11:20	10-Feb-2020 11:30	----	----	----
Compound	*CAS Number*	*LOR*	*Unit*	**ES2004438-001**	**ES2004438-002**	**--------**	**--------**	**--------**
				Result	Result	----	----	----
EA005P: pH by PC Titrator								
pH Value	----	0.01	pH Unit	**6.70**	**5.88**	**----**	**----**	**----**
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	**12**	**14**	**----**	**----**	**----**
EA045: Turbidity								
Turbidity	----	0.1	NTU	**82.1**	**25.3**	**----**	**----**	**----**

Appendix D – Noise Compliance Report

Dixon Sand (No.1) Pty Ltd

Haerses Road Quarry, Maroota

Noise monitoring report
June 2020

Doc no. 19020-NV-RP-3-0

Dixon Sand (No.1) Pty Ltd
Haerses Road Quarry, Maroota

Title	Noise monitoring report
Document no.	19020-NV-RP-3-0
Revision	0
Date	13 July 2020
Author	John Hutchison
Reviewer	Scott Hughes
File path	I:\PROJECTS\19020 - Dixon Sand\02 Deliverables\021 Reports\Winter 2020\19020-NV-RP-3-0 Dixon Sand Haerses Road Noise Monitoring June 2020.docx

Hutchison Weller Pty Ltd
ABN 37 001 024 095
13/357 Military Road
Mosman NSW 2008

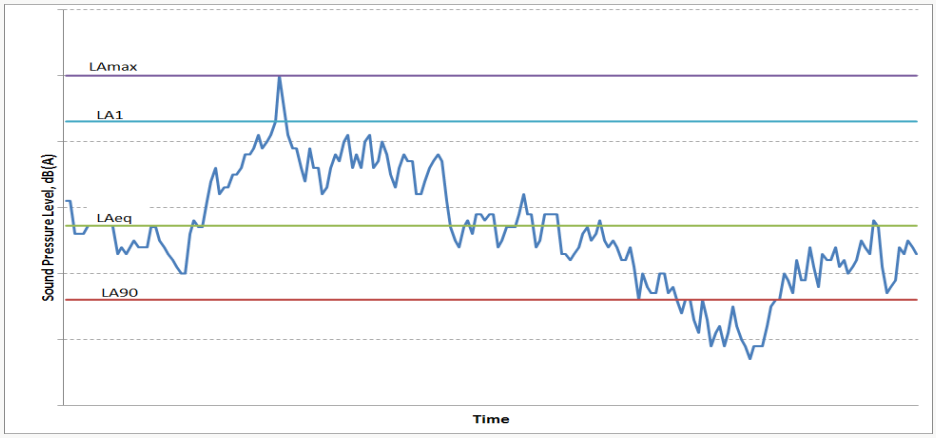
www.hutchisonweller.com

Revision history

0	13 July 2020	Draft report to client

Table of Contents

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	L_{A90} – The A-weighted sound pressure level exceeded 90% of the monitoring period. This is considered to represent the background noise. 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. L_{A1} – The A-weighted sound pressure level exceeded 1% of the monitoring period. L_{Amax} – The maximum A-weighted noise level associated with the measurement period. 
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)	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. 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 µPa equivalent to 0 dB).
Tonal noise	Noise with perceptible and definite pitch or tone

1. Introduction

Dixon Sand (No.1) Pty Ltd operates the Haerses Road Quarry in Maroota, NSW (the Quarry). The Quarry is located off Wisemans Ferry Road, as illustrated in Figure 1.

Operations at the quarry include extraction of sand and sandstone blocks, processing by screening and grading and loading of trucks for shipment.

The Quarry operates under Development Consent DA 165-7-2005 and Environment Protection Licence (EPL) 12513, which set noise limits for its operation. Extraction in the areas described in Modification 1 of the development consent and utilisation of the processing plant area commenced in December 2019, and require attended noise monitoring on a six-monthly basis to ensure compliance with the conditions.

Hutchison Weller was commissioned by Dixon Sand to undertake the six-monthly noise monitoring in accordance with the conditions of consent, EPL and requirements of the Noise Management Plan.

This document outlines the consent conditions, monitoring methodology and results of the monitoring undertaken on 5 June 2020.

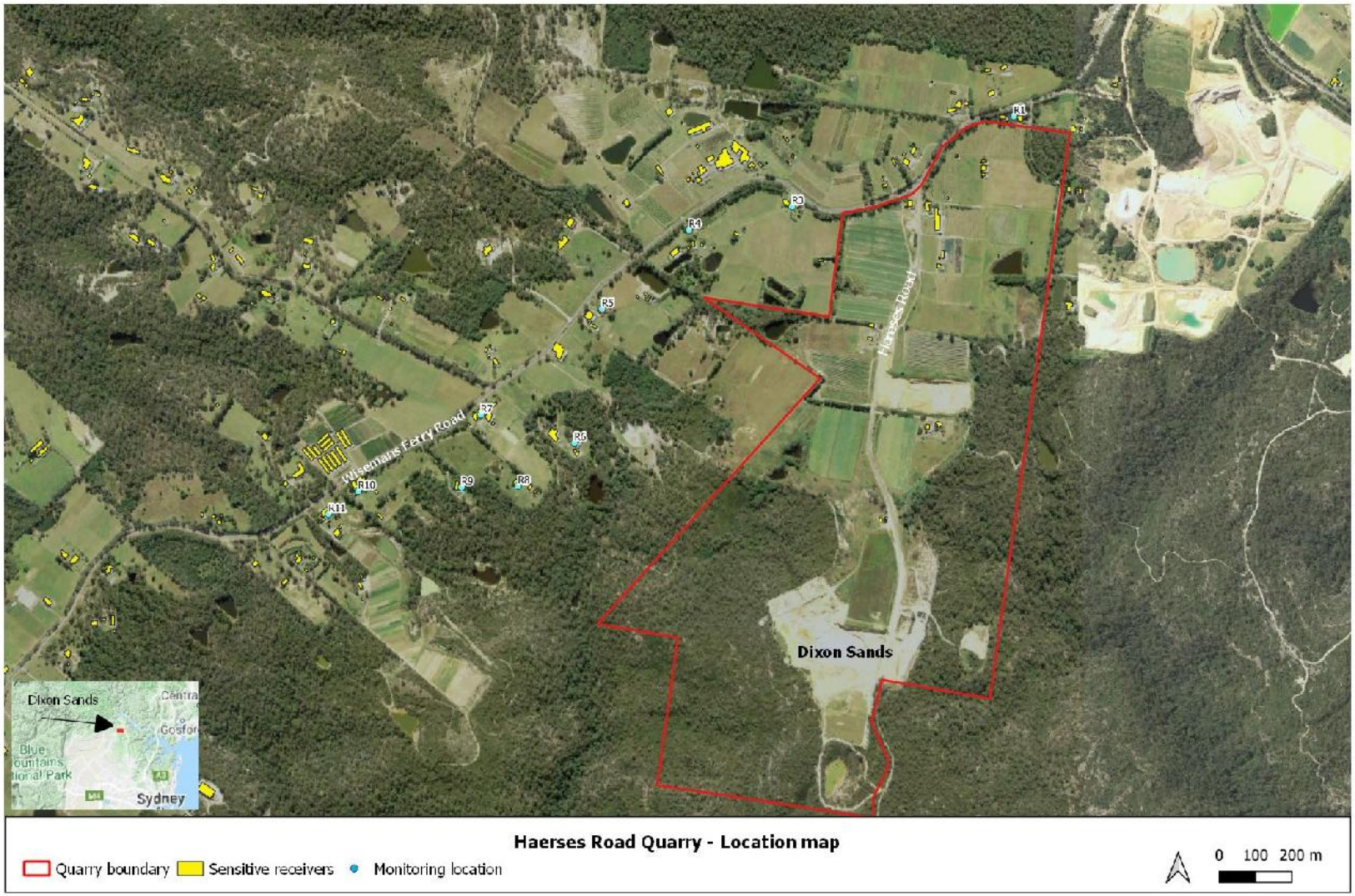


Figure 1 Location of the Quarry

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)	LAmax
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 then 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 ease of Haerses Road quarry on Hitchcock Road

3. Monitoring methodology

Operator-attended noise monitoring was undertaken on 5 June 2020 by John Hutchison of Hutchison Weller, an independent acoustic specialist. Monitoring locations included those described in the Quarry Noise Management Plan, as illustrated in Figure 1 and summarised in Table 3.

Table 3 Monitoring locations

Receiver	Address	Description
R3	1643 Wisemans Ferry Road	Private residence adjacent plant nursery
R4	1617 Wisemans Ferry Road	No access granted – levels predicted instead
R6	1543 Wisemans Ferry Road	Private residence at quarry side of home
R8	1521 Wisemans Ferry Road	Private residence. Monitoring conducted at boundary between R7 and R8 since no access granted to R8.
HAS1	Haerses Road Quarry	Close to equipment within Haerses Road boundary

Monitoring was conducted in general accordance with the Noise Policy for Industry and Section 6 of the Noise Management Plan.

At-receiver monitoring locations were within 30 metres of residential dwellings, whilst onsite measurement locations were selected for safe access and to be representative of the operations, without extraneous noise from sources such as traffic and insects.

Instrumentation included a Bruel & Kjaer Class 1 sound level meter (SLM), serial no. 3008237, field-calibrated prior to and following monitoring. The SLM was within current calibration, next due January 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 LAmax statistics.

Meteorological data was recorded during each monitoring period adjacent to the Maroota public school, including wind speed, direction, temperature, relative humidity and sigma-theta (to establish the Pascall-Guifford stability category). This data was used to establish whether meteorological conditions were suitable for monitoring.

Where extraneous noise such as road traffic or insects were the dominant noise sources, making it impractical to discern the contribution of the Quarry to ambient noise levels, noise levels measured at alternative locations closer to the Quarry were utilised, in line with procedures outlines in Noise Policy for Industry. This involved extrapolation from the near-distance location to the sensitive receiver location.

4. Monitoring results

4.1 Attended measurements

Results of noise monitoring for each location are presented in Table 4.

The main sources of noise from quarry operations were sand processing and truck loading (screening, front end loaders, trucks).

In all cases, the Haerses Road quarry was compliant with the project noise objectives.

Quarry operations were inaudible at all residential receivers prior to 7am, with traffic noise in all cases the dominant source of noise. No LAmax noise levels were attributable to the quarry in the shoulder period.

During the day period, quarry noise was barely audible at two monitoring locations, R6 and R8, which were the two closest receivers.

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.

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	LAmax			
Shoulder (6.00am to 7.00am)	5.58AM	R3	38	48.9	32.4	64.7	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 63 dBA for HV and 53 for LV. No quarry-related activity audible During breaks in traffic, frogs audible at levels around 30 dBA. No LAmax attributable to the quarry.	Light breeze from NE @ 4-5km/h Temperature 6°C Clear sky Neutral conditions (C to D- class)
	6.27AM	R6	35	36.3	33.8	69.0	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 64 dBA for HV. No quarry-related activity audible. No LAmax attributable to the quarry	
	6.48am	R8	35	46.2	39.6	62.9	<35	Traffic on Wisemans Ferry Road is dominant source of noise with pass-bys of around 56 dBA for HV. No quarry-related activity audible. No LAmax attributable to the quarry	
Day (7.00am to 6.00pm)	8:00am	HAS1	N/A	65.9	62.1	73.4	66	Measurement around 50 metres from screen (Super reclaimer 10XS) and Volvo loader ~67 dBA. Screen up to 72 dBA with coarse material. No trucks but two loaders operating. Volvo loader is the quieter of the two.	Light breeze from NW @ 1-4 km/h Temperature 8 - 9 °C Clear sky Unstable conditions (A to B - class)
	8.18am	HAS1	N/A	61.4	58.6	69.7	61	Screen and loader 63 dBA at 86 metres. Noise drops to 60 dBA when screen empty. Second loader not operating.	
	9.01AM	R3	38	46.5	31.1	64.3	<35	Quarry inaudible even during breaks in the traffic at ambient levels of 31 dBA.	Light breeze from WNW-WSW

Monitoring period	Time	Location	Noise criterion	Measured 15-minute noise level			Estimated LAeq, 15 min quarry contribution	Observations	Meteorological conditions
				LAeq	LA90	LAmax			
								Wisemans Ferry Road dominant with light vehicle passbys of around 48 dBA and heavy vehicles at 54 dBA. Dog barked in the residence a couple of times ~ 56	@ 5-6km/h Temperature 9°C Clear sky Unstable conditions (A- to B- class)
Day (7.00am to 6.00pm)	9.28AM	R6	37	41.5	35.0	64.3	34-35	Quarry noise audible with screen operating, faint drone. Estimated noise level of 34-35 dBA Wisemans Ferry Road audible with pass-bys of 46 dBA Other noises included birds ~ 59 dBA intermittently Resident operating a grinder for less than a minute ~ 40 dBA	Light breeze from W-NW @ 2 -4 km/h Temperature 9 - 10°C Clear sky Unstable conditions (A-class)
	9.55AM	R8	36	45.2	36.8	66.3	32	Noise measured at R7 at boundary with R8. Traffic on Wiesemans Ferry Road audible ~ 43 – 49 dBA Roosters intermittently ~ 65 dBA Quarry faintly audible – strained to hear it – between breaks in traffic and birds. Estimated level 32 dBA.	

4.3 Extrapolated measurements

A conclusive noise level attributable to the Quarry was not possible in all locations due to ambient noise levels affected by road traffic and birds. 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 and loader).

Extrapolated results demonstrate the Quarry is compliant with the criteria for should 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	29	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	34	
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.

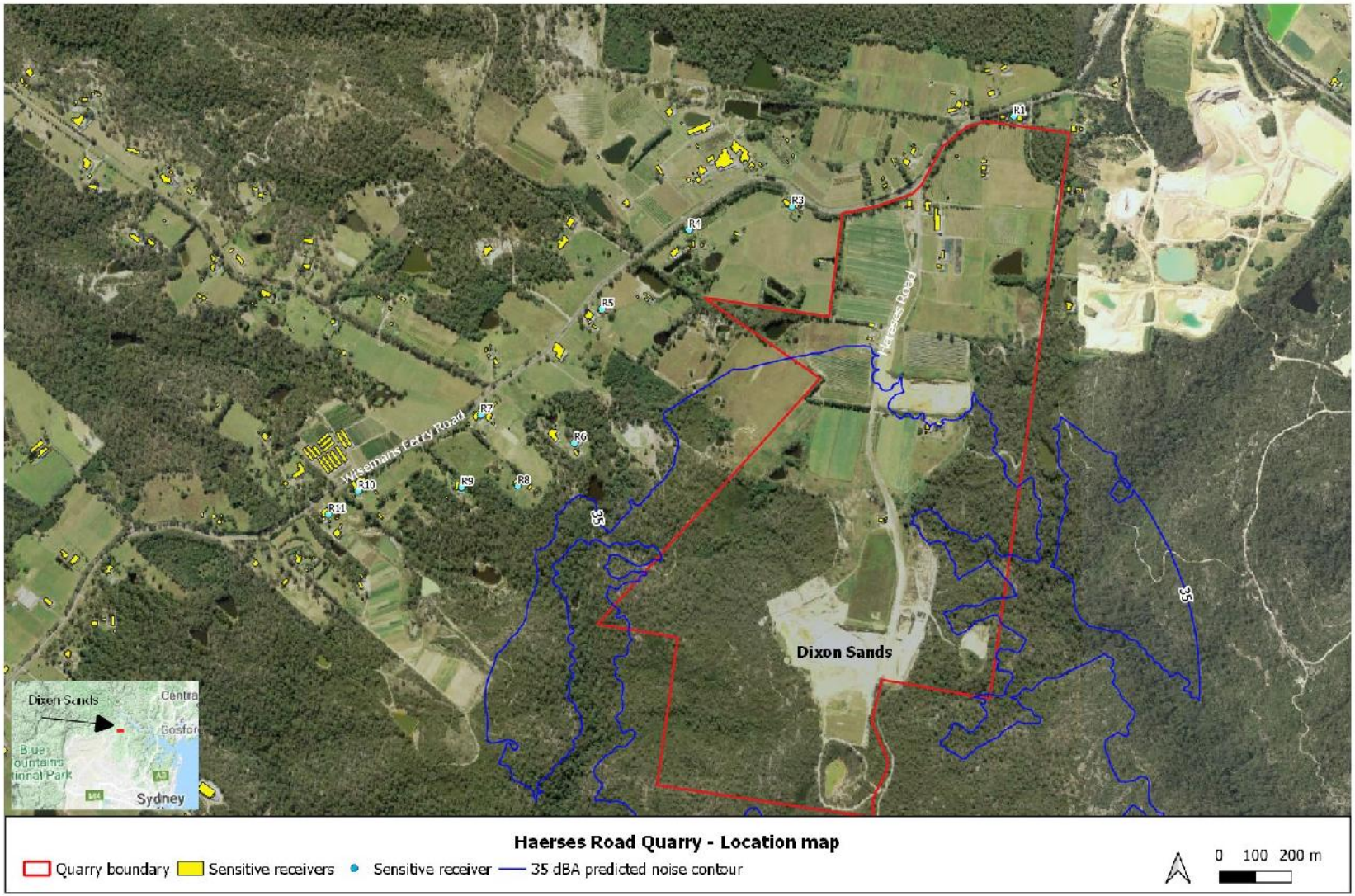


Figure 2 Predicted noise levels from Haerses Road quarry based on on-site measurements.

Appendix E – Monthly Site Inspection

MAERSES 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:	29/07/19
Inspection by:	HUNNY CHURCHER
Measured monthly rainfall (mm)	PERIOD 27/06/19 - 29/07/19 RAINFALL = MM

	Yes (✓) No (X) N/A	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.	✓			
Effectiveness and capacity of Erosion and Sediment controls checked (drains, basins, filters etc.)	✓			
Stockpiles located and maintained correctly	✓			
Tree clearance restricted to required area	N/A	NO VEGETATION CLEARING THIS PERIOD		
WATER QUALITY AND QUANTITY				
Monthly water quality samples collected from monitoring bores. Samples tested for pH and electrical conductivity	✓	SAMPLING + ANALYSIS BY VGT		
Monthly surface water monitoring of the in-pit sump	N/A	NO IN PIT SUMP		
6 monthly monitoring of groundwater quality at 13 bores	✓	SAMPLING + ANALYSIS IN JUNE 2019.	NEXT SAMPLING + TESTING IN DEC 2019.	
Monthly depth measurement of all groundwater bores and comparison with rainfall	✓			
Monthly inspection of drainage & sediment controls including water storages, pumps, pipes and dams' walls	✓			
Any Fuel or oil spills reported and maintained	✓			
Fuels/chemicals stored in bunded areas	✓			

AIR QUALITY				
Monitoring station (TEOM) and continuous automatic meteorological station are maintained and operating in the vicinity of the Maroota Public School	✓			
On site dust suppression	✓			
Loads covered entering and leaving site	✓			
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	✓	NO HIGH WINDS THIS PERIOD.		
NOISE				
Compliance with approved hours of operation	✓	REFER TO TRUCK RECORD + TMP		
No complaints received from surrounding residences	✓	REFER TO PUBLISHED COMPLAINT REGISTER		
Annual attended and unattended monitoring	✓	UNDERTAKEN IN JUNE 2019	NEXT NOISE MON TO BE DONE IN JUNE 2020.	
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	CONDITION NOT YET TRIGGERED.		
The use of noisy equipment scheduled at the least sensitive time of day	✓			
Plant switched off when not in use	✓	AS PER NMP.		
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	✓			
No disturbance of buffer/conservation areas	✓			
All buffer/conservation area fencing/marking intact	✓			
Rehabilitation undertaken to schedule	✓			
Success of rehabilitation of buffers, conservation areas & rehabilitation areas	✓	ECOLOGISTS UNDERTAKING ANNUAL SURVEY + MON. IN JULY - SEP. REFER TO ECOL. REPORT		
Flora and fauna monitoring program undertaken to schedule	✓	AS PER ECOLOGISTS MONITORING SCHEDULE		
ARCHAEOLOGY				
Stop work if sites located – OEH notified	✓	NO FINES		
WASTE & SITE CONDITION				
No rubbish visible or buried on site	✓			
Recyclables removed by licensed Contractors	✓	WASTE CONTRACTORS + COUNCIL CONTRACTORS		
Putrescible waste covered and regularly removed	✓			
ROAD & TRAFFIC				
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 site and total truck movements	✓			
Truck movements have not exceeded 56 per day, or 20 between 6:00 am and 7:00 am	✓	REFER TO TRUCK RECORD		
Weighbridge/log book records retained and recorded	✓			
REPORTING				
Complaints register maintained	✓	PUBLISHED MONTHLY ON WEBSITE		
Environmental incidents reported to EPA and DPE	✓	NO INCIDENT THIS PERIOD		
Monitoring results and statements of compliance with Development Consent and EPL conditions provided in the Annual Review and EPL Annual Return	✓			

Signed: ..... (Environmental Officer)

Appendix F – Truck Movement Data

TRANSFERS

JAN 2020			Tonnes/Mth	3,372.50		
			Number/Mth	95		
Date	**AM/PM**	**Arrival Time**	**Dispatch Time**	**Tonnes**	**No Trks/day**	**6:00-7:00 am Truck at HR**
08-Jan-20	AM	7.11	7.16	35.50		
08-Jan-20	PM	1.51	1.56	35.50		
08-Jan-20	PM	2.06	2.11	35.50		
08-Jan-20	PM	3.19	3.24	35.50		
08-Jan-20	PM	3.47	3.52	35.50	**5**	
09-Jan-20	AM	6.28	6.33	35.50		2
09-Jan-20	PM	1.41	1.46	35.50	**2**	
10-Jan-20	AM	6.36	6.41	35.50		2
10-Jan-20	PM	12.54	12.59	35.50		
10-Jan-20	PM	2.43	2.48	35.50		
10-Jan-20	PM	3.12	3.17	35.50		
10-Jan-20	PM	4.20	4.25	35.50	**5**	
11-Jan-20	AM	6.51	6.56	35.50	**1**	2
13-Jan-20	AM	6.29	6.34	35.50		4
13-Jan-20	PM	12.36	12.41	35.50		
13-Jan-20	PM	2.19	2.24	35.50		
13-Jan-20	PM	3.56	4.01	35.50	**4**	
14-Jan-20	AM	6.37	6.42	35.50		2
14-Jan-20	AM	8.45	8.50	35.50		
14-Jan-20	PM	12.44	12.49	35.50		
14-Jan-20	PM	2.26	2.31	35.50		
14-Jan-20	PM	3.58	4.03	35.50	**5**	
15-Jan-20	AM	6.37	6.42	35.50		2
15-Jan-20	AM	8.30	8.35	35.50		
15-Jan-20	AM	9.43	9.48	35.50		
15-Jan-20	AM	10.12	10.17	35.50		
15-Jan-20	AM	11.53	11.58	35.50		
15-Jan-20	PM	1.49	1.54	35.50		
15-Jan-20	PM	3.24	3.29	35.50	**7**	
16-Jan-20	AM	6.35	6.40	35.50		2
16-Jan-20	PM	12.24	12.29	35.50		
16-Jan-20	PM	1.02	1.07	35.50		
16-Jan-20	PM	2.48	2.53	35.50	**4**	
17-Jan-20	AM	6.40	6.45	35.50		2
17-Jan-20	AM	8.41	8.46	35.50	**2**	
20-Jan-20	AM	6.44	6.49	35.50		2
20-Jan-20	AM	8.38	8.43	35.50		
20-Jan-20	PM	12.19	12.24	35.50		
20-Jan-20	PM	1.53	1.58	35.50	**4**	
21-Jan-20	AM	6.44	6.49	35.50		2
21-Jan-20	AM	8.19	8.24	35.50		
21-Jan-20	AM	10.06	10.11	35.50		
21-Jan-20	AM	11.54	11.59	35.50		

21-Jan-20	PM	1.53	1.58	35.50		
21-Jan-20	PM	3.26	3.31	35.50	**6**	
22-Jan-20	AM	6.08	6.13	35.50		2
22-Jan-20	AM	7.49	7.54	35.50		
22-Jan-20	AM	9.28	9.33	35.50		
22-Jan-20	AM	11.14	11.19	35.50		
22-Jan-20	PM	12.51	12.56	35.50		
22-Jan-20	PM	2.18	2.23	35.50		
22-Jan-20	PM	3.52	3.57	35.50	**7**	
23-Jan-20	AM	6.05	6.10	35.50		2
23-Jan-20	AM	7.04	7.09	35.50		
23-Jan-20	AM	7.37	7.42	35.50		
23-Jan-20	AM	9.00	9.05	35.50		
23-Jan-20	AM	9.16	9.21	35.50		
23-Jan-20	AM	10.52	10.57	35.50		
23-Jan-20	AM	11.16	11.21	35.50		
23-Jan-20	AM	11.22	11.27	35.50		
23-Jan-20	PM	12.52	12.57	35.50		
23-Jan-20	PM	2.23	2.28	35.50		
23-Jan-20	PM	4.07	4.12	35.50	**11**	
24-Jan-20	AM	6.18	6.23	35.50		2
24-Jan-20	AM	7.57	8.02	35.50		
24-Jan-20	AM	9.59	10.04	35.50		
24-Jan-20	AM	11.33	11.38	35.50		
24-Jan-20	AM	2.05	2.10	35.50		
24-Jan-20	PM	3.41	3.46	35.50	**6**	
28-Jan-20	AM	6.22	6.27	35.50		2
28-Jan-20	AM	7.56	8.01	35.50		
28-Jan-20	AM	9.51	9.56	35.50		
28-Jan-20	AM	11.28	11.33	35.50		
28-Jan-20	PM	1.06	1.11	35.50		
28-Jan-20	PM	2.49	2.54	35.50		
28-Jan-20	PM	4.25	4.30	35.50	**7**	
29-Jan-20	AM	6.30	6.35	35.50		2
29-Jan-20	AM	8.19	8.24	35.50		
29-Jan-20	AM	10.30	10.35	35.50		
29-Jan-20	PM	4.20	4.25	35.50	**4**	
30-Jan-20	AM	6.37	6.42	35.50		2
30-Jan-20	AM	8.15	8.20	35.50		
30-Jan-20	AM	10.02	10.07	35.50		
30-Jan-20	AM	11.36	11.41	35.50		
30-Jan-20	PM	12.56	1.10	35.50		
30-Jan-20	PM	1.30	1.35	35.50		
30-Jan-20	PM	3.08	3.13	35.50	**7**	
31-Jan-20	AM	6.22	6.27	35.50		2
31-Jan-20	AM	8.27	8.32	35.50		
31-Jan-20	AM	10.05	10.10	35.50		
31-Jan-20	AM	10.55	11.00	35.50		
31-Jan-20	AM	11.45	11.50	35.50		
31-Jan-20	PM	1.44	1.49	35.50		

31-Jan-20	PM	3.23	3.28	35.50		
31-Jan-20	PM	5.00	5.05	35.50	**8**	
					11	**4**
					Max	**Max Daily HR Morning Truck**