



Aus 10 Rhyolite Pty Limited

ABN: 90 002 325 144



2023 Annual Review

for the

Tinda Creek Quarry



Prepared by:

RWCorkery&co

March 2024



ACKNOWLEDGEMENT

R. W. Corkery & Co. acknowledge and pay our respects to the Traditional Custodians of the lands comprising NSW and Australia on which our projects are located. We appreciate the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.





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ABN: 90 002 325 144

2023 Annual Review

for the

Tinda Creek Quarry

Period: 1 January 2023 to 31 December 2023

Prepared for:

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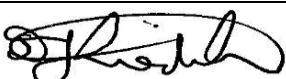
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ORANGE NSW 2800

Ref No. 980/24

March 2024

Table A
Title Block

Name of operation	Tinda Creek Sand Quarry
Name of operator	Aus 10 Rhyolite Pty Limited t/a Hy-Tec Concrete and Aggregates
Development consent / project approval #	SSD_4978
Name of holder of development consent / project approval	Aus 10 Rhyolite Pty Limited
Mining Lease #	No Mining Lease applicable to site under <i>Mining Act</i> (1992).
Name of holder of mining lease	N/A
Water licence #	WAL 24367 / WAL 24381 / WAL 42446
Name of holder of water licence	Aus 10 Rhyolite Pty Limited
MOP/RMP start date	N/A
MOP/RMP end date	N/A
Annual Review start date	1 January 2023
Annual Review end date	31 December 2023
<p>I, Darryl Thiedeke, certify that to the best of my knowledge this audit report is a true and accurate record of the compliance status of the Tinda Creek Quarry for the period 1 January 2023 to 31 December 2023 and that I am authorised to make this statement of behalf of Aus 10 Rhyolite Pty Limited.</p> <p><i>Note.</i></p> <p>a) <i>The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, \$1 million and for an individual, \$250,000.</i></p> <p>b) <i>The Crimes Act 1900 contains other offences relating to false and misleading information: Section 192G (Intention to defraud by false or misleading statement – maximum penalty 5 years imprisonment); Section 307A, 307B and 307C (false or misleading application/information/documents – maximum penalty 2 years imprisonment or \$22,000, or both).</i></p>	
Name of authorised reporting officer	Darryl Thiedeke
Title of authorised reporting officer	National Planning and Development Manager
Signature of authorised reporting officer	
Date	28 March 2024

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CONTENTS

	Page
LIST OF ACRONYMS	VII
1. STATEMENT OF COMPLIANCE	1
2. INTRODUCTION	2
2.1 SCOPE AND FORMAT.....	2
2.2 KEY PERSONNEL CONTACT DETAILS.....	4
3. APPROVALS	5
4. OPERATIONS SUMMARY	7
4.1 INTRODUCTION.....	7
4.2 CLOSED WATER MANAGEMENT SYSTEM.....	7
4.3 EXTRACTION OPERATIONS.....	7
4.4 HOURS OF OPERATION.....	9
4.5 TRANSPORT LEVELS.....	9
4.6 CONSTRUCTION ACTIVITIES.....	10
4.7 IMPORTATION OF VENM/ENM.....	10
4.8 WASTE MANAGEMENT.....	10
4.9 NEXT REPORTING PERIOD.....	10
5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW	12
6. ENVIRONMENTAL PERFORMANCE	13
6.1 METEOROLOGICAL MONITORING.....	13
6.1.1 Rainfall.....	13
6.2 AIR QUALITY.....	13
6.2.1 Introduction.....	13
6.2.2 Air Quality Criteria.....	15
6.2.3 Air Quality Monitoring Results.....	15
6.2.4 Analysis of Results.....	16
6.3 OPERATIONAL NOISE.....	16
6.3.1 Introduction.....	16
6.3.2 Noise Criteria.....	17
6.3.3 Noise Monitoring Results.....	17
6.3.4 Attended Noise Measurement Compliance Assessment.....	18
6.3.5 Quarry Noise Predictions at Residences.....	19
6.4 ABORIGINAL HERITAGE.....	19
6.5 NON-ABORIGINAL HERITAGE.....	19
7. WATER MANAGEMENT	20
7.1 GROUNDWATER.....	20
7.1.1 Groundwater Quality Monitoring.....	20
7.1.2 Analysis of Groundwater Quality Results.....	21
7.1.3 Groundwater Level Monitoring.....	22
7.1.4 Analysis of Groundwater Level Results.....	26
7.1.5 Groundwater Usage.....	26

CONTENTS

	Page
7.2 SURFACE WATER	27
7.2.1 Introduction.....	27
7.2.2 Surface Water Monitoring.....	28
7.2.3 Dredge Pond Water Levels	28
7.2.4 Surface Water Quality	29
7.2.5 Surface Water Discharge Events	29
7.2.6 Drainage Lines, Diversion Drains and Water Management System.....	30
8. REHABILITATION AND LANDSCAPE MANAGEMENT	32
8.1 REHABILITATION MANAGEMENT.....	32
8.2 LANDSCAPE MANAGEMENT.....	32
8.2.1 Rehabilitation Monitoring.....	33
8.2.2 Long-Term Rehabilitation Monitoring	34
8.2.3 Biodiversity Offset Area Monitoring.....	35
8.2.4 Koala Monitoring	35
8.2.5 Aquatic Monitoring.....	37
8.2.6 Nest Box Monitoring	38
8.2.7 Threatened Species Monitoring	38
8.2.8 <i>Grevillea parviflora</i> Monitoring	39
8.2.9 Conclusion.....	39
9. COMMUNITY	41
9.1 COMMUNITY COMPLAINTS.....	41
9.2 COMMUNITY LIAISON.....	41
10. INDEPENDENT ENVIRONMENTAL AUDIT RESPONSE	42
11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD	44
11.1 INTRODUCTION.....	44
11.2 INCIDENTS	44
11.3 DEVELOPMENT CONSENT SSD_4978.....	44
11.4 ENVIRONMENT PROTECTION LICENCE	44
11.5 WATER ACCESS LICENCES	44
11.6 VOLUNTARY UNDERTAKING	45
12. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD	46

CONTENTS

	Page
APPENDICES	
Appendix 1 Internal Compliance Audit (SSD_4978 and EPL 12007) – 1 January 2023 to 31 December 2023	
Appendix 2 Annual Return for Extractive Materials 2022 / 2023	
Appendix 3 Noise Monitoring Assessment 2023	
Appendix 4 Biodiversity Monitoring Report 2023	
Appendix 5 Aquatic Monitoring Report – Spring 2023	
Appendix 6 Minutes of Tinda Creek Quarry Community Consultative Committee Meetings	
FIGURES	
Figure 1 Locality Plan.....	2
Figure 2 Activities During the Reporting Period.....	3
Figure 3 Environmental Monitoring Locations.....	14
Figure 4 Deposited Dust Levels 2017 to 2023.....	15
Figure 5 2023 Groundwater Level Monitoring Results.....	23
Figure 6 Hydrography for Site Bores with Monthly Rainfall (Historic Bores)	24
Figure 7 Hydrography for Site Bores with Monthly Rainfall (2018 Bores)	25
Figure 8 Biodiversity Monitoring Locations	36
TABLES	
Table 1 Statement of Compliance.....	1
Table 2 Non-compliances	1
Table 3 Tinda Creek Sand Quarry – Approvals and Licences	5
Table 4 Sand Transportation from Site.....	7
Table 5 Monthly Laden Truck Movements at Tinda Creek Quarry.....	10
Table 6 Summary of Rainfall Records Since 2007.....	13
Table 7 Air Quality Criteria.....	15
Table 8 Measured Performance – Deposited Dust.....	16
Table 9 Noise Monitoring Criteria SSD_4978 (dB(A))	17
Table 10 Noise Monitoring Criteria EPL 12007 (dB(A)) – All Receivers.....	17
Table 11 Summary of Attended Noise Monitoring at Receiver NM1	17
Table 12 Day and Morning Shoulder Noise Compliance Assessment at R1	18
Table 13 Groundwater Quality Trigger Criteria.....	20
Table 14 Water Monitoring Results – 28 March 2023	20
Table 15 Water Monitoring Results – 28 July 2023.....	21
Table 16 Groundwater Investigation Trigger Levels	22
Table 17 Results of 2023 Groundwater Levels Monitoring Program.....	25
Table 18 Groundwater Usage – Meter Reading and Monthly Usage.....	27

CONTENTS

	Page
Table 19	Surface Water Monitoring Regime 28
Table 20	Surface Water Quality Triggers..... 29
Table 21	Surface Water Quality Results – 2023..... 29
Table 22	Recorded and Average Annual Rainfall in the Vicinity of the Quarry 30
Table 23	Results of Surface Water Monitoring – 2023 31
Table 24	Ecological Monitoring Requirements at Tinda Creek Quarry..... 33
Table 25	Rehabilitation Inspections 34
Table 26	Long-Term Rehabilitation Monitoring 34
Table 27	Biodiversity Offset Area Monitoring..... 35
Table 28	Nesting Boxes 38
Table 29	Ecological Monitoring Requirements at Tinda Creek Quarry..... 39
Table 30	Response to the Non-Compliance Issues from the 2022 IEA 43

PLATES

Plate 1	Dredge pond in Domain 7 8
Plate 2	Sand loader and generator 8
Plate 3	Sand loader and stockpile..... 8
Plate 4	Overland clean water diversion pipe from Domain 4 to Domain 6..... 9
Plate 5	Clean water diversion drain..... 9

LIST OF ACRONYMS

AHD	Australian height datum
ANZECC	Australian and New Zealand Environment Conservation Council
ARI	average recurrence interval
AUSRIVAS	Australian River Assessment System
CCC	Community Consultative Committee
DD	deposited dust
DPE	Department of Planning and Environment
DPIE	Department of Planning, Industry and Environment
EIS	Environmental Impact Statement
EMM	EMM Consulting Pty Ltd
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EPA	Environment Protection Authority
EPL	Environment Protection License
MAC	Muller Acoustic Consulting Pty Ltd
PM	particulate matter
RCE	Riparian and Channel and Environment Inventory Assessment
RFS	Rural Fire Service
RWC	R.W. Corkery and Co. Pty Limited
SIGNAL	stream invertebrate grade number average level
SSD	State Significant Development
TRH	total recoverable hydrocarbon
TSP	total suspended particulate
WAL	Water Access Licence

1. STATEMENT OF COMPLIANCE

Table 1
Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	Yes / No
DC # SSD_4978	No
EPL # 12007	Yes

Table 2
Non-compliances

Relevant Approval	Condition #	Condition Description (summary)	Compliance Status	Comment	Where Addressed in Annual Review
SSD_4978	2 (2)	This condition relates to operation of the Quarry in accordance with the conditions of consent.	Administrative	Non-compliance with two conditions of SSD_4978 occurred during the reporting period precluding the achievement of compliance with this condition.	Section 11.2, Appendix 1
SSD_4978	3 (16)	This condition provides a deadline to secure the on-site Offset Area	Low	Land intended for the On-site Offset Area will be transferred to the Office of the NSW Minister of Environment and Heritage in 2024. It is noted that the area is not being disturbed and environmental management is implemented in accordance with an approved Landscape Management Plan.	Section 11.2, Appendix 1
SSD_4978	3 (21)	This condition relates to the preparation of an estimate for a Rehabilitation and Conservation Bond	Administrative	An updated estimate of the Rehabilitation and Conservation Bond is in preparation but has yet to be submitted to DPHI.	Section 11.2, Appendix 1

Compliance Status Key

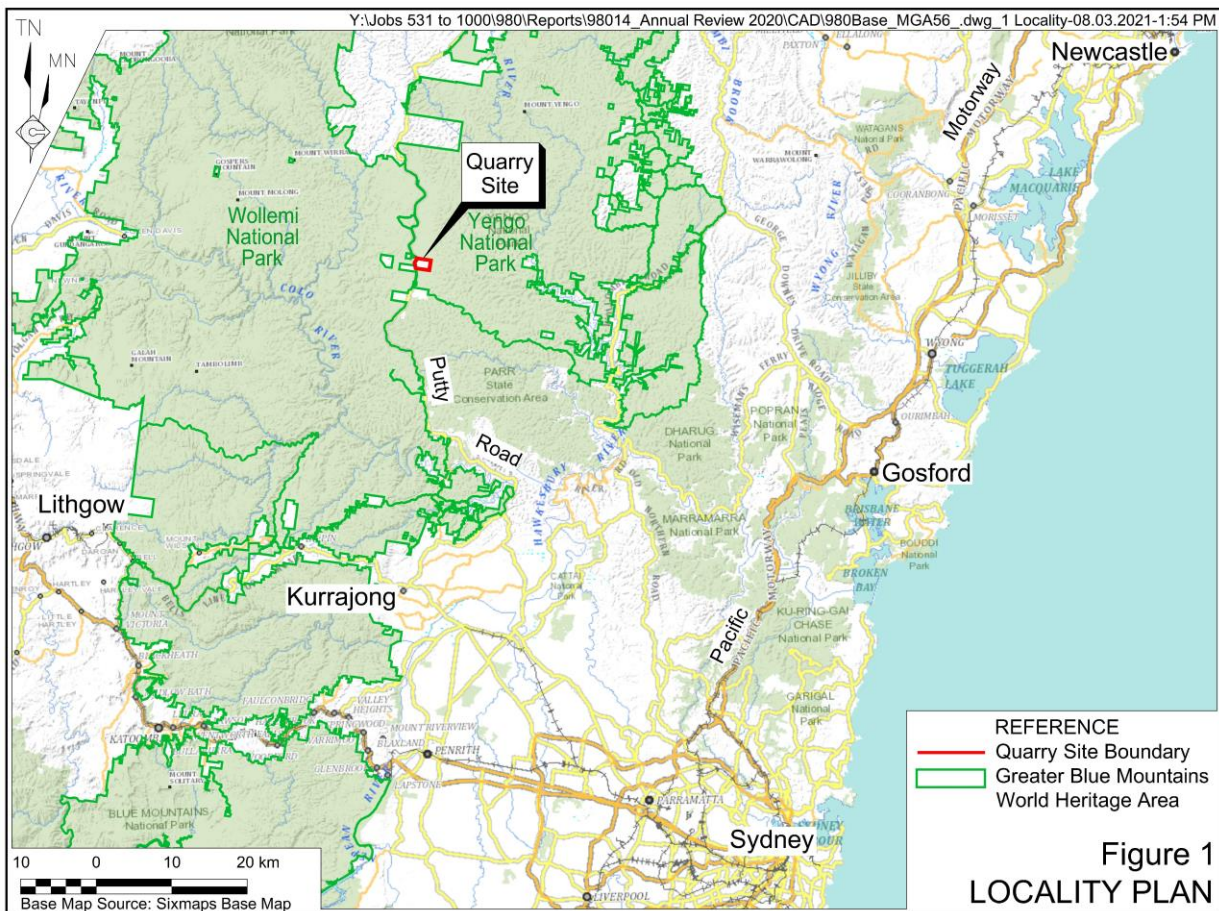
Risk level	Colour code	Description
High	Non-compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence.
Medium	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences but is likely to occur.
Low	Non-compliant	Non-compliance with: <ul style="list-style-type: none"> potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences but is likely to occur.
Administrative non-compliance	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 SCOPE AND FORMAT

This *Annual Review* has been compiled by R.W. Corkery & Co. Pty Limited (RWC) on behalf of Aus 10 Rhyolite Pty Limited. This report is applicable for the period 1 January 2023 to 31 December 2023 (“the reporting period”). The information presented within this *Annual Review* has been prepared based upon observations made during a site visit on 24 October s and information provided by Hy-Tec.

The Tinda Creek Sand Quarry (the Quarry) is owned and operated by Aus 10 Rhyolite Pty Limited trading as Hy-Tec Concrete and Aggregates hereafter referred to as Hy-Tec. The Quarry Site is located approximately 67km north of Windsor along Putty Road, NSW (see **Figure 1**). Development Consent SSD_4978 (SSD_4978) was granted on 10 April 2015 to permit the extraction and despatch of up to 300 000 tonnes of sand from the Quarry each year for the duration of the Project. **Figure 2** displays the layout of the Quarry.



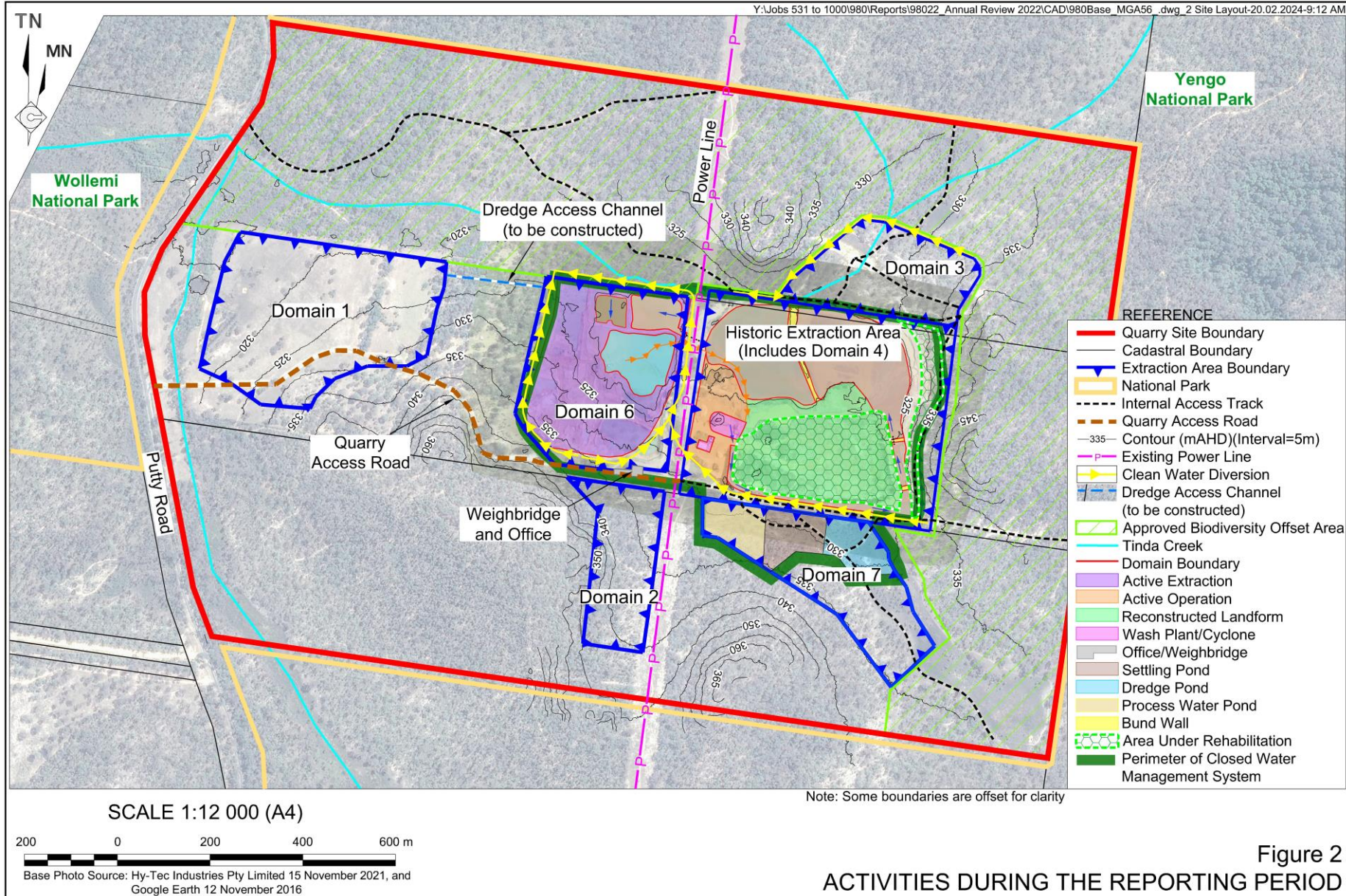


Figure 2
ACTIVITIES DURING THE REPORTING PERIOD

This *Annual Review* has been prepared in accordance with *Condition 5(4)* of Development Consent SSD_4978 to record the activities and environmental monitoring undertaken at the Quarry during the reporting period and to outline the activities and environmental monitoring planned throughout the next reporting period (1 January 2023 to 31 December 2023). *Condition 5(4)* requires the preparation of a report which must:

- a) *describe the development (including 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 (Sections 4, 8 and 11);*
- 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;*
 - *the monitoring results of previous years; and*
 - *the relevant prediction in the EIS (Sections 6, 7 and 9);*
- c) *identify any non-compliance over the last year, and describes what actions were (or are being) taken to ensure compliance (Section 10);*
- d) *identify any trends in the monitoring data over the life of the development (Section 6 and 7);*
- e) *identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies (Section 6 and 7); and*
- f) *describe what measures will be implemented over the current calendar year to improve the environmental performance of the development (Sections 6, 7 and 11).*

2.2 KEY PERSONNEL CONTACT DETAILS

The key personnel contact names, position and phone numbers are as follows.

Name	Position	24 Hour Contact
Bryan Grant	Quarry Manager	0400 967 633
Lee Attard	NSW Quarry Operations Manager	0497 603 401

3. APPROVALS

Hy-Tec is required to operate the Tinda Creek Quarry in accordance with the conditions of development consent under the *NSW Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Commonwealth Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and four licences as described in **Table 3**.

Table 3
Tinda Creek Sand Quarry – Approvals and Licences

Consent/Lease/Licence	Issue Date	Expiry Date	Details / Comments
Development Consent SSD_4978	10/04/2015	31/12/2045	Issued by Department of Planning and Environment
Approval EPBC 2013/7028	04/10/2016	31/12/2045	Issued by the Department of the Environment and Energy
Environment Protection Licence No 12007	03/03/2017	12 May ⁺	Issued by Environment Protection Authority
Water Access License 24381 40 Units	01/09/2014	Continuing	Nominated Water Supply Works (Excavation) approval number 10WA112523 issued on 01/07/2011. Valid until 08/11/2025
Water Access License 24367 15 Units	02/02/2012	Continuing	Nominated Water Supply Works (Bore) approval number 10WA112531 amended on 11/11/2020. Valid until 13/04/2025*
Water Access License 42446 60 Units	20/06/2019	Continuing	Nominated Water Supply Works (Bore) approval number 10WA112531 amended on 11/11/2020. Valid until 13/04/2025*
⁺ Anniversary Date [*] Works Approval 10WA112531 has a conditional limit of 44ML per annum.			

No modifications or variations to the development consent or licenses outlined in **Table 3** were sought within the reporting period.

SSD_4978 was granted in accordance with Part 4 of the EP&A Act by the Minister for Planning on 10 April 2015 to extract and transport no more than 300 000 tonnes of sand products from the Quarry Site each calendar year until 31 December 2045. SSD_4978 superseded DA134/95 after it was formally surrendered on 10 December 2015. Sand extraction within the new approved extraction area commenced in October 2016. Condition 15 of Schedule 3 of SSD_4978 requires Hy-Tec to secure an On-site Offset Area of at least 106.6ha in accordance with the biodiversity offset strategy for the operation. On 30 June 2022, the NSW Minister for Environment and Heritage approved the transfer of land designated for the On-site Offset Area to the office of the Minister for Environment and Heritage to be managed by the National Parks and Wildlife Service (NPWS) in Yengo National Park. The transfer was conditional upon:

- Hy-Tec gaining access to the offset land in order to continue biodiversity management actions and environmental monitoring for the life of the quarry; and
- that the land be held under Part 11 of the National Parks and Wildlife Act 1974 (NPW Act), and that the reservation of the land as national park be delayed until the quarrying operations are complete, expected to be 25 years.

NPWS has advised Hy-Tec that it will issue a licence or lease under section 150 (2) of the NPW Act for ongoing access. NPWS is in the process of finalising the necessary subdivision of the land intended for dedication. Once complete, Hy-Tec will be able to finalise the transfer of land and arrange the necessary lease agreement. It is expected that Hy-Tec would retain responsibility for monitoring and management of the land in accordance with the approved Landscape Management Plan until operations cease and the Quarry is closed.

Hy-Tec also operates in accordance with Approval EPBC 2013/7028 granted under the EPBC Act. This approval relates principally to operations that may impact the threatened Koala and small flower *Grevillea* identified within the Quarry Site. This approval also recognises the international recognition of natural heritage values of the nearby Greater Blue Mountains Area. A compliance review of the conditions of EPBC 2013/7028 is completed annually and placed on the Hy-Tec website. During the reporting period, Hy-Tec remained compliant with the conditions of EPBC 2013/7028.

Hy-Tec also operates the Tinda Creek Quarry in accordance with Environment Protection Licence (EPL) 12007. This licence incorporates standard conditions for extractive industries and includes limits for noise emissions from the Quarry Site.

Water Access Licence (WAL) 24381 (40 units), WAL 42446 (60 units) and WAL 24367 (15 units) have been issued to represent the allocation of water from the Sydney Basin North Groundwater Source that may be used by Hy-Tec under the relevant works approval(s). Water within this source is managed through the water sharing plan for the *Greater Metropolitan Region Groundwater Sources 2011*. Two Water Supply Works approvals have been issued to Hy-Tec to permit extraction of groundwater associated with the WALs. The WALs and licences permit extraction of groundwater in accordance with the conditions provided in the licences.

WAL 24381 and the nominated works approval 10WA112523 permit the use of water accessed from the groundwater setting through extraction activities and principally accounts for evaporation from exposed faces. Anecdotally, Quarry personnel have observed very little seepage into operating domains, however this license accounts for the possible evaporation.

WAL 42446 and WAL 24367 and the nominated works approval 10WA112531 permit the use of groundwater sourced via a production bore from the underlying aquifer. This water is used to top up the dredge pond to ensure the dredge can operate efficiently. Water Supply Works (Bore) approval number 10WA112531 has a conditional limit of 44ML per annum. This limit has been imposed to account for potential impacts to the groundwater setting including groundwater dependent ecosystems in the vicinity of the existing production bore. Hy-Tec is in the process of identifying a location for a second production bore that will permit use of the remaining groundwater entitlements.

4. OPERATIONS SUMMARY

4.1 INTRODUCTION

The following subsections provide a summary of activities undertaken during the reporting period. Activities were generally consistent with those described in previous environmental management reporting. **Plates 1 to 5** display a series of photographs of the Tinda Creek Quarry taken on 24 October 2023 that are representative of existing conditions at the Quarry.

4.2 CLOSED WATER MANAGEMENT SYSTEM

Condition 12 of Schedule 3 of SSD_4978 requires that the catchment of the closed water system must not exceed 40ha at any one time. The closed water management system includes the area within the clean water diversions (**Figure 2**).

During the reporting period the closed water management system covered an area of approximately 38.6ha and remained unchanged from the previous year.

4.3 EXTRACTION OPERATIONS

Extraction and processing during the reporting period continued within Domain 7 (see **Figure 2**). The total volume of sand produced was 159,431t which is within the limits specified in Condition 6 of Schedule 2 of SSD_4978. Sand was extracted via excavator then loaded onto a single articulated dump truck and hauled to the dredge where the material was tipped into a dump pocket in front of the dredge throughout the reporting period (refer **Plate 1** and **Plate 2**).

The dredging process involves the removal of water, sand, silt and clay in the form of a slurry which is then pumped to the processing area, further washed and then the clean sand is stockpiled prior to transportation (refer **Plate 3**). Sand transported from site during the reporting period and forecast for the 2024 reporting period is displayed in **Table 4**.

Table 4
Sand Transportation from Site

Material	Approved annual limit (SSD_4978)	2018 reporting period	2019 reporting period	2020 reporting period	2021 reporting period	2022 reporting period	2023 reporting period	2024 reporting period (approximate forecast)
Sand	300,000 t	116,865t	46,942t	93,488t	96,703t	103,180t	158,421t	145,000t
Source: Hy-Tec								

A copy of the annual return for extractive materials submitted to MEG for 2022/2023 is included within **Appendix 2**.

During the reporting period, the reported sand transported from site (158,421t) was slightly less than the volume of sand produced (159,431) which is below the 300,000tpa limit approved within the development consent.



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Plate 1: Dredge pond in Domain 7
(Ref: E9801_013)



Plate 2: Sand loader and generator
(Ref: E9801_038)

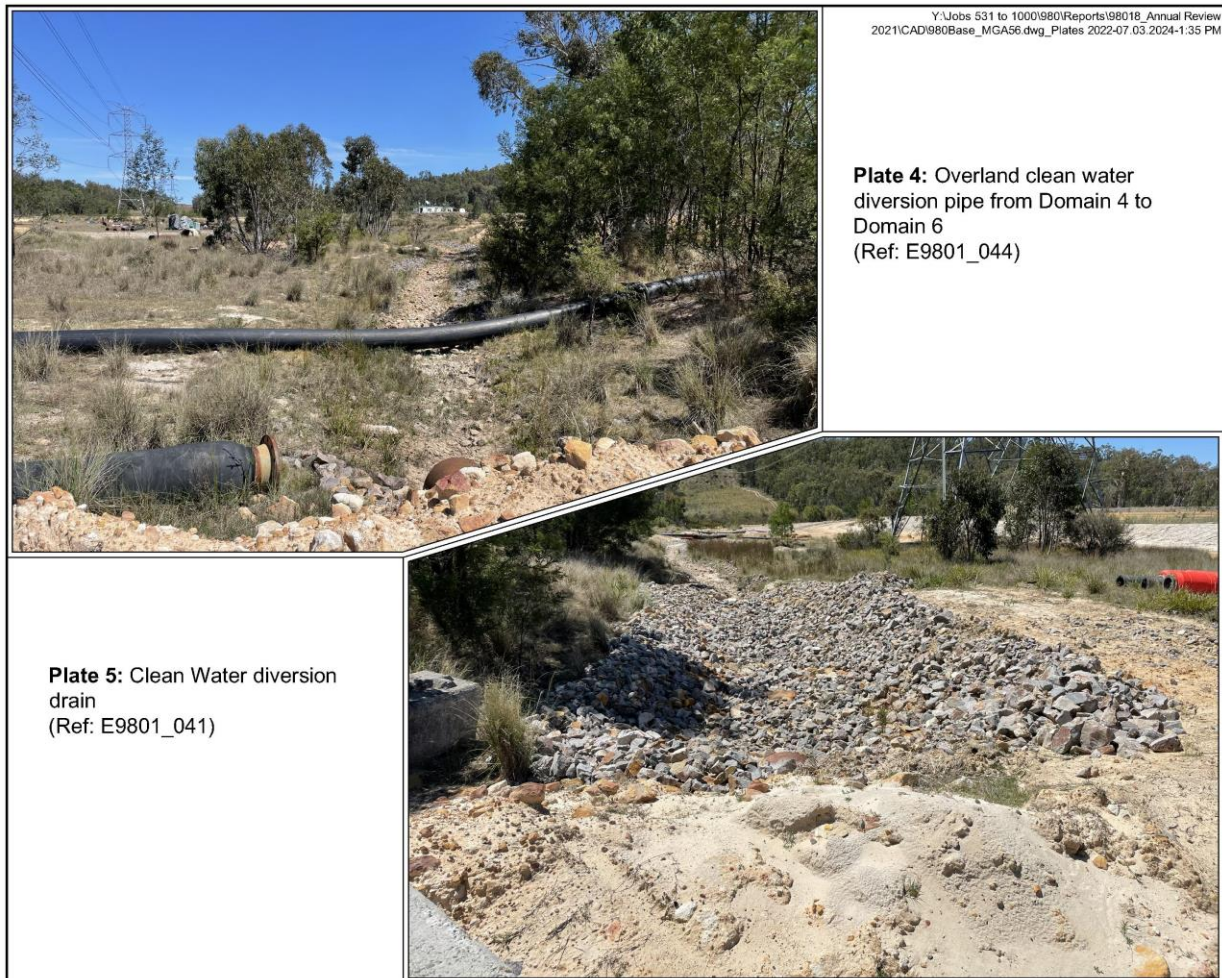


Plate 3: Sand loader and stockpile
(Ref: E9801_039)



During the reporting period (and for all historic operations) extraction operations did not exceed the limit of 15m below the natural ground surface described in *Condition 2(6)* of SSD_4978. Hy-Tec has established a site-based standard procedure for survey and confirmation of the depth of extraction. The site-based procedure is undertaken on monthly basis.

It is expected that sand processing and transportation from Site may slightly decrease in 2024.



4.4 HOURS OF OPERATION

The permissible operating hours as set out in *Condition 3(3)* of SSD_4978 were adhered to throughout the reporting period. Extended hours for major supply contracts were not required during the reporting period.

4.5 TRANSPORT LEVELS

SSD_4978 specifies that haulage activities at Tinda Creek Quarry should not exceed 34 trucks per day, averaged over a calendar month. A total of 4,092 laden loads were despatched from the Quarry during the reporting period. A summary of the vehicle movements at Tinda Creek Quarry is provided from the Hy-Tec website and are summarised in **Table 5**. There were no recorded exceedances of average daily vehicle movements (based on a calendar month averaging period) within the reporting period.

Table 5
Monthly Laden Truck Movements at Tinda Creek Quarry

Month	Laden Truck Loads	Mean Daily Laden Truck Loads ¹
January	159	5
February	292	10
March	355	11
April	302	10
May	395	13
June	346	12
July	357	12
August	405	13
September	401	13
October	389	13
November	395	13
December	322	10
Annual Total	4,118	-
Annual Daily Average	11.3	-
Note 1: Daily despatch averaged over the calendar month is presented, consistent with the requirements of Condition 7 of Schedule 2 of SSD_4978.		
Source: Hy-Tec		

4.6 CONSTRUCTION ACTIVITIES

No new buildings and/or structures were constructed during the reporting period.

4.7 IMPORTATION OF VENM/ENM

No VENM/ENM was imported onto the site during this reporting period.

4.8 WASTE MANAGEMENT

Waste management practices continued in accordance with the provisions of the *Protection of the Environment Operations (Waste) Regulation 2014* throughout the reporting period. Hy-Tec has engaged licensed waste contractors to recycle and dispose of waste throughout the reporting period.

4.9 NEXT REPORTING PERIOD

Sand extraction and processing from Domain 7 will continue in the 2024 reporting period, Extraction is unlikely to proceed into Domains 1, 2 or 3 in 2024.

Other construction activities due to commence during 2024 include the installation of a new section of the wash plant. This section will include a dewatering screen and radial stacker, as well as a cyclone. The old tower will subsequently be decommissioned.

Rehabilitation within areas of the former Domain 4 will continue to be rehabilitated throughout the next reporting period. Weed management is proposed to continue and topsoil removed from Domain 7 will be applied to the surface. Once the existing weeds are under control, direct seeding of the area will be undertaken in accordance with the approved Landscape Management Plan.

Processing activities will continue, consistent with historic processing activities. Average daily laden truck levels will remain within approved limits.

5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

No actions were required as a result of the Department's review of the Annual Review 2022.

6. ENVIRONMENTAL PERFORMANCE

6.1 METEOROLOGICAL MONITORING

Hy-Tec installed a meteorological station in July 2016 in accordance with the requirements of *Condition 3(10)* of SSD_4978. The meteorological station complies with the requirements in the *Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales* guideline. The location of the meteorological station is shown on **Figure 3**.

6.1.1 Rainfall

A summary of the rainfall data for the reporting period is provided in **Table 6**. A total of 583mm of rain was recorded from 1 January 2023 to 31 December 2023. Total rainfall during 2023 was 1081mm less than in 2022, approximately one third of the previous year. Rainfall varied between individual months, with the highest rainfall occurring throughout January, March and November.

Table 6
Summary of Rainfall Records Since 2007

Month	Year																	Mean
	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	
Jan	50.5	95.5	29.0	48.5	66.5	133.0	138.0	8.0	163.0	272.0	36.2*	25.6	30.0	64.8	61.8	87.0	76	84.3
Feb	152.0	146.5	137.5	119.5	47.0	179.0	202.0	64.0	46.5	0.0	34.2*	58.4	25.2	208.4	81	99.4	70.2	102.3
Mar	80.5	43.0	30.0	85.5	97.0	145.0	103.0	135.2	96.5	0.0	208.0	64.4	86.8	134.2	205.8	752.8	130.2	141.1
Apr	61.5	81.5	117.0	26.0	60.0	64.0	63.5	60.5	285.5	0.0	22.4^	13.4	12.4	57.6	30.2	68.8	68.4	66.9
May	29.0	10.5	56.5	59.5	96.0	-	31.0	0.0	56.5	0.0	16.6	6.2	4.4	20.0	39.6	43.2	4.2	29.6
Jun	210.0	94.0	39.5	43.0	85.5	29.0	84.5	29.0	20.5	126.0	54.0	33.0	22.0	12.8	30.4	6.2	18.0	55.1
Jul	13.0	24.5	17.5	38.5	25.5	27.0	18.5	13.0	34.0	55.0	2.6	5.0	12.2	114.6	25.6	221.0	13.0	38.9
Aug	107.0	40.5	4.0	13.5	90.0	4.0	11.0	74.5	26.5	36.5	11.6	10.0	26.0	51.4	53.8	51.2	29.8	37.7
Sep	18.5	58.5	21.0	18.0	69.0	27.5	31.5	29.0	26.5	45.5	0.0	20.0	51.6	37.6	13.8	92.8	7.4	33.4
Oct	22.0	93.5	85.5	85.0	65.5	17.5	26.5	48.0	34.0	40.4	61.6	88.8	19.6	66.6	29.2	168.4	22.0	57.3
Nov	157.5	75.0	31.5	127.5	159.0	70.5	106.5	16.5	141.0	72.2	35.8	13.2	24.4	34.2	169.2	52.0	74.0	80.0
Dec	76.0	71.0	103.5	120.5	72.5	18.5	27.0	150	116.0	69.0	65.0	2.8	0.0	186.0	30.4	20.8	69.8	70.5
Totals (mm)	977.5	834.0	672.5	785.0	933.5	715.0	843.0	627.7	1,046.5	716.6	548.0	340.8	314.6	988.2	770.8	1,663.6	583	785.9

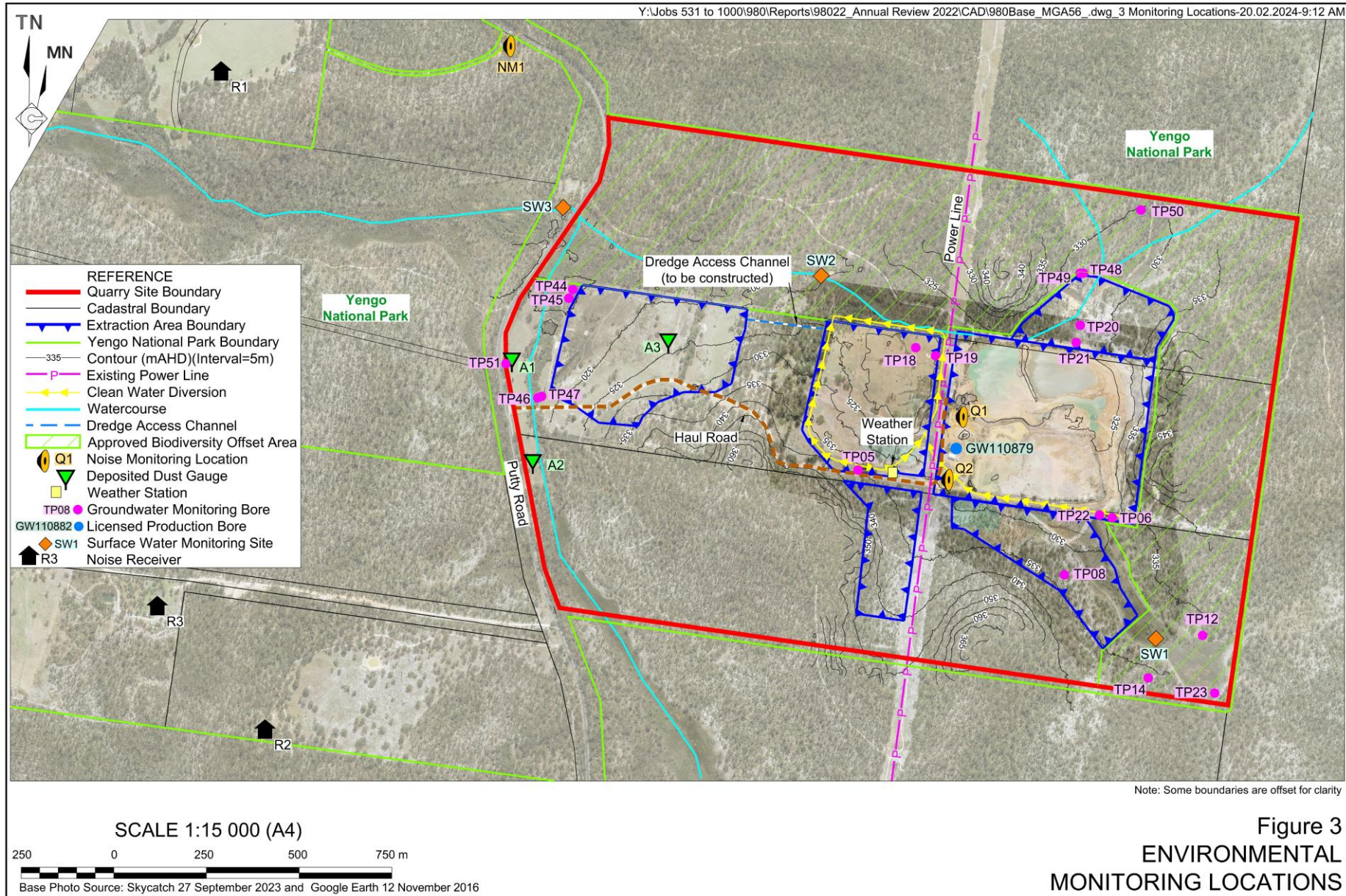
* Estimated from Putty Tea RMS as Quarry weather station out of service.

^ Data downloaded between 31/3/2017 – 9/4/2017 due to weather station fault

6.2 AIR QUALITY

6.2.1 Introduction

Air quality monitoring is required to be undertaken in accordance with the approved *Air Quality Management Plan*.



6.2.2 Air Quality Criteria

The air quality criteria for the Quarry are provided in *Condition 3(7)* of SSD_4978 and are summarised in **Table 7**. Deposited dust (DD) is currently the only air quality parameter that is required to be monitored as specified in the approved *Air Quality Management Plan*. The level of monitoring is considered appropriate as all extraction and processing is essentially a ‘wet’ process and generates limited dust. Deposited dust levels are used as an indicator of the overall air quality performance of operations.

Table 7
Air Quality Criteria

Pollutant	Criterion	Averaging Period
Total suspended particulates (TSP)	90µg/m ³	Annual mean
Particulate matter <10µm (PM ₁₀) <10µm (PM ₁₀)	30µg/m ³	Annual mean
Particulate matter <10µm (PM ₁₀)	50µg/m ³	24-hour average
Deposited dust	4g/m ² /month*	Annual mean

* or 2g/m²/month above the annual background level
Nb: Particulate matter (PM10) data is required to be monitored as specified in the approved Air Quality Management Plan

6.2.3 Air Quality Monitoring Results

Monthly deposited dust monitoring was undertaken throughout the reporting period. The location of dust monitoring gauges DG1, DG2 and DG3 are shown on **Figure 3**. **Figure 4** and **Table 8** present the results of the deposited dust monitoring program over the reporting period. It is noted that the approved *Air Quality Management Plan* requires deposited dust monitoring at location DG1 only. Monitoring at locations DG2 and DG3 is undertaken on a voluntary basis and therefore is not subject to compliance under SSD 4978.

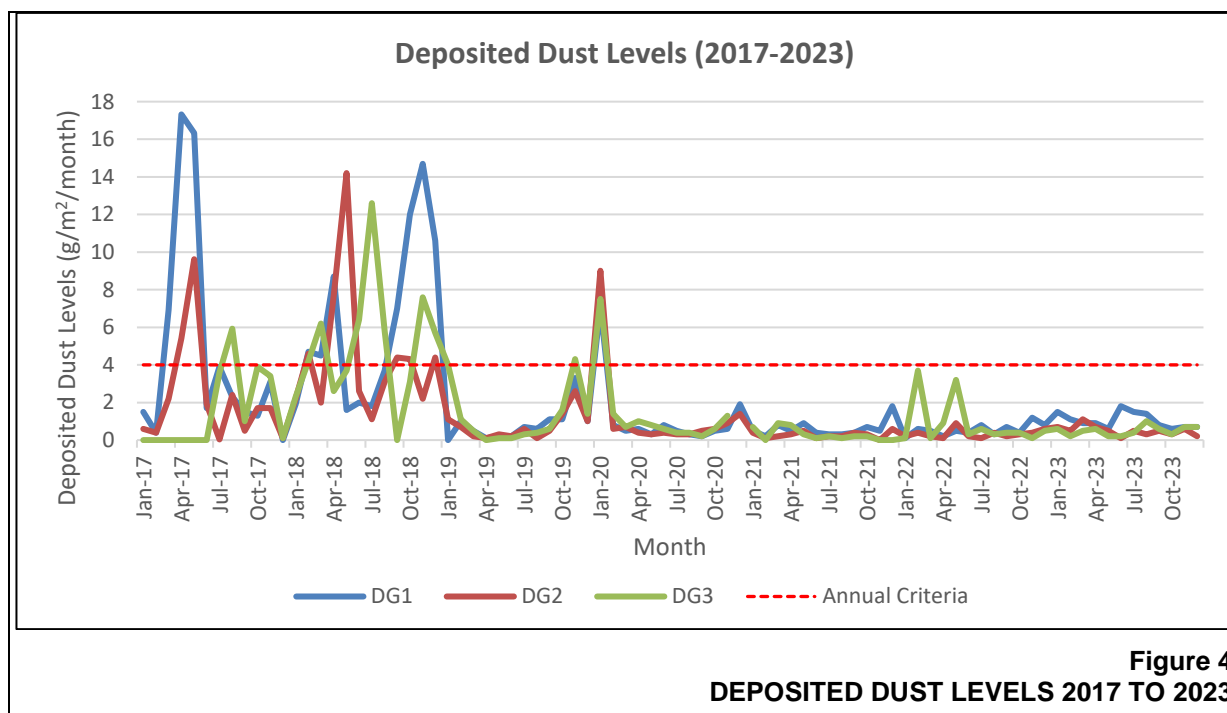


Table 8
Measured Performance – Deposited Dust

Date	Deposited Dust Level ¹			Criterion
	DG1	DG2	DG3	
January	1.5	0.7	0.6	-
February	1.1	0.5	0.2	-
March	0.9	1.1	0.5	-
April	0.9	0.7	0.6	-
May	0.6	0.5	0.2	-
June	1.8	0.1	0.2	-
July	1.5	0.5	0.4	-
August	1.4	0.3	1.0	-
September	0.8	0.5	0.6	-
October	0.6	0.3	0.3	-
November	0.7	0.6	0.7	-
December	0.7	0.2	0.7	-
Annual Average	1.0	0.5	0.5	4

Note 1: Units – g/m²/month

6.2.4 Analysis of Results

Deposited dust levels were all well below the trigger value at each dust gauge throughout the reporting period.

Deposited dust levels remained lower than levels recorded in 2017 and 2018 due to the installation of bird deterrence collars on 4 January 2019, which prevented the entry of insects, organic matter, and bird droppings in samples. As a result of the low records, the annual average level is well below the criteria level for the reporting period.

It is noted that the EIS does not include a quantitative assessment of potential air quality impacts as the operation is essentially a ‘wet’ process and significant air quality impacts were not anticipated.

6.3 OPERATIONAL NOISE

6.3.1 Introduction

Noise monitoring is required to be undertaken in accordance with the conditions listed in the development consent, EPL and approved *Noise Management Plan*. The following subsections provide a brief summary of noise criteria that apply at the Quarry, the results of noise monitoring activities and a discussion of the results recorded during the reporting period.

Following discussions with DPE in January 2017, it was agreed that additional monitoring would be undertaken to provide an estimate of the contribution of the Quarry to noise levels at residential locations. The results of this monitoring for 2023 are presented in Section 6.3.5 and in **Appendix 3**.

6.3.2 Noise Criteria

Condition 3(4) of SSD_4978 is relevant to noise compliance assessment and sets the criteria for noise generated by the development at any residence on privately-owned land as outlined in **Table 9**.

Table 9
Noise Monitoring Criteria SSD_4978 (dB(A))

Receiver	Day / Evening	Night	
	LAeq (15 min)	LAeq (15min)	LA1 (max)
All receivers	35	35	45

Condition L3 of EPL 12007 is relevant to the noise compliance assessment and stipulates the noise criteria at any monitoring point established under the EPL as outlined in **Table 10**.

Table 10
Noise Monitoring Criteria EPL 12007 (dB(A)) – All Receivers

Time Period	Measurement Parameter	Noise level dB(A)
All hours	LAeq (15 minute)	35
Night	Lmax OR LA1, 1min	45

6.3.3 Noise Monitoring Results

Attended noise monitoring was undertaken by Muller Acoustic Consulting Pty Ltd (MAC) on 13 April 2023 in accordance with the approved *Noise Management Plan*. A report prepared by MAC is included as **Appendix 3**.

A summary of the attended noise monitoring results at NM1 is provided in **Table 11**. In all instances the Quarry contribution to noise levels was <35dB_{LAeq (15 minute)}.

Table 11
Summary of Attended Noise Monitoring at Receiver NM1

Time (hrs)	Measure (dBA re 20µPa)			Descriptor and Noise Contribution (dBA)
	LAmx	LAeq	LA90	
Morning Shoulder (6:00am)	57	32	21	Birds 20-57 Site Inaudible
Morning Shoulder (6:15am)	67	45	19	Traffic 20-67 Birds 20-51 Site Inaudible
Morning Shoulder (6:30am)	65	39	19	Traffic 20-54 Birds 20-65 Site Inaudible

Page 1 of 2

Table 11 (Cont'd)
Summary of Attended Noise Monitoring at Receiver NM1

Page 2 of 2

Time (hrs)	Measure (dBA re 20µPa)			Descriptor and Noise Contribution (dBA)
	L _{Amax}	L _{Aeq}	L _{A90}	
Morning Shoulder (6:45am)	65	46	25	Traffic 20-65 Birds 20-50 Site – Water Pump 22-27
Tinda Creek Quarry Contribution				<25
Day (7:30am)	65	44	26	Traffic 20-65 Birds 20-44 Aircraft 25-36 Site Water Pump 23-27
Day (7:45am)	61	39	27	Traffic 20-61 Birds 20-51 Site Water Pump 24-28
Day (8:00am)	62	41	27	Traffic 20-62 Birds 20-48 Site Water Pump 24-28
Day (8:15am)	63	46	28	Traffic 20-63 Birds 20-45 Site Water Pump 24-28 Quarry operations 35-38
Tinda Creek Quarry Contribution				27

6.3.4 Attended Noise Measurement Compliance Assessment

The compliance assessment summary for R1 (see **Figure 3**) is presented in **Table 12** for day and morning shoulder assessment periods and compares operational contributions against the relevant criteria.

Table 12
Day and Morning Shoulder Noise Compliance Assessment at R1

Period	Quarry Noise Contribution L _{Aeq(15min)}	Quarry Noise Criteria L _{Aeq(15min)}	Compliant
Day	<27	35	Yes
Morning Shoulder	<25	35	Yes

The overall contribution of the Quarry to ambient noise was found to be less than 27dB(A) at the time of the monitoring which is within the limits set by both SSD_4978 and EPL 12007. These results indicate that the Quarry is complying with all relevant noise assessment criteria.

The results of the noise monitoring program are also comparable with historic noise monitoring data from Tinda Creek Quarry. Attended noise monitoring conducted from 2016 to 2022 estimated Quarry noise contribution to vary between be <27dB(A) and <20dB(A) in each reporting period. This indicates that current noise mitigation measures are effective in restricting noise to an acceptable level.

6.3.5 Quarry Noise Predictions at Residences

On 20 January 2017, the DPE requested that Hy-Tec undertake additional noise monitoring to record existing noise levels (sound power levels) that were being produced at the Quarry and undertake an assessment to predict the noise impact of the Quarry at nearby privately-owned residences. The request was only made for the year 2017, however Hy-Tec has taken on the initiative to continue to assess the noise levels at surrounding residences that could potentially be impacted by noise generated from Quarry operations.

Sound power levels were measured at locations Q1 and Q2 (see **Figure 3**) with the results of this assessment presented in **Appendix 3**. In summary, it was concluded that Quarry noise at R1, R2, and R3 after taking into consideration the attenuation caused from distance and topography is 28dB(A), 27dB(A), and 28dB(A) at the respective residences. These results all fall well below the criteria nominated by both the SSD_4978 and the EPL12007 of 35dB(A). It is noted that the noise levels are also well below the predicted noise levels modelled during the preparation of the EIS which ranged from <30dB(A) to 35dB(A) at the nearest receivers.

6.4 ABORIGINAL HERITAGE

No actions or impacts related to Aboriginal heritage occurred during the reporting period.

6.5 NON-ABORIGINAL HERITAGE

No actions or impacts related to non-Aboriginal heritage occurred during the reporting period.

7. WATER MANAGEMENT

7.1 GROUNDWATER

7.1.1 Groundwater Quality Monitoring

Groundwater quality monitoring was conducted by Hy-Tec in accordance with the approved *Water Management Plan*. Groundwater quality monitoring was undertaken at six-month intervals over the reporting period at the locations shown on **Figure 3**. The groundwater quality assessment trigger values recorded in the approved *Water Management Plan* are presented in **Table 13**.

Table 13
Groundwater Quality Trigger Criteria

Analyte	Lower Trigger Value	Upper Trigger Value
pH	<4.5	>7.0
Conductivity (µS/cm)	N/A	900
Nitrate (mg/L)	N/A	7.5
Ammonia (mg/L)	N/A	0.2
TRH (C6-C9) (mg/L)	N/A	5.0
TRH (C10-C14) (mg/L)	N/A	5.0
TRH (C15-C28) (mg/L)	N/A	5.0
TRH (C29-C36) (mg/L)	N/A	5.0

Source: Water Management Plan (RWC, 2019) – Table 18

The results of the groundwater quality monitoring data are outlined in **Tables 14** and **15**. All results for Total Recoverable Hydrocarbon (TRH) were below the limit of recording and it is assumed there was none present. TRH is not discussed further in this review.

Table 14
Water Monitoring Results – 28 March 2023

Bore Hole	pH	EC (µS/cm)	Nitrate (mg/L)	Ammonia (mg/L)
TP05	5.5	100	<0.1	<0.1
TP06	5.9	40	1.1	<0.1
TP08	5.1	70	0.5	<0.1
TP12	5.8	50	0.2	0.2
TP14	5.7	50	0.3	<0.1
TP20	5.6	50	1.9	<0.1
TP21	5.7	50	1.9	<0.1
TP22	5.6	60	<0.1	<0.1
TP23	5.2	60	0.2	<0.1
TP44	5.8	190	0.6	<0.1
TP45	4.5	260	18.0	0.9
TP46	6.6	90	2.7	<0.1
TP47	5.8	90	<0.1	<0.1
TP48	6.3	250	0.3	0.2
TP49	5.4	220	0.6	<0.1
TP50	5.3	280	<0.1	<0.1
TP51	6.2	90	0.1	<0.1

Table 15
Water Monitoring Results – 28 July 2023

Bore Hole	pH	EC (µS/cm)	Nitrate (mg/L)	Ammonia (mg/L)
TP05	5.3	100	<0.1	<0.1
TP06	5.6	50	<0.1	<0.1
TP08	5.1	80	<0.1	<0.1
TP12	5.4	55	0.2	<0.1
TP14	5.8	60	<.01	<0.1
TP20	5.6	50	0.5	<0.1
TP21	5.6	55	3.9	<0.1
TP22	NM	NM	NM	NM
TP23	5.2	55	0.2	<0.1
TP44	5.7	190	0.1	<0.1
TP45	5.6	220	<0.1	<0.1
TP46	6	90	<0.1	<0.1
TP47	5.9	110	<0.1	<0.1
TP48	6.2	260	1.2	<0.1
TP49	5.3	230	<0.1	<0.1
TP50	5.1	310	<0.1	<0.1
TP51	5.8	90	<0.1	<0.1

NM = Not monitored, no water sample was taken as well was damaged.

7.1.2 Analysis of Groundwater Quality Results

General observations from the groundwater quality monitoring data are as follows:

- There have been no exceedances of the relevant criteria throughout the reporting period.
- The slightly acidic pH is consistent with historic data and likely to represent the breakdown of plant material.
- The outcomes for EC are consistent with historic data and within the assumed trigger levels.
- It is highly unlikely that quarrying activities are impacting groundwater quality.
- pH, conductivity, nitrate and ammonia results are consistent with groundwater monitoring data obtained during previous monitoring campaigns. No distinct temporal trends are evident within the measured parameters.

The EIS noted that the groundwater tended to be slightly acidic due to the generation of organic acid from the breakdown of plant material (min pH = 4.5, max pH = 6.6). The EIS further noted that conductivity was generally very low (min µS/cm = 50, max µS/cm = 310). It should be noted that levels of ammonia reached the upper trigger measure of 0.2mg/L in TP12 and TP48. Additionally, TP45 exceeded the trigger level for ammonia and nitrate during the first monitoring

event of the reporting period (**Table 14**). As these bores are located outside of the extraction boundary, these levels are unlikely to be attributed to quarry operations, and is likely a result of naturally occurring nitrates and ammonia in the groundwater system. Nitrate and ammonia levels will be monitored on an ongoing basis to ensure levels do not exceed the upper trigger limit. Additionally, the groundwater quality results are generally consistent with those presented in the EIS and it is unlikely that extractive operations are impacting on the quality of the groundwater. As a result, notification to DPHI on the exceedance of ammonia trigger levels was not deemed necessary.

It is noted that bores TP18 and TP19 had been removed as a part of the development of Domain 6. Additional monitoring bores TP44, 45, 46, 47, 48, 49, 50 and 51 were installed in 2017.

7.1.3 Groundwater Level Monitoring

Groundwater levels at the monitoring bores were monitored monthly in accordance with the approved *Water Management Plan*.

Groundwater levels in the monitoring bores are used to assess the impacts of Quarry operations on the surrounding aquifers. This analysis involves assessing the risk of Quarry operations impacting on the Greater Blue Mountains Heritage Area. No significant impacts were anticipated to groundwater flow as a result of quarrying activities.

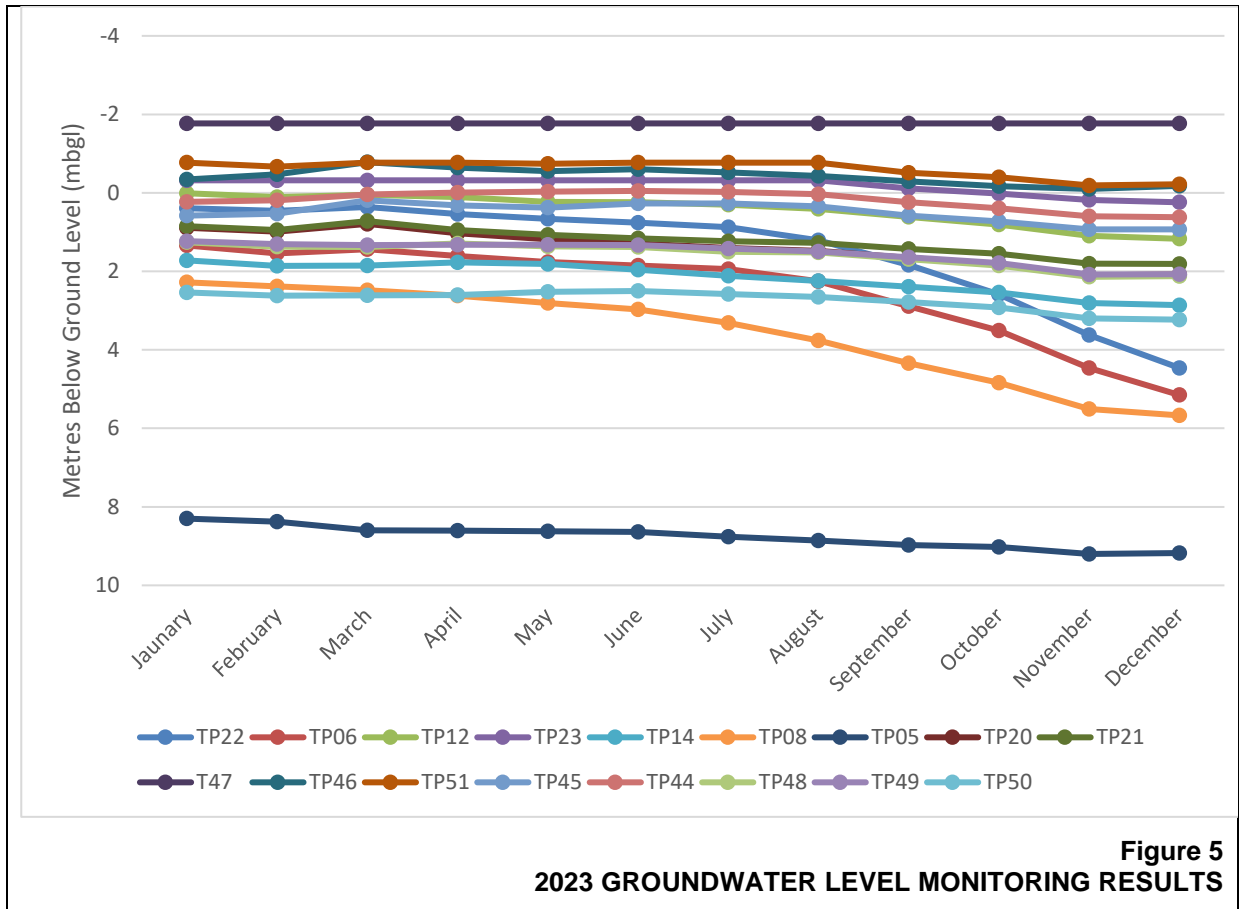
Table 16 presents the drilled depth and groundwater investigation trigger level for each bore.

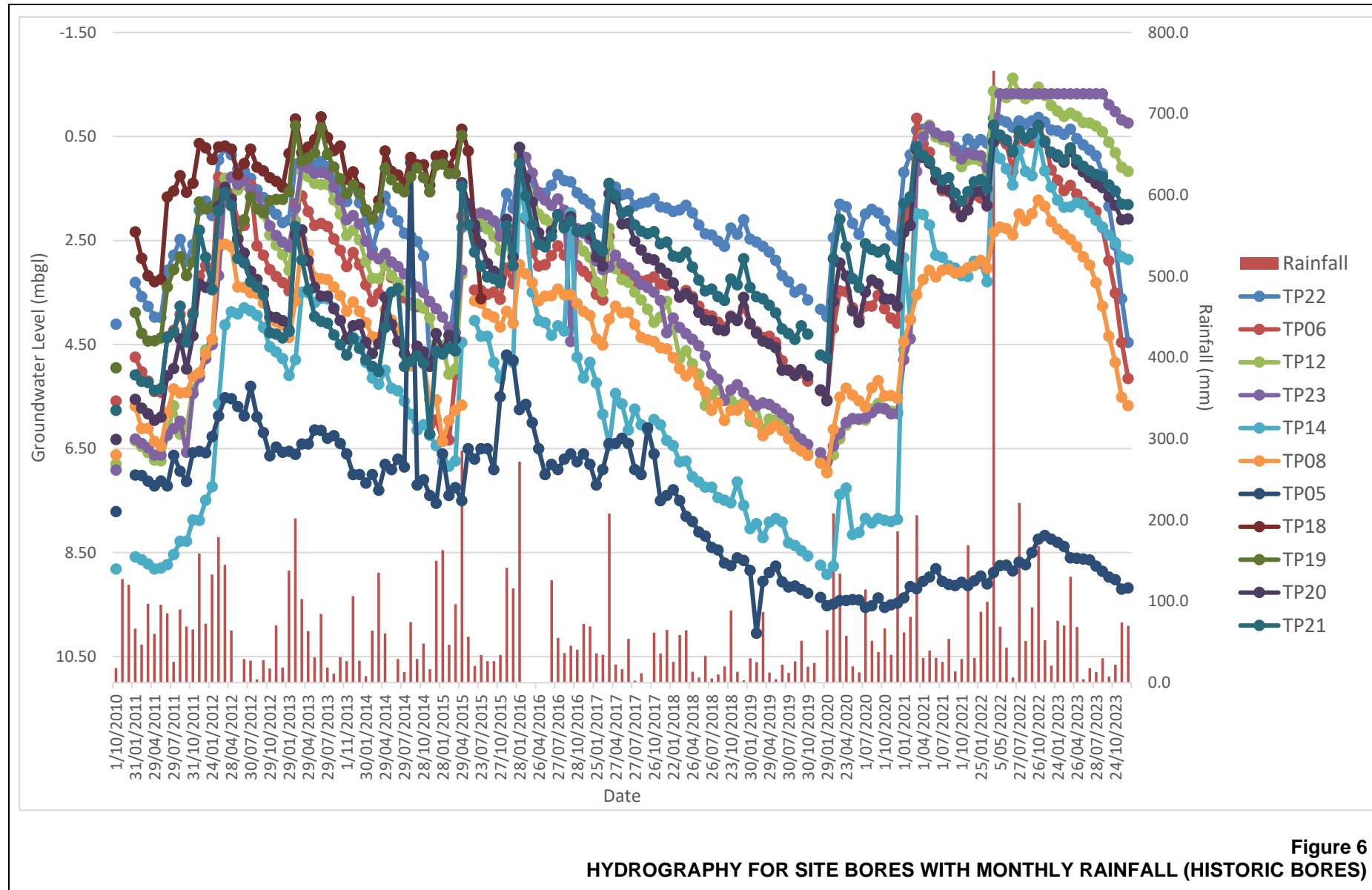
Table 16
Groundwater Investigation Trigger Levels

Bore	Drilled Depth (m)	Trigger Level mBGL
TP22	12	4.43
TP06	18	5.91
TP12	15	6.67
TP23	15	6.77
TP14	20	9.08
TP08	18	6.76
TP05	15	8.75
TP18*	18	3.30
TP19*	12	4.79
TP20	12	5.84
TP21	12	5.84
TP44	18.5	3.11
TP45	9	3.36
TP46	20	1.71
TP47	12	0.69
TP48	18	5.85
TP49	10	5.80
TP50	20	7.67
TP51	16	2.49
* Bore no longer accessible		
Source: Water Management Plan (RWC, 2019) - Table 17		

Groundwater level monitoring has been undertaken at 11 groundwater bores since October 2010 (bores TP05, TP06, TP08, TP12, TP14, TP18, TP19, TP20, TP21, TP22, TP23). In March 2018, monitoring also commenced at a further five bores located to the west of the Quarry (TP44, TP45, TP46, TP47, and TP51) and three bores in the vicinity of Domain 7 (TP49, TP48 and TP50). The locations of the monitoring bores are shown on **Figure 3**.

The results of the 2023 groundwater levels monitoring are outlined in **Table 17** and displayed in **Figure 5**. The historical groundwater levels are presented in **Figure 6** and **Figure 7**. Monitoring results are displayed for both the original monitoring bores and the bores constructed in 2018.





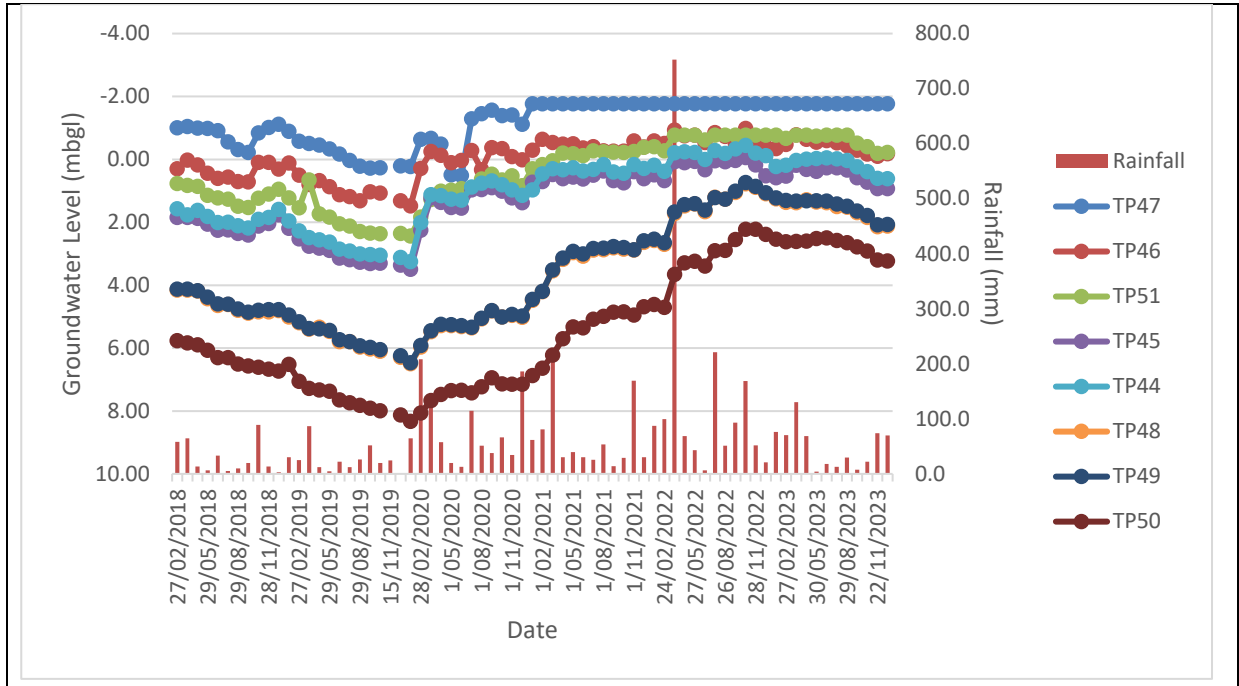


Figure 7
HYDROGRAPHY FOR SITE BORES WITH MONTHLY RAINFALL (2018 BORES)

Table 17
Results of 2023 Groundwater Levels Monitoring Program

Bore Hole	Trigger	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
TP22	4.43	0.39	0.46	0.36	0.54	0.66	0.76	0.87	1.21	1.84	2.59	3.62	4.46
TP06	5.91	1.34	1.54	1.44	1.61	1.76	1.85	1.94	2.25	2.89	3.51	4.46	5.15
TP12	6.67	0.01	0.11	0.05	0.11	0.23	0.24	0.3	0.41	0.61	0.81	1.09	1.17
TP23	6.77	-0.32	-0.32	-0.32	-0.32	-0.32	-0.32	-0.32	-0.32	-0.11	0.02	0.18	0.24
TP14	9.08	1.72	1.86	1.85	1.77	1.81	1.96	2.11	2.24	2.39	2.54	2.81	2.86
TP08	6.76	2.28	2.38	2.48	2.62	2.81	2.97	3.31	3.76	4.34	4.84	5.51	5.67
TP05	8.75	8.30	8.38	8.6	8.61	8.62	8.64	8.76	8.86	8.97	9.02	9.2	9.18
TP20	5.84	0.89	0.99	0.79	1.03	1.18	1.29	1.4	1.48	1.66	1.82	2.1	2.08
TP21	5.84	0.85	0.95	0.72	0.95	1.07	1.16	1.23	1.27	1.43	1.55	1.8	1.81
TP47	0.69	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77	-1.77
TP46	1.71	-0.34	-0.47	-0.78	-0.64	-0.55	-0.6	-0.52	-0.43	-0.29	-0.17	-0.1	-0.18
TP51	2.49	-0.77	-0.67	-0.77	-0.77	-0.74	-0.77	-0.77	-0.77	-0.51	-0.40	-0.19	-0.22
TP45	3.36	0.58	0.53	0.19	0.32	0.38	0.27	0.27	0.34	0.58	0.73	0.93	0.93
TP44	3.11	0.23	0.19	0.04	-0.01	-0.03	-0.05	-0.02	0.03	0.24	0.39	0.60	0.62
TP48	5.85	1.26	1.37	1.38	1.29	1.36	1.38	1.50	1.52	1.69	1.85	2.14	2.12
TP49	5.80	1.23	1.31	1.33	1.32	1.32	1.33	1.42	1.49	1.64	1.79	2.08	2.07
TP50	7.67	2.54	2.62	2.61	2.60	2.52	2.50	2.58	2.65	2.78	2.92	3.2	3.23

Red text indicates exceed trigger levels

7.1.4 Analysis of Groundwater Level Results

Figure 5 and **Figure 6** indicate that water levels have progressively decreased since a peak in the previous reporting period. This is particularly evident in TP22, TP06 and TP08. These bores lie within or adjacent to the current extraction area in Domain 7 (**Figure 3**). The groundwater levels in monitoring bore TP22 were below the investigation trigger level for December of the reporting period. **Figure 5** indicates that groundwater levels across the Quarry Site decreased over the reporting period, however there was a more marked decline in TP22, TP06 and TP08. Bores at TP12, TP14 and TP23 are located upgradient of TP22, TP06 and TP08 and show a slight decline over the reporting period. The higher reduction evident in TP22, TP06 and TP08 is likely attributed to water extraction occurring in Domain 7 during the reporting period reducing the groundwater table level. Investigations by a hydrogeologist will be conducted in the 2024 reporting period to ensure extraction activities will not have an adverse impact on groundwater quality, or the overall health of the surrounding vegetation that may rely on the groundwater reserves.

Groundwater levels in monitoring bore TP05 were below the investigation trigger levels for the second half of the reporting period. Groundwater levels at this bore have consistently been below the trigger levels, established in the Water Management Plan, for the past four years. Historically, TP05, which is close to the active Domain 6, has not been as responsive to recharge as other bores. It is indicated that this trigger level may no longer be appropriate for this bore.

Several bores continue to indicate artesian conditions in the aquifer resulting in water levels above ground level in the monitored bores (within the casing). This is considered to likely represent confined aquifer conditions with subsequent pressure forcing water into the bore and then stabilising within the casing. Monitoring bores TP23, TP46, TP47 and TP51 located downgradient of the Quarry retain higher groundwater level (artesian) conditions, however TP47 and TP51 do not accurately measure the water level as they are often flowing above ground level.

7.1.5 Groundwater Usage

Hy-Tec have the capacity to extract 44 megalitres (ML) of water per year under its water access licences and water supply works approvals (see Section 3 and **Table 2**). Water extracted from the deeper aquifers are primarily used to fill the dredge pond and for use in dust suppression during extended dry periods.

The approved *Water Management Plan* requires that the quantity of water obtained from production bores is monitored on a monthly basis. **Table 18** presents a summary of the groundwater usage from January 2023 until December 2023.

A total of 6.56 ML of groundwater was utilised over the reporting period which represents an increase of 6.36ML compared to 2022. Hy-Tec is approved to use 44ML of water per annum (based on a water year (July to June)). It is noted that between July 2022 to June 2023 a total of 0.62ML of water was used. Groundwater use increased in the final quarter of 2023 to account for the low rainfall levels experienced over that period.

Table 18
Groundwater Usage – Meter Reading and Monthly Usage

Date	Meter Reading (KL)	Usage (ML)
January	55241	0.090
February	55357	0.116
March	55680	0.323
April	55693	0.013
May	55700	0.007
June	55706	0.006
July	55716	0.010
August	55818	0.102
September	55827	0.059
October	58503	2.676
November	60233	1.730
December	61662	1.429
Total	681136	6.561

There was an increase in the overall groundwater use during the reporting period compared to the previous reporting period, as a result of decreased rainfall captured in the closed water management system and an uptake in water sourced from the production bore.

7.2 SURFACE WATER

7.2.1 Introduction

The Tinda Creek Quarry is situated near the top of the Tinda Creek catchment. Tinda Creek itself typically experiences intermittent, short duration flows immediately following heavy rainfall events. Previous monitoring, conducted in 2008 and 2015, indicates that quarrying activities have not impacted negatively on the Tinda Creek system and the downstream portions of the creek remain consistent with other creek systems in the vicinity of the Quarry.

The Quarry utilises a closed water management system. This system has been successfully implemented for the past 30 years and involves a number of pump lines and catch drains, though it is noted that a number of discharge events as reported took place during 2020, 2021 and 2022 with no detectable impacts. An update to the Water Management Plan for the Quarry is currently in preparation alongside the assessments being undertaken for the Modification 1 application that will seek approval for the necessary controlled discharge of water from the Quarry. The updated plan will include a description of the discharge process should extreme events require it. Hy-Tec has adapted its water management procedures to account for the transition from extremely dry conditions experienced in 2018/2019 to the more recent significant rainfall events. In 2023, rainfall has largely gone back to pre-2022 levels. Despite this, a revised water management strategy will still be implemented for the Quarry and be included in an update to the Water Management Plan as described above.

Clean water diversion drains have been constructed within the Quarry Site in order to prevent clean runoff entering the operations area. The diversion drain system shown on **Figure 3** comprises the following components.

- Southern Diversion
- Southern Diversion Extension
- Existing Diversion.

Clean water diversion for operations in Domain 6 were constructed in 2017. In 2022, the clean water diversion drain was moved to the southern side of the access road.

During the reporting period the closed water management system covered an area of approximately 38.6ha and remained within the limit of 40ha at any one time, as described in *Condition 3(12)* of SSD_4978.

7.2.2 Surface Water Monitoring

Surface water monitoring was conducted generally in accordance with the approved *Water Management Plan* over the reporting period. A summary of the required surface water monitoring is provided in **Table 19**.

Table 19
Surface Water Monitoring Regime

Monitoring Type	Location	Parameters Monitored	Frequency of Monitoring	Monitoring Method
Dredge Pond Level	Dredge Pond	Level (depth below ground)	Monthly	Observation or dip
Surface Water Quality	Upstream and downstream of Quarry	pH, EC, turbidity	Monthly if water is flowing in Tinda Creek. Samples will also be taken after more than 50mm of rain in 24 hours if water is flowing.	Grab Sample
Drainage Lines and Diversion Drains	Upstream and downstream of quarry	Stability, erosion, and sediment build up	Monthly and event based	Observation and photography
Closed Water Management System	Quarry	Stability, erosion, and sediment build up	Monthly and event based	Observation and photograph

7.2.3 Dredge Pond Water Levels

The *Water Management Plan* requires that dredge pond water levels are assessed on a monthly basis. The depth of water in any operating dredge pond is to remain more than 5m to avoid triggering further investigations.

The depth of the dredge pond was measured regularly between January 2023 to December 2023. Water levels were approximately 4.2mbgs to 9.8mbgs during each survey. On the basis of these results it is confirmed that the dredge pond was at an appropriate level during the reporting period and the approved depth of extraction (15mbgl) was not exceeded. Therefore no further investigations were required.

7.2.4 Surface Water Quality

Surface water quality monitoring was conducted by Hy-Tec in accordance with the approved *Water Management Plan*. The surface water quality assessment trigger values recorded in the approved *Water Management Plan* are presented in **Table 20**.

Table 20
Surface Water Quality Triggers

Parameter	ANZECC Trigger*
pH	6.5-8.0
Electrical Conductivity	30-350
Turbidity	2-25
*ANZECC (2000) guideline triggers are based on values for upland streams in NSW (see Table 3.3.2 and Table 3.3.3 of ANZECC (2000)).	

Water was only available to sample upstream and downstream of the Quarry during January of the reporting period. The results from January of the reporting period are presented in **Table 21**.

Table 21
Surface Water Quality Results – 2023

Month	Monitoring Location	Parameter		
		pH	Electrical Conductivity	Turbidity
January	SW1	6.48	66	4.00
	SW2	6.60	64	17.50
	SW3	6.61	77	14.50
	SW3	6.61	77	14.5
	Gibba	7.04	153	38.00

The pH values recorded at the Quarry are below the ANZECC (2000) trigger for upland creek systems. These results are consistent with the baseline results presented in the approved *Water Management Plan*. The exceedance of turbidity ANZECC trigger at the Gibba is attributed to heavy rainfall during this month which increased the levels of freshwater and exacerbated the runoff of suspended sediment into these ponds.

7.2.5 Surface Water Discharge Events

No surface water discharge events from the quarry occurred during the 2023 reporting period.

7.2.5.1 Rainfall

A summary of recent rainfall, recorded at Bureau of Meteorology (BoM) stations and a Department operated flow gauging station near the Quarry as well as data obtained from the Scientific Information for Landowner's (SILO) data service is presented in **Table 22** below.

As shown in **Table 22**, annual rainfall at each location over the past three years falls below that location's average, despite some years (particularly 2022) having incomplete annual records. Quarry site rainfall is almost one third of recorded rainfall in the previous reporting period,

indicating that the rainfall experienced in 2022 was substantially higher than average and well above previous records. Rainfall recorded in the 2023 reporting period has resulted in less catchment saturation and volumes entering the closed water management system, particularly in comparison to the 2022 reporting period.

Table 22
Recorded and Average Annual Rainfall in the Vicinity of the Quarry

Source	ID	Period of Record	Annual Rainfall (mm/year)			
			2021	2022	2023	Average
Quarry Site	None	2007 – present	769.6	1,637.2 ¹	583	996.6
Putty (the Gibba)	BoM ID 61336	2001 – present	888	998 ¹	629.0	838.3
Putty Tea Rooms	BoM ID 61209	1962 – present	893	1,306.2 ¹	431.2	876.8
Macdonald River at Howes Valley	Gauge ID 212021	2014 – present	837.4	759.4 ¹	317 ¹	637.9
SILO	-33.15S, 150.70E	1889 – present	896.7	1,159.5 ¹	624.5	893.6

Note 1: Incomplete annual record

7.2.6 Drainage Lines, Diversion Drains and Water Management System

Hy-Tec have implemented a range of measures to ensure sediment movement within the Quarry (in clean water diversion drains) is limited. These measures include the following.

- Construction and maintenance of spoon drains.
- Lining of drains with geofabric and rock armouring.
- Installation of a gabion mattress at the end of drain in the vicinity of Domain 6 to capture sediment and slow the flow of water.
- Installation of rows of hay bales and silt fencing.
- Re-seeding of the drain to establish a suitable ground cover.

Condition M2.1 of the EPL 12007 requires that the licensee undertake monthly inspections of the surface water system at the premises. The monthly inspection must:

- be undertaken immediately upstream and downstream of the Quarry disturbance area;
- include visual inspection for litter, oil and grease and sediment within the surface water system, including diversion channels;
- include visual inspection of the physical integrity of the surface water system, including any signs of erosion; and
- include visual inspection of the water level/flow in Tinda Creek.

Results of the visual inspections recorded during the reporting period is presented in **Table 23**.

Table 23
Results of Surface Water Monitoring – 2023

Observation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Litter	No	No	No	No	No	No	No	No	No	No	No	No
Oil/Grease	No	No	No	No	No	No	No	No	No	No	No	No
Sediment	Yes	Yes	Yes	No	No	No	No	No	No	No	No	No
Erosion	No	No	No	No	No	No	No	No	No	No	No	No
Water Level/Flow	Yes	No	No	Yes	No	No	No	No	No	No	No	No

As no discharge of water from the Quarry occurred in 2023, the identified sediment in surface water monitoring was considered to be caused by the naturally sandy substrate in the vicinity of the Quarry.

8. REHABILITATION AND LANDSCAPE MANAGEMENT

8.1 REHABILITATION MANAGEMENT

Rehabilitation objectives for the Quarry are described in Schedule 3, Condition 17 of SSD_4978 and reiterated in the approved *Landscape Management Plan* for the Quarry. The objectives for progressive and final rehabilitation of the Quarry include the following.

- The Quarry Site is safe, stable and non-polluting.
- Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35ha of Mellong Sandmass Sedgeland.
- Surface infrastructure is to be decommissioned and removed (unless the Secretary agrees otherwise).
- Minimise the size, depth, batter slope and the drainage catchment of the final void.
- Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site.
- Ensure that the surface area of the final voids is no greater than 16ha in total.
- Ensure that final voids are separated from the surface water drainage system, unless the Secretary agrees otherwise.
- Restore alignment and hydraulic function of watercourses, as far as practical.
- Ensure public safety.

Rehabilitation works continued in the 2ha domain in the south-eastern quadrant of the Quarry Site and the north-eastern corner of the historic extraction area of Domain 4 as shown on **Figure 2**. Rehabilitation works comprised primarily landform construction through backfilling the area with overburden, silt and clay material with coarse woody debris applied as available to enhance the natural regeneration. This activity was consistent with the methods and timing presented in the *Landscape Management Plan*.

Hy-Tec considers that the potential for successful rehabilitation of the Quarry Site remains positive following the Gaspers Mountain Bush Fire in early 2020. During the life of the Quarry, natural regeneration following bush fire has demonstrated the natural resilience of the vegetation. The resilience of the vegetation is evident and the speed of regeneration (following rainfall) evident. This is consistent with the response to fires that occurred in October 2013, with Quarry personnel reporting that within a matter of months the vegetation was re-establishing and within one year there was almost no evidence of the fire.

8.2 LANDSCAPE MANAGEMENT

Landscape management was undertaken generally in accordance with the approved *Landscape Management Plan* which was prepared in accordance with *Condition 3(19)* of SSD_4978. Activities involved predominantly weed management, maintenance of clean water diversions and some vegetation maintenance.

Local Land Services initiated a 1080 Wild Dog Baiting Program within the Hawkesbury and Blue Mountains region in June and October 2023. This included the Quarry Site. A total of five baits were placed in June, one of which was taken in the week following. A total of six baits were placed in October, three of which were taken in the week following, with signs of goannas at the site of inspection.

The *Landscape Management Plan* includes a range of monitoring activities to be undertaken by Hy-Tec to demonstrate compliance with the objectives and performance criteria for landscape and rehabilitation management. A summary of these activities is provided in **Table 24**.

Table 24
Ecological Monitoring Requirements at Tinda Creek Quarry

Type of Monitoring	Parameters Monitored	Frequency	Monitoring Method	Responsibility
Rehabilitation	Inspections of survey markers, drainage lines, water management systems and rehabilitation areas.	Monthly	Visual Inspection	Quarry Manager
	Survey of 9 x BAM plot as per Section 13.2.2.	Annually	Field Survey	Quarry Manager / Ecologist
Koala	Targeted Spot Assessment Technique, Call playback surveys, Spotlight surveys.	Bi-annually (every two years)	Field Survey	Quarry Manager / Ecologist
<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	Surveys during known flowering period (July to December), stem counts in permanent plots, photo monitoring, habitat quality.	Annually	Field Survey	Quarry Manager / Ecologist
Nest Boxes	Condition assessment.	Annually (if required).	Field Survey	Quarry Manager / Ecologist
Voluntary Undertaking	Natural regeneration.	Annually	Visual Inspection / Photographs	Quarry Manager
Aquatic Monitoring	Stream width and edge habitat, stream features including substrate, vegetation and organic material, site observation including catchment description and local land use practises, and riparian characteristics.	Annually	Field Survey and Photography	Quarry Manager / Ecologist

8.2.1 Rehabilitation Monitoring

Visual inspections of the areas under active rehabilitation were undertaken monthly during the reporting period (rather than six-monthly) and cross-over with requirements for monitoring of erosion and sediment controls and surface water quality in accordance with the *Water Management Plan*. A summary of the outcomes of monitoring during the reporting period is provided in **Table 25**. Visual inspections of the Quarry Site were supplemented by monitoring undertaken by EMM in November 2023 (EMM, 2023) with the outcomes of this monitoring presented in **Appendix 4**.

Table 25
Rehabilitation Inspections

Rehabilitation Monitoring Aspect	Comment
<p>Monitoring is to include:</p> <ul style="list-style-type: none"> • soil conditions and erosion (i.e. stability); • drainage and sediment control structures; • runoff water quality; • germination rates; • plant health; • natural regeneration; and • weed infestation. 	<p>Visual inspections were undertaken monthly by the Quarry Manager with photographic evidence of drain conditions and stability recorded. It is considered that existing erosion and sediment controls were functioning appropriately (see Plate 4 and 5).</p> <p>No significant erosion was noted.</p> <p>During the reporting period campaigns of weed (African Lovegrass) spraying and manual removal via scalping has occurred.</p>

8.2.2 Long-Term Rehabilitation Monitoring

Long-term rehabilitation monitoring was undertaken by EMM in November 2023 (EMM, 2023). The outcomes of this monitoring are described in detail in the monitoring report presented as **Appendix 4** of this report. **Table 26** presents an overview of key monitoring aspects and outcomes.

Table 26
Long-Term Rehabilitation Monitoring

Rehabilitation Monitoring Aspect	Comment
<p>Monitoring is to:</p> <ul style="list-style-type: none"> • compare results against rehabilitation objectives and targets • identify possible trends and continuous improvement • link to records of rehabilitation to determine causes and explain results • assess effectiveness of environmental controls implemented • where required, identify modifications required for the monitoring program, rehabilitation practices or areas requiring research • compare flora species present against original seed mix and/or analogue sites • assess vegetation health • assess vegetation structure (e.g. upper, mid. and lower storey) • the presence and abundance of any weed species • assessment of natural regeneration/recruitment of new species • where applicable, assess native fauna species diversity and the effectiveness of habitat creation for target fauna species 	<p>The majority of the rehabilitation objectives do not yet apply, however progressive rehabilitation and management of the rehabilitating landscape remains consistent with these objectives (described in Section 8.1). No monitoring occurred on BAM plots B1 and B2 in the 2023 reporting period due to substantial ground disturbance, ongoing earthworks, and landform alterations in proximity to the plot. Monitoring of these plots will be deferred until rehabilitation works have been undertaken,</p> <p>EMM (2023) observed that native species richness increased in the rehabilitation BAM site (B3) compared to 2022 surveys. An increase in species richness was also observed in the analogue site (B7). Plot B3 presented with a substantial increase in litter cover compared to 2022 (34% and increase from 18%).</p> <p>However, weed cover and abundance in plot B3 covers approximately 80.5% influenced mostly by African Lovegrass, which is in line with 2022 surveys. Weed control will be continually required as the African Lovegrass density will negatively affect biodiversity values of the surrounding Biodiversity Offset Areas.</p> <p>Pest species including deer, feral cat and wild dogs occur throughout Wollemi and Yengo National Parks directly adjacent to the Quarry Site. Control will therefore be impossible given that these species will continue to move from the national parks into unoccupied habitat within the Quarry Site.</p>

8.2.3 Biodiversity Offset Area Monitoring

Monitoring within the Biodiversity Offset Area was undertaken by EMM in November 2023 in accordance with the *Landscape Management Plan*. The monitoring plots that were re-visited with the approximate locations presented in **Figure 8. Table 27** presents the monitoring aspects and general conclusions of the monitoring campaign. A more detailed review of the monitoring outcomes and the data collected from monitoring plots is provided in **Appendix 4**.

Table 27
Biodiversity Offset Area Monitoring

Biodiversity Offset Area Monitoring Aspect	Comment
<p>Monitoring is to include:</p> <ul style="list-style-type: none"> • general vegetation health • evidence of natural seedling recruitment • occurrence and abundance of weed species • structure and floristics of vegetation cover • signs of disturbance (by stock, people or feral animals) • nature and extent of erosion • evidence of fire • characteristic of ground cover (e.g. leaf litter, rocks, logs and soil) • nectar or fruit resources and perch sites • water resources • secondary evidence of fauna use such as scats, tree scratches or diggings. 	<p>EMM (2023) noted no obvious adverse effects from the Quarry on vegetation communities within the Biodiversity Offset Area.</p> <p>EMM (2023) observed that, with the exception of the Mellong Sandmass Dry Woodland, native species richness has decreased in all vegetation communities when compared to the 2022 monitoring year data. The largest decrease between 2022 and 2023 was a decrease of five species (28 in 2022 down to 23 in 2023) recorded within the Mellong Sandmass Sedgeland. A decrease in species richness across the majority of the site is likely associated with increased temperatures and drier conditions across the region in 2023. However, species richness is still greater across all vegetation communities since year 1 of monitoring. This increase is a sign that the vegetation communities have stabilised following the 2019 Gospers Mountain bushfire.</p> <p>A number of threatened species occur within the Biodiversity Offset Area, including a population of <i>Grevillea parviflora</i>. The <i>Grevillea</i> population has increased during the reporting period.</p> <p>Exotic species were recorded within B4 and B5 on the western end of the Quarry, all of which are in, or close to, areas of disturbance. Weed diversity and cover across the surveyed plots (i.e. Plots B3 and B7) remain consistent with 2022 results.</p> <p>Plots B6 and B9 contained vegetation in good condition, with no evidence of exotic species.</p> <p>No weed species recorded are listed as 'Weeds of National Significance'.</p>

8.2.4 Koala Monitoring

As per the Landscape Management Plan (RW Corkery & Co, 2022), koala monitoring is required bi-annually. As surveys were undertaken during the 2022 reporting period, koala monitoring was not completed during the 2023 period. EMM (2023) notes that no Koalas were sighted during their 2023 survey period and none have been recorded in the vicinity since 2018.

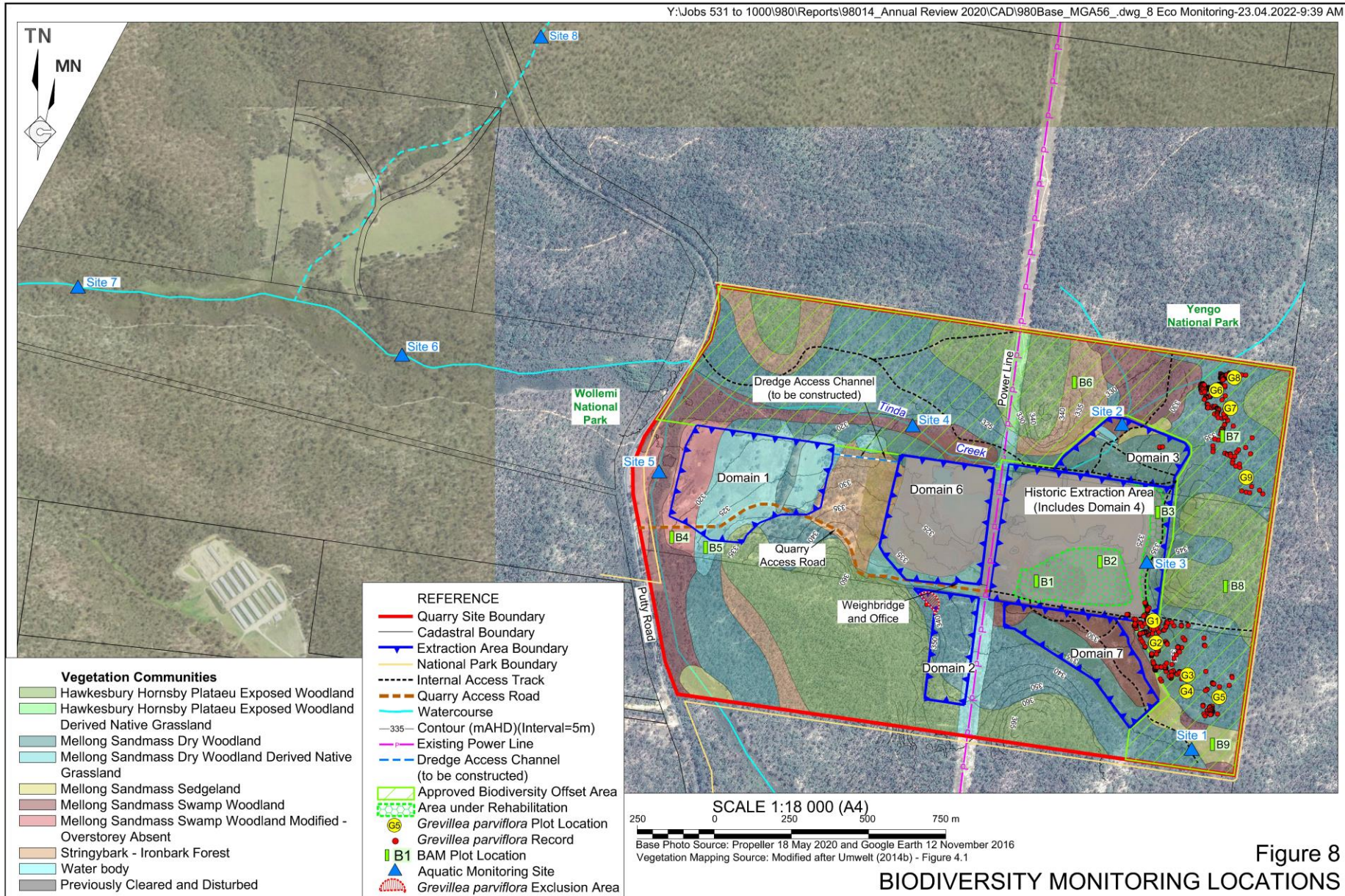


Figure 8
BIODIVERSITY MONITORING LOCATIONS

The approved *Landscape Management Plan* for the Quarry contains a Koala Plan of Management (Appendix 1 of the plan) that specifies performance criteria for Koala management. These include the following:

- No koalas will be harmed as a result of any tree-clearing practices that take place as a result of this Project.
- Potential quarry-induced impacts will not result in the alteration to the floristics, structure or condition of non-cleared areas of potential koala habitat.

Quarry personnel have reported no incidents involving Koala vehicle strikes. There is no evidence that there are Quarry-related impacts occurring to Koala habitat.

8.2.5 Aquatic Monitoring

On 1 November 2023, Niche (2024) undertook aquatic monitoring to monitor the river health of Tinda Creek and its tributaries and to assess any potential impacts from Quarry development. A report detailing the methods, outcomes and conclusions of the aquatic monitoring program is provided as **Appendix 5**. The monitoring program is consistent with the previous monitoring presented as Appendix 2 of the *Landscape Management Plan* (Umwelt, 2016).

The monitoring program in 2023 included the following:

- Assessment of habitat condition using AUSRIVAS proforma.
- Assessment of water quality against default ANZG trigger values.
- Assessment of the macroinvertebrate community condition using Stream Invertebrate Grade Number Average Level (SIGNAL2) and AUSRIVAS.

Aquatic monitoring sites are presented in **Figure 8**. In comparison to the relatively wet sampling season of the previous reporting period, many sites were dry in spring 2023 after receiving fewer major rainfall events throughout the year. Aquatic environments downstream of the Quarry were found to have a good level of riparian growth, having recovered from the 2019-2020 bushfire events, as well as stable channel morphology. The macroinvertebrate communities had recorded generally poor SIGNAL2 and poor to moderate AUSRIVAS results, however these results were comparable between the test site and reference sites. All sites recorded macroinvertebrate diversity lower than the previous reporting period, however these results are comparable to those previously recorded throughout the monitoring program.

All water quality results for the samples sites were within the ANZG default trigger values, within the exception of turbidity at Site 5 (reference site), and dissolved oxygen levels at Site 6 (test site). However, these results are consistent with expected ephemeral/intermittent streams in the region.

Overall stream health results recorded at Site 6 (Tinda Creek, approximately 0.75km downstream of the Quarry) are comparable to those recorded at the reference sites. As such, the streams are likely being influenced by natural stress associated with intermittent/ephemeral streams and reflect conditions experienced within the locality, and not impacts associated with the operation of the Quarry.

Based on the evidence available, there appears to be no obvious disturbance resulting from the Quarry operations at downstream sites

8.2.6 Nest Box Monitoring

During 2022 reporting period 10 nesting boxes were installed on site. These were installed in October 2022 by the Quarry Manager. A mixture of nesting boxes for Microbats, Possums and Parrots were installed, the locations of which are displayed on **Figure 8** with GPS coordinates provided in **Table 28**. It is recommended that nest box monitoring commence during the 2024 survey period and continued annually.

Table 28
Nesting Boxes

Type	Nesting Box no.	Latitude	Longitude
Possum	1	-33.168198	150.704772
	2	-33.16837	150.704882
	3	-33.168391	150.705098
	4	-33.168494	150.705342
Parrot	1	-33.16804	150.704686
	2	-33.16719	150.70748
	3	-33.167294	150.709030
Microbat	1	-33.167267	150.708069
	2	-33.167255	150.708450
	3	-33.167294	150.708649

8.2.7 Threatened Species Monitoring

Threatened fauna monitoring was undertaken by EMM in December 2023, predominantly focused on the Biodiversity Offset Area (EMM, 2023). The outcomes of these surveys are presented in **Appendix 4**.

The Site is a known and potential habitat for 18 threatened fauna species. Rosenberg’s Goanna (*Varanus rosenbergi*) was observed multiple times during surveys of the Study Areas. The species is listed as Vulnerable under the *Biodiversity Conservation Act 2016*.

During monitoring for the previous reporting period, one flora species listed as endangered under the *Biodiversity Conservation Act 2016* was identified within the study area. *Hibbertia puberula subsp. extensa* was identified again in monitoring for this reporting period (EMM, 2023). A habitat assessment and survey for *Hibbertia puberula subsp. extensa* was conducted in two patches of PCT 3622 Sydney Hinterland Yellow Bloodwood Woodland south of the active Quarry area on 16 December 2023. These patches were approximately 9ha and 20ha in size and comprised dry sclerophyll woodland on sandy soil. Elevation in these patches ranged between 340m and 380m. The assessment determined that no *Hibbertia puberula subsp. extensa* was observed within or surrounding the quarry site. EMM (2023) considered this likely to be because the areas surveyed were unsuitable habitat for the species based on the slope and elevated drainage occurring in these areas.

8.2.8 *Grevillea parviflora* Monitoring

Monitoring of the condition and persistence of the small flower *Grevillea parviflora* subsp. *parviflora* was undertaken in November 2023 and is considered to provide an indication of the condition of this species for the reporting period. A series of nine 10m x 10m plots were revisited within the approved Biodiversity Offset Area to facilitate annual stem counts of the species. The locations of these plots can be seen on **Figure 8**. The goal of this monitoring program is to assess the ongoing viability and health of the species and to ensure the habitat is maintained or improved over the life of the operations. The monitoring results are included in **Table 29**.

Table 29
Ecological Monitoring Requirements at Tinda Creek Quarry

Plot Number	2018 ^{^1} Count	2019* Count	2020* Count	2021 [^] Count	2022 [^] Count	2023 [^] Count
G1	18	38	0	21	80	202
G2	50	7	0	103	650	577
G3	32	25	18	14	20	24
G4	44	1	10	53	35	61
G5	20	19	35	9	40	25
G6	23	35	16	26	100	90
G7	16	0	0	25	120	237
G8	14	0	0	12	5	0
G9	3	0	1	22	65	65
Total	220	125	80	285	1,115	1,281
Note 1: Average number of stems from March 2018 and September 2018.						
* Count of number of individual plants.						
[^] Count of number of stems.						
Source: EMM (2023) – Table 3.6						

Despite inherent inaccuracies in *Grevillea parviflora* subsp. *parviflora* monitoring plot boundary locations (and difficulty in separating resprouting / clonal plants from new seedlings), the results of the survey plot counts provide a general indication of population condition. A total of 1,281 plants were recorded within the nine plots during the survey. This is an increase of 166 plants recorded compared with 2022. It is noted that the methodology applied to survey was different between monitoring events; Niche counted stems but accounted for separate stems at ground level, EnviroKey counted individual plants but also considered separation at ground level, and EMM counted each stem individually. EMM (2023) concluded that plot monitoring indicates the distribution of *Grevillea parviflora* subsp. *parviflora* increased within four plots (Plot 1, 3, 4 and 7), decreased in four plots (Plot 2, 5, 6, 8) and remained the same in one plot (Plot 9).

8.2.9 Conclusion

Consistent with previous years, Hy-Tec has continued to operate the Quarry with minimal evident impact to the surrounding landscape or within the Quarry Site, the Biodiversity Offset Area or in aquatic environments downstream of the Quarry. Rehabilitation progress during the reporting period has been steady, with further action required to establish vegetation communities to benchmark conditions.

Weed control is also recommended using spot spray techniques on foot and by hand only (as to prevent the spread of weed seeds by vehicles and minimise overspray of plants nearby). Weeds should be monitored visually every three months and sprayed as necessary.

To address the ongoing African Lovegrass population on site, EMM (2023) recommends an integrated approach of multiple techniques conducted seasonally in 2024, including:

- slashing, mechanical removal, or burning of African Lovegrass in winter to reduce cover; and
- re-seeding of bare soil with native grass to reduce lovegrass re-establishment in cleared areas

EMM also recommends the commencement of nest box monitoring during the 2024 reporting period from established nest boxes installed in the 2022 reporting period.

It is apparent from the recent ecological monitoring that the overall flora species richness has increased as well as the number of *Grevillea parviflora* present in the monitored plots since monitoring began. Installation of plot markers to demarcate the boundaries of all *Grevillea parviflora* subsp. *parviflora* plots is recommended to increase the accuracy of stem counts and photo monitoring.

Aquatic ecological monitoring has identified that the streams are likely being influenced by natural stress associated with intermittent/ephemeral streams and reflect conditions experienced within the locality, and not impacts associated with the operation of the Quarry.

9. COMMUNITY

9.1 COMMUNITY COMPLAINTS

There were no complaints regarding the Quarry operations during the reporting period.

Complaints will continue to be logged within the complaints register and investigated fully when they are received. The complaints register will continue to be kept in the weighbridge office and updated on the Hy-Tec website on a monthly basis.

9.2 COMMUNITY LIAISON

A single Tinda Creek Quarry Community Consultative Committee (CCC) meeting was conducted during the reporting period. It was held on site on Tuesday 23 May 2023. Minutes of the meetings are provided in **Appendix 6**.

There were no issues raised during the CCC meetings that were considered to be complaints or required investigation by Hy-Tec.

The CCC agreed to move to annual meetings, and extraordinary meetings to be held at the request of CCC members.

10. INDEPENDENT ENVIRONMENTAL AUDIT RESPONSE

An independent environmental audit of quarrying operations was undertaken between 5 and 14 July 2022. The audit was undertaken by Mr James Hart (Lead Environmental Auditor - Exemplar Global No. 12105). The audit was the third for the Quarry and covered the period from 10 October 2019 to 14 July 2022.

The outcomes of the audit report and Hy-Tec's response to the matters raised are presented in **Table 30**, with the full audit report and response available from the Hy-Tec website. All matters raised in the audit report have been addressed or are in the process of being addressed.

The next independent environmental audit will be commissioned before July 2025.

Table 30
Response to the Non-Compliance Issues from the 2022 IEA

Issue No.	Condition	Requirement	Issue sighted	Recommendation	Comments
01	Schedule 2 Condition 2	The Applicant shall carry out the development generally in accordance with the: <ul style="list-style-type: none"> EIS; Statement of Commitments; and conditions of this consent. 	Three non-compliances have been identified against the requirements of the conditions of consent, triggering a non-compliance with Schedule 2 Condition 2.	It is recommended that all non-compliances identified are addressed and closed out.	Hy-Tec believes that all matters raised in the audit have previously been addressed and closed or are in the process of being addressed.
02	Schedule 2 Condition 12	The Applicant shall: <ol style="list-style-type: none"> comply with Section 120 of the POEO Act, unless an EPL authorises otherwise; ensure that the catchment of the water management system is not larger than 40ha, unless the Secretary agrees otherwise; maintain the dredge and silt ponds to capture a 1 in 100 ARI storm event plus adequate freeboard to ensure no offsite discharge; and ensure that the loss of groundwater and surface water to Tinda Creek is no greater than predicted in the EIS in the dredge and silt ponds. 	The closed water management system had not been maintained to ensure adequate freeboard to prevent offsite discharge.	Review the adequacy of the capacity of the closed water management system to prevent uncontrolled discharge. Include in the Water Management Plan a process for the management of discharging water from the closed water system Revise and update the Water Management Plan to following the review.	The closed water management system including the dredge and silt ponds has been constructed with a capacity to capture a 1% annual exceedance probability rainfall event and has been extended during the audit period to increase the capacity to manage significant rainfall events. The discharge of water from the closed water management system occurred on seven occasions during the audit period. These events either exceeded the design capacity of the system or were caused by operational or mechanical failures. For each of the incidents, Hy-Tec communicated with DPE and other relevant agencies regarding the matter and prepared detailed incident reports. An update to the Water Management Plan for the Quarry is currently in preparation alongside the assessments being undertaken for the Modification 1 application that will seek approval for the necessary controlled discharge of water from the Quarry. The updated plan will include a description of the discharge process should extreme events require it. Investigations following each event concluded that material harm to the environment had not occurred. Hy-Tec has adapted its water management procedures to account for the transition from extremely dry conditions experienced in 2018/2019 to the more recent significant rainfall events. In 2023, rainfall has largely gone back to pre-2022 levels. Despite this, a revised water management will still be implemented for the Quarry and being included in an update to the Water Management Plan as described above.
03	Schedule 3 Condition 16	Within 2 years of this consent, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the offset area, to the satisfaction of the Secretary.	Agreement on the long-term security of the offset area had not been obtained. In principle agreement with NPWS Offset area.	The agreement for the long-term security of the offset area should be finalised.	Hy-Tec has reached an agreement with the NSW National Parks and Wildlife Service (dated 30 June 2022) for the transfer of land dedicated as an offset area to the Minister for Environment and Heritage for future dedication to Yengo National Park. NPWS is currently making arrangements for the formal subdivision of the land to enable transfer. The deadline for securing the offset area was extended to 29 April 2022, however no further extension has been granted. It is anticipated that this process will be completed in 2024.
04	Schedule 3 Condition 21	Within 3 months of each Independent Environmental Audit (see condition 9 of schedule 5), the Applicant shall review, and if necessary, revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary.	The Conservation and Rehabilitation Bond had not been reviewed and updated within 3 months of the previous independent environmental audit.	Hy-Tec should ensure that the Conservation and Rehabilitation Bond is reviewed and, if necessary, reviewed within 3 months of the independent environmental audit.	A Conservation and Rehabilitation Bond was submitted to DPE on 10 August 2021. Although the estimate was overdue at the time, no response has been received from DPE. An updated Conservation and Rehabilitation Bond is currently in preparation.
05	Schedule 5 Condition 5 Water Management Plan Section 18	Within 3 months of a modification to this consent or following the submission of an: <ol style="list-style-type: none"> annual review under condition 4 above; incident report under condition 7 below; or audit report under condition 9 below, the Applicant shall review, and if necessary, revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary.	Records available did not demonstrate that strategies, plans, and programs had been reviewed following submission of incident reports.	Where incidents have occurred, Hy-Tec should ensure that relevant management plans, strategies and programs are reviewed, and if necessary updated to incorporate any recommended measures to improve the environmental performance of the development.	Hy-Tec notes this comment and has committed to review and update (where necessary) all management plans and strategies following completion of the Annual Review, an incident report or audit report.
06	WAL MW2337-00001	The following information must be recorded in the logbook for each period of time that water is taken: <ol style="list-style-type: none"> date, volume of water, start and end time when water was taken as well as the pump capacity per unit of time, and the access licence number under which the water is taken, and the approval number under which the water is taken, and the volume of water taken for domestic consumption and/or stock watering. 	While an electronic logbook had been maintained, the records do not include the start time and end time when water was taken.	Hy-Tec should update the WAL logbook to include provision for the recording of the start and end time when water was taken.	Hy-Tec has adjusted procedures for management of the production bore to allow for records of the start and end time when water was taken to be included.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 INTRODUCTION

The following subsections outline incidents and non-compliances that occurred during the reporting period. An internal review of compliance with the conditions of SSD_4978 was undertaken by Hy-Tec and RWC and is included as **Appendix 1**. The operation remained generally compliant with development conditions throughout the reporting period with the exception of the non-compliances listed below.

11.2 INCIDENTS

There were no notable incidents relating to non-compliances that occurred at the Quarry Site during the reporting period.

11.3 DEVELOPMENT CONSENT SSD_4978

Hy-Tec was not compliant with Conditions 2(2), 3(16) and 3(21) of SSD_4978 during the reporting period. These administrative non-compliance issues are summarised as follows.

- Condition 2(2) relating to carrying out the development in accordance with the EIS, Statement of Commitments, and conditions of SSD_4978 – Non-compliance with this condition reflects other non-compliance issues identified above and below.
- Condition 3(16) relating to the requirement to secure the Onsite Offset Area – as noted in Section 3, an agreement has been reached with NPWS for the transfer of this land to the office of the Minister for Environment and Heritage. Hy-Tec is awaiting the finalisation of a subdivision that is being processed by NPWS before proceeding to an agreement on ongoing lease arrangements.
- Condition 3(21) relating to an update to Rehabilitation Bond for the Quarry – Hy-Tec is in the process of preparing an update to the Rehabilitation and Conservation Bond for the Quarry, noting that agreement on ongoing landscape management requirements would be needed from NPWS following the transfer of land to secure the Onsite Offset Area.

11.4 ENVIRONMENT PROTECTION LICENCE

Hy-Tec was compliant with all conditions of EPL 12007 during the reporting period.

11.5 WATER ACCESS LICENCES

Works Approval 10WA112531 permits extraction of 44ML of water per annum via the production bore based on a water year (i.e. July to June). A total of 0.62ML of water was used between July 2022 to June 2023.

11.6 VOLUNTARY UNDERTAKING

During a site inspection and audit by officers of DPE on 6 June 2017, it was identified that equipment and other materials historically stored within the southeast corner of the Quarry Site constituted a breach of *Condition 3(30)* of SSD_4978 in relation to waste management at the Quarry. The material was subsequently removed by Hy-Tec and the Company entered into a voluntary undertaking regarding revegetation in this area. The requirements of the voluntary undertaking were completed in February 2020 after DPIE requested additional evidence of vegetation regeneration. Hy-Tec has committed to undertake annual visual inspections of the affected area until 2025 (unless otherwise directed). It is noted that this area was significantly impacted by the Gaspers Mountain Bush Fire and much of the regrowth vegetation was burnt. Inspection of the area was undertaken by site personnel during the reporting period and it was noted that the area has re-established after the bush fire event in 2019/2020.

12. ACTIVITIES TO BE COMPLETED IN THE NEXT REPORTING PERIOD

The following operational activities are planned throughout the 2023 reporting period.

- Extraction and clearing will continue in Domain 7 including construction of diversion channel and bundings (see **Figure 9**).
- Hy-Tec anticipates that the transfer of the Onsite Offset Area to Yengo National Park will be finalised once the subdivision of the land is finalised and agreement is reached on ongoing access arrangements. Once this agreement is reached, Hy-Tec will notify the Department of the details of the agreement.
- Hy-Tec intends to apply for a modification to SSD_4978 during the reporting period to recognise the possible future need for water management to include occasional controlled discharge of water from the Quarry Site.
- A Variation to EPBC 2013/7028 is expected to occur in relation to final arrangements to secure the Onsite Offset Area.
- The production forecast for 2024 is to extract, process and transport approximately 145,000t of sand product.
- Ongoing monitoring and maintenance of erosion and sediment controls and diversion drains.
- Maintenance and improvement to processing infrastructure would be continued to enhance washing processes and improve water re-use in production.
- Maintenance of the Quarry Access Road.
- Continuation of progressive rehabilitation as practicable. This will primarily continue within the south-eastern rehabilitation area, utilising topsoil to begin revegetation of the area.
- Tubestock planting and professional seed harvesting will continue in the next reporting period to support rehabilitation activities in Domain 4.
- Continuation of water management and dust control measures.
- Continue to monitor deposited dust and confirm the success of bird control measures through review of results against historic trends.
- Waste will continue to be collected by licensed contractors and volumes and dates recorded.
- Continuation of minimum of annual aerial Survey or other aerial imagery capture of the Quarry Site.
- Continued implementation of all requirements and conditions prescribed under Development Consent SSD_4978, EPL 12007 and approved management plans.

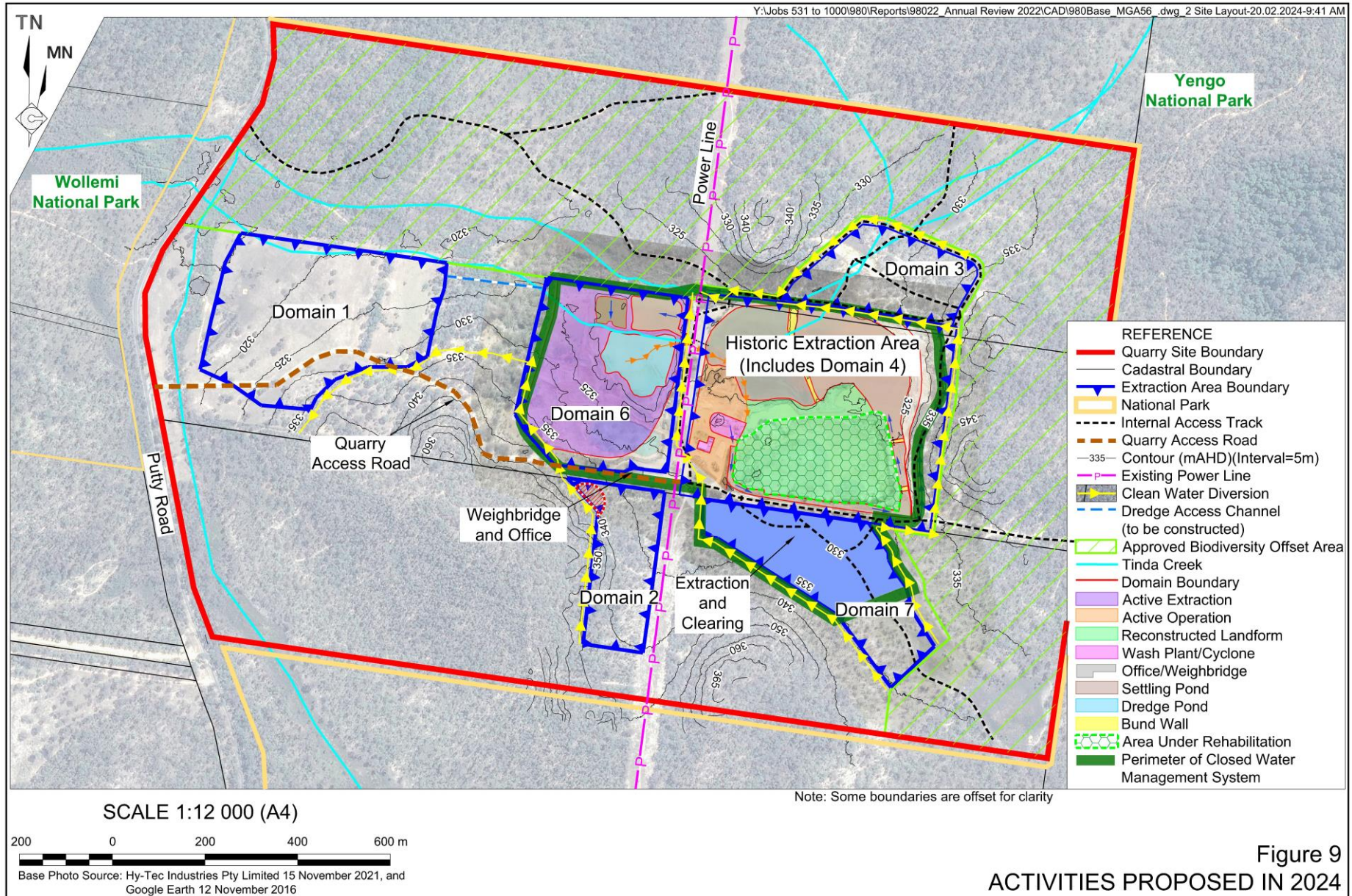


Figure 9
ACTIVITIES PROPOSED IN 2024

Appendices

- Appendix 1 Internal Compliance Audit
(SSD_4978 and EPL 12007)
– 01 January 2023 to 31 December 2023
- Appendix 2 Annual Return 2022 / 2023
- Appendix 3 Noise Monitoring Report 2023
- Appendix 4 Biodiversity Monitoring Report – 2023
- Appendix 5 Aquatic Monitoring Report – Spring 2023
- Appendix 6 Minutes of Tinda Creek Quarry Community
Consultative Committee Meetings

Appendix 1

Internal Compliance Audit (SSD_4978 & EPL 12007) – 01 January 2023 to 31 December 2023

(Total No. of pages including blank pages = 29)

Table A1-1
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 1 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2: ADMINISTRATION CONDITIONS				
Obligation to Minimise Harm to the Environment				
1.	In addition to meeting the specific performance criteria established under this consent, the Applicant shall implement all reasonable and feasible measures to prevent and/or minimise any material harm to the environment that may result from the construction, operation, or rehabilitation of the development.	Yes	No incidences occurred during the reporting period that caused material harm to the environment.	O/D
TERMS OF CONSENT				
2.	The Applicant shall carry out the development generally in accordance with the: (a) EIS; (b) Statement of Commitments; and (c) conditions of this consent.	No	Two non-compliance issues have been identified against the conditions of SSD_4978.	O/D
3.	If there is any inconsistency between the above documents, the most recent document shall prevail to the extent of the inconsistency. However, the conditions of this consent shall prevail to the extent of any inconsistency.	Noted		
4.	The Applicant shall comply with any reasonable requirement/s of the Secretary arising from the Department's assessment of: (a) any strategies, plans, programs, reviews, audits, reports or correspondence that are submitted in accordance with this consent; (b) any reports, reviews or audits commissioned by the Department regarding compliance with this consent; or (c) the implementation of any actions or measures contained in these documents.	Yes	No requests were received from DPE during the reporting period.	D
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A1-1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 2 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2: ADMINISTRATION CONDITIONS (Cont'd)				
LIMITS ON CONSENT				
Extraction Operations				
5.	The Applicant may undertake extraction operations on the site until 31 December 2045.	Noted		
Production Limits				
6.	The Applicant shall not: (a) extract or process more than 300,000 tonnes of sand in any calendar year; or (b) undertake extraction operations beyond 15 m below the natural ground surface.	Yes	Approximately 159,431 tonnes of sand were extracted and processed and depth restrictions were not exceeded during the reporting period.	D
Transportation Limits				
7.	The Applicant shall not: (a) transport more than 300,000 tonnes of sand from the site in a calendar year; and (b) dispatch more than 34 trucks per day or receive more than 34 trucks per day, averaged over a calendar month.	Yes	Product despatch was limited to 158,421 tonnes and truck level limits were not exceeded during the reporting period.	D
SURRENDER OF EXISTING DEVELOPMENT CONSENT				
8.	Within 6 months of the date of this consent, unless the Secretary agrees otherwise, the Applicant shall surrender the development consent (DA 0134/95) for the existing operations on the site in accordance with Section 104A of the EP&A Act. Prior to the surrender of development consent DA 0134/95, the conditions of this consent shall prevail to the extent of any inconsistency with the conditions of that consent.	Yes	DA 1034/95 was surrendered on 10 December 2015.	D
STRUCTURAL ADEQUACY				
9.	The Applicant shall ensure that any new buildings and structures, and any alterations, or additions to existing buildings and structures, are constructed in accordance with the relevant requirements of the BCA.	Noted	No new buildings and structures were constructed during the reporting period.	O
DEMOLITION				
10.	The Applicant shall ensure that all demolition work on site is carried out in accordance with Australian Standard AS 2601-2001: The Demolition of Structures, or its latest version.	Noted	No demolition occurred during the reporting period.	O
11.	The Applicant shall: (a) repair, or pay the full costs associated with repairing, any public infrastructure that is damaged by the development; and	Noted	There was no damage or necessary relocation of public infrastructure during the reporting period.	O
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 3 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 2: ADMINISTRATION CONDITIONS (Cont'd)				
PROTECTION OF PUBLIC INFRASTRUCTURE				
	(b) relocate, or pay the full costs associated with relocating, any public infrastructure that needs to be relocated as a result of the development. <i>Note: This condition does not apply to any damage to roads caused as a result of general road usage.</i>			
OPERATION OF PLANT AND EQUIPMENT				
12.	The Applicant shall ensure that all plant and equipment used on site is: (a) maintained in a proper and efficient condition; and (b) operated in a proper and efficient manner.	Yes	All equipment was maintained and operated in an acceptable manner during the reporting period.	D
UPDATING & STAGING STRATEGIES, PLANS OR PROGRAMS				
13.	With the approval of the Secretary, the Applicant may submit any strategies, plans or programs required by this consent on a progressive basis. To ensure the strategies, plans or programs under the conditions of this consent are updated on a regular basis, the Applicant may at any time submit revised strategies, plans or programs to the Secretary for approval. With the agreement of the Secretary, the Applicant may prepare any revised strategy, plan or program without undertaking consultation with all parties under the applicable condition of this consent.	Noted	Not required during the reporting period.	D
14.	Until they are replaced by an equivalent strategy, plan or program approved under this consent, the Applicant shall implement the existing strategies, plans or programs for the site that have been approved under DA 0134/95.	Noted	All management strategies, plans and programs have been updated and approved.	D
PRODUCTION DATA				
15.	The Applicant shall: (a) provide annual quarry production data to DRE using the standard form for that purpose; and (b) include a copy of this data in the Annual Review (see condition 4 of schedule 5).	Yes	See Appendix 2 and Section 4.3.	
DEVELOPER CONTRIBUTIONS				
16.	The Applicant shall pay Council road maintenance contributions consistent with Council's Section 94 Contributions Plan, or its latest version.	Yes	Road maintenance contributions are paid monthly.	D
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*															
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS																			
IDENTIFICATION OF APPROVED LIMITS OF EXTRACTION																			
1.	Prior to undertaking extraction operations under this consent, the Applicant shall: (a) engage a registered surveyor to mark out the boundaries of the approved limits of extraction within the site; and (b) submit a survey plan of these boundaries with applicable GPS coordinates to the Secretary.	Yes	All relevant boundaries have been surveyed and marked to comply with this condition.																
2.	While extraction operations are being carried out, the Applicant shall ensure that these boundaries are clearly marked at all times.	Noted	All boundaries were clearly marked during the reporting period.																
HOURS OF OPERATION																			
3.	The Applicant shall comply with the operating hours set out in Table 1. Table 1: Operation Hours	Yes	Hy-Tec complied with all approved operating hours during the reporting period.	D															
	<table border="1"> <thead> <tr> <th>Activity</th> <th>Operating Hours</th> </tr> </thead> <tbody> <tr> <td rowspan="3">Extraction operations and deliveries</td> <td>7 am to 6 pm, Monday to Friday</td> </tr> <tr> <td>7 am to 3 pm, Saturday</td> </tr> <tr> <td>No activities on Sundays or Public Holidays</td> </tr> <tr> <td rowspan="2">Dispatch</td> <td>5 am to 10 pm, Monday to Friday</td> </tr> <tr> <td>6 am to 3 pm, Saturday</td> </tr> <tr> <td rowspan="3">Construction activities</td> <td>7 am to 6 pm, Monday to Friday</td> </tr> <tr> <td>8 am to 1 pm, Saturday</td> </tr> <tr> <td>No construction to be undertaken on Sundays or Public Holidays</td> </tr> <tr> <td>Maintenance activities</td> <td>24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence</td> </tr> </tbody> </table>	Activity	Operating Hours	Extraction operations and deliveries	7 am to 6 pm, Monday to Friday	7 am to 3 pm, Saturday	No activities on Sundays or Public Holidays	Dispatch	5 am to 10 pm, Monday to Friday	6 am to 3 pm, Saturday	Construction activities	7 am to 6 pm, Monday to Friday	8 am to 1 pm, Saturday	No construction to be undertaken on Sundays or Public Holidays	Maintenance activities	24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence			
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	8 am to 1 pm, Saturday																		
	No construction to be undertaken on Sundays or Public Holidays																		
Maintenance activities	24 hours a day, 7 days per week, providing maintenance activities are inaudible at any privately-owned residence																		
NOISE																			
Noise Criteria																			
4.	The Applicant shall ensure that the noise generated by the development does not exceed the criteria in Table 2 at any residence on privately-owned land. Table 2: Noise criteria dB(A)	Yes	Noise monitoring undertaken during the reporting period demonstrates that Hy-Tec complied with this criteria. There were no noise complaints during the reporting period.	D															
	<table border="1"> <thead> <tr> <th rowspan="2">Receiver</th> <th>Day/Evening</th> <th colspan="2">Night</th> </tr> <tr> <th>L_{Aeq}(15 min)</th> <th>L_{Aeq}(15 min)</th> <th>L_{A1}(max)</th> </tr> </thead> <tbody> <tr> <td>All receivers</td> <td>35</td> <td>35</td> <td>45</td> </tr> </tbody> </table>	Receiver	Day/Evening	Night		L _{Aeq} (15 min)	L _{Aeq} (15 min)	L _{A1} (max)	All receivers	35	35	45							
Receiver	Day/Evening		Night																
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for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 5 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*									
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)													
NOISE (Cont'd)													
Operating Conditions													
5.	The Applicant shall: (a) implement all reasonable and feasible mitigation measures to minimise the construction, operational and road noise of the development; (b) regularly assess noise monitoring data and relocate, modify and/or stop operations on site to ensure compliance with the noise criteria in this consent; (c) minimise the noise impacts of the development during meteorological conditions under which the noise criteria in this consent do not apply (see Appendix 6); and (d) carry out regular noise monitoring to determine whether the development is complying with the relevant conditions of this consent, to the satisfaction of the Secretary.	Yes	See previous response. Hy-Tec has not been required to modify operations due to noise-related concerns during the reporting period.										
Noise Management Plan													
6.	The Applicant shall prepare and implement a Noise Management Plan for the development to the satisfaction of the Secretary.	Yes	A Noise Management Plan has been approved by the Secretary and is implemented at the Quarry. The Noise Management Plan is available from the Hy-Tec website.										
AIR QUALITY													
Air Quality Criteria													
7.	The Applicant shall implement all reasonable and feasible avoidance and mitigation measures so that particulate matter emissions generated by the development do not exceed the criteria in Tables 3 to 5 at any residence on privately-owned land. Table 3: Long-Term Criteria for Particulate Matter <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>^d Criterion</th> </tr> </thead> <tbody> <tr> <td>Total suspended particulates (TSP)</td> <td>Annual</td> <td>^a 90 µg/m³</td> </tr> <tr> <td>Particulate matter < 10µm (PM₁₀)</td> <td>Annual</td> <td>^a 30 µg/m³</td> </tr> </tbody> </table>	Pollutant	Averaging period	^d Criterion	Total suspended particulates (TSP)	Annual	^a 90 µg/m ³	Particulate matter < 10µm (PM ₁₀)	Annual	^a 30 µg/m ³	Yes	Dust monitoring undertaken during the reporting period indicates that the operation complied with the criteria in this condition. The introduction of bird deterrence on deposited dust gauges in January 2019 has reduced deposited dust levels significantly. This indicates that previously elevated deposited dust levels are not attributable to Quarry operations.	D
Pollutant	Averaging period	^d Criterion											
Total suspended particulates (TSP)	Annual	^a 90 µg/m ³											
Particulate matter < 10µm (PM ₁₀)	Annual	^a 30 µg/m ³											
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 6 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*														
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)																		
AIR QUALITY (Cont'd)																		
Air Quality Criteria (Cont'd)																		
	<p>Table 4: Short-Term Criteria for Particulate Matter</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>^d Criterion</th> </tr> </thead> <tbody> <tr> <td>Particulate matter < 10µm (PM₁₀)</td> <td>24 hour</td> <td>^a 50 µg/m³</td> </tr> </tbody> </table> <p>Table 5: Long-Term Criteria for Deposited Dust</p> <table border="1"> <thead> <tr> <th>Pollutant</th> <th>Averaging period</th> <th>Maximum increase in deposited dust level</th> <th>Maximum total deposited dust level</th> </tr> </thead> <tbody> <tr> <td>^c Deposited dust</td> <td>Annual</td> <td>^b 2g/m²/month</td> <td>^a 4g/m²/month</td> </tr> </tbody> </table>	Pollutant	Averaging period	^d Criterion	Particulate matter < 10µm (PM ₁₀)	24 hour	^a 50 µg/m ³	Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level	^c Deposited dust	Annual	^b 2g/m ² /month	^a 4g/m ² /month	Yes		
Pollutant	Averaging period	^d Criterion																
Particulate matter < 10µm (PM ₁₀)	24 hour	^a 50 µg/m ³																
Pollutant	Averaging period	Maximum increase in deposited dust level	Maximum total deposited dust level															
^c Deposited dust	Annual	^b 2g/m ² /month	^a 4g/m ² /month															
Operating Conditions																		
8.	The Applicant shall: (a) implement all reasonable and feasible measures to minimise the dust emissions of the development; (b) minimise surface disturbance of the site; and (c) monitor and report on compliance with the relevant air quality criteria in this consent; to the satisfaction of the Secretary.	Yes	Dust impacts were effectively managed during the reporting period.	D														
Air Quality Management Plan																		
9.	The Applicant shall prepare and implement an Air Quality Management Plan for the development to the satisfaction of the Secretary.	Yes	An Air Quality Management Plan has been approved by the Secretary and is implemented at the Quarry. The Air Quality Management Plan is available from the Hy-Tec website.	D														
METEOROLOGICAL MONITORING																		
10.	For the life of the development, the Applicant shall ensure that there is a suitable meteorological station operating in the vicinity of the site that complies with the requirements in the Approved Methods for Sampling of Air Pollutants in New South Wales guideline.	Yes	A meteorological station was installed in July 2016.	D														
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>																		

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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 7 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
SOIL AND WATER				
Water Supply				
11.	The Applicant shall ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply to the satisfaction of the Secretary.	Noted	Hy-Tec is approved to use 44ML of water per annum (based on a water year (July to June)). A total of 0.6ML was used between July 2022 to June 2023.	D
Operating Conditions				
12.	The Applicant shall: (a) comply with Section 120 of the POEO Act, unless an EPL authorises otherwise; (b) ensure that the catchment of the water management system is not larger than 40 ha, unless the Secretary agrees otherwise; (c) maintain the dredge and silt ponds to capture a 1 in 100 ARI storm event plus adequate freeboard to ensure no offsite discharge; and (d) ensure that the loss of groundwater and surface water to Tinda Creek is no greater than predicted in the EIS.	Yes	The water management system was effective for managing water the reporting period. The catchment of the closed water management system used in the reporting period was 38.6ha.	D
Water Management Plan				
13.	The Applicant shall prepare and implement a Water Management Plan for the development to the satisfaction of the Secretary.	Yes	A Water Management Plan has been prepared and approved by the Secretary and is being implemented at the Quarry.	D
HERITAGE				
Heritage Management Plan				
14.	The Applicant shall prepare and implement a Heritage Management Plan for the development to the satisfaction of the Secretary.	Yes	A Heritage Management Plan has been approved by the Secretary and is implemented at the Quarry. The Heritage Management Plan is available from the Hy-Tec website	
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A1-1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 8 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*						
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)										
LANDSCAPE AND REHABILITATION										
Biodiversity Offset Strategy										
15.	<p>The Applicant shall implement the biodiversity offset strategy described in the EIS, as summarised and revised in Table 6, and shown conceptually in Appendix 5, to the satisfaction of the Secretary.</p> <p>Table 6: Biodiversity Offset Strategy (ha)</p> <table border="1"> <thead> <tr> <th>Area</th> <th>Offset Type</th> <th>Minimum Size (ha)</th> </tr> </thead> <tbody> <tr> <td>On-site Offset Area</td> <td>Existing vegetation to be enhanced</td> <td>106.6</td> </tr> </tbody> </table>	Area	Offset Type	Minimum Size (ha)	On-site Offset Area	Existing vegetation to be enhanced	106.6	NYA	Hy-Tec has reached an agreement with NPWS regarding the transfer of land to satisfy the offsetting requirements of SSD_4978. The transfer of this land is pending.	
Area	Offset Type	Minimum Size (ha)								
On-site Offset Area	Existing vegetation to be enhanced	106.6								
Security of Offsets										
16.	<p>Within 2 years of this consent, unless otherwise agreed with the Secretary, the Applicant shall make suitable arrangements to provide appropriate long-term security for the offset area, to the satisfaction of the Secretary.</p>	No	Land intended to represent the On-site Offset Area is in the process of being transferred to the Office of the NSW Minister of Environment and Heritage and is expected to be completed in 2024. It is noted that the area is not being disturbed and environmental management is implemented in accordance with an approved Landscape Management Plan. The planned subdivision of the land is awaiting action by the NSW Land Registry Services.							
Rehabilitation Objectives										
17.	<p>The Applicant shall rehabilitate the site to the satisfaction of the Secretary. The final landform must:</p> <p>(a) be generally consistent with the proposed rehabilitation strategy in the EIS, and the final landform shown conceptually in Appendices 4 and 5. and</p>	Yes	Progressive rehabilitation is consistent with the EIS. The final landform is yet to be developed.	O						
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>										

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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 9 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*												
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)																
LANDSCAPE AND REHABILITATION (Cont'd)																
Rehabilitation Objectives (Cont'd)																
	(b) comply with the objectives in Table 7. Table 7: Rehabilitation Objectives	Yes	Progressive rehabilitation complied with these objectives during the reporting period.	O												
	<table border="1"> <thead> <tr> <th>Feature</th> <th>Objective</th> </tr> </thead> <tbody> <tr> <td>Site (as a whole)</td> <td> <ul style="list-style-type: none"> Safe, stable and non-polluting Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35 ha of Mellong Sandmass Sedgeland </td> </tr> <tr> <td>Surface Infrastructure</td> <td> <ul style="list-style-type: none"> To be decommissioned and removed (unless the Secretary agrees otherwise) </td> </tr> <tr> <td>Final Voids</td> <td> <ul style="list-style-type: none"> Minimise the size, depth, batter slope and the drainage catchment of the final void Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site Ensure that the surface area of the final voids is no greater than 16 ha in total Separated from the surface water drainage system, unless the Secretary agrees otherwise </td> </tr> <tr> <td>Watercourses</td> <td> <ul style="list-style-type: none"> Restore alignment and hydraulic function, as far as practical </td> </tr> <tr> <td>Community</td> <td> <ul style="list-style-type: none"> Ensure public safety </td> </tr> </tbody> </table>	Feature	Objective	Site (as a whole)	<ul style="list-style-type: none"> Safe, stable and non-polluting Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35 ha of Mellong Sandmass Sedgeland 	Surface Infrastructure	<ul style="list-style-type: none"> To be decommissioned and removed (unless the Secretary agrees otherwise) 	Final Voids	<ul style="list-style-type: none"> Minimise the size, depth, batter slope and the drainage catchment of the final void Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site Ensure that the surface area of the final voids is no greater than 16 ha in total Separated from the surface water drainage system, unless the Secretary agrees otherwise 	Watercourses	<ul style="list-style-type: none"> Restore alignment and hydraulic function, as far as practical 	Community	<ul style="list-style-type: none"> Ensure public safety 			
Feature	Objective															
Site (as a whole)	<ul style="list-style-type: none"> Safe, stable and non-polluting Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35 ha of Mellong Sandmass Sedgeland 															
Surface Infrastructure	<ul style="list-style-type: none"> To be decommissioned and removed (unless the Secretary agrees otherwise) 															
Final Voids	<ul style="list-style-type: none"> Minimise the size, depth, batter slope and the drainage catchment of the final void Ensure that the volume of VENM and ENM detailed in the EIS is imported for rehabilitation of the site Ensure that the surface area of the final voids is no greater than 16 ha in total Separated from the surface water drainage system, unless the Secretary agrees otherwise 															
Watercourses	<ul style="list-style-type: none"> Restore alignment and hydraulic function, as far as practical 															
Community	<ul style="list-style-type: none"> Ensure public safety 															
Progressive Rehabilitation																
18.	The Applicant shall rehabilitate the site progressively, that is, as soon as reasonably practicable following disturbance. Interim stabilisation measures must be implemented where reasonable and feasible to control erosion (both wind and water) in disturbed areas that are not active and which are not ready for final rehabilitation.	Yes	Rehabilitation continued in Domain 4 during the reporting period with this landform progressively being stabilised prior to revegetation.	O												
Landscape Management Plan																
19.	The Applicant shall prepare and implement a Landscape Management Plan for the development to the satisfaction of the Secretary.	Yes	A Landscape Management Plan has been approved by the Secretary and is being implemented at the Quarry. The Landscape Management Plan is available from the Hy-Tec website. An updated Landscape Management Plan is currently in preparation to revise ongoing management and monitoring measures.	D												
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>																

Table A1-1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 10 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
LANDSCAPE AND REHABILITATION (Cont'd)				
Conservation and Rehabilitation Bond				
20.	<p>Within 6 months of the approval of the Landscape Management Plan, the Applicant shall lodge a Conservation and Rehabilitation Bond with the Department to ensure that the biodiversity offset strategy and rehabilitation of the site are implemented in accordance with the performance and completion criteria set out in the plan and relevant conditions of this consent. The sum of the bond shall be determined by:</p> <p>(a) calculating the cost of implementing the biodiversity offset strategy over the next 3 years;</p> <p>(b) calculating the cost of rehabilitating the site, taking into account the likely surface disturbance over the next 3 years of extraction operations; and</p> <p>(c) employing a suitably qualified quantity surveyor or other expert to verify the calculated costs, to the satisfaction of the Secretary.</p>	Yes	A Conservation and rehabilitation bond was lodged with DPE on 11 December 2017.	D
21.	<p>Within 3 months of each Independent Environmental Audit (see condition 9 of schedule 5), the Applicant shall review, and if necessary revise, the sum of the Conservation and Rehabilitation Bond to the satisfaction of the Secretary.</p>	No	<p>An Independent Environment Audit was undertaken between 5 and 14 July 2022.</p> <p>An updated bond estimate is in preparation but has yet to be submitted to DPHI.</p>	D
TRANSPORT				
Monitoring of Product Transport				
22.	<p>The Applicant shall keep accurate records of all laden truck movements to and from the site (hourly, daily, weekly, monthly and annually) and publish these records on its website every 6 months.</p>	Yes	See Section 4.5 of the Annual Review. Truck movement records are also available from the Hy-Tec website.	D
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				

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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 11 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
TRANSPORT (Cont'd)				
Operating Conditions				
23.	The Applicant shall ensure that: (a) all laden vehicles have appropriate signage, including a contact phone number, so they be easily identified by road users; (b) all laden vehicles entering or exiting the site have their loads covered; (c) all laden vehicles exiting the site are cleaned of sand and other material that may fall on the road, before leaving the site; and (d) no trucks queue at the entrance to the site before 6am.	Yes	All laden vehicles complied with these requirements during the reporting period.	D
Access Road and Intersection Construction				
24.	Within 12 months from the date of this consent, unless the Secretary agrees otherwise, the Applicant shall upgrade the site access road and its intersection with Putty Road in accordance with applicable AUSTROADS standards, and to the satisfaction of RMS.	Yes	Intersection upgrade completed in November 2015.	D
Transport Management Plan				
25.	The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary.	Yes	A Transport Management Plan has been approved by the Secretary and is implemented at the Quarry. The Transport Management Plan is available from the Hy-Tec website	D
VISUAL				
26.	The Applicant shall: (a) implement all reasonable and feasible measures to minimise the visual and off-site lighting impacts of the development on local residences and road users; and (b) ensure that all external lighting associated with the development complies with the relevant Australian Standards.... to the satisfaction of the Secretary.	Yes	Visual amenity was managed effectively during the reporting period. No complaints were received during the reporting period regarding visual impacts.	
BUSHFIRE MANAGEMENT				
27.	The Applicant shall ensure that the development is suitably equipped to respond to any fires on site; and assist the Rural Fire Service, emergency services and National Parks and Wildlife Service as much as practicable if there is a fire in the surrounding area.	Yes	Firefighting equipment is readily available at the Quarry.	D
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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 3: ENVIRONMENTAL PERFORMANCE CONDITIONS (Cont'd)				
WASTE				
28.	The Applicant shall ensure that only certified VENM and ENM is imported to the site to aid in the minimisation of final voids.	Yes	No material was imported during the reporting period.	D
29.	The Applicant shall manage on-site sewage treatment and disposal in accordance with the requirements of its EPL, and to the satisfaction of the EPA and Council.	Yes	There were no compliance issues with regards to sewerage management during the reporting period.	D
30.	The Applicant shall: (a) minimise the waste generated by the development; (b) ensure that the waste generated by the development is appropriately stored, handled, and disposed of; and (c) report on waste management and minimisation in the Annual Review, to the satisfaction of the Secretary.	Yes	Waste is being managed appropriately at the Quarry Site.	O
SCHEDULE 4: ADDITIONAL PROCEDURES				
NOTIFICATION OF LANDOWNERS				
1.	As soon as practicable after obtaining monitoring results showing an exceedance of any relevant criteria in schedule 3, the Applicant shall notify affected landowners in writing of the exceedance, and provide regular monitoring results to each affected landowner until the development is again complying with the relevant criteria.	Yes	Hy-Tec did not receive monitoring results that indicated impacts at a nearby residence.	D
INDEPENDENT REVIEW				
2.	If an owner of privately-owned land considers the development to be exceeding the relevant criteria in schedule 3, then he/she may ask the Secretary in writing for an independent review of the impacts of the development on his/her land. If the Secretary is satisfied that an independent review is warranted, then within 2 months of the Secretary's decision the Applicant shall:	NYA	No requests for an independent review of impacts of the Quarry were received during the reporting period.	
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING				
ENVIRONMENTAL MANAGEMENT				
Environmental Management Strategy				
1.	The Applicant shall prepare and implement an Environmental Management Strategy for the development to the satisfaction of the Secretary.	Yes	An Environmental Management Strategy has been approved by the Secretary and is implemented at the Quarry. The Environmental Management Strategy Plan is available from the Hy-Tec website.	D
Yes = Complied with during 2023		No = Not Complied with during 2023		ND = Not Determined
NYA = Not Yet Applicable		HNC = Historical Non-Compliance		ANC = Administrative Non-Compliance
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Table A1-1 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 13 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
ENVIRONMENTAL MANAGEMENT (Cont'd)				
Adaptive Management				
2.	<p>The Applicant shall assess and manage development-related risks to ensure that there are no exceedances of the criteria and/or performance measures in schedule 3. Any exceedance of these criteria and/or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation.</p> <p>Where any exceedance of these criteria and/or performance measures has occurred, the Applicant shall, at the earliest opportunity:</p> <p>(a) take all reasonable and feasible measures to ensure that the exceedance ceases and does not recur;</p> <p>(b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and</p> <p>(c) implement remediation measures as directed by the Secretary;</p> <p>to the satisfaction of the Secretary.</p>	Yes	All non-compliance issues that occurring during the reporting period were addressed in a manner consistent with this condition.	D
Management Plan Requirements				
3.	<p>The Applicant shall ensure that the management plans required under this consent are prepared in accordance with any relevant guidelines, and include:</p> <p>(a) detailed baseline data;</p> <p>(b) a description of:</p> <ul style="list-style-type: none"> • the relevant statutory requirements (including any relevant approval, licence or lease conditions); • any relevant limits or performance measures/criteria; and • the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; <p>(c) a description of the measures that would be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria;</p>	Yes	All management plans and strategies have been approved by the Secretary.	D
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				

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Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
ENVIRONMENTAL MANAGEMENT (Cont'd)				
Management Plan Requirements (Cont'd)				
	(d) a program to monitor and report on the: <ul style="list-style-type: none"> • impacts and environmental performance of the development; and • effectiveness of any management measures (see (c) above); (e) a contingency plan to manage any unpredicted impacts and their consequences;			
	(f) a program to investigate and implement ways to improve the environmental performance of the development over time;			
	(g) a protocol for managing and reporting any: <ul style="list-style-type: none"> • incidents; • complaints; • non-compliances with statutory requirements; and • exceedances of the impact assessment criteria and/or performance criteria; and (h) a protocol for periodic review of the plan.			
Annual Review				
4.	By the end of December each year, or other timing as may be agreed by the Secretary, the Applicant shall review the environmental performance of the development to the satisfaction of the Secretary.	Yes	This document.	D
Revision of Strategies, Plans and Programs				
5.	Within 3 months of a modification to this consent or following the submission of an: <ul style="list-style-type: none"> (a) annual review under condition 4 above; (b) incident report under condition 7 below; or (c) audit report under condition 9 below, the Applicant shall review, and if necessary revise, the strategies, plans, and programs required under this consent to the satisfaction of the Secretary. <i>Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.</i>	Yes	Hy-Tec have advised that a review has been carried out accordingly.	D
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 15 of 16

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
ENVIRONMENTAL MANAGEMENT (Cont'd)				
Community Consultative Committee				
6.	The Applicant shall establish and operate a Community Consultative Committee (CCC) for the development to the satisfaction of the Secretary. This CCC must be operated in general accordance with the Guidelines for Establishing and Operating Community Consultative Committees for Mining Developments (Department of Planning, 2007, or its latest version), and be operating within 6 months of the date of this consent.	Yes	A CCC Meeting was held at the Quarry Site on 23 May 2023.	D
REPORTING				
Incident Reporting				
7.	The Applicant shall immediately notify the Secretary and any other relevant agencies of any incident that has caused, or threatens to cause, material harm to the environment. For any other incident associated with the Development, the Applicant shall notify the Secretary. Within 7 days of the date of the incident, the Applicant shall provide the Secretary and any relevant agencies with a detailed report on the incident, and such further reports as may be requested.	Yes	No incidences occurred during the reporting period.	D
Regular Reporting				
8.	The Applicant shall provide regular reporting on the environmental performance of the development on its website, in accordance with the reporting arrangements in any plans or programs approved under the conditions of this consent.	Yes	All relevant documents and monitoring results are available from the Hy-Tec website.	O
INDEPENDENT ENVIRONMENTAL AUDIT				
9.	Within a year of the date of this consent, and every 3 years thereafter, unless the Secretary directs otherwise, the Applicant shall commission and pay the full cost of an Independent Environmental Audit of the development.	Yes	An Independent Environment Audit was undertaken between 5 and 14 July 2022.	D
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

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Internal Compliance Audit of Relevant Conditions of Development Consent SSD_4978
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Condition No.	Paraphrased Requirement	Compliance	Comment	Basis*
SCHEDULE 5: ENVIRONMENTAL MANAGEMENT, REPORTING AND AUDITING (Cont'd)				
INDEPENDENT ENVIRONMENTAL AUDIT (Cont'd)				
10.	Within 6 weeks of the completion of this audit, unless the Secretary agrees otherwise, the Applicant shall submit a copy of the audit report to the Secretary, together with its response to any recommendations contained in the audit report, including a timetable for the implementation of any measures proposed to address the recommendations in the audit report. If the Applicant intends to defer the implementation of a recommendation, reasons must be documented.	Yes	The audit report and response from Hy-tec were provided to DPE on 15 August 2022	D
11.	<p>Within 6 months of the date of this consent, the Applicant shall:</p> <p>(a) make copies of the following publicly available on its website:</p> <ul style="list-style-type: none"> • the EIS; • current statutory approvals for the development; • approved strategies, plans and programs required under the conditions of this consent; • a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; • a complaints register, which is to be updated monthly; • minutes of CCC meetings; • the annual reviews of the development (for the last 5 years); • any independent environmental audit of the development, and the Applicant's response to the recommendations in any audit; • any other matter required by the Secretary; and <p>(b) keep this information up-to-date, to the satisfaction of the Secretary.</p>	Yes	All relevant documents and monitoring results are available from the Hy-Tec website.	D
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				

Table A1-2
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 1 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*	
1. Administrative Conditions					
What the licence authorises and regulates					
A1.1	This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation. Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.		Yes	Scheduled Activity Fee Based Activity Scale > 100 000 – 500 000m ³ annual extractive capacity	D
	Scheduled Activity	Fee Based Activity	Scale		
	Extractive activities	Water-based extractive activity	>100000 – 500000m ³ annual extractive capacity		
A1.2	Notwithstanding condition A1.1, the scale of the water-based extractive activity authorised under this licence must not exceed more than 300,000 tonnes of sand extracted or processed in any calendar year, being the amount equivalent to the annual extraction limit approved by the development consent granted under the Environmental Planning and Assessment Act 1979 for the premises specified in A2.		Yes	Water-based extractive activity did not exceed more than 300 000 tonnes of sand extracted or processed during the reporting period.	D
Premises or plant to which this licence applies					
A2.1	The licence applies to the following premises: TINDA CREEK QUARRY 6102 PUTTY ROAD MELLONG NSW 2756 LOT 1 DP 628806, LOT 2 DP 628806, LOT 3 DP 628806 AS DEPICTED IN THE MAP OF THE APPROVED PROJECT AREA FOR SSD 4978 IN CONDITION A2.2		N/A		
A2.2	The premises location is shown on the map below		N/A		
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed					

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 2 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*		
1. Administrative Conditions (Cont'd)						
Information supplied to the EPA						
A3.1	Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence. In this condition the reference to "the licence application" includes a reference to: a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.	Yes	Works and activities carried out in the reporting period complied with the EPL.	D		
A3.2	Works and activities must be carried out in accordance with the Development Consent for State Significant Development 4978 approved by the Department of Planning and Environment on 10 April 2015.	Yes	No non-compliances were recorded during the reporting period.	D		
2. Discharges to Air and Water and Applications to Land						
P1 Location of monitoring/discharge points and areas						
P1.1	The following points referred to in the table below are identified in this licence for the purposes of weather and/or noise monitoring and/or setting limits for the emission of noise from the premises.	Yes	A Noise Management Plan has been approved by the Secretary and is implemented at the Quarry. The Noise Management Plan is available from the Hy-Tec website and identifies monitoring locations.	D		
	<table border="1"> <thead> <tr> <th>EPA ID No.</th> <th>Type of monitoring point</th> <th>Location Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Noise monitoring</td> <td>The boundary of "Receiver 1" as detailed in Figure 6.1 of the document titled "Tinda Creek Sand Quarry Noise Management Plan Final October 2015", submitted to the EPA on 18 November 2015</td> </tr> </tbody> </table>				EPA ID No.	Type of monitoring point
EPA ID No.	Type of monitoring point	Location Description				
1	Noise monitoring	The boundary of "Receiver 1" as detailed in Figure 6.1 of the document titled "Tinda Creek Sand Quarry Noise Management Plan Final October 2015", submitted to the EPA on 18 November 2015				
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>						

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Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 3 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*																
3. Limit Conditions																				
L1 Pollution of waters																				
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Yes	No breaches of the license occurred during the reporting period.	D																
L2 Waste																				
L2.1	The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.	Yes	No waste material was received on site during the reporting period.	D																
L2.2	This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.	Yes	No waste material was received on site during the reporting period.	D																
L3 Noise Limits																				
L3.1	Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.	Yes	Noise monitoring undertaken during the reporting period demonstrates that Hy-Tec complied with the criteria. There were no noise complaints during the reporting period.	D																
<table border="1"> <thead> <tr> <th colspan="4">POINT 1</th> </tr> <tr> <th>Time period</th> <th>Measurement parameter</th> <th>Measurement frequency</th> <th>Noise level dB(A)</th> </tr> </thead> <tbody> <tr> <td>All hours</td> <td>LAeq (15 minute)</td> <td>-</td> <td>35</td> </tr> <tr> <td>Night</td> <td>Lmax OR LA1,1min</td> <td>-</td> <td>45</td> </tr> </tbody> </table>		POINT 1				Time period	Measurement parameter	Measurement frequency	Noise level dB(A)	All hours	LAeq (15 minute)	-	35	Night	Lmax OR LA1,1min	-	45			
POINT 1																				
Time period	Measurement parameter	Measurement frequency	Noise level dB(A)																	
All hours	LAeq (15 minute)	-	35																	
Night	Lmax OR LA1,1min	-	45																	
L3.2	For the purposes of the table under Condition L3.1 "Night" has the same meaning as in the NSW Industrial Noise Policy (EPA, 2000).	Noted																		
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed																				

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 4 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
3. Limit Conditions (Cont'd)				
L4 Hours of Operation				
L4.1	Unless permitted by another condition of this licence, activities at the premises must: a) only be undertaken between 7:00 am and 6:00 pm Monday to Friday; b) only be undertaken between 7:00 am and 3:00 pm Saturday; and c) not be undertaken on Sundays or public holidays.	Yes	Hy-Tec reports that all hours of operation were complied with during the reporting period.	D
L4.2	In addition to the limitations imposed by Condition L4.1, construction activities must not be undertaken: a) between 7:00 am and 8:00 am Saturdays; and b) between 1:00 pm and 3:00 pm Saturdays.	Yes	No construction activities were undertaken in the reporting period with the exception of raising the northern wall of the sediment pond. Hy-Tec reports that hours of operation were adhered to.	D
L4.3	In addition to the hours of operation specified in Condition L4.1, dispatch activities may be undertaken: a) between 5:00 am and 10:00 pm Monday to Friday; and b) between 6:00 am and 3:00 pm Saturdays	Yes	Hy-Tec reports that dispatch occurred during the approved hours throughout the reporting period.	D
L4.4	Maintenance activities may be undertaken at any time if those activities are inaudible at all residential premises.	Yes	Hy-Tec has confirmed that all maintenance activities were inaudible at residential premises. No noise complaints were received through the reporting period.	D
4. Operating Conditions				
O1 Activities must be carried out in a competent manner				
O1.1	Licensed activities must be carried out in a competent manner. This includes: a) the processing, handling, movement and storage of materials and substances used to carry out the activity; and b) the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.	Yes	All activities were carried out in a competent manner during the reporting period.	D
Yes = Complied with during 2023		No = Not Complied with during 2023		ND = Not Determined
NYA = Not Yet Applicable		HNC = Historical Non-Compliance		ANC = Administrative Non-Compliance
* = Basis for assessment of compliance		D = Documentation/Discussion		O = Observation during audit
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Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 5 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
4. Operating Conditions (Cont'd)				
O2 Maintenance of plant and equipment				
O2.1	All plant and equipment installed at the premises or used in connection with the licensed activity: a) must be maintained in a proper and efficient condition; and b) must be operated in a proper and efficient manner.	Yes	Hy-Tec reports that all plant and equipment was maintained and operated in a proper and efficient manner.	D
O3 Dust				
O3.1	The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.	Yes	Hy-Tec reports that quarry-generated dust was minimal throughout the reporting period. No complaints relating to dust impacts were received.	D
O3.2	The licensee must ensure that all laden vehicles exiting the site have their loads covered.	Yes	Hy-Tec reports that all loads were covered during the reporting period.	D
5. Monitoring and Recording Conditions				
M1 Monitoring Records				
M1.1	The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.	Yes	All monitoring was conducted and retained in accordance with M1 of EPL 12007	D
M1.2	All records required to be kept by this licence must be: a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them.	Yes	All records have been kept in accordance with condition M1 of EPL 12007.	D
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample.	Yes	Hy-Tec confirms that all relevant details have been recorded for monitoring activities.	D
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
5. Monitoring and Recording Conditions (Cont'd)				
M2 Environmental Monitoring				
M2.1	a) The licensee must undertake monthly inspections of the surface water management system at the premises. b) The monthly inspections must: (i) be undertaken immediately upstream and downstream of the quarry disturbance area; (ii) include visual inspection of litter, oil and grease and sediment levels within the surface water system, including diversion channels; (iii) include visual inspection of the physical integrity of the surface water management system, including any signs of erosion; and (iv) include visual inspection of the water level and flow in Tinda Creek.	Yes	Monthly inspections of the surface water management system were undertaken throughout the reporting period in accordance with condition M2 of EPL 12007.	D
M3 Recording of pollution complaints				
M3.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Yes	A complaints register is maintained with no complaints received during the reporting period.	D
M3.2	The record must include details of the following: a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken.	Yes	A complaints register is maintained with no complaints received during the reporting period.	D
M3.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	Yes	A complaints register is maintained with no complaints received during the reporting period.	D
M3.4	The record must be produced to any authorised officer of the EPA who asks to see them.	NYA	No requests were provided during the reporting period.	D
M4 Telephone complaints line				
M4.1	The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.	Yes	A telephone complaints line was maintained, however, no complaints were received during the reporting period.	D
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 7 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*												
5. Monitoring and Recording Conditions (Cont'd)																
M4 Telephone complaints line (Cont'd)																
M4.2	The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.	Yes	The telephone complaints number is displayed on a sign at the front gate of the Quarry.	D												
M4.3	The preceding two conditions do not apply until 3 months after: the date of the issue of this licence.	Noted														
M5 Noise Monitoring																
M5.1	To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with the table below.	Yes	Noise monitoring was undertaken by Muller Acoustic Consultants in 2023 in accordance with the approved Noise Management Plan.	D												
	<table border="1"> <thead> <tr> <th colspan="4">POINT 1</th> </tr> <tr> <th>Assessment period</th> <th>Minimum frequency in a reporting period</th> <th>Minimum duration within assessment period</th> <th>Minimum number of assessment period</th> </tr> </thead> <tbody> <tr> <td>All hours when in use</td> <td>Yearly</td> <td>1 hour</td> <td>1 operation day</td> </tr> </tbody> </table>	POINT 1				Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period	All hours when in use	Yearly	1 hour	1 operation day			
POINT 1																
Assessment period	Minimum frequency in a reporting period	Minimum duration within assessment period	Minimum number of assessment period													
All hours when in use	Yearly	1 hour	1 operation day													
M5.2	The licensee must undertake noise monitoring as directed by an authorised officer of the EPA.	NYA	No request was made for additional noise monitoring during the reporting period.	D												
M5.3	All noise monitoring required by this licence must be undertaken in accordance with Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters, or any revisions of that standard that may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.	Yes	Noise monitoring was undertaken in accordance with Australian Standard AS 2659.1 – 1998.	D												
6. Reporting Conditions																
R1 Annual Return Documents																
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance - Licence Conditions, 4. a Statement of Compliance - Load based Fee, 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan, 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance - Environmental Management Systems and Practices. At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.	Yes	Annual Return submitted to EPA on 10/07/2023.	D												
Yes = Complied with during 2023		No = Not Complied with during 2023		ND = Not Determined												
NYA = Not Yet Applicable		HNC = Historical Non-Compliance		ANC = Administrative Non-Compliance												
* = Basis for assessment of compliance		D = Documentation/Discussion		O = Observation during audit												
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Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R1 Annual Return Documents (Cont'd)				
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	Noted		
R1.3	Where this licence is transferred from the licensee to a new licensee: a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.	Noted		
R1.4	Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on: a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.	Noted		
R1.5	The Annual Return for the reporting period must be supplied to the EPA via eConnect EPA or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').	Yes	Annual Return submitted to EPA 10/07/2023.	D
R1.6	The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.	Noted		
R1.7	Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by: a) the licence holder; or b) by a person approved in writing by the EPA to sign on behalf of the licence holder.	Yes	Compliance declaration was signed by a Director and Company Secretary.	D
R2 Notification of environmental harm				
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	Noted		
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 9 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R2 Notification of environmental harm (Cont'd)				
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.	Yes	No incidences occurred during the reporting period.	D
R3 Written Report				
R3.1	Where an authorised officer of the EPA suspects on reasonable grounds that: a) where this licence applies to premises, an event has occurred at the premises; or b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence, and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.	Yes	No requests for written reports of an event were made by the EPA.	D
R3.2	The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.	Yes	No requests for written reports of an event were made by the EPA.	D
R3.3	The request may require a report which includes any or all of the following information: a) the cause, time and duration of the event; b) the type, volume and concentration of every pollutant discharged as a result of the event; c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event; d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort; e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants; f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and g) any other relevant matters.	Yes	No requests for written reports of an event were made by the EPA.	D
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R3 Written Report (Cont'd)				
R3.4	The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.	Noted	No feedback has been received by EPA in relation to an R3 written Report.	D
R4 Other reporting conditions				
Noise Monitoring Results				
R4.1	<p>a) The licensee must submit the results of any noise monitoring undertaken in accordance with the requirements of Condition M5.1 or Condition M5.2 to the EPA within three weeks of the noise monitoring being undertaken.</p> <p>b) The noise monitoring results submitted to the EPA must include:</p> <p>(i) a map of each noise monitoring location in relation to the noise source, including relevant distances;</p> <p>(ii) an analysis of the noise monitoring results;</p> <p>(iii) any detected exceedance of the noise limits specified in Condition L4.1;</p> <p>(iv) details of any remedial action taken or proposed to be taken in relation to any exceedance of the noise limits specified in Condition L4.1;</p> <p>(v) details of the prevailing meteorological conditions during the period when the noise monitoring was undertaken; and</p> <p>(vi) confirmation that noise monitoring was/was not undertaken in accordance with Condition M5.3.</p>	Yes	A copy of the Noise Monitoring Assessment is available on the Hy-Tec website and was provided to the EPA within the allocated timeframe. No exceedances were recorded during the reporting period.	D
Surface Water Management System reporting				
R4.2	In accordance with section 5.3 of the approved Water Management Plan for the premises, the licensee must notify the EPA when surface water triggers are exceeded and provide a written report to the EPA.	NYA	No surface water triggers were exceeded during the reporting period.	D
R4.3	<p>The report to the EPA must include:</p> <p>a) the results of surface water management system inspections required in condition M2.1 for the month related to the exceedance, including photographs; and</p> <p>b) appropriate mitigation and contingency measures to be implemented within one month of the exceedance being detected.</p>	NYA	No surface water triggers were exceeded during the reporting period.	D
<p>Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined</p> <p>NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance</p> <p>* = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit</p> <p>Yes# / No# = Complied / not complied with and compliance no longer required to be assessed</p>				

Table A1-2 (Cont'd)
Internal Compliance Audit of Relevant Conditions of Environment Protection Licence 12007
for Tinda Creek Sand Project from 01 January 2023 to 31 December 2023

Page 11 of 11

Cond. No.	Paraphrased Requirement	Compliance	Comment	Basis*
6. Reporting Conditions (Cont'd)				
R4 Other reporting conditions (Cont'd)				
R4.4	The report must be submitted to the EPA within one month of surface water triggers being detected and be directed to the Manager, Sydney Industry Section by email to metro.regulation@epa.nsw.gov.au	NYA	No request was received for written reports during the reporting period.	D
7. General Conditions				
G1 Copy of licence kept at the premises or plant				
G1.1	A copy of this licence must be kept at the premises to which the licence applies.	Yes	A copy of the licence is available at the Quarry.	D
G1.2	The licence must be produced to any authorised officer of the EPA who asks to see it.	Noted		
G1.3	The licence must be available for inspection by any employee or agent of the licensee working at the premises.	Noted		
Yes = Complied with during 2023 No = Not Complied with during 2023 ND = Not Determined NYA = Not Yet Applicable HNC = Historical Non-Compliance ANC = Administrative Non-Compliance * = Basis for assessment of compliance D = Documentation/Discussion O = Observation during audit Yes# / No# = Complied / not complied with and compliance no longer required to be assessed				

Appendix 2

Annual Return 2023

(Total No. of pages including blank pages = 3)

Extractive Materials Return

2022-2023



Regional
NSW

Form S1 – Period Ending 30 June 2023

Quote RIMS ID in all correspondence

Quarry Id: Rims ID: 401060	Inquiries please telephone: (02) 4063 6713 Completed or Nil Returns Email – mineral.royalty@planning.nsw.gov.au Postal Address (see below)
Operators Name: AUS-10 RHYOLITE T/AS HY-TEC INDUSTRIES Address: PO BOX 6770 SILVERWATER NSW 1811	Please amend name, postal address and location of mine or quarry if incorrect or incomplete.
Email: darryl.thiedeke@hy-tec.com.au Quarry Name: TINDA CREEK QUARRY Quarry Address: 6102 PUTTY RD, MELLONG NSW 2756	

The return should be completed and forwarded to **Senior Advisory Officer, RESOURCE ECONOMICS, STRATEGY, PERFORMANCE & INDUSTRY DEVELOPMENT, DEPARTMENT OF REGIONAL NSW, PO BOX 344 HUNTER REGION MAIL CENTRE NSW 2310 on or before 31 October 2023**. If completion of the return is unavoidably delayed, an application for extension of time should be requested **before** the due date. If no work was done during the year, a **NIL** return must be forwarded.

The return should relate to the **above quarrying establishment** and should cover the operations of quarrying and treatment (such as crushing, screening, washing etc.) carried out at or near the quarry. A return is required even if the operations are solely of a developmental nature and whether the area being worked is held under a mining title or otherwise.

Director, Resources Policy

Please complete all the following information to assist in identifying the location of the Quarry

Typical Geology Friable Sandstone / Lacustrine

Nearest Town to Quarry Wilberforce

Local Council Name Hawkesbury Shire Council

Deposited Plan and Lot Number/s of Quarry Lots 1 to 3 DP628806

Email Address of Operator As above

Name of Owner or Licensee As above

Postal Address of Licensee As above

Licence/Lease Number/s (if any)
From Mining, Exploration & Geoscience (NSW Mineral Resources) N/A
From Crown Lands or other NSW Department N/A

If any output was obtained from land NOT held under licence from the above Departments, state the Name/s and Address/es of the Owners of the land N/A

To the best of my knowledge, information entered in this return is correct and no blank spaces left where figures should have been inserted.

- SIGNATURE of PROPRIETOR or MANAGER  DATE 27.10.2023
- CONTACT PERSON for this return Darryl Thiedeke
- NAME (Block letters) DARRYL THIEDEKE Telephone 02 96472866

Extractive Materials Return

2022-2023



Regional
NSW

Form S1 – Period Ending 30 June 2023

Sales During 2021-2022

Production information may be published in aggregated form for statistical reporting. However, production data for individual operations is kept strictly confidential.

Product	Description	Quantity Tonnes
Virgin Materials		
Crushed Coarse Aggregates		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand	Washed fine sand	136,900
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
Recycled Materials		
Crushed Coarse Aggregates		
Over 75mm		
Over 30mm to 75mm		
5mm to 30mm		
Under 5mm		
Natural Sand		
Manufactured Sand		
Prepared Road Base & Sub Base		
Other Unprocessed Materials		
River Gravel		
Over 30mm		
5mm to 30mm		
Under 5mm		
Construction Sand	Excluding Industrial	
Industrial Sand		
Foundry, Moulding		
Glass		
Other (Specify)		
Dimension Stone	Building, Ornamental, Monumental	
Quarried in Blocks		
Quarried in Slabs		
Decorative Aggregate	Including Terrazzo	
Loam	Soil for Topdressing, Garden soil, Horticultural purposes)	
TOTAL SITE PRODUCTION		136,900t
Gross Value (\$) of all Sales		\$3.7M
Type of Material		
Number of Full-Time Equivalent (FTE) Employees	Employees 6	Contractors 1

Please Note: A return for clay-based products can be obtained by contacting the inquiry number.

Appendix 3

Noise Monitoring Assessment

Prepared by Muller Acoustic
Consulting Pty Ltd

(Total No. of pages including blank pages = 23)

Noise Monitoring Assessment

Tinda Creek Quarry
Tinda Creek, NSW

April 2023



Document Information

Noise Monitoring Assessment

Tinda Creek Quarry

Tinda Creek, NSW

April 2023

Prepared for: RW Corkery & Co Pty Limited

Level 1, 12 Dangar Road

Brooklyn NSW 2083



Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC180647-01RP6V2	4 May 2023	Kristian Allen		Oliver Muller	

DISCLAIMER

All documents produced by Muller Acoustic Consulting Pty Ltd (MAC) are prepared for a particular client's requirements and are based on a specific scope, circumstances and limitations derived between MAC and the client. Information and/or report(s) prepared by MAC may not be suitable for uses other than the original intended objective. No parties other than the client should use or reproduce any information and/or report(s) without obtaining permission from MAC. Any information and/or documents prepared by MAC is not to be reproduced, presented or reviewed except in full.

CONTENTS

1	INTRODUCTION.....	5
2	NOISE CRITERIA.....	7
3	METHODOLOGY.....	9
3.1	LOCALITY.....	9
3.2	NOISE MONITORING LOCATIONS.....	9
3.3	ASSESSMENT METHODOLOGY.....	10
3.4	OPERATIONAL LOG.....	10
4	RESULTS.....	13
4.1	MORNING SHOULDER RESULTS.....	13
4.2	DAY ASSESSMENT RESULTS.....	14
5	NOISE COMPLIANCE ASSESSMENT.....	15
5.1	ATTENDED NOISE MONITORING COMPLIANCE ASSESSMENT.....	15
5.2	CALCULATED DPE ASSESSMENT METHODOLOGY.....	15
6	DISCUSSION AND CONCLUSION.....	17
	APPENDIX A – GLOSSARY OF TERMS	

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by RW Corkery & Co Pty Limited (RWC) on behalf of Hy-Tec Industries Pty Ltd (Hy-Tec) to complete a Noise Monitoring Assessment (NMA) for the Tinda Creek Quarry, Tinda Creek, NSW (the project).

The monitoring has been conducted in accordance with the approved Tinda Creek Quarry Noise Management Plan and in general accordance with Conditions L3.1 and M5 of EPL#12007 (EPL).

The assessment was conducted in accordance with the following documents:

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- NSW Environment Protection Authority (EPA's), Environment Protection Licence EPL#12007;
- NSW Environment Protection Authority (EPA's), Approved methods for the measurement and analysis of environmental noise in NSW, 2022;
- Umwelt Pty Ltd, Tinda Creek Quarry Noise Management Plan (NMP); and
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise.

The assessment was undertaken on Thursday 13 April 2023 and forms part of the noise monitoring program to address conditions of EPL#12007 and the Noise Management Plan.

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Noise Criteria

Noise criteria for the project are outlined in NSW Environment Protection Authority (EPA's) Environment Protection Licence EPL#12007. The relevant sections from the EPL pertaining to noise are reproduced below:

L3 Noise Limits

L3.1 Noise generated at the premises that is measured at each noise monitoring point established under this licence must not exceed the noise levels specified in Column 4 of the table below for that point during the corresponding time periods specified in Column 1 when measured using the corresponding measurement parameters listed in Column 2.

Point 1			
<i>Time Period</i>	<i>Measurement parameter</i>	<i>Measurement frequency</i>	<i>Noise level dB(A)</i>
All hours	LAeq (15 minute)	-	35
Night	Lmax OR LA1,1min	-	45

L3.2 For the purpose of the table under Condition L3.1 "Night" has the same meaning as in the NSW Industrial Noise Policy (EPA, 2000).

M5 Noise monitoring

M5.1 To assess compliance with the noise limits specified within this licence, the licensee must undertake operator attended noise monitoring at each specified noise monitoring point in accordance with table below.

Point 1			
<i>Assessment Period</i>	<i>Minimum frequency in a reporting period</i>	<i>Minimum duration within assessment period</i>	<i>Minimum number of assessment period</i>
All hours when in use	Yearly	1 hour	1 operation day

M5.2 The licensee must undertake noise monitoring as directed by an authorised officer of the EPA.

M5.3 All noise monitoring required by this licence must be undertaken in accordance with Australian Standard AS 2659.1 - 1998: Guide to the use of sound measuring equipment - Portable sound level meters, or any revisions of that standard that may be made by Standards Australia, and the compliance monitoring guidance provided in the NSW Industrial Noise Policy.

R4 Other reporting conditions

Noise monitoring results

R4.1

a) The licensee must submit the results of any noise monitoring undertaken in accordance with the requirements of Condition M5.1 or Condition M5.2 to the EPA within three weeks of the noise monitoring being undertaken.

b) The noise monitoring results submitted to the EPA must include:

(i) a map of each noise monitoring location in relation to the noise source, including relevant distances;

(ii) an analysis of the noise monitoring results;

(iii) any detected exceedance of the noise limits specified in Condition L4.1;

(iv) details of any remedial action taken or proposed to be taken in relation to any exceedance of the noise limits specified in Condition L4.1;

(v) details of the prevailing meteorological conditions during the period when the noise monitoring was undertaken; and

(vi) confirmation that noise monitoring was/was not undertaken in accordance with Condition M5.3

3 Methodology

3.1 Locality

The project is located on Putty Road, Tinda Creek, NSW, approximately 67km north of Windsor, NSW. Receivers in the locality surrounding the project are primarily rural/residential. Putty Road is situated to the west of the site with the Yengo National Park bordering the site in all other directions.

3.2 Noise Monitoring Locations

Section M5.1 of the EPL specifies that noise monitoring is to be conducted for a minimum duration of one hour at the boundary of R1, (6255 Putty Road, Mellong, NSW) as detailed in Figure 6.1 of the Tinda Creek Noise Management Plan.

It should be noted that access to the property was not possible during the time of the noise measurements. Therefore, attended measurements were conducted at the boundary gate (NM1) of the property, as shown in **Figure 1**.

Following a request from the Department of Environment and Planning (DPE) on 20 January 2017, two additional near-field monitoring locations were selected to quantify project noise levels and limiting noise influence from Putty Road. The locations include a position adjacent to the dam, where a temporary water pump and generator is installed (Q1) and a second location adjacent to the main plant and loading areas (Q2). The noise levels monitored at these locations were used to quantify the overall sound power of the onsite operations, which was then used to calculate the noise contribution at surrounding noise sensitive receivers (ie R2 and R3).

The three monitoring locations, their MGA 56 coordinates and duration of measurement period are outlined in **Table 1** and are presented visually in the locality plan shown in **Figure 1**.

Table 1 Receiver Locations					
Receiver ID	Receiver Location	MGA56 Coordinates		Duration	Periods Monitored
		Easting	Northing		
R1	6255 Putty Road	284801	6329055	1 Hour	Morning Shoulder, Day
Q1	Dam Plant	285915	6328065	15 mins	Morning Shoulder, Day
Q2	Main Plant	285991	6327885	15 mins	Morning Shoulder, Day

3.3 Assessment Methodology

All noise surveys were conducted in general accordance with the procedures described in Australian Standard AS 1055:2018, "Acoustics - Description and Measurement of Environmental Noise" and the EPL. The acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA.

Attended noise measurements were carried out using a Svantek Type 1, 971 noise analyser on Thursday 13 April 2023. Four noise measurements of 15 minutes in duration were conducted at NM1 (R1) monitoring location during the day and morning shoulder monitoring periods. Where possible, throughout each survey, the operator quantified the contribution of each significant noise source.

Additionally, unattended noise monitoring was conducted at nearfield locations for a period of one hour during the day and morning shoulder monitoring periods to quantify the noise emissions from the quarry. These measurements were carried out using Svantek Type 1, 977 noise analysers.

3.4 Operational Log

Transportation activities are approved to commence at 5.00am and work shifts including operation of processing equipment are approved to commence at 7am.




Maintenance activities are approved to be undertaken at any time if those activities are inaudible at all residential premises.

Morning shoulder measurements were conducted from 6am to 7am to capture the onsite loading and transportation operations. Daytime operations commenced at approximately 7am with the daytime monitoring conducted from 7.30am to 8.30am.



FIGURE 1
LOCALITY PLAN
REF: MAC180647



KEY	
	RECEIVER LOCATION
	NOISE MONITORING LOCATION
	PROJECT BOUNDARY



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4 Results

4.1 Morning Shoulder Results

Four attended noise measurements of 15-minutes in duration were completed during the morning shoulder assessment period at NM1 on Thursday 13 April 2023. **Table 2** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 2 Operator-Attended Noise Survey Results – Morning Shoulder Period, Location NM1

Date	Time ¹ (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/04/2023	06:00	57	32	21	WD: SW	Birds 20-57
					WS: <0.1m/s	Site Inaudible
	06:15	67	45	19	Rain: Nil	
					WD: SW	Traffic 20-67
	06:30	65	39	19	WS: <0.1m/s	Birds 20-51
					Rain: Nil	Site Inaudible
06:45	65	46	25	WD: SW	Traffic 20-54	
				WS: <0.1m/s	Birds 20-65	
Tinda Creek Contribution						<25

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Unattended noise monitoring was completed during the morning shoulder assessment period at Q1 and Q2 on Thursday 13 April 2023. **Table 3** presents the monitored 15-minute noise levels, noted on-site activities and meteorological conditions at the time of measurements.

Table 3 Unattended Noise Survey Results – Morning Shoulder Period, Location Q1 and Q2

Location	Date / Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Onsite Activities
		L _{Amax}	L _{Aeq}	L _{A90}		
Q1	13/04/2023	60	38	36	WD: SW	Vehicle movements and loading
Q2					WS: <0.1m/s	Generator noise
	06:30	48	40	39	Rain: Nil	30-60

4.2 Day Assessment Results

Four attended noise measurements of 15-minutes in duration were completed during the day assessment period at NM1 on Thursday 13 April 2023. **Table 4** presents the monitored noise level contributions and observed meteorological conditions for each measurement.

Table 4 Operator-Attended Noise Survey Results – Day Period, Location NM1

Date	Time ¹ (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
13/04/2023	07:30	65	44	26	WD: SW	Traffic 20-65
					WS: <0.1m/s	Birds 20-44
				Rain: Nil	Aircraft 25-36	
					Site Water Pump 23-27	
	07:45	61	39	27	WD: SW	Traffic 20-61
				WS: <0.1m/s	Birds 20-51	
				Rain: Nil	Site – Water Pump 24-28	
	08:00	62	41	27	WD: SW	Traffic 20-62
WS: <0.1m/s					Birds 20-48	
				Rain: Nil	Site – Water Pump 24-28	
	08:15	63	46	28	WD: SW	Traffic 20-63
					WS: <0.5m/s	Birds 20-45
				Rain: Nil	Site – Water Pump 24-28	
					Site - Impacts 35-38	
Tinda Creek Contribution						27

Note 1: Day – the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening – the period from 6pm to 10pm; Night – the remaining periods.

Unattended noise monitoring was completed during the day assessment period at Q1 and Q2 on Thursday 13 April 2023. **Table 5** presents the monitored 15-minute noise levels, noted on-site activities and meteorological conditions at the time of measurements.

Table 5 Unattended Noise Survey Results – Day Period, Location Q1 and Q2

Location	Date / Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Onsite Activities
		L _{Amax}	L _{Aeq}	L _{A90}		
Q1	13/04/2023	66	60	60	WD: SW	Vehicle movements and loading
					WS: 0.1m/s	Processing operations
Q2	08:00	74	58	49	Rain: Nil	Generator noise
						Temporary water pump
						52-74

5 Noise Compliance Assessment

5.1 Attended Noise Monitoring Compliance Assessment

The compliance assessment summary results for R1 are presented in **Table 6** for day and the morning shoulder assessment periods and compares project contributions against relevant criteria.

Table 6 Day and Morning Shoulder Noise Compliance Assessment			
Period	Quarry Noise Contribution	Quarry Noise Criteria	Compliant
	dB LAeq(15min)	dB LAeq(15min)	
Day	27	35	✓
Morning Shoulder	<25	35	✓

5.2 Calculated DPE Assessment Methodology

The dominant noise source observed on site during this measurement period was a temporary water pump and generator located near the Q1 logging location. The calculated sound power from these plant items was 113dBA when operating at full capacity or 101dBA when operating at a reduced capacity. At full capacity the cumulative sound power level for the site is 114 dBA.

The contribution at each of the receivers R1 to R3 has been calculated taking into account loss due to distance and topography. The quarry sound power level was propagated to the surrounding noise sensitive receivers, with the calculated received noise level presented in **Table 7**. Results of the calculations generally correlate with the measured noise contributions from the project and therefore validate compliance.

Table 7 Calculated DPE Compliance Assessment					
Receiver	Quarry Sound Power dB	Distance to Receiver m	Distance attenuation dB	Attenuation due to Topography dB	Calculated Quarry Contribution dB LAeq(15min)
R1	114	2050	74	12	28
R2	114	2210	75	12	27
R3	114	2030	74	12	28

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6 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) for RW Corkery & Co Pty Limited on behalf of Hy-Tec Industries Pty Ltd for the Tinda Creek Quarry, Tinda Creek, NSW. The assessment was completed to assess the quarry's compliance with the relevant criteria outlined in EPL#12007 for the nominated residential receiver surrounding the quarry.

Operator attended noise monitoring was undertaken on Thursday 13 April 2023 at the nominated monitoring locations with quarry noise contributions compared against the relevant criteria.

The assessment has identified that noise emissions generated by Tinda Creek Quarry comply with relevant noise criteria specified in EPL#12007 at the assessed receiver location for both the morning shoulder and daytime monitoring periods.

Furthermore, the calculated noise contribution at two nearfield reference locations demonstrate that project noise contributions satisfy relevant criteria at R1, R2 and R3.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in Table A1.

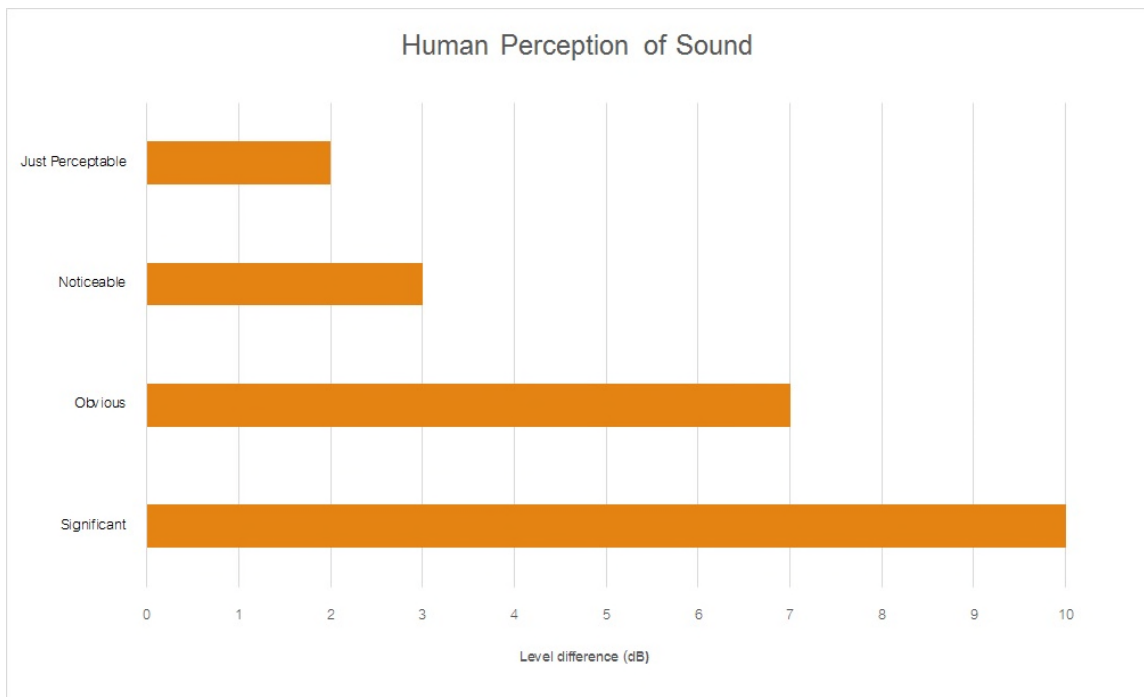
Table A1 Glossary of Acoustical Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAm _{ax}	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (L _w or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (L _p or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from L _w in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawn-mower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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Appendix 4

Biodiversity Monitoring Report 2023

Prepared by EMM Consulting

(Total No. of pages including blank pages = 55)

Tinda Creek Quarry

Biodiversity monitoring report 2023

Prepared for Hy-tec Concrete and Aggregates (Hy-Tec)

February 2024

Tinda Creek Quarry

Biodiversity monitoring report 2023

Hy-tec Concrete and Aggregates (Hy-Tec)

E230940 RP1

February 2024

Version	Date	Prepared by	Reviewed by	Comments
V1	14/12/2023	Jennifer Lindsay	Philippa Fagan	Draft
V2	28/02/2024	Jennifer Lindsay	Philippa Fagan	Final

Approved by



Philippa Fagan

Associate Ecologist

28 February 2024

Level 3 175 Scott Street

Newcastle NSW 2300

This report has been prepared in accordance with the brief provided by Hy-tec Concrete and Aggregates (Hy-Tec) and, in its preparation, EMM has relied upon the information collected at the times and under the conditions specified in this report. All findings, conclusions or recommendations contained in this report are based on those aforementioned circumstances. The contents of this report are private and confidential. This report is only for Hy-tec Concrete and Aggregates (Hy-Tec)'s use in accordance with its agreement with EMM and is not to be relied on by or made available to any other party without EMM's prior written consent. Except as permitted by the Copyright Act 1968 (Cth) and only to the extent incapable of exclusion, any other use (including use or reproduction of this report for resale or other commercial purposes) is prohibited without EMM's prior written consent. Except where expressly agreed to by EMM in writing, and to the extent permitted by law, EMM will have no liability (and assumes no duty of care) to any person in relation to this document, other than to Hy-tec Concrete and Aggregates (Hy-Tec) (and subject to the terms of EMM's agreement with Hy-tec Concrete and Aggregates (Hy-Tec)).

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TABLE OF CONTENTS

1	Introduction	1
1.1	Background	1
1.2	The project	1
1.3	Terminology	1
1.4	Purpose and objectives	2
1.4.1	Annual biodiversity monitoring	2
1.4.2	<i>Hibbertia puberula</i> subsp. <i>extensa</i> habitat assessment and targeted surveys	2
2	Methodology	5
2.1	Qualification and experience of personnel	5
2.2	Vegetation monitoring	5
2.3	<i>Grevillea parviflora</i> spp. <i>parviflora</i> monitoring	6
2.4	<i>Hibbertia puberula</i> subsp. <i>extensa</i> habitat assessment and survey	8
2.5	Koala population monitoring	8
2.6	Limitations	8
2.6.1	BAM Plots B1 and B2	8
2.6.2	<i>Hibbertia puberula</i> subsp. <i>Extensa</i> habitat assessment and surveys	8
3	Results	9
3.1	Vegetation monitoring	9
3.1.1	Species richness and composition	10
3.1.2	Occurrence and abundance of weeds	11
3.1.3	Composition, structure and function	12
3.2	<i>Grevillea parviflora</i> spp. <i>parviflora</i> monitoring	14
3.3	<i>Hibbertia puberula</i> subsp. <i>extensa</i> habitat assessment and survey effort	14
3.4	Opportunistic threatened species sightings	18
3.4.1	Rosenberg's Goanna	18
4	Discussion	19
4.1	Vegetation monitoring	19
4.1.1	Vegetation composition, structure and function	19
4.1.2	Weeds	19
4.1.3	<i>Grevillea parviflora</i> subsp. <i>parviflora</i>	20
4.1.4	<i>Hibbertia puberula</i> subsp. <i>extensa</i>	20
4.2	Landscape Management Plan performance criteria	20
5	Recommendations	23

5.1	General recommendations	23
5.2	Specific actions in the rehabilitation area	23
5.3	Specific actions in the BOA	24
6	Conclusion	25
7	References	26

Appendices

Appendix A	BAM Plot Data	A.1
Appendix B	BAM plot photo point monitoring	B.1
Appendix C	<i>Grevillea parviflora</i> subsp. <i>parviflora</i> photo point monitoring	C.1

Tables

Table 1.1	Terminology	1
Table 2.1	EMM's BAM plot locations	6
Table 2.2	<i>Grevillea parviflora</i> subsp. <i>parviflora</i> plot locations	6
Table 3.1	Average native species richness per vegetation community within 400 m ² plots (2019 – present)	10
Table 3.2	BAM plot values within rehabilitation sites and plot B7 (analogue site)	11
Table 3.3	Diversity of weed species 2020 - present	11
Table 3.4	Diversity and cover of exotic species in the rehabilitation site and analogue site	12
Table 3.5	Composition, structure and function of the BAM plots surveyed (2023)	13
Table 3.6	Results from 2019-2022 <i>Grevillea parviflora</i> plot monitoring	14

Figures

Figure 1.1	Regional setting	3
Figure 1.2	Study Area and Biodiversity Offset Area (BOA)	4
Figure 2.1	Ecological monitoring locations	7
Figure 3.1	<i>Hibbertia puberula</i> subsp. <i>extensa</i> habitat assessment and survey effort	17

Photographs

Photograph 3.1	BAM Plot 1 (left) and BAM Plot 2 (right) – surveys deferred until rehabilitation has been undertaken	9
Photograph 3.2	A section of Domain 4 undergoing final profiling in preparation for revegetation	9
Photograph 3.3	Disturbance in Plot B4 between 2022 (left) monitoring and 2023 monitoring (right)	10
Photograph 3.4	<i>Hibbertia puberula</i> subsp. <i>extensa</i> observed within the Biodiversity Offset Area (BOA)	15
Photograph 3.5	<i>Hibbertia puberula</i> subsp. <i>extensa</i> flowering within the Biodiversity Offset Area (BOA)	15
Photograph 3.6	Rosenberg's Goanna observed within the Quarry Site during the 2023 surveys	18

1 Introduction

1.1 Background

EMM Consulting Pty Limited (EMM) has been engaged by Hy-Tec Concrete and Aggregates (Hy-Tec) to carry out the sixth year of biodiversity monitoring as defined in the Landscape Management Plan (LMP) for the Tinda Creek Quarry (RW Corkery & Co, 2022). The first monitoring survey was undertaken by Niche Environment and Heritage (Niche) in December 2018 (Niche, 2019). The methods used by Niche (2019) to undertake the monitoring were based on the monitoring framework described in the previous iteration of the LMP, prepared by Umwelt (2016).

Monitoring surveys were completed by EnviroKey in 2019 and 2020 (EnviroKey, 2020; EnviroKey, 2021), while EMM has conducted annual monitoring surveys since 2021 (EMM, 2022; EMM, 2023).

1.2 The project

The Tinda Creek Quarry Extension Project is approximately 5 kilometres (km) south of Mellong (see Figure 1.1) and involves the extraction of up to 300,000 tonnes per annum (tpa) of sand from six extraction domains. Throughout the project planning process, Hy-Tec was committed to the application of the avoid and minimise hierarchy on potential biodiversity impacts. This included avoiding and minimising impacts to key vegetation communities and threatened flora and fauna habitat.

The Quarry Site comprises six extraction domains, a Quarry Access Road and a Biodiversity Offset Area (BOA). The BOA is an area of 106.6 hectares (ha) of adjacent land which has been retained to offset the proposed disturbance area and will be managed for conservation in perpetuity with likely future transfer into Yengo National Park. The Study Area, which includes the BOA, is illustrated in Figure 1.2.

1.3 Terminology

Terms utilised within this report are defined in Table 1.1.

Table 1.1 Terminology

Term	Definition
BAM	Biodiversity Assessment Method
BBAM	BioBanking Assessment Methodology
BC Act	<i>Biodiversity Conservation Act 2016</i>
BOA	Biodiversity Offset Area
EMM	EMM Consulting Pty Limited
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GDEs	Groundwater dependent ecosystems
GPS	Global Positioning System
Ha	Hectares
Hy-Tec	Hy-Tec Concrete and Aggregates
Km	Kilometres
LMP	Landscape Management Plan

Table 1.1 **Terminology**

Term	Definition
OEH	NSW Office of Environment and Heritage
Quarry Site	The Hy-Tec Tinda Creek Quarry site, comprising: <ul style="list-style-type: none">• six extraction domains• Quarry Access Road• Biodiversity Offset Area (BOA)
PCT	Plant Community Type
SAT	Spot Assessment Technique
Study Area	The area within the Quarry Site boundary, including the Biodiversity Offset Area (BOA)
tpa	Tonnes per annum

1.4 Purpose and objectives

The LMP identifies the following key ecological values present within the Tinda Creek Quarry project area:

- known and potential habitat for at least 18 threatened fauna species, listed under the *Biodiversity Conservation Act 2016* (BC Act) and/or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- a large population of *Grevillea parviflora* subsp. *parviflora* (Small-flower Grevillea), listed as Vulnerable under the BC Act and EPBC Act
- the presence of groundwater dependent ecosystems (GDEs), Mellong Sandmass Swamp Woodland and Mellong Sandmass Sedgeland, which are naturally rare and isolated communities considered to be of high conservation value.

1.4.1 Annual biodiversity monitoring

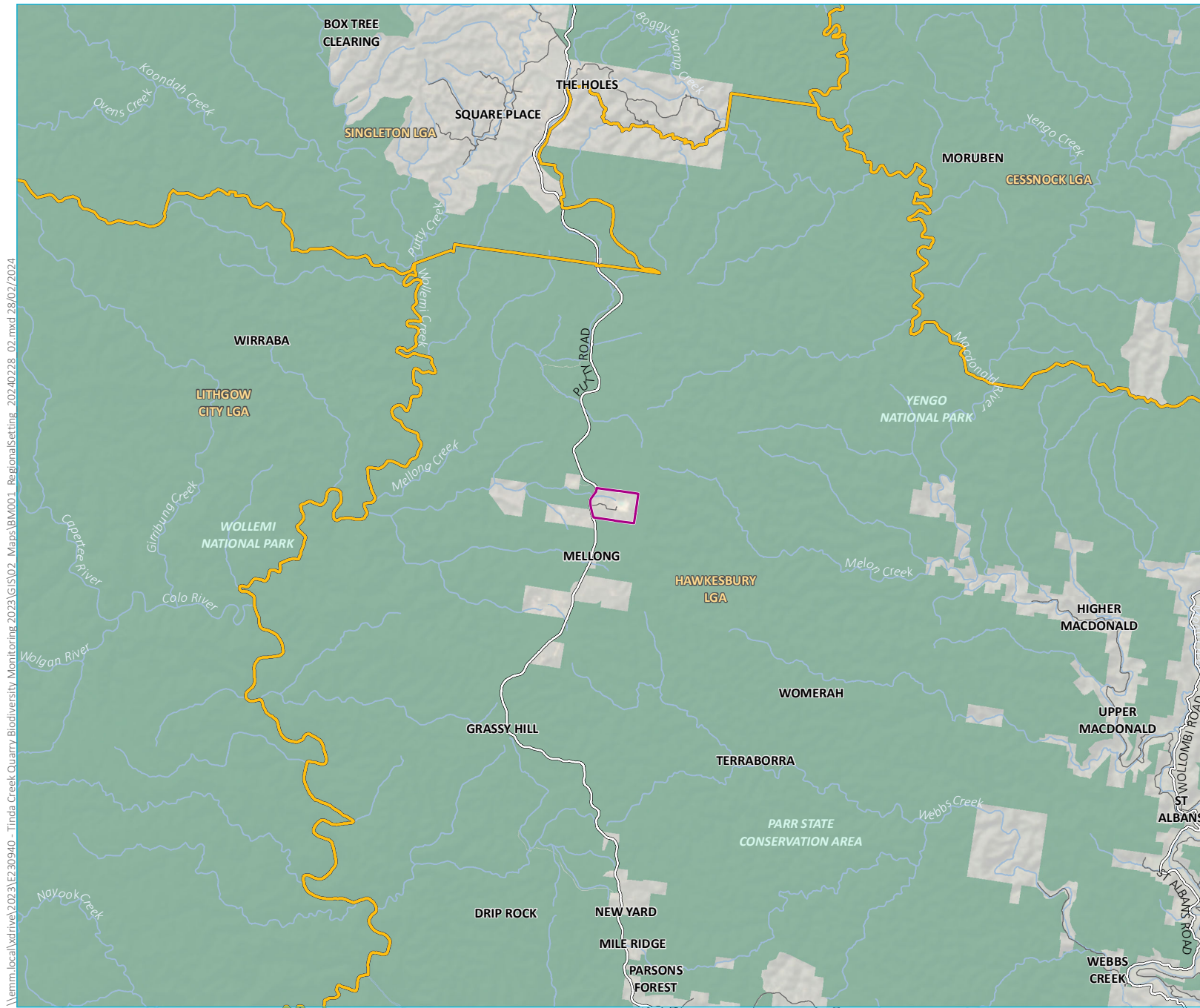
The LMP (RW Corkery & Co, 2022) outlines the ecological monitoring requirements for Tinda Creek Quarry. In line with these requirements, EMM undertakes annual monitoring of:

- nine established vegetation plots
- nine permanent *Grevillea parviflora* subsp. *parviflora* plots
- Koala surveys (bi-annually)
- general site vegetation assessment.

This monitoring report aims to assess the success of site management, rehabilitation, and the possible impacts to the BOA with reference to performance targets outlined in the LMP (RW Corkery & Co, 2022).

1.4.2 *Hibbertia puberula* subsp. *extensa* habitat assessment and targeted surveys

The 2021 and 2022 Annual Biodiversity Monitoring Reports presented by EMM detected the presence of *Hibbertia puberula* subsp. *extensa* within the study area and have recommended surveying for the species within areas of suitable habitat that fall outside of the BOA. As such, a habitat assessment and targeted surveys for the species were included in the 2023 monitoring program.



- KEY**
- Study area
 - Major road
 - Minor road
 - Named watercourse
 - Named waterbody
 - Local government area
 - NPWS reserve
 - State forest

Regional setting

Tinda Creek Quarry
Biodiversity Monitoring Report 2023
Figure 1.1



\\emm.local\drive\2023\E2 30940 - Tinda Creek Quarry Biodiversity Monitoring 2023\GIS\02_Maps\BMD001_RegionalSetting_20240228_02.mxd 28/02/2024

Source: EMM (2024); ABS (2021); DCSSS (2023); ESRI (2024); GA (2009)

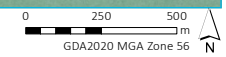
0 5 10
km
GDA2020 MGA Zone 56



- KEY**
- Extraction area
 - Study area
 - Biodiversity offset area
 - Area under rehabilitation
 - Quarry access road
 - Internal access track
 - Existing environment
 - Major road
 - Minor road
 - Watercourse/drainage line
 - NPWS reserve

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Source: EMM (2024); DCSSS (2023); MetroMap (2024); GA (2009)



Study area and Biodiversity Offset Area (BOA)

Tinda Creek Quarry Biodiversity Monitoring Report 2023
Figure 1.2



2 Methodology

This section provides a description of the methodology used to monitor the biodiversity values within the study area.

2.1 Qualification and experience of personnel

Preparation of this report and associated fieldwork were undertaken by ecologists Jennifer Lindsay and Nicole McVicar (Accredited BAM Assessor BAAS 18077) under the authority of a Scientific License (SL100409).

2.2 Vegetation monitoring

Field surveys were conducted from 14–16 November 2023.

The monitoring design and methodology follows the methods specified in the LMP (RW Corkery & Co, 2022), including:

- utilisation of the Biodiversity Assessment Method (BAM) data collection method for analysis of vegetation condition via floristic BAM plots
- monitoring of BAM plots in areas that have been subject to rehabilitation
- BAM plots in analogue sites within areas of native vegetation that correspond to vegetation communities to be rehabilitated, to provide vegetation condition benchmarks
- comparison of data within rehabilitation areas and analogue sites to determine progress towards completion criteria.

Monitoring plots were established by Niche during the 2018 monitoring survey (Niche, 2019); however, the 2019 Gaspers Mountain Wildfire resulted in damage to field equipment, including timber marker pegs. These plots comprised a 50 x 20 m plot-transect conducted in accordance with the 'Biometric' method, as used in the BioBanking Assessment Methodology (BBAM) (OEH, 2014), with a number of extra parameters also recorded (Niche, 2019).

The LMP (RW Corkery & Co, 2022) specifies the locations of three BAM plots (B1, B2 and B3) in the rehabilitation area and six BAM plots (B4 to B9 analogue sites) within areas of remnant vegetation (Figure 1.2) to provide a benchmark in terms of species composition, diversity and structure. These analogue sites will be used for future monitoring assessment to determine if rehabilitation completion criteria outlined within the LMP are met. Monitoring will be undertaken annually within analogue sites throughout the operational period of the Quarry. BAM plot data is provided in Appendix A.

BAM plot locations are illustrated within Figure 2.1, while Global Positioning System (GPS) coordinates of EMM's BAM plots are presented in Table 2.1. Photos were taken at each BAM plot to allow for visualisation of the changes in vegetation and habitat type over time. Photo reference points from the 2023 monitoring survey are presented in Appendix B.

Table 2.1 EMM's BAM plot locations

BAM Plot ID	Latitude	Longitude	Bearing
B1	-33.1665	150.7060	-
B2	-33.1659	150.7087	140
B3	-33.1649	150.7106	350
B4	-33.1653	150.6937	325
B5	-33.1655	150.6947	350
B6	-33.1610	150.7075	340
B7	-33.1628	150.7126	0
B8	-33.1668	150.7131	338
B9	-33.1713	150.7122	150

2.3 *Grevillea parviflora* spp. *parviflora* monitoring

The nine 10 m x 10 m *Grevillea parviflora* subsp. *parviflora* monitoring plots established during the initial 2018 monitoring surveys (Niche, 2019), were resurveyed. It is noted that, while the first three years of monitoring (i.e. 2018–2020) utilised counts of individuals, stem counts have been employed since the 2021 monitoring period. Threatened flora plot locations are illustrated in Figure 2.1 and GPS coordinates of the threatened flora plots are presented in Table 2.2.

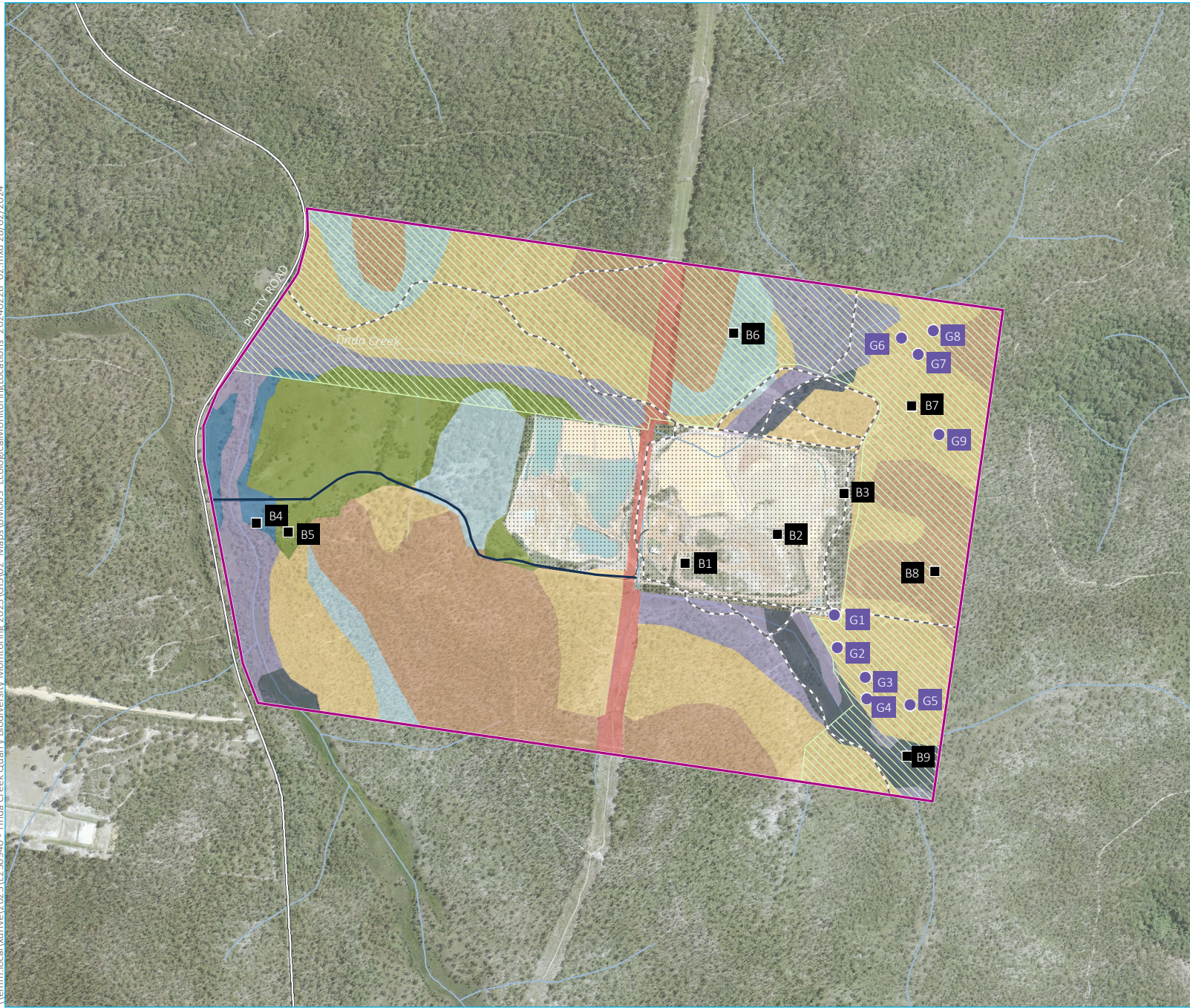
Table 2.2 *Grevillea parviflora* subsp. *parviflora* plot locations

Grevillea plot	Location	
	Latitude	Longitude
1	-33.16782	150.710237
2	-33.168618	150.710302
3	-33.16935	150.711094
4	-33.16987	150.711109
5	-33.170039	150.712354
6	-33.161185	150.712342
7	-33.161596	150.712797
8	-33.161022	150.713246
9	-33.163537	150.713348

In accordance with the methodology outlined in the Threatened Biodiversity Profile Search for *Grevillea parviflora* subsp. *parviflora* (OEH, 2022a), the stems of the *Grevillea parviflora* subsp. *parviflora* were counted rather than the individual plants. This is due to the particular reproductive and growth habits of this species which include suckering from rootstock and spreading vegetatively.

Photo monitoring for *Grevillea parviflora* subsp. *parviflora* can be found in Appendix C.

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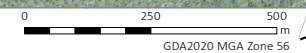
- KEY**
- Study area
 - BAM plot
 - Grevillea plot
 - Biodiversity offset area
 - Quarry access road
 - Internal access track
 - Major road
 - Minor road
 - Watercourse/drainage line
- Vegetation community**
- Disturbed area
 - Hawkesbury Hornsby Plateau exposed woodland
 - Hawkesbury Hornsby Plateau exposed woodland - derived grassland
 - Mellong sandmass dry woodland
 - Mellong sandmass dry woodland - derived grassland
 - Mellong sandmass sedgeland
 - Mellong sandmass swamp woodland
 - Mellong sandmass swamp woodland (modified - overstorey absent)
 - Stringybark-Ironbark forest

Ecological monitoring locations

Tinda Creek Quarry
Biodiversity Monitoring Report 2023
Figure 2.1



Source: EMM (2024); DCSSS (2023); MetroMap (2024); GA (2009)



2.4 *Hibbertia puberula* subsp. *extensa* habitat assessment and survey

As per advice provided in EMM's previous biodiversity monitoring reports (EMM, 2022; EMM, 2023), habitat assessment and surveys were conducted for *Hibbertia puberula* subsp. *extensa* in areas of associated habitat outside of the BOA.

Desktop searches prior to field surveys utilised the following resources to determine survey timing and associated habitat within the Quarry site for *Hibbertia puberula* subsp. *extensa*:

- NSW BioNet Atlas of NSW Wildlife (OEH, 2023) for indication of ideal survey period and associated plant community types (PCTs)
- NSW SEED Data Portal (DPIE, 2023) for information on PCTs mapped within the Quarry area utilising State Vegetation Type Map (SVTM 1750)
- Sydney Royal Botanic Gardens *PlantNet* (PlantNET, 2023) for species description and further information on associated habitat for *Hibbertia puberula* subsp. *extensa*.

Based on this information, two areas of potentially suitable habitat south of the Quarry extraction areas were identified for assessment and survey for the species. Following onsite identification of records within the BOA, a general habitat assessment and targeted survey for *Hibbertia puberula* subsp. *extensa* were conducted in these two areas, utilising a combination of random meander searches and 10–20 m transects.

2.5 Koala population monitoring

The Koala (*Phascolarctos cinereus*), listed as Endangered under both the EPBC Act and the BC Act, has been historically recorded in the Tinda Creek region, during the 2018 monitoring survey (Niche, 2019), and during the 2020 survey (EnviroKey, 2021).

The LMP (RW Corkery & Co, 2022) recommends Koala surveys to be undertaken every two years. Surveys for Koala were undertaken during the 2022 monitoring program and, as such, surveys were not conducted in 2023.

2.6 Limitations

2.6.1 BAM Plots B1 and B2

Monitoring in BAM Plots B1 and B2 were not undertaken during the 2023 survey period as it is understood that ongoing earthworks and landform alterations have yet to be completed in this area. At the time of survey, BAM Plot B1 was being utilised as a stockpile area for vegetation removed from the clearing of Domain 7 (Photograph 3.1). Although BAM Plot B2 was surveyed during the previous two monitoring events (i.e. 2021 and 2022), monitoring in 2023 was not undertaken due to substantial ground disturbance in proximity to the plot (Photograph 3.1). Monitoring at BAM Plots B1 and B2 will be deferred until rehabilitation works have been undertaken.

2.6.2 *Hibbertia puberula* subsp. *Extensa* habitat assessment and surveys

Habitat assessment and survey for *Hibbertia puberula* subsp. *extensa* were undertaken in areas of associated habitat within the Quarry Site (exclusive of the BOA), as identified in the *BioNet Atlas of NSW Wildlife* (OEH, 2023) and the NSW SEED Data Portal (DPIE, 2023). This habitat was limited to PCT 3622 Sydney Hinterland Yellow Bloodwood Woodland and the defined survey area for the species was based on State Vegetation Mapping (SVTM 1750), which has not been ground-truthed across the study area.

3 Results

3.1 Vegetation monitoring

Vegetation monitoring was conducted at seven locations during the 2023 survey period. Plots B1 and B2 were inspected; however, it is understood that this area of the quarry (Domain 4) is under active quarry workings and the landform has not been completed to a stage where rehabilitation can be established. Monitoring of these plots will be deferred until a time when rehabilitation has been established (refer to Section 2.6.1 and Photograph 3.1).



Photograph 3.1 BAM Plot 1 (left) and BAM Plot 2 (right) – surveys deferred until rehabilitation has been undertaken

It should be noted that, at the time of survey, a section of Domain 4 was undergoing final landform profiling in preparation for rehabilitation (see Photograph 3.2). Once revegetation has commenced in this area, it is recommended that a monitoring plot be established within the revegetated area to monitor progress of rehabilitation.



Photograph 3.2 A section of Domain 4 undergoing final profiling in preparation for revegetation

Plots B4 and B5 appeared to have been subject to substantial disturbance since the 2022 monitoring period (see Photograph 3.3). It is noted that slashing of African Lovegrass and other weed species was conducted a week or two prior to monitoring surveys in the vicinity of Plots B4 and B5 and within a portion of Plot B3, which may have had an impact on species detectability.



Photograph 3.3 Disturbance in Plot B4 between 2022 (left) monitoring and 2023 monitoring (right)

3.1.1 Species richness and composition

The year six monitoring period (2023) recorded a total of 144 flora species within the BAM plots, comprising 138 native species and 6 exotic species (Appendix A). The average native species richness per vegetation community between 2019–2023 is displayed in Table 3.1. With the exception of Mellong Sandmass Dry Woodland, average native species richness decreased in all vegetation communities when compared to the 2021 monitoring year data. The largest decrease between 2022 and 2023 was five species recorded within the Mellong Sandmass Sedgeland. A decrease in species richness across the majority of the site, compared to the 2022 survey period, is likely associated with increased temperatures and drier conditions across the region throughout 2023. However, species richness has increased within all vegetation communities since year 1 of monitoring.

Table 3.1 Average native species richness per vegetation community within 400 m² plots (2019 – present)

Vegetation Community	2018 ¹	2019	2020	2021	2022	2023
Hawkesbury Hornsby Plateau Exposed Woodland	-	30.5	32.0	51	53	50
Mellong Sandmass Dry Woodland	-	30.4	29.6	35.5	36	41
Mellong Sandmass Sedgeland	-	12.5	12	25	28	23
Mellong Sandmass Swamp Woodland	-	21.0	21.3	18	28	24
Stringybark – Ironbark Forest	-	23.7	31.0	40	47	37
Regenerating Mellong Sandmass Woodland	-	27	18	25.5	28.5	38

Note: 1 – BAM plot monitoring was not undertaken during the 2018 monitoring period.

Plots B1, B2 and B3 are all located within the areas under rehabilitation; however, only Plot B3 was surveyed during the 2023 survey period (refer to Section 2.6.1) (Figure 1.2). Native species richness, tree count, hollow bearing tree count, length of logs and average litter cover recorded within Plot B3 has been compared with Plot B7 (an analogue site containing benchmark values) and is presented in Table 3.2.

Table 3.2 BAM plot values within rehabilitation sites and plot B7 (analogue site)

BAM plot	Site type	Native species richness	Tree count: ≥30 cm DBH	Tree count: <30 cm DBH	Number of hollow trees	Length of logs (m)	Average litter cover (%)
B1 ¹	Rehabilitation	-	-	-	-	-	-
B2 ¹	Rehabilitation	-	-	-	-	-	-
B3	Rehabilitation	38	0	3	0	0	34
B7	Analogue	46	4	4	4	4	48

Note 1: Monitoring at this location has been deferred until rehabilitation has progressed.
- metric not measured.

Native species richness increased at both Plot B3 and Plot B7, compared to 2022 surveys. Plot B3 presented with a substantial increase in litter cover compared to 2022 (up from 18%). Plot B7 recorded an increase in hollow-bearing trees (HBTs), and a decrease in both logs and average litter cover when compared to 2022 results.

3.1.2 Occurrence and abundance of weeds

Exotic species were recorded within three plots (B3, B4 and B5) in 2023, all of which are in, or close to, areas of disturbance (i.e. the Quarry Access Road and historic extraction areas). Weeds recorded that are considered of particular environmental risk include the perennial grasses African Lovegrass (*Eragrostis curvula*), Whiskey Grass (*Andropogon virginicus*) and Narrow-leafed Carpet Grass (*Axonopus fissifolius*), due to their particularly aggressive nature.

Plots B6 to B9 contained vegetation in good condition with no exotic species recorded.

The number of weed species recorded during 2020 (EnviroKey), and 2021 to 2023 (EMM) are presented in Table 3.3. Plots established by the LMP (RW Corkery & Co, 2022) (Plots B1, B2, B4 and B5) have no equivalent plots to compare.

Table 3.3 Diversity of weed species 2020 - present

BAM Plot IDs (2021 – 2023)	BBAM Plot IDs (EnviroKey 2021)	Number of weed species			
		2020 (EnviroKey)	2021 (EMM)	2022 (EMM)	2023 (EMM)
B1 ¹	-	-	-	-	-
B2 ¹	-	-	3	3	-
B3	Plot 18	2	3	3	2
B4	-	-	7	7	6
B5	-	-	3	3	1
B6	Plot 12	0	2	2	0
B7	Plot 16	0	0	0	0

Table 3.3 Diversity of weed species 2020 - present

BAM Plot IDs (2021 – 2023)	BBAM Plot IDs (EnviroKey 2021)	Number of weed species			
		2020 (EnviroKey)	2021 (EMM)	2022 (EMM)	2023 (EMM)
B8	Plot 8	1	0	0	0
B9	Plot 6	0	1	0	0

Note: Monitoring at this location has been deferred until rehabilitation has progressed.
- metric not measured.

The diversity and associated cover of exotic species recorded within rehabilitation sites and analogue site is presented in Table 3.4.

Table 3.4 Diversity and cover of exotic species in the rehabilitation site and analogue site

2023 BAM plots	Site type	Number of exotic species	Cover (%)
B1 ¹	Rehabilitation	-	-
B2 ¹	Rehabilitation	-	-
B3	Rehabilitation	2	80.5
B7	Analogue	0	0

Note: Monitoring at this location has been deferred until rehabilitation has progressed.
- metric not measured.

Weed diversity and cover across the surveyed plots (i.e. Plots B3 and B7) remain consistent with 2022 results. Plot B3 within the rehabilitation area presented with a high cover of African Lovegrass in line with 2022 results.

3.1.3 Composition, structure and function

The composition, structure and function for each BAM plot is provided in Table 3.5.

Table 3.5 **Composition, structure and function of the BAM plots surveyed (2023)**

BAM plot	Vegetation Community	Tree count: 80 cm plus	Tree count: 50–79 cm	Tree count: 30–49 cm	Tree count: 20–29 cm	Tree count: 10–19 cm	Tree count: 5–9 cm	Tree count: <5 cm	Number of hollow trees	Length of logs (m)	Subplot 1 – Litter cover (%)	Subplot 2 – Litter cover (%)	Subplot 3 – Litter cover (%)	Subplot 4 – Litter cover (%)	Subplot 5 – Litter cover (%)
B1	Regenerating Mellong Sandmass Dry Woodland	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B2	Regenerating Mellong Sandmass Dry Woodland	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B3	Regenerating Mellong Sandmass Dry Woodland	0	0	0	0	1	1	1	0	0	70	15	15	20	50
B4	Mellong Sandmass Swamp Woodland Modified -Overstory Absent	0	0	0	1	0	0	1	0	0	5	60	5	30	50
B5	Mellong Sandmass Dry Woodland Derived Native Grassland	1	0	0	0	0	0	1	0	0	20	30	10	50	20
B6	Stringybark – Ironbark Forest	2	1	1	1	1	1	1	0	84	40	30	70	85	70
B7	Mellong Sandmass Dry Woodland	2	1	1	1	1	1	1	4	4	60	70	40	50	20
B8	Hawkesbury Hornsby Plateau Exposed Woodland	0	0	1	1	1	1	1	5	50	60	70	50	40	75
B9	Mellong Sandmass Sedgeland	0	0	0	0	0	0	0	0	0	-	-	-	-	-

3.2 *Grevillea parviflora* spp. *parviflora* monitoring

Grevillea parviflora subsp. *parviflora* was recorded within eight of the nine monitoring plots during the 2023 survey period (Table 3.6). No stems were recorded in Plot 8 during the 2023 survey effort. Stem counts increased within four plots (Plots 1, 3, 4 and 7), while numbers decreased marginally or remained stable within the remaining five plots. Total stem count across all plots in 2023 was 1,281 stems. This is a marginal increase from the total stem count from the 2022 monitoring period, being 1,115.

Table 3.6 Results from 2019-2022 *Grevillea parviflora* plot monitoring

Site	2018 Count ¹	2019 count ¹	2020 count ¹	2021 count ²	2022 count ²	2023 count ²
1	18	38	0	21	80	202
2	51	7	0	103	650	577
3	33	25	18	14	20	24
4	47	1	10	53	35	61
5	20	19	35	9	40	25
6	16	35	16	26	100	90
7	11	0	0	25	120	237
8	14	0	0	12	5	0
9	2	0	1	22	65	65
Total	212¹	125¹	80¹	285²	1,115²	1,281²

Notes:

1. Count of number of individuals.
2. Count of stems.

3.3 *Hibbertia puberula* subsp. *extensa* habitat assessment and survey effort

Prior to commencing broader habitat assessment and survey for *Hibbertia puberula* subsp. *extensa*, previous records of the species within the BOA and within Plot B3 were identified. It should be noted that the individuals recorded were in areas of previous disturbance (i.e. old tailings and artificial bunds) in low-lying areas within proximity to heath and sedgelands. Additionally, the majority of individuals identified on site were in bud, with minimal flowering occurring at the time of survey (see Photograph 3.4 and Photograph 3.5).



Photograph 3.4 *Hibbertia puberula* subsp. *extensa* observed within the Biodiversity Offset Area (BOA)



Photograph 3.5 *Hibbertia puberula* subsp. *extensa* flowering within the Biodiversity Offset Area (BOA)

Habitat assessment and surveys for *Hibbertia puberula* subsp. *extensa* were conducted in two patches of PCT 3622 Sydney Hinterland Yellow Bloodwood Woodland south of the active Quarry area on 16 December 2023 (Figure 3.1). These patches were approximately 9 ha and 20 ha in size and comprised dry sclerophyll woodland on sandy soil. Elevation in these patches ranged between 340 m and 380 m.

The canopy in these areas was dominated by Yellow Bloodwood (*Corymbia eximia*) and Narrow-leaved Apple (*Angophora bakeri*), while the mid-storey was dominated by *Leptospermum* (tea tree) and *Persoonia* (geebung) species. The ground layer was sparse and generally dominated by herbs and forbs. While other *Hibbertia* species, such as Hoary Guinea Flower (*Hibbertia obtusifolia*) were identified throughout these areas, *Hibbertia puberula* subsp. *extensa* was not observed.

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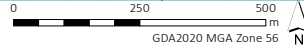


- KEY**
- Study area
 - Biodiversity offset area
 - Hibbertia puberula* subsp. *extensa* associated habitat
 - *Hibbertia puberula* subsp. *extensa*
 - Survey tracks
 - Quarry access road
 - Internal access track
 - Existing environment
 - Major road
 - Minor road
 - Vehicular track
 - Watercourse/drainage line
 - NPWS reserve

Hibbertia puberula subsp. *extensa*
habitat assessment and
survey effort

Tinda Creek Quarry
Biodiversity Monitoring Report 2023
Figure 3.1

Source: EMM (2024); DCSSS (2023); MetroMap (2024); GA (2009)



3.4 Opportunistic threatened species sightings

3.4.1 Rosenberg's Goanna

Rosenberg's Goanna (*Varanus rosenbergi*) was observed multiple times within the Study Area during surveys (see Photograph 3.6). The species, listed as Vulnerable under the BC Act, has previously been recorded within the area and is known to nest in termite mounds, which have also been observed within the Study Area.



Photograph 3.6 Rosenberg's Goanna observed within the Quarry Site during the 2023 surveys

4 Discussion

4.1 Vegetation monitoring

A comparison of 2022 and 2023 monitoring survey results indicate plant species richness has increased within two vegetation communities and decreased within four vegetation communities as identified in Table 3.1.

Mellong Sandmass Dry Woodland and Regenerating Mellong Sandmass Dry Woodland both had increases in species richness compared to the 2022 results. The increase in species richness within the Regenerating Mellong Sandmass Dry Woodland (i.e. Plot B3) is particularly encouraging, as the number of species has more than doubled since the 2020 monitoring period (i.e. the first monitoring event following the 2019/2020 Gosper's Mountain Wildfire).

Four vegetation communities presented with a decrease in species richness during the 2023 monitoring period, as indicated in Table 3.1. The Stringybark-Ironbark Forest vegetation community (i.e. Plot B6) presented with the greatest decrease in species diversity with a decrease in 10 species compared to 2022 results. This decline was visually evident during surveys within the vegetation community and is most likely associated with warmer, drier weather conditions and increased drainage associated with slope (see plot photo in Appendix B). The average monthly rainfall for 2020 to 2022 was approximately 83 millimetres (mm) compared to just 48 mm in 2023 (BoM, 2023). Likewise, the average maximum monthly temperature for 2020 to 2022 was 16 degrees Celsius, compared to an average maximum monthly temperature of 17.3 degrees Celsius in 2023 (BoM, 2023).

4.1.1 Vegetation composition, structure and function

BAM plots undertaken outside of the rehabilitation area show composition, structure, and function values that are consistent with their vegetation community. When compared to the analogue site (Plot B7), the plot undertaken in the rehabilitation site (Plot B3) contains a small number of trees within the smallest size categories (<5 cm, 5–9 cm and 10–19 cm), which is to be expected in rehabilitation areas, while the analogue site has trees present in all range categories (Table 3.5). The analogue site also has notably higher scores in the number of hollow trees present and the length of logs, not surprising given the greater number and size of trees present within the analogue site compared to the rehabilitation site, and the older age of the vegetation.

It should be noted that in the weeks preceding surveys, weed management efforts such as slashing, were conducted across the Quarry site. As Plot B3 contained a significant cover of exotic African Lovegrass, weed control in and around the plot has led to a substantial increase in litter score within the plot, because of dead weed matter on the ground.

The composition, structure and function of the rehabilitation area is expected to improve over time and with effective weed management, as native species establish ground cover and mid and over storey species progress into their respective ranges.

4.1.2 Weeds

The transmission line which traverses the study area and regeneration area, as well as Putty Road to a lesser extent, are likely to be source populations for weeds. Further disturbance within new areas of the study area is likely to encourage weeds to become established in those areas.

Plot B3 continues to present with the highest cover and abundance of exotic species. Monitoring within the plot recorded an exotic cover of 81% during the 2023 monitoring period, made up almost exclusively of African Lovegrass. Proximity to substantial earthworks and landform profiling in both Domain 4 and Domain 7 are likely to be the source of weed spread within the plot. While it is noted that weed control is ongoing and most recently occurred within the two weeks preceding monitoring surveys, if weeds are left unchecked in the rehabilitation area, they could intrude into the BOA and other areas of native vegetation, thereby negatively impacting the biodiversity values of these areas.

4.1.3 *Grevillea parviflora* subsp. *parviflora*

Year six (2023) plot monitoring indicates stem counts increased marginally in 2023 compared to 2022 results. Four monitoring sites (Sites G1, G3, G4 and G7) recorded increases in stem counts, while four sites (Sites G2, G5, G6 and G8) decreased in count, and one site (Site 9) remained static. Monitoring Site G1 presented the greatest increase in stem count from 2022, with an increase in 122 stems, while monitoring Site G2 had the largest decrease in stem count by 73 stems.

The NSW Office of Environment and Heritage (OEH) notes that ‘Plants are capable of suckering from a rootstock and most populations demonstrate a degree of vegetative spread, particularly after disturbance such as fire. This can make counts of individual genets in a population very difficult, and stem counts are usually an acceptable means of assessment for management purposes.’ (OEH, 2022c).

A marginal increase in the abundance of *Grevillea parviflora* subsp. *parviflora* across the Study Area indicates that the population is beginning to stabilise following the 2019 Gosper’s Mountain Wildfire and two years of above average rainfall. It should also be noted that several stems had significant growth, indicating that plant resources are being allocated towards individual stem growth rather than spread.

4.1.4 *Hibbertia puberula* subsp. *extensa*

Habitat assessment and survey for *Hibbertia puberula* subsp. *extensa* were conducted within areas identified by regional vegetation mapping (SVTM 1750) as PCT 3622 Sydney Hinterland Yellow Bloodwood Woodland. Although the species is known to be associated with this PCT (which falls within an area mapped as Hawkesbury Hornsby Plateau exposed woodland), the records within the Study Area occur within Mellong Sandmass Swamp Woodland, Sedgeland and Dry Woodland.

The areas assessed are likely to be unsuitable habitat for the species based on the slope and elevated drainage occurring in these areas.

4.2 Landscape Management Plan performance criteria

The approved LMP (RW Corkery & Co, 2022) details completion criteria and performance indicators for the rehabilitation area and the BOA. The below table (Table 4.1) details the matters reviewed during monitoring surveys within the rehabilitated areas.

Table 4.1 Completion criteria, performance indicators and monitoring strategy – rehabilitated areas

Objectives	Completion criteria	Performance measurement / indicator	Monitoring strategy	Comments
Ensure that the Quarry Site is safe, stable and non-polluting.	The final landform achieves the nominated design of the EIS or subsequent Rehabilitation Plan.	Completed to the satisfaction of the Secretary.	Survey following completion of landform establishment activities.	Not within the scope of this monitoring report.
	The size, depth, batter slopes and the drainage catchment of the final void are consistent with nominated design of the EIS or subsequent Rehabilitation Plan.			Not within the scope of this monitoring report.
	The surface area of the final voids is no greater than 16 ha in total.			Not within the scope of this monitoring report.
	Final voids are separated from the surface water drainage system unless the Secretary agrees otherwise.			Not within the scope of this monitoring report.
Restore ecosystem function, including maintaining or establishing self-sustaining ecosystems comprised of local native species and habitat, including at least 0.35 ha of Mellong Sandmass Sedgeland.	Revegetation within the Quarry Site is generally consistent with the vegetation communities displayed on Figure 8.	At least 75% of trees are healthy. At least 0.35 ha of Mellong Sandmass Sedgeland established within Quarry Site.	Monitoring undertaken as per Section 13.2 of the LMP.	Trees recorded within rehabilitated areas were observed growing and healthy; however, they would not be considered to have achieved 'sustained growth and development' (as specified in Section 11.3.2 of the LMP). Mellong Sandmass Sedgeland is not mapped within the current rehabilitation area, and as such, is not currently intended to be re-established within this area. This vegetation community is however, mapped within Domains 3 and 7.
Decommission and remove surface infrastructure (unless the Secretary agrees otherwise).	Infrastructure not required for future land use removed.	Completed to the satisfaction of the Secretary.	Survey of infrastructure to be completed.	Not within the scope of this monitoring report.

The below table (Table 4.2) details the matters reviewed during monitoring surveys within the BOA.

Table 4.2 Completion criteria, performance indicators and monitoring strategy – BOA

Objectives	Completion criteria	Performance measurement / indicator	Monitoring strategy	Comments
Establish and secure a BOA.	BOA dedicated to Yengo National Park.	Land secured for conservation.	Monitoring of Koala, <i>Grevillea parviflora</i> subsp. <i>parviflora</i> and nest boxes as per Sections 13.3, 13.4 and 13.5 of the LMP throughout the life of the Quarry.	Monitoring of Koalas was not undertaken during the 2023 survey period, as per the LMP. Monitoring of <i>Grevillea parviflora</i> subsp. <i>parviflora</i> was undertaken in the dedicated plots for this species. It is recommended that nest box monitoring commence during the 2024 survey period.
Maintain and where possible improve biodiversity values within the BOA.	Controlled access to the BOA achieved and maintained.	Unauthorised access to the BOA is prevented.	Monthly and quarterly inspections and/or weed control programs.	The BOA was observed to be fenced and signed, and with no obvious signs of vegetation trampling or damage via uncontrolled access.
	No significant weed infestation.	There is no weed infestation greater than exists within the analogue sites and there are no contiguous areas of weeds that are greater than 25 m ² in area.		Weeds were observed in low to moderate abundance along access tracks within the BOA. There is substantial weed cover in Plot B3 despite ongoing weed management within proximity to the Plot.
	Feral animal control.	Site does not harbour feral animals.	Monthly inspections.	Not within the scope of this monitoring report.

5 Recommendations

5.1 General recommendations

EMM recommends an integrated approach of multiple techniques conducted seasonally to control the African Lovegrass population within the Tinda Creek Quarry:

- priority of slashing/ mechanical removal and/or burning (if feasible) of African Lovegrass in winter to remove cover
- priority of follow-up spraying of existing African Lovegrass extent and new shoots/growth in cleared/ burned areas at the beginning of spring and into summer
- re-seeding of bare soil with a native grass or non-invasive cover crop to reduce lovegrass re-establishment in cleared areas
- repeat process yearly or as required to prevent establishment of new plants and remove new seeds from the growth cycle.

General year-round measures of helping to control the spread of African Lovegrass include:

- avoidance of vehicles and persons entering areas of lovegrass infestation, where practical
- where practicable, inspection for and cleaning of African Lovegrass seed/ foliage from vehicles and clothing if contact with lovegrass has occurred.

EMM recommends commencement of nest box monitoring during the 2024 survey period as per Section 13.5 of the LMP (RW Corkery & Co, 2022).

5.2 Specific actions in the rehabilitation area

The following recommendations have been made within the rehabilitation area:

- continued weed-control efforts combined with direct seeding to be implemented
- for direct seeding, species should be sourced from the native tree and shrub seed bank indicated in previous monitoring reports; if this is not available, they should be sourced from local provenance only
- weed control should target African Lovegrass, as this currently covers 80 percent of the area surveyed in Plot B3, and should follow the measures outlined in Section 9.3.2 of the LMP (RW Corkery & Co, 2022), which includes quarterly inspections
- weed control should utilise methods that minimise direct impact to native species, where possible.

5.3 Specific actions in the BOA

The following recommendations have been made within the BOA:

- Continued spot spraying of weeds on foot and by hand only, to minimise weed seed being spread by vehicles and avoid herbicide overspray killing native plants nearby. It is important that adjacent native plants remain alive to maintain competition against weed growth.
- Monitor weeds visually at least every three months and spray as necessary to prevent seed-set. Always assess the efficacy of the control method over time (e.g. if native plants are inadvertently killed and weed cover is not decreasing, cease weed control and reassess methods).
- Installation of plot markers to demarcate the boundaries all *Grevillea parviflora* subsp. *parviflora* plots. This will increase accuracy of stem counts and photo monitoring.

6 Conclusion

Year six of monitoring (2023) was completed by EMM during November 2023 by two suitably qualified ecologists. This report details the methodology and results of the year six monitoring period.

The data captured within this report demonstrates that the biodiversity values of the BOA are improving, with native species richness increasing since monitoring began, and weed numbers stable or declining. The quarry operations do not appear to be having an adverse impact on the BOA.

The rehabilitation area requires further action to establish vegetation communities to benchmark conditions. Weed cover within this area (i.e. Plot B3) remains high, and composition attributes such as tree numbers and leaf litter cover are below that of the analogue site. It is understood that weed management is being undertaken, with a particular focus on controlling African Lovegrass (*Eragrostis curvula*) present on the site. If these weeds are left unchecked, they could intrude into the BOA and other areas of native vegetation, thereby negatively impacting the biodiversity values of these areas.

The total number of *Grevillea parviflora* subsp. *parviflora* has increased marginally since the last monitoring period (2022). A marginal increase in the abundance of *Grevillea parviflora* subsp. *parviflora* across the Study Area indicates that the population is beginning to stabilise following the 2019 Gosper's Mountain Wildfire and two years of above average rainfall.

Survey for *Hibbertia puberula* subsp. *extensa* within areas previously identified as suitable habitat outside of the BOA did not identify any individuals within these areas. Habitat assessment concluded that, while containing vegetation associated with the species, these areas are unlikely to provide suitable habitat for *Hibbertia puberula* subsp. *extensa* due to terrain and increased drainage.

7 References

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Appendix A

BAM plot data

BAM Site – Field Survey Form

Plot ID:	P3	Date:	14/11/23	Project number:	E230940	Plot dimensions:	20x50
Datum:	GDA94	Easting:	286,505	Recorders:	NM JL		
Zone:	56	Northing:	6,328,100	IBRA region:		Midline bearing:	350
Plant Community Type:				Condition class:		PCT confidence:	
Vegetation Class:				EEC:		EEC confidence:	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	20
	Grasses etc.:	8
	Forbs:	7
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0.6
	Shrubs:	7.3
	Grasses etc.:	1.1
	Forbs:	0.7
	Ferns:	0
Other:	0.1	
High Threat Weed cover:		80.5

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	70	15	15	20	50
Average litter cover (%):	34				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

Parts recently undergone weed control for African lovegrass

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P3	Date:	14/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	<i>Cryptandra spinescens</i>	0.5	30		N
Shrub (SG)	<i>Grevillea mucronulata</i>	0.2	20		N
Shrub (SG)	<i>Persoonia oblongata</i>	1	10		N
	<i>Eragrostis curvula</i> (African Lovegrass)	80	2000		HTE
Forb (FG)	<i>Laxmannia gracilis</i> (Slender Wire Lily)	0.1	30		N
Forb (FG)	<i>Dianella revoluta</i> (Blueberry Lily)	0.1	10		N
Grass & grasslike (GG)	<i>Lepyrodia scariosa</i>	0.3	100		N
Grass & grasslike (GG)	<i>Lomandra longifolia</i> (Spiny-headed Mat-rush)	0.1	3		N
Shrub (SG)	<i>Hibbertia fasciculata</i>	0.1	10		N
Shrub (SG)	<i>Melichrus procumbens</i> (Jam Tarts)	0.1	5		N
Shrub (SG)	<i>Callistemon linearis</i> (Narrow-leaved Bottlebrush)	0.2	3		N
Shrub (SG)	<i>Leptospermum trinervium</i> (Slender Tea-tree)	3	20		N
Shrub (SG)	<i>Isopogon anemonifolius</i> (Broad-leaf Drumsticks)	0.1	1		N
	<i>Andropogon virginicus</i> (Whisky Grass)	0.5	200		HTE
Shrub (SG)	<i>Conospermum ericifolium</i>	0.1	1		N
Shrub (SG)	<i>Platysace ericoides</i>	0.1	40		N
Shrub (SG)	<i>Leucopogon</i> spp. (A Beard-heath)	0.1	5		N
Forb (FG)	<i>Dampiera stricta</i>	0.1	3		N
Tree (TG)	<i>Eucalyptus haemastoma</i> (Broad-leaved Scribbly Gum)	0.5	1		N
Grass & grasslike (GG)	<i>Eragrostis brownii</i> (Brown's Lovegrass)	0.1	10		N
Shrub (SG)	<i>Pimelea linifolia</i> (Slender Rice Flower)	0.1	20		N
Shrub (SG)	<i>Persoonia isophylla</i>	0.1	5		N
Shrub (SG)	<i>Brachyloma daphnoides</i> (Daphne Heath)	0.1	1		N
Shrub (SG)	<i>Leptospermum polygalifolium</i> (Tantoon)	1	5		N
Shrub (SG)	<i>Leptospermum juniperinum</i> (Prickly Tea-tree)	0.1	2		N
Forb (FG)	<i>Epaltes australis</i> (Spreading Nut-heads)	0.1	20		N
Forb (FG)	<i>Gonocarpus tetragynus</i> (Poverty Raspwort)	0.1	30		N
Shrub (SG)	<i>Melaleuca thymifolia</i> (Thyme Honey-myrtle)	0.1	1		N
Shrub (SG)	<i>Hibbertia puberula</i>	0.1	10		N
Grass & grasslike (GG)	<i>Entolasia stricta</i> (Wiry Panic)	0.2	30		N
Shrub (SG)	<i>Acacia ulicifolia</i> (Prickly Moses)	0.1	5		N
Grass & grasslike (GG)	<i>Themeda triandra</i>	0.1	20		N
Grass & grasslike (GG)	<i>Cyathochaeta diandra</i>	0.1	2		N
Other (OG)	<i>Billardiera scandens</i> (Hairy Apple Berry)	0.1	2		N
Shrub (SG)	<i>Bossiaea heterophylla</i> (Variable Bossiaea)	0.1	20		N
Forb (FG)	<i>Patersonia sericea</i> (Silky Purple-Flag)	0.1	5		N
Grass & grasslike (GG)	<i>Lomandra obliqua</i>	0.1	3		N
Tree (TG)	<i>Allocasuarina littoralis</i> (Black She-Oak)	0.1	1		N
Grass & grasslike (GG)	<i>Schoenus imberbis</i>	0.1	1		N
Forb (FG)	<i>Xanthosia atkinsoniana</i>	0.1	40		N

BAM Site – Field Survey Form

Plot ID:	P4	Date:	15/11/23	Project number:	E230940	Plot dimensions:	20x50	
Datum:	GDA94	Easting:	284,937	Recorders:	NM JL			
Zone:	56	Northing:	6,328,025	IBRA region:		Midline bearing:	325	
Plant Community Type:					Condition class:		PCT confidence:	
Vegetation Class:					EEC:		EEC confidence:	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	2
	Shrubs:	7
	Grasses etc.:	9
	Forbs:	5
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	5.1
	Shrubs:	5.9
	Grasses etc.:	72.8
	Forbs:	0.7
	Ferns:	0.1
Other:		0
High Threat Weed cover:		2.6

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	1	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	5	60	5	30	50
Average litter cover (%):	30				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P4	Date:	15/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	<i>Eucalyptus haemastoma</i> (Broad-leaved Scribbly Gum)	5	30		N
Forb (FG)	<i>Gonocarpus tetragynus</i> (Poverty Raspwort)	0.2	100		N
	<i>Eragrostis curvula</i> (African Lovegrass)	0.5	100		HTE
	<i>Andropogon virginicus</i> (Whisky Grass)	0.1	20		HTE
Grass & grasslike (GG)	<i>Aristida ramosa</i> (Purple Wiregrass)	20	400		N
Shrub (SG)	<i>Leptospermum polygallifolium</i> (Tantoon)	0.1	1		N
Grass & grasslike (GG)	<i>Aristida warburgii</i>	10	200		N
Tree (TG)	<i>Angophora bakeri</i> (Narrow-leaved Apple)	0.1	5		N
Grass & grasslike (GG)	<i>Lomandra longifolia</i> (Spiny-headed Mat-rush)	2	50		N
Forb (FG)	<i>Chrysocephalum apiculatum</i> (Common Everlasting)	0.2	50		N
	<i>Axonopus fissifolius</i> (Narrow-leaved Carpet Grass)	2	400		HTE
Shrub (SG)	<i>Melichrus procumbens</i> (Jam Tarts)	0.3	5		N
Fern (EG)	<i>Cheilanthes sieberi</i> (Rock Fern)	0.1	20		N
Grass & grasslike (GG)	<i>Lomandra glauca</i> (Pale Mat-rush)	0.5	200		N
Shrub (SG)	<i>Leptospermum trinervium</i> (Slender Tea-tree)	5	100		N
Forb (FG)	<i>Tricoryne elatior</i> (Yellow Autumn-lily)	0.1	1		N
	<i>Richardia</i> spp.	0.1	10		E
	<i>Hypochaeris radicata</i> (Catsear)	0.1	40		E
Grass & grasslike (GG)	<i>Cynodon dactylon</i> (Common Couch)	0.1	10		N
Shrub (SG)	<i>Brachyloma daphnoides</i> (Daphne Heath)	0.1	1		N
Shrub (SG)	<i>Cryptandra spinescens</i>	0.1	15		N
Forb (FG)	<i>Laxmannia gracilis</i> (Slender Wire Lily)	0.1	40		N
Grass & grasslike (GG)	<i>Aristida vagans</i> (Threawn Speargrass)	20	400		N
Grass & grasslike (GG)	<i>Lepyrodia scariosa</i>	0.1	10		N
Grass & grasslike (GG)	<i>Lepidosperma</i> spp.	0.1	10		N
Grass & grasslike (GG)	<i>Eragrostis brownii</i> (Brown's Lovegrass)	20	400		N
Shrub (SG)	<i>Persoonia oblongata</i>	0.1	1		N
Forb (FG)	<i>Stylidium graminifolium</i> (Grass Triggerplant)	0.1	1		N
	<i>Gamochoaeta calviceps</i> (Cudweed)	0.1	15		E
Shrub (SG)	<i>Dillwynia glaberrima</i>	0.2	2		N

BAM Site – Field Survey Form

Plot ID:	P5	Date:	15/11/23	Project number:	E230940	Plot dimensions:	20x50	
Datum:	GDA94	Easting:	285,025	Recorders:	NM JL			
Zone:	56	Northing:	6,327,993	IBRA region:		Midline bearing:	350	
Plant Community Type:					Condition class:		PCT confidence:	
Vegetation Class:					EEC:		EEC confidence:	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	6
	Shrubs:	12
	Grasses etc.:	14
	Forbs:	4
	Ferns:	0
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	12.8
	Shrubs:	36.6
	Grasses etc.:	59.2
	Forbs:	0.4
	Ferns:	0
Other:		0
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	1		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	20	30	10	50	20
Average litter cover (%):	26				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P5	Date:	15/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	<i>Eucalyptus haemastoma</i> (Broad-leaved Scribbly Gum)	0.3	15		N
Tree (TG)	<i>Acacia parramattensis</i> (Parramatta Wattle)	0.2	3		N
Shrub (SG)	<i>Exocarpos cupressiformis</i> (Cherry Ballart)	0.3	10		N
Shrub (SG)	<i>Leptospermum trinervium</i> (Slender Tea-tree)	30	400		N
Grass & grasslike (GG)	<i>Lomandra longifolia</i> (Spiny-headed Mat-rush)	5	100		N
Grass & grasslike (GG)	<i>Cyathochaeta diandra</i>	3	100		N
Shrub (SG)	<i>Persoonia oblongata</i>	0.1	3		N
	<i>Hypochaeris radicata</i> (Catsear)	0.1	1		E
Grass & grasslike (GG)	<i>Entolasia stricta</i> (Wiry Panic)	0.1	10		N
Grass & grasslike (GG)	<i>Rytidosperma</i> spp.	0.1	10		N
Grass & grasslike (GG)	<i>Aristida ramosa</i> (Purple Wiregrass)	10	500		N
Forb (FG)	<i>Gonocarpus tetragynus</i> (Poverty Raspwort)	0.1	50		N
Grass & grasslike (GG)	<i>Themeda triandra</i>	15	500		N
Shrub (SG)	<i>Leptospermum polygalifolium</i> (Tantoon)	5	100		N
Tree (TG)	<i>Angophora bakeri</i> (Narrow-leaved Apple)	0.1	2		N
Grass & grasslike (GG)	<i>Lomandra glauca</i> (Pale Mat-rush)	0.1	10		N
Shrub (SG)	<i>Melichrus procumbens</i> (Jam Tarts)	0.1	2		N
Grass & grasslike (GG)	<i>Lepyrodia scariosa</i>	0.5	100		N
Grass & grasslike (GG)	<i>Lepidosperma laterale</i> (Variable Sword-sedge)	0.1	5		N
Grass & grasslike (GG)	<i>Lomandra</i> spp. (Mat-rush)	0.1	1		N
Forb (FG)	<i>Laxmannia gracilis</i> (Slender Wire Lily)	0.1	15		N
Shrub (SG)	<i>Gompholobium</i> spp.	0.1	1		N
Shrub (SG)	<i>Conospermum ericifolium</i>	0.1	10		N
Forb (FG)	<i>Dianella revoluta</i> (Blueberry Lily)	0.1	3		N
Tree (TG)	<i>Banksia serrata</i> (Old-man Banksia)	0.1	1		N
Shrub (SG)	<i>Astraloma humifusum</i> (Native Cranberry)	0.1	1		N
Shrub (SG)	<i>Persoonia isophylla</i>	0.1	3		N
Tree (TG)	<i>Allocasuarina littoralis</i> (Black She-Oak)	0.1	2		N
Grass & grasslike (GG)	<i>Aristida vagans</i> (Threeawn Speargrass)	5	500		N
Shrub (SG)	<i>Platysace ericoides</i>	0.1	50		N
Shrub (SG)	<i>Cryptandra amara</i> (Bitter Cryptandra)	0.1	5		N
Shrub (SG)	<i>Leptospermum juniperinum</i> (Prickly Tea-tree)	0.5	20		N
Grass & grasslike (GG)	<i>Cynodon dactylon</i> (Common Couch)	0.1	3		N
Forb (FG)	<i>Patersonia sericea</i> (Silky Purple-Flag)	0.1	1		N
Grass & grasslike (GG)	<i>Lomandra obliqua</i>	0.1	2		N
Tree (TG)	<i>Eucalyptus punctata</i> (Grey Gum)	12	1		N
Grass & grasslike (GG)	<i>Aristida warburgii</i>	20	500		N

BAM Site – Field Survey Form

Plot ID:	P6	Date:	15/11/23	Project number:	E230940		
Datum:	GDA94	Easting:	286,214	Recorders:	NM JL	Plot dimensions:	20x50
Zone:	56	Northing:	6,328,526	IBRA region:		Midline bearing:	340
Plant Community Type:					Condition class:		PCT confidence:
Vegetation Class:					EEC:		EEC confidence:

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	6
	Shrubs:	7
	Grasses etc.:	9
	Forbs:	6
	Ferns:	3
	Other:	6
Sum of Cover of native vascular plants by growth form group	Trees:	23.2
	Shrubs:	2.8
	Grasses etc.:	31.7
	Forbs:	0.6
	Ferns:	1.2
Other:	0.7	
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	84
80 + cm:	2		
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	0
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	40	30	70	85	70
Average litter cover (%):	59				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ... 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P6	Date:	15/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	<i>Eucalyptus crebra</i> (Narrow-leaved Ironbark)	2	3		N
Tree (TG)	<i>Eucalyptus fibrosa</i> (Red Ironbark)	15	5		N
Tree (TG)	<i>Acacia parramattensis</i> (Parramatta Wattle)	5	20		N
Shrub (SG)	<i>Bursaria spinosa</i> (Native Blackthorn)	2	20		N
Grass & grasslike (GG)	<i>Imperata cylindrica</i> (Blady Grass)	20	1000		N
Grass & grasslike (GG)	<i>Entolasia</i> spp.	1	100		N
Grass & grasslike (GG)	<i>Microaena stipoides</i> (Weeping Grass)	10	300		N
Shrub (SG)	<i>Persoonia linearis</i> (Narrow-leaved Geebung)	0.1	5		N
Fern (EG)	<i>Pteridium esculentum</i> (Bracken)	1	50		N
Grass & grasslike (GG)	<i>Austrostipa</i> spp. (A Speargrass)	0.1	5		N
Shrub (SG)	<i>Polyscias sambucifolia</i> (Elderberry Panax)	0.3	10		N
Other (OG)	<i>Macrozamia communis</i> (Burrawang)	0.2	1		N
Tree (TG)	<i>Allocasuarina torulosa</i> (Forest Oak)	1	10		N
Other (OG)	<i>Glycine tabacina</i> (Variable Glycine)	0.1	30		N
Forb (FG)	<i>Dianella caerulea</i> (Blue Flax-lily)	0.1	1		N
Forb (FG)	<i>Dianella revoluta</i> (Blueberry Lily)	0.1	5		N
Shrub (SG)	<i>Acacia falcata</i>	0.1	1		N
Grass & grasslike (GG)	<i>Lomandra multiflora</i> subsp. <i>multiflora</i> (Many-flowered Mat-rush)	0.2	3		N
Forb (FG)	<i>Hydrocotyle laxiflora</i> (Stinking Pennywort)	0.1	2		N
Forb (FG)	<i>Dichondra repens</i> (Kidney Weed)	0.1	30		N
Fern (EG)	<i>Cheilanthes sieberi</i> (Rock Fern)	0.1	20		N
Grass & grasslike (GG)	<i>Entolasia marginata</i> (Bordered Panic)	0.1	30		N
Other (OG)	<i>Billardiera scandens</i> (Hairy Apple Berry)	0.1	2		N
Shrub (SG)	<i>Persoonia oblongata</i>	0.1	1		N
Fern (EG)	<i>Hypolepis muelleri</i> (Harsh Ground Fern)	0.1	2		N
Grass & grasslike (GG)	<i>Carex inversa</i> (Knob Sedge)	0.1	1		N
Shrub (SG)	<i>Acacia implexa</i> (Hickory Wattle)	0.1	3		N
Forb (FG)	<i>Lobelia purpurascens</i> (whiteroot)	0.1	20		N
Other (OG)	<i>Glycine clandestina</i> (Twining glycine)	0.1	20		N
Tree (TG)	<i>Angophora costata</i> (Sydney Red Gum)	0.1	1		N
Other (OG)	<i>Hardenbergia violacea</i> (False Sarsaparilla)	0.1	3		N
Grass & grasslike (GG)	<i>Rytidosperma</i> spp.	0.1	2		N
Grass & grasslike (GG)	<i>Lomandra cylindrica</i>	0.1	3		N
Other (OG)	<i>Clematis aristata</i> (Old Man's Beard)	0.1	2		N
Tree (TG)	<i>Eucalyptus eugenioides</i> (Thin-leaved Stringybark)	0.1	1		N
Forb (FG)	<i>Veronica plebeia</i> (Trailing Speedwell)	0.1	1		N
Shrub (SG)	<i>Daviesia ulicifolia</i> (Gorse Bitter Pea)	0.1	1		N

BAM Site – Field Survey Form

Plot ID:	P7	Date:	15/11/23	Project number:	E230940	Plot dimensions:	20x50	
Datum:	GDA94	Easting:	286,690	Recorders:	NM JL			
Zone:	56	Northing:	6,328,329	IBRA region:		Midline bearing:	0	
Plant Community Type:					Condition class:		PCT confidence:	
Vegetation Class:					EEC:		EEC confidence:	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	3
	Shrubs:	22
	Grasses etc.:	13
	Forbs:	7
	Ferns:	1
	Other:	0
Sum of Cover of native vascular plants by growth form group	Trees:	24
	Shrubs:	4.5
	Grasses etc.:	27.4
	Forbs:	1
	Ferns:	15
Other:	0	
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	4
80 + cm:	2		
50 – 79 cm:	1		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	4
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	70	40	50	20
Average litter cover (%):	48				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ... 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P7	Date:	15/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	<i>Eucalyptus haemastoma</i> (Broad-leaved Scribbly Gum)	10	3		N
Tree (TG)	<i>Angophora bakeri</i> (Narrow-leaved Apple)	7	8		N
Tree (TG)	<i>Banksia serrata</i> (Old-man Banksia)	7	40		N
Shrub (SG)	<i>Leptospermum trinervium</i> (Slender Tea-tree)	1	20		N
Shrub (SG)	<i>Banksia marginata</i> (Silver Banksia)	0.5	20		N
Shrub (SG)	<i>Acacia ulicifolia</i> (Prickly Moses)	0.1	20		N
Shrub (SG)	<i>Persoonia linearis</i> (Narrow-leaved Geebung)	0.2	10		N
Shrub (SG)	<i>Isopogon anemonifolius</i> (Broad-leaf Drumsticks)	0.1	5		N
Shrub (SG)	<i>Leptospermum juniperinum</i> (Prickly Tea-tree)	0.2	5		N
Shrub (SG)	<i>Hakea dactyloides</i> (Finger Hakea)	0.2	3		N
Shrub (SG)	<i>Persoonia levis</i> (Broad-leaved Geebung)	0.1	2		N
Shrub (SG)	<i>Persoonia lanceolata</i> (Lance Leaf Geebung)	0.1	2		N
Grass & grasslike (GG)	<i>Cyathochaeta diandra</i>	5	100		N
Fern (EG)	<i>Pteridium esculentum</i> (Bracken)	15	200		N
Shrub (SG)	<i>Melaleuca thymifolia</i> (Thyme Honey-myrtle)	0.2	20		N
Grass & grasslike (GG)	<i>Lepyrodia scariosa</i>	20	300		N
Forb (FG)	<i>Gonocarpus tetragynus</i> (Poverty Raspwort)	0.1	30		N
Grass & grasslike (GG)	<i>Entolasia stricta</i> (Wiry Panic)	0.5	100		N
Forb (FG)	<i>Dianella revoluta</i> (Blueberry Lily)	0.2	40		N
Grass & grasslike (GG)	<i>Lomandra filiformis</i> (Wattle Mat-rush)	0.1	5		N
Grass & grasslike (GG)	<i>Lomandra longifolia</i> (Spiny-headed Mat-rush)	0.5	20		N
Grass & grasslike (GG)	<i>Themeda triandra</i>	0.2	30		N
Shrub (SG)	<i>Cryptandra spinescens</i>	0.1	2		N
Grass & grasslike (GG)	<i>Eragrostis brownii</i> (Brown's Lovegrass)	0.2	50		N
Shrub (SG)	<i>Hibbertia fasciculata</i>	0.1	10		N
Forb (FG)	<i>Laxmannia gracilis</i> (Slender Wire Lily)	0.3	100		N
Shrub (SG)	<i>Platysace ericoides</i>	0.3	70		N
Shrub (SG)	<i>Dillwynia glaberrima</i>	0.1	5		N
Forb (FG)	<i>Dampiera stricta</i>	0.1	20		N
Shrub (SG)	<i>Melichrus procumbens</i> (Jam Tarts)	0.3	5		N
Shrub (SG)	<i>Leptospermum polygalifolium</i> (Tantoon)	0.1	1		N
Grass & grasslike (GG)	<i>Hypolaena fastigiata</i>	0.2	50		N
Shrub (SG)	<i>Grevillea parviflora</i>	0.2	30		N
Shrub (SG)	<i>Hibbertia puberula</i>	0.2	20		N
Forb (FG)	<i>Caesia parviflora</i> (Pale Grass-lily)	0.1	2		N
Grass & grasslike (GG)	<i>Lomandra glauca</i> (Pale Mat-rush)	0.1	30		N
Shrub (SG)	<i>Micromyrtus ciliata</i> (Fringed Heath-myrtle)	0.1	10		N
Grass & grasslike (GG)	<i>Panicum simile</i> (Two-colour Panic)	0.1	1		N
Grass & grasslike (GG)	<i>Aristida vagans</i> (Threeawn Speargrass)	0.2	30		N
Grass & grasslike (GG)	<i>Austrostipa</i> spp. (A Speargrass)	0.1	20		N
Shrub (SG)	<i>Pimelea linifolia</i> (Slender Rice Flower)	0.1	5		N

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P7	Date:	15/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	<i>Leucopogon</i> spp. (A Beard-heath)	0.1	2		N
Grass & grasslike (GG)	<i>Entolasia marginata</i> (Bordered Panic)	0.2	40		N
Forb (FG)	<i>Patersonia sericea</i> (Silky Purple-Flag)	0.1	2		N
Forb (FG)	<i>Stylidium graminifolium</i> (Grass Triggerplant)	0.1	2		N
Shrub (SG)	<i>Bossiaea heterophylla</i> (Variable Bossiaea)	0.1	3		N

BAM Site – Field Survey Form

Plot ID:	p8	Date:	14/11/23	Project number:	E230940	Plot dimensions:	20x50	
Datum:	GDA94	Easting:	286,754	Recorders:	NM JL			
Zone:	56	Northing:	6,327,889	IBRA region:		Midline bearing:	338	
Plant Community Type:					Condition class:		PCT confidence:	
Vegetation Class:					EEC:		EEC confidence:	

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	5
	Shrubs:	19
	Grasses etc.:	13
	Forbs:	9
	Ferns:	0
	Other:	4
Sum of Cover of native vascular plants by growth form group	Trees:	8.8
	Shrubs:	5.8
	Grasses etc.:	28.3
	Forbs:	0.9
	Ferns:	0
Other:	0.5	
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	50
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	1		
20 – 29 cm:	1	Tree hollow count	5
10 – 19 cm:	1		
5 – 9 cm:	1		
< 5 cm:	1		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	60	75	50	40	75
Average litter cover (%):	60				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ... 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	p8	Date:	14/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Tree (TG)	<i>Corymbia eximia</i> (Yellow Bloodwood)	5	10		N
Tree (TG)	<i>Eucalyptus punctata</i> (Grey Gum)	0.5	1		N
Tree (TG)	<i>Eucalyptus eugenioides</i> (Thin-leaved Stringybark)	3	20		N
Shrub (SG)	<i>Leptospermum trinervium</i> (Slender Tea-tree)	1	20		N
Shrub (SG)	<i>Acacia penninervis</i> (Mountain Hickory)	0.3	20		N
Shrub (SG)	<i>Leucopogon muticus</i> (Blunt Beard-heath)	0.5	20		N
Shrub (SG)	<i>Acacia parvipinnula</i> (Silver-stemmed Wattle)	0.3	5		N
Shrub (SG)	<i>Grevillea mucronulata</i>	1	50		N
Grass & grasslike (GG)	<i>Entolasia stricta</i> (Wiry Panic)	25	1000		N
Forb (FG)	<i>Pomax umbellata</i> (Pomax)	0.1	30		N
Grass & grasslike (GG)	<i>Aristida vagans</i> (Threawn Speargrass)	0.5	50		N
Grass & grasslike (GG)	<i>Eragrostis brownii</i> (Brown's Lovegrass)	0.3	50		N
Shrub (SG)	<i>Cryptandra spinescens</i>	0.2	40		N
Forb (FG)	<i>Stackhousia viminea</i> (Slender Stackhousia)	0.1	10		N
Shrub (SG)	<i>Platysace ericoides</i>	1	60		N
Shrub (SG)	<i>Phyllanthus hirtellus</i> (Thyme Spurge)	0.1	30		N
Forb (FG)	<i>Goodenia hederacea</i> (Ivy Goodenia)	0.1	2		N
Shrub (SG)	<i>Acacia ulicifolia</i> (Prickly Moses)	0.1	1		N
Grass & grasslike (GG)	<i>Dichelachne micrantha</i> (Shorthair Plumegrass)	0.1	10		N
Shrub (SG)	<i>Gompholobium grandiflorum</i> (Large Wedge Pea)	0.2	20		N
Grass & grasslike (GG)	<i>Cyathochaeta diandra</i>	0.5	30		N
Grass & grasslike (GG)	<i>Lomandra filiformis</i> (Wattle Matt-rush)	0.1	5		N
Grass & grasslike (GG)	<i>Austrostipa pubescens</i>	0.2	30		N
Other (OG)	<i>Cassytha pubescens</i> (Downy Dodder-laurel)	0.1	20		N
Grass & grasslike (GG)	<i>Themeda triandra</i>	1	100		N
Tree (TG)	<i>Corymbia gummifera</i> (Red Bloodwood)	0.2	3		N
Shrub (SG)	<i>Isopogon anemonifolius</i> (Broad-leaf Drumsticks)	0.2	10		N
Shrub (SG)	<i>Persoonia linearis</i> (Narrow-leaved Geebung)	0.2	20		N
Grass & grasslike (GG)	<i>Lomandra obliqua</i>	0.1	5		N
Forb (FG)	<i>Dianella revoluta</i> (Blueberry Lily)	0.1	5		N
Shrub (SG)	<i>Podolobium ilicifolium</i> (Prickly Shaggy Pea)	0.1	10		N
Grass & grasslike (GG)	<i>Lepidosperma laterale</i> (Variable Sword-sedge)	0.1	5		N
Grass & grasslike (GG)	<i>Lomandra multiflora</i> subsp. <i>multiflora</i> (Many-flowered Mat-rush)	0.1	2		N
Other (OG)	<i>Billardiera scandens</i> (Hairy Apple Berry)	0.1	10		N
Shrub (SG)	<i>Acacia terminalis</i> (Sunshine Wattle)	0.1	5		N
Forb (FG)	<i>Opercularia diphylla</i> (Stinkweed)	0.1	2		N
Forb (FG)	<i>Scaevola ramosissima</i> (Purple Fan-flower)	0.1	5		N
Forb (FG)	<i>Gonocarpus tetragynus</i> (Poverty Raspwort)	0.1	10		N
Shrub (SG)	<i>Exocarpos cupressiformis</i> (Cherry Ballart)	0.1	5		N
Shrub (SG)	<i>Melichrus procumbens</i> (Jam Tarts)	0.1	20		N
Forb (FG)	<i>Lagenifera stipitata</i> (Blue Bottle-daisy)	0.1	30		N

Project name:	E230940				
Recorders:	NM JL	Plot ID:	p8	Date:	14/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Shrub (SG)	<i>Leucopogon</i> spp. (A Beard-heath)	0.1	1		N
Grass & grasslike (GG)	<i>Lomandra longifolia</i> (Spiny-headed Mat-rush)	0.1	2		N
Other (OG)	<i>Xanthorrhoea</i> spp.	0.2	2		N
Grass & grasslike (GG)	<i>Anisopogon avenaceus</i> (Oat Speargrass)	0.2	2		N
Shrub (SG)	<i>Hibbertia acicularis</i>	0.1	1		N
Shrub (SG)	<i>Persoonia oblongata</i>	0.1	1		N
Other (OG)	<i>Hardenbergia violacea</i> (False Sarsaparilla)	0.1	10		N
Forb (FG)	<i>Patersonia sericea</i> (Silky Purple-Flag)	0.1	2		N
Tree (TG)	<i>Banksia serrata</i> (Old-man Banksia)	0.1	1		N

BAM Site – Field Survey Form

Plot ID:	P9	Date:	14/11/23	Project number:	E230940		
Datum:	GDA94	Easting:	286,672	Recorders:	NM JL	Plot dimensions:	20x50
Zone:	56	Northing:	6,327,399	IBRA region:		Midline bearing:	150
Plant Community Type:					Condition class:		PCT confidence:
Vegetation Class:					EEC:		EEC confidence:

Record easting and northing at 0 m on midline. Dimensions (Shape) of 0.04 ha base plot.

BAM Attribute (400 m2 plot)		Sum values
Count of Native Richness	Trees:	0
	Shrubs:	7
	Grasses etc.:	10
	Forbs:	5
	Ferns:	0
	Other:	1
Sum of Cover of native vascular plants by growth form group	Trees:	0
	Shrubs:	0.7
	Grasses etc.:	108
	Forbs:	0.9
	Ferns:	0
	Other:	0.7
High Threat Weed cover:		0

BAM Attribute (1000 m2 plot) DBH			
DBH	Tree stem count	Length of logs (m) (≥10 cm diameter, >50 cm in length)	0
80 + cm:	0		
50 – 79 cm:	0		
30 – 49 cm:	0		
20 – 29 cm:	0	Tree hollow count	0
10 – 19 cm:	0		
5 – 9 cm:	0		
< 5 cm:	0		

Counts apply when no. of tree stems within a size class is ≤ 10. Estimates can be used when > 10 (eg. 10, 20, 30..., 100, 200, 300...). For multi-stemmed tree, only largest living stem is included in the count. Tree stems must be living.

For hollows, count only the presence of a stem containing hollows. For a multi-stemmed tree, only the largest stem is included in the count/estimate. Stems may be dead and may be shrubs.

BAM Attribute (1 x 1 m plots)	Litter cover (%)				
Subplot:	1	2	3	4	5
Subplot score (%):	0	0	0	0	0
Average litter cover (%):	0				

Litter cover is assessed as the average percentage ground cover of litter recorded from five 1 m x 1 m plots centred at 5, 15, 25, 35, 45 m along the plot midline. Litter cover includes leaves, seeds, twigs, branchlets and branches (less than 10 cm in diameter). Assessors may also record the cover of rock, bare ground and cryptogams.

Physiography and site features

Plot Disturbance

GF Code: see Growth Form definitions in Appendix 1; N: native, E: exotic, HTE: high threat exotic; GF – circle code if 'top 3'; Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover)
 Note: 0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m
 Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

Project name:	E230940				
Recorders:	NM JL	Plot ID:	P9	Date:	14/11/23

GF Code	Scientific name	Cover	Abundance	Voucher	N, E or HTE
Grass & grasslike (GG)	<i>Lepidosperma limicola</i>	5	30		N
Grass & grasslike (GG)	<i>Chorizandra cymbaria</i>	60	2000		N
Forb (FG)	<i>Gonacarpus micranthus</i>	0.3	500		N
Grass & grasslike (GG)	<i>Deyeuxia</i> spp. (A Bent Grass)	0.1	50		N
Grass & grasslike (GG)	<i>Lepyrodia</i> spp.	30	2000		N
Grass & grasslike (GG)	<i>Baumea teretifolia</i>	0.5	50		N
Grass & grasslike (GG)	<i>Entolasia stricta</i> (Wiry Panic)	0.1	100		N
Shrub (SG)	<i>Callistemon citrinus</i> (Crimson Bottlebrush)	0.1	5		N
Forb (FG)	<i>Hydrocotyle</i> spp.	0.1	30		N
Grass & grasslike (GG)	<i>Themeda triandra</i>	0.2	100		N
Forb (FG)	<i>Hypericum gramineum</i> (Small St John's Wort)	0.1	40		N
Shrub (SG)	<i>Melaleuca thymifolia</i> (Thyme Honey-myrtle)	0.1	2		N
Other (OG)	<i>Xanthorrhoea media</i>	0.7	6		N
Forb (FG)	<i>Utricularia dichotoma</i> (Fairy Aprons)	0.1	10		N
Forb (FG)	<i>Goodenia paniculata</i>	0.3	100		N
Shrub (SG)	<i>Leptospermum juniperinum</i> (Prickly Tea-tree)	0.1	2		N
Grass & grasslike (GG)	<i>Schoenus brevifolius</i>	2	100		N
Shrub (SG)	<i>Leucopogon</i> spp. (A Beard-heath)	0.1	1		N
Shrub (SG)	<i>Almaleea paludosa</i>	0.1	2		N
Grass & grasslike (GG)	<i>Baumea rubiginosa</i>	0.1	5		N
Shrub (SG)	<i>Persoonia oblongata</i>	0.1	1		N
Grass & grasslike (GG)	<i>Lepyrodia anarthria</i>	10	500		N
Shrub (SG)	<i>Leptospermum polygalifolium</i> (Tantoon)	0.1	1		N

Appendix B

BAM plot photo point monitoring

B.1 BAM plot photo point monitoring



Plot B1



Plot B2



Plot B3



Plot B4



Plot B5



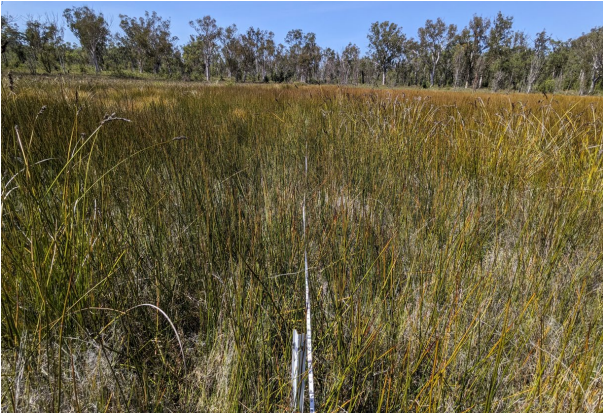
Plot B6



Plot B7



Plot B8



Plot B9

Appendix C

Grevillea parviflora subsp. *parviflora* photo point
monitoring

C.1 *Grevillea parviflora* subsp. *parviflora* photo point monitoring



Grevillea Plot 1



Grevillea Plot 2



Grevillea Plot 3



Grevillea Plot 4



Grevillea Plot 5



Grevillea Plot 6



Grevillea Plot 7



Grevillea Plot 8

Grevillea Plot 9

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Appendix 5

Aquatic Monitoring Report Spring 2023

Prepared by Niche Environment
and Heritage Pty Ltd

(Total No. of pages including blank pages = 33)

Excellence in your environment



Aquatic Monitoring Report

Spring 2023

Prepared for Tinda Creek Quarry Pty Ltd | 31 January 2024



Document control

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8242	Hy-Tech	David Wilkinson	Lithgow

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Executive summary

An aquatic monitoring program was established as a requirement of the Landscape Management Plan (LMP) for the Tinda Creek Quarry. The program involves survey and analytical methods for measuring macroinvertebrates, stream health, water quality and catchment-riparian conditions.

The aim of the monitoring program is to monitor the river health of Tinda Creek and its tributaries. The monitoring includes:

- Assessment of habitat condition using Australian River Assessment System (AUSRIVAS) proforma recording forms
- Assessment of water quality against default ANZG trigger values
- Assessment of the macroinvertebrate community condition using Stream Invertebrate Grade Number Average Level (SIGNAL2) and AUSRIVAS.

In comparison to the relatively wet sampling season of 2022, many sites were dry in spring 2023, receiving fewer major rain events throughout the year. Aquatic environments downstream of Tinda Creek Quarry infrastructure were found to have a good level of riparian growth, having continued to recover from the 2019-2020 bushfire events, as well as stable channel morphology.

The macroinvertebrate communities recorded generally poor SIGNAL2 and poor to moderate AUSRIVAS results, however these results were comparable between the test sites and reference sites. All sites recorded results lower than in spring 2022, however these results are comparable to those previously recorded as part of the program.

The overall stream health results recorded at test Site 6 comparable to those recorded at the reference sites. As such, no impacts to aquatic systems associated with the operation of the Tinda Creek Quarry are identified in the spring 2023 data. The streams are likely being influenced by natural stress associated with intermittent/ephemeral streams and reflect conditions experienced within the locality, not impacts associated with the operation of the Tinda Creek Quarry.

Table of Contents

Executive summary	i
Table of Contents	ii
Glossary and abbreviations	4
1. Introduction	5
1.1 Background	5
1.2 Catchment characteristics	5
1.3 Aim.....	5
2. Methods	6
2.1 Location of monitoring sites	6
2.2 Field methods	9
2.3 Data analysis.....	12
3. Results	13
3.1 Weather conditions	13
3.2 Aquatic habitat/condition	13
3.3 Water quality	22
3.4 Macroinvertebrates.....	22
4. Discussion	25
4.1 Water quality.....	25
4.2 SIGNAL2 scores and macroinvertebrate communities.....	25
5. Conclusion	26
6. References	27
Annex 1. Macroinvertebrate survey results	29

List of Figures

Figure 1: Location of monitoring sites.....	8
Figure 2: Rainfall data for January-November 2023 (station no. 061211).....	13

List of Plates

Plate 1: Sampling method	11
Plate 2: Site 1	14
Plate 3: Site 2	15

Plate 4: Site 3	15
Plate 5: Site 4	17
Plate 6: Site 5	18
Plate 7: Site 6	19
Plate 8: Site 7	20
Plate 9: Site 8	21

List of Tables

Table 1: Location of monitoring sites	6
Table 2: Summary of methods at each site	9
Table 3: SIGNAL grade and the level of pollution tolerance for individual taxa	12
Table 4: Guide to interpreting the SIGNAL2 scores.....	12
Table 5: Bi-plot interpretation.....	12
Table 7: Site 1 habitat results	13
Table 8: Site 2 habitat results	14
Table 9: Site 3 habitat results	15
Table 10: Site 4 habitat results	17
Table 11: Site 5 habitat results	18
Table 12: Site 6 habitat results	19
Table 13: Site 7 habitat results	20
Table 14: Site 8 habitat results	21
Table 15: Water quality results	22
Table 16: Macroinvertebrate results.....	22
Table 17: Weighted SIGNAL2 scores (2015, 2018, 2019, 2020, 2021, 2022 and 2023)	24
Table 18: AUSRIVAS (2018 - 2023)	24
Table 19: Macroinvertebrate survey results in spring 2023.....	29

Glossary and abbreviations

ANZECC	Australian and New Zealand Environment and Conservation Council.
ANZG	Australian and New Zealand Guidelines (ANZG) for Fresh and Marine Water Quality.
Anthropogenic	Caused or produced by humans.
Aquatic macroinvertebrates	Animals that have no backbone, are visible with the naked eye and spend all or part of their life in water.
AUSRIVAS	Australian Rivers Assessment System.
Drainage	Natural or artificial means for the interception and removal of surface or subsurface water.
DTVs	Default Trigger Values.
Ecology	The study of the relationship between living things and the environment.
Ephemeral	Existing for a short amount of time.
Habitat	The place where a species, population or ecological community lives (whether permanently, periodically or occasionally).
LMP	Landscape Management Plan.
Riparian	Relating to the banks of a natural waterway.
SIGNAL2	Stream Invertebrate Grade Number Average Level. SIGNAL2 scores are indicative only and pollution does not refer to just anthropogenic sources. Environmental stress may result in poor water quality occurring naturally in waterways such as those conditions found in ephemeral streams. Low family richness and the occurrence of pollution tolerant invertebrates can give a low SIGNAL score even though they are a natural condition.
Stress	Response to a stressor such as an environmental condition or a stimulus.

1. Introduction

1.1 Background

As part of the Tinda Creek Quarry Landscape Management Plan (LMP), a macroinvertebrate monitoring program within the Tinda Creek system and its tributaries was established to monitor changes to the system over time and assess possible influence from Quarry operations. The program includes methods for assessing stream health through the monitoring of macroinvertebrates, water quality and catchment-riparian conditions.

A baseline survey and assessment of eight sites was conducted in August 2007 shortly after a period of heavy rainfall and runoff. Following the 2015 approval for expansion of the Quarry, another survey was conducted in November 2015 to update the baseline data. Hy-Tec has committed to annual monitoring under the approved LMP. Niche were engaged to conduct aquatic monitoring in spring 2018, 2019, 2020, 2021, 2022 and 2023.

1.2 Catchment characteristics

The aquatic habitats surrounding the Tinda Creek Quarry include:

- Tinda Creek, a tributary of Wollemi Creek which joins the Colo River approximately 16 km to the west of the project area
- Ephemeral drainage lines that flow to Tinda Creek
- Artificially created diversion channels
- Farm dam sites.

Tinda Creek is an ephemeral/intermittent stream which flows to the west, away from the Quarry grounds. It has been diverted around the eastern and northern boundaries of the current operation zone via small earth drainage channels.

Tinda Creek is met by ephemeral second order drainage lines on the northern boundary of the Quarry. These lines do not hold water due to the substrate having a high concentration of sand and silt, and as such, are usually dry due to the high permeability of the sandy substrate.

Two small former farm dams are located within the property to the north of the Quarry. These dams have been overgrown with vegetation in recent monitoring periods, however, have been cleared to some extent due to the recent bushfires and are currently regenerating.

1.3 Aim

The aim of the aquatic monitoring program is to assess the health of Tinda Creek and its tributaries to ensure that the expanded quarry operations do not result in adverse impacts to the health of the downstream creek system. Specifically, in regard to aquatic environment and aquatic habitat health of the Greater Blue Mountains World Heritage Area. The monitoring includes:

- Assessment of habitat condition using AUSRIVAS
- Assessment of water quality against default ANZECC trigger values
- Assessment of the macroinvertebrate community condition using SIGNAL2 and AUSRIVAS.

2. Methods

2.1 Location of monitoring sites

A total of eight sites were surveyed along the Tinda Creek system and its tributaries (Figure 1, Table 1) consistent with the baseline monitoring conducted in 2015 and monitoring in 2018-2023. This included sites upstream and sites downstream of operations of the Quarry and therefore provides both reference and test sites for monitoring.

Table 1: Location of monitoring sites

Site	Stream	Location	Easting	Northing
Reference sites				
Site 1	Tinda Creek	Tinda Creek Upstream of Quarry	286599	6327354
Site 2	Tinda Creek	Tinda Creek Upstream of Quarry	286400	6328390
Site 5	Tributary of Tinda Creek	Tinda Creek Tributary	284913	6328247
Site 8	Tributary of Tinda Creek	Tinda Creek tributary (outside of Quarry influence)	284476	6329656
Test sites				
Site 3	Tinda Creek Diversion Channel	Tinda Creek Diversion channel within Quarry	286405	6327957
Site 4	Tinda Creek	Tinda Creek Downstream of Quarry	285711	6328427
Site 6	Tinda Creek	Tinda Creek downstream of Quarry	284048	6328633
Site 7	Tinda Creek	Tinda Creek downstream of Quarry	282998	6328847

2.1.1 Site 1 – Tinda Creek, Upstream of Quarry

Site 1 is situated on the upper reaches of Tinda Creek, upstream and to the southeast of Quarry activities. In this location, Tinda Creek lacks a defined drainage channel, being characterised by an open, sandy floodplain. As Site 1 is located upstream of the quarry, it is monitored as a reference site.

2.1.2 Site 2 – Tinda Creek, Upstream of Quarry

Site 2 is located upstream and to the north of the Quarry and is downstream of a former farm dam. Site 2 is located on a section of an upper tributary of Tinda Creek formed as a constructed drainage channel with an open floodplain. As Site 2 is located upstream of the Quarry, it is monitored as a reference site.

2.1.3 Site 3 – Tinda Creek Quarry – Clean Water Diversion

Site 3 is situated along a clean water diversion channel that was constructed to divert overland flows around the eastern edge of the Quarry and to the north towards Tinda Creek. The diversion channel is generally less than 2 m in width. As a constructed diversion channel, Site 3 is included in the program as a test site.

2.1.4 Site 4 – Downstream of the Quarry

Site 4 is located downstream of the Quarry along a section of Tinda Creek that occurs just upstream of a small former farm dam. Tinda Creek at Site 4 comprises a defined drainage channel which supports a number of small, isolated pools. As Site 4 is situated downstream of the Quarry, it is monitored as a test site.

2.1.5 Site 5 – Tinda Creek Tributary

Site 5 comprises a tributary of Tinda Creek that runs generally parallel to the eastern side of Putty Road and joins Tinda Creek just upstream of the road culvert. The tributary at this site comprises a series of wide pools interspersed with narrower sections. Site 5 is monitored as a reference site.

2.1.6 Site 6 – Tinda Creek, West of Putty Road

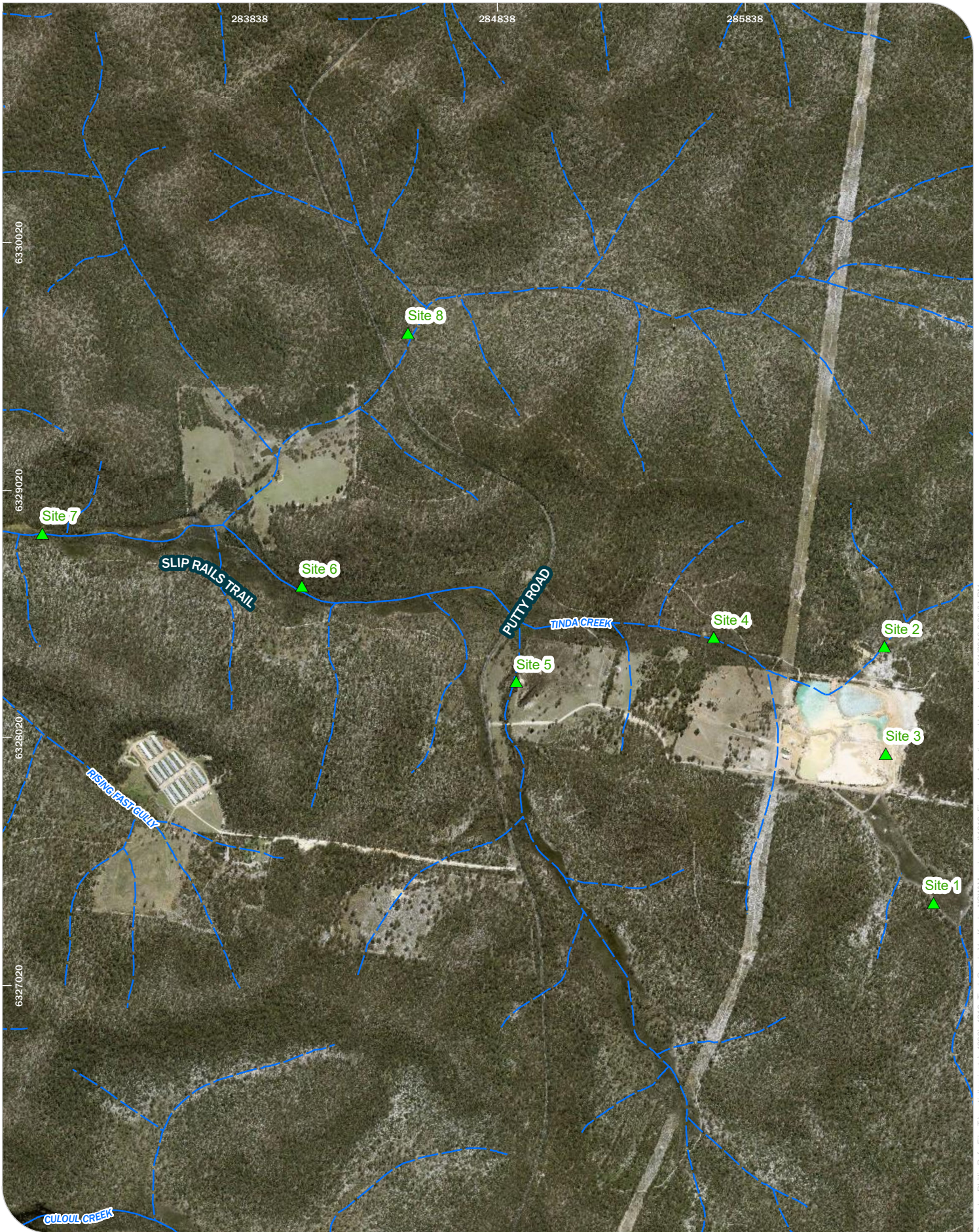
Site 6 is situated on Tinda Creek, approximately 0.75 km downstream of Putty Road. Site 6 comprises a shallow channel with broad floodplain. As Site 6 is downstream of the quarry, it is monitored as a test site.

2.1.7 Site 7 – Tinda Creek, Far West of Putty Road

Site 7 is positioned along Tinda Creek, approximately 2 km downstream of Putty Road. Site 7 comprises a broad, open channel. As Site 7 is downstream of the Quarry, it is monitored as a test site.

2.1.8 Site 8 – Tinda Creek Tributary, North West of the Quarry

Site 8 is located upstream of Putty Road within a tributary of Tinda Creek to the north of the Quarry that is not influenced by Quarry operations. The site is directly above the culvert under Putty Road and comprises a broad open channel. Given that Site 8 occurs in a tributary that could not be affected by the quarry operations it is monitored as a reference site.



Drawn by: Philip Role File: T:\spatial\projects\aa4200\aa4216_TindaCreek_VegKoala_NSWM\Map\reportM4216_Figure_1_Aquatic.mxd Last updated: 3/1/2019 3:38:34 PM

2.2 Field methods

The field survey was undertaken on the 1 November 2023 by David Wilkinson (Aquatic Ecology Consultant) and Luke Stone (Principle – Aquatic Ecology) of Niche. Field methods were consistent with standardised techniques for field sampling as prescribed by AUSRIVAS (Turak *et al.* 2004) and previous monitoring surveys. The AUSRIVAS methods of sampling both pools and riffles has been modified for this program, as no suitable in-stream riffle features were present.

A summary of the survey methods used at each of the eight sites is provided in Table 2. The application of some methods were limited at some of the sites as the sites were dry at the time of the survey and these are identified below.

Table 2: Summary of methods at each site

Site	Macroinvertebrate sampling	AUSRIVAS habitat assessment	Photo monitoring
Reference site			
Site 1	-	-	X
Site 2	-	-	X
Site 5	X	X	X
Site 8	X	X	X
Test site			
Site 3	-	-	X
Site 4	X	X	X
Site 6	X	X	X
Site 7	X	X	X

2.2.1 Aquatic habitat and stream condition

Riparian, Channel and Environment inventory assessment (RCE)

Niche reviews monitoring methods employed in the program on an annual basis. Following this review, it was identified that the RCE visual assessment previously completed (Niche 2023) along with the AUSRIVAS proforma, provides limited value to the overall assessment due to the highly specific landscape setting, and the limited relevance of the scoring system to the waterways of relevance to the program, and pathways of potential impact. The AUSRIVAS proforma provides a robust and more suitable basis for the visual assessment of site condition and continues to form the basis of this component of the program.

Habitat description

A description of aquatic habitat was also produced using the AUSRIVAS proforma. The survey is a rapid visual assessment used to describe the habitat based on the following parameters:

- Geomorphology
- Channel diversity
- Bank stability
- Riparian vegetation and adjacent land use
- Water quality
- Macrophytes
- Local impacts and land use practices.

Macro-invertebrate sampling

Macro-invertebrate sampling was to be undertaken at sites 4-8 in accordance with AUSRIVAS protocol (Turak et al., 2004), where possible. This is due to the fact that sites 1-3 do not typically hold sufficient water to allow for sampling. The lack of sufficient water in these sites is a result of the ephemeral nature of the streams in the project area and the sandy substrate.

2.2.2 Water quality

Surface water quality was measured *in situ* using a Yeokal 618 water quality probe at each site. The following variables were recorded:

- Temperature (°C)
- Conductivity (µS/cm)
- pH
- Dissolved oxygen (DO) (% saturation and mg/L)
- Turbidity (NTU).

Alkalinity (mg CaCO₃/L) was measured with a standard titration kit. Water quality data were compared with the Australian and New Zealand Guidelines (ANZG) for Fresh and Marine Water Quality Default Trigger Values (DTVs) for the region as a benchmark for comparison for the program. Currently, no updated ANZG DTVs for the region have been provided. As such the DTVs applied in this report are the ANZECC (2000) physical and chemical stressors for protection of slightly upland aquatic ecosystems in South-Eastern Australia default guideline values. This is consistent with previous iterations of the monitoring program.

2.2.3 Macroinvertebrates

Samples of macroinvertebrates were collected from pool edges for a length of 10 metres, either as a continuous line or in disconnected segments. Sampling in segments was often undertaken to ensure the sampling of sub-habitats such as macrophyte beds, bank overhangs, submerged branches and root mats. Segmented sampling was also employed where pool length was short and it was logistically difficult to sample in a continuous line (e.g. in-stream logs). A 250 µm dip net was drawn through the water with short sweeps towards the bank to dislodge benthic fauna while scraping submerged rocks and debris, sides of the stream bank and the bed substrate (Plate 1). Further sweeps in the water column targeted the suspended fauna.



Plate 1: Sampling method

Each sample was rinsed from the net onto a white sorting tray from which macroinvertebrates were picked using forceps, pipettes and or paint brushes. Each tray was picked for a minimum period of 40 minutes, after which they were picked at 10 minute intervals for either a total of one hour or until no new specimens had been found. Care was taken to collect cryptic and fast moving animals, in addition to those that were conspicuous or slow. The animals collected at each site were placed into a labelled jar containing 70% ethanol.

Laboratory methods-invertebrate identification

Macroinvertebrate samples were identified to family level with the exception of Oligochaeta (to class), Polychaeta (to class), Ostracoda (to subclass), Nematoda (to phylum), Nemertea (to phylum), Acarina (to order) and Chironomidae (to subfamily). Keys used to identify taxa included:

- Centre for Freshwater Ecosystems (n.d.) – Identification Key and Ecology of Australian Freshwater Invertebrates. <http://www.mdfrc.org.au/bugguide/>.
- Dean, J., Rosalind, M., St Clair, M., and Cartwright, D. (2004) Identification keys to Australian families and genera of caddis-fly larvae (Trichoptera) Cooperative Research Centre for Freshwater Ecology.
- Gooderham, J. and Tsyrlin, E. (2002) The Waterbug Book: A guide to the Freshwater Macroinvertebrates of Temperate Australia, CSIRO Publishing.
- Hawking and Theischinger (1999) A guide to the identification of larvae of Australian families and to the identification of ecology of larvae from NSW.
- Madden, C. (2010) Key to genera of Australian Chironomidae. Museum Victoria Science Reports 12, 1-31.
- Madden, C. (2011) Draft identification key to families of Diptera larvae of Australian inland waters La Trobe University.
- Smith, B. (1996) Identification keys to the families and genera of bivalve and gastropod molluscs found in Australian inland waters Murray Darling Freshwater Research Centre.

2.3 Data analysis

2.3.1 SIGNAL2: (Stream Invertebrate Grade Number Average Level) scores

The revised SIGNAL2 biotic index developed by Chessman (2003a and 2003b) was used to determine the “environmental quality” of sites. This method assigns grade numbers to each macroinvertebrate family or taxa found, based largely on their response to a range of environmental conditions (Table 3). The sum of all grade numbers for that habitat is then divided by the total number of families recorded in each habitat to calculate the SIGNAL2 index.

Table 3: SIGNAL grade and the level of pollution tolerance for individual taxa

SIGNAL grade	Pollution tolerance
10-8	Indicates a greater sensitivity to pollution
7-5	Indicates a sensitivity to pollution
4-3	Indicates a tolerance to pollution
2-1	Indicates a greater tolerance to pollution

Table 4 provides a broad guide for interpreting the health of the site according to the SIGNAL2 score of the site. A weighted SIGNAL2 score was also calculated (see Chessman 2003b). The SIGNAL2 index therefore uses the average sensitivity of macroinvertebrate families to present a snapshot of biotic integrity at a site. The number of taxa and weighted SIGNAL scores were used to create a bi plot using categories provided in Table 5.

Table 4: Guide to interpreting the SIGNAL2 scores

SIGNAL2 score	Habitat quality
Greater than 6	Healthy habitat
Between 5 and 6	Mild pollution
Between 4 and 5	Moderate pollution
Less than 4	Severe pollution

(Source: Gooderham and Tsyrlin 2002)

*Note that SIGNAL2 scores are indicative only and that pollution does not refer to just anthropogenic pollution. Environmental stress may result in poor water quality occurring naturally in waterways. Low family richness and the occurrence of pollution tolerant invertebrates can give a low SIGNAL score even when they are in natural condition.

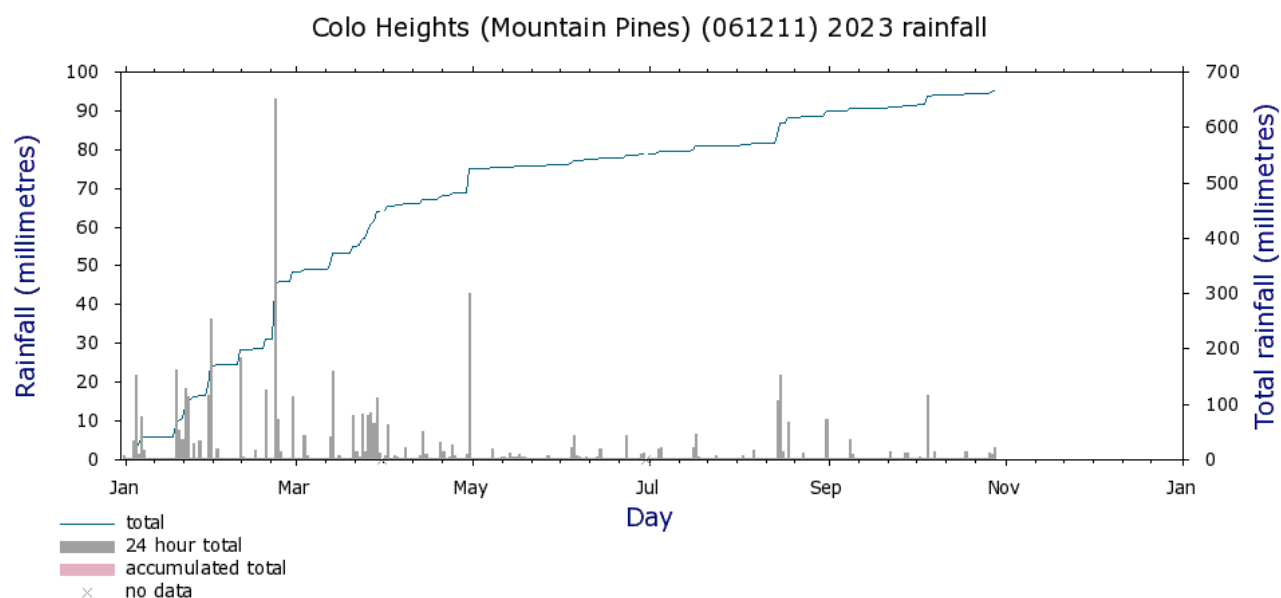
Table 5: Bi-plot interpretation

Bi plot category	SIGNAL2	Number of taxa
Toxic pollution, harsh physical conditions	>5	<17
Urban Industrial or agricultural pollution	<5	<17
High salinity or nutrients	<5	>17
Favourable habitat	>5	>17

3. Results

3.1 Weather conditions

The survey was conducted on the 1 November 2023, with a low level of rainfall leading up to the survey date (Figure 2). In the 10 days preceding the survey, a total of 5.4 mm of rain was recorded. The total rainfall recorded in October was 25.6 mm, which is less than half of the median for October for the Colo Heights (Mountain Pines) station of 61.8 mm (1962 – 2023). These drier than average conditions were reflected in the levels of water present within the study area, with only 3 sites holding water during the spring 2023 sampling survey.



Note: Data may not have completed quality control.

Climate Data Online, Bureau of Meteorology
Copyright Commonwealth of Australia, 2023

Figure 2: Rainfall data for January-November 2023 (station no. 061211)



3.2 Aquatic habitat/condition

3.2.1 Site 1 Tinda Creek upstream of the Quarry (reference)

The key aquatic habitat features at Site 1 (Plate 2) at the time of the spring 2023 monitoring surveys are described in Table 7.

Table 6: Site 1 habitat results

Criteria	Attribute	Site 1
Riparian	Vegetation	Canopy absent. Scattered Parramatta Red Gum (<i>Eucalyptus parramattensis</i>) regenerating within this location. Mid-story absent. Groundcover dominated by sedge, low shrub, herb and grasses including <i>Leptocarpus tenax</i> ; <i>Juncus</i> sp.; <i>Lepyrodia scariosa</i> ; <i>Schoenus brevifolius</i> ; <i>Entolasia stricta</i> ; <i>Gonocarpus micranthus</i> ; <i>Melaleuca thymifolia</i> ; <i>Micromyrtus ciliata</i> and <i>Dampiera stricta</i> .
	Stream shading	Low <5%.
	Exotic vegetation	-
Stream characteristics	Width (m)	<1 m.
	Substrate	Majority sand and silt.
	Flow/depth	Dry
	Macrophytes/algae	Macrophytes present

Criteria	Attribute	Site 1
	Water quality observations	Dry
Comments		Very shallow and generally narrow channel form (<1 m). Open sandy floodplain with the flow channel identified by the change in vegetation, indicating the more permanent presence of surface water or subsurface flow.
Plate 2: Site 1	Downstream	
	Upstream	

3.2.2 Site 2 Tinda Creek upstream of the Quarry (reference site)

The aquatic habitat at Site 2 (Plate 3) at the time of the spring 2023 monitoring surveys is detailed in Table 8.

Table 7: Site 2 habitat results


Criteria	Attribute	Site 2
Riparian	Vegetation	Canopy consisted of sparse Scribbly Gums (<i>Eucalyptus haemastoma</i>), with a scattered grass/shrub land dominated by <i>Chorizandra spaerocephala</i> .
	Stream shading	Low/moderate.
	Exotic vegetation	-
Stream characteristics	Width (m)	<1 m.
	Substrate	Sand 80%, Silt 20%.
	Flow/depth	Dry
	Macrophytes/algae	Absent.
	Water quality	Dr
Comments		Constructed channel to drain farm dam.

Criteria	Attribute	Site 2
Plate 3: Site 2	Downstream	
	Upstream	

3.2.3 Site 3 Tinda Creek diversion channel within Quarry (test site)

The aquatic habitat at Site 3 (Plate 4) at the time of the spring 2023 monitoring surveys is detailed in Table 9.

Table 8: Site 3 habitat results

Criteria	Attribute	Site 3
Riparian	Vegetation	Canopy and mid-story absent. Groundcover dominated by <i>Chorizandra spaerocephala</i> .
	Stream shading	Low/none.
	Exotic vegetation	-
Stream characteristics	Width (m)	<2 m.
	Substrate	Sand 70%, silt 30%.
	Flow/depth	Dry
	Macrophytes/algae	Absent.
	Water quality observations	Dry
Comments		Very loose and unstable banks.
Plate 4: Site 3	Downstream	


Upstream



3.2.4 Site 4 Tinda Creek downstream of Quarry (test site)

The aquatic habitat at Site 4 (Plate 5) at the time of the spring 2023 monitoring surveys is detailed in Table 10.



Table 9: Site 4 habitat results

Criteria	Attribute	Site 4
Riparian	Vegetation	Canopy composed of <i>Eucalyptus haemastoma</i> (<5%). Mid-story dominated by small trees and tall shrubs. Ground cover was sparse with signs of slight post fire regrowth and dominated by <i>Chorizandra spaerocephala</i> .
	Stream shading	Low.
	Exotic vegetation	-
Stream characteristics	Width (m)	2 m.
	Substrate	80% silt, 20% sand.
	Flow/depth	Dry
	Macrophytes/algae	Macrophytes present
	Water quality observations	Dr
Comments	None.	
Plate 5: Site 4	Downstream	
	Upstream	

3.2.5 Site 5 Tinda Creek Tributary (reference site)

The aquatic habitat at Site 5 (Plate 6) at the time of the spring 2023 monitoring surveys is detailed in Table 11.

Table 10: Site 5 habitat results

Criteria	Attribute	Site 5
Riparian	Vegetation	Canopy present and comprised of <i>Eucalyptus haemastoma</i> , Mid-story supporting dense cover of small trees and tall shrubs (<i>Acacia</i> spp. and <i>Cassurina</i> spp.). There were signs of regrowth of ground covering including regenerative Cat-tailed bulrush (<i>Typha</i> sp.) and Round headed bristle sedge (<i>Chorizandra spaerocephala</i>).
	Stream shading	Low-moderate.
	Exotic vegetation	-
Stream characteristics	Width (m)	6 m.
	Substrate	Silt 90%, sand 10%.
	Flow/depth	No flow/deep >1 m.
	Macrophytes/algae	Cat tail Bulrush (<i>Typha</i> sp.) and floating macrophyte <i>Potamogetan sulcus</i>
	Water quality observations	Water availability was relatively high; conditions were highly turbid.
Comments	Riparian and macrophyte vegetation present	
Plate 6: Site 5	Downstream	
	Upstream	

3.2.6 Site 6 Tinda Creek downstream of Quarry (test site)

The aquatic habitat at Site 6 (Plate 7) at the time of the spring 2023 monitoring surveys is detailed in Table 12.

Table 11: Site 6 habitat results

Criteria	Attribute	Site 6
Riparian	Vegetation	Forest Red Gum (<i>Eucalyptus tereticornis</i>), White Stringybark (<i>Eucalyptus globoidea</i>) dominated the canopy vegetation. The mid-storey was dominated by small trees and tall shrubs. The ground cover consisted of regenerating native grasses, herbs and ferns.
	Stream shading	Low/moderate.
	Exotic vegetation	-
Stream characteristics	Width (m)	4 m.
	Substrate	Sand 20%, silt 80%.
	Flow/depth	No flow/ >1 m deep.
	Macrophytes/algae	Large amount of biofilm present. Cat tail Bulrush (<i>Typha</i> sp.),
	Water quality observations	Water availability was relatively high; conditions were highly turbid.
Comments		-
Plate 7: Site 6	Downstream	
	Upstream	

3.2.7 Site 7 Tinda Creek downstream of Quarry (test site)

The aquatic habitat at Site 7 (Plate 8) at the time of the spring 2023 monitoring surveys is detailed in Table 13.



Table 12: Site 7 habitat results

Criteria	Attribute	Site 7
Riparian	Vegetation	Canopy vegetation included Grey Gums (<i>Eucalyptus punctata</i>) and Scribbly Gums (<i>Eucalyptus haemastoma</i>). The ground cover consisted of by native grasses, herbs and ferns, as well as macrophytes.
	Stream shading	Low/moderate.
	Exotic vegetation	-
Stream characteristics	Width (m)	<5 m.
	Substrate	Silt 100%.
	Flow/depth	Low flow
	Macrophytes/algae	Cat tail Bulrush (<i>Typha</i> sp.), Saw sedge (<i>Gahnia</i> sp.).
	Water quality observations	Visually clear and tannin colour
Comments		Overgrown creek bed
Plate 8: Site 7	Downstream	
	Upstream	

3.2.8 Site 8 Tinda Creek tributary (reference site, outside of Quarry influence)

The aquatic habitat at Site 8 (Plate 9) at the time of the spring 2023 monitoring surveys is detailed in Table 14.

Table 13: Site 8 habitat results

Criteria	Attribute	Site 8
Riparian	Vegetation	Canopy vegetation included Grey Gums (<i>Eucalyptus punctata</i>) and Scribbly Gums (<i>Eucalyptus haemastoma</i>). The mid-storey was heavily damaged due to bushfires. The ground cover consisted of by native grasses, herbs and ferns along with Eucalyptus and Casuarina regeneration post fires.
	Stream shading	Low/moderate.
	Exotic vegetation	-
Stream characteristics	Width (m)	<3 m.
	Substrate	Pebble 30%, sand 20%, silt 50%.
	Flow/depth	No flow.
	Macrophytes/algae	A green macro algae was present
	Water quality observations	Turbid, low flow conditions.
Comments		-
Plate 9:Site 8	Downstream	
	Upstream	

3.3 Water quality

The collection of water samples was only possible at three of the eight sites due to the levels of water present. The results show that temperature ranged between 15.7 – 18.7 °C; the highest being reference Site 5 (Table 15). Conductivity ranged between 98-148.0 µS/cm; with the highest level also recorded at Site 5. All sites were within the ANZG DTVs for conductivity (30-350 µS/cm). Turbidity ranged between 20.4 – 113.0 NTU, with only reference site 8 exceeding the adopted DTVs. Dissolved Oxygen (DO) values were below DTVs at all sites except for Site 6, with values ranging between 10.3 and 80.1 % saturation. All sites had pH levels below DTVs (ranging between 6.0-6.3). Alkalinity was low, recording 20 CaCO₃/L for all sites.

Table 14: Water quality results

Site acronym	Temp (C°)	Conductivity (µS/cm)	Turbidity (NTU)	Dissolved Oxygen (% sat)	pH*	Alkalinity (mg CaCO ₃ /L)
Reference site						
Site 1	-	-	-	-	-	-
Site 2	-	-	-	-	-	-
Site 5	18.7	148.0	20.4	65.8	6.1	20
Site 8	15.7	98.0	113.0	10.3	6.3	20
Test site						
Site 3	-	-	-	-	-	-
Site 4	*	*	*	*	*	*
Site 6	17.5	139.0	48.0	80.1	6.0	20
Site 7	*	*	*	*	*	*

ANZG DTVs for upland streams: Electrical conductivity (30-350 µS/cm), Turbidity (2-25 NTU), pH (6.5-8), Dissolved Oxygen (80-110%). Text in bold indicate those variables that exceed the DTVs.

Note: For some waterways, DTVs do not reflect typical background water quality and chemistry. Therefore an assessment of water quality monitoring data against default values can suggest the condition of the waterway is outside the normal range, or polluted, when in fact it is 'clean', or vice versa.

Sites marked with * were unable to be sampled during the spring 2023 survey due to low water levels.

3.4 Macroinvertebrates

AUSRIVAS results and SIGNAL2 scores for the three sampled sites are provided in Table 16. Raw data is provided in Annex 1.

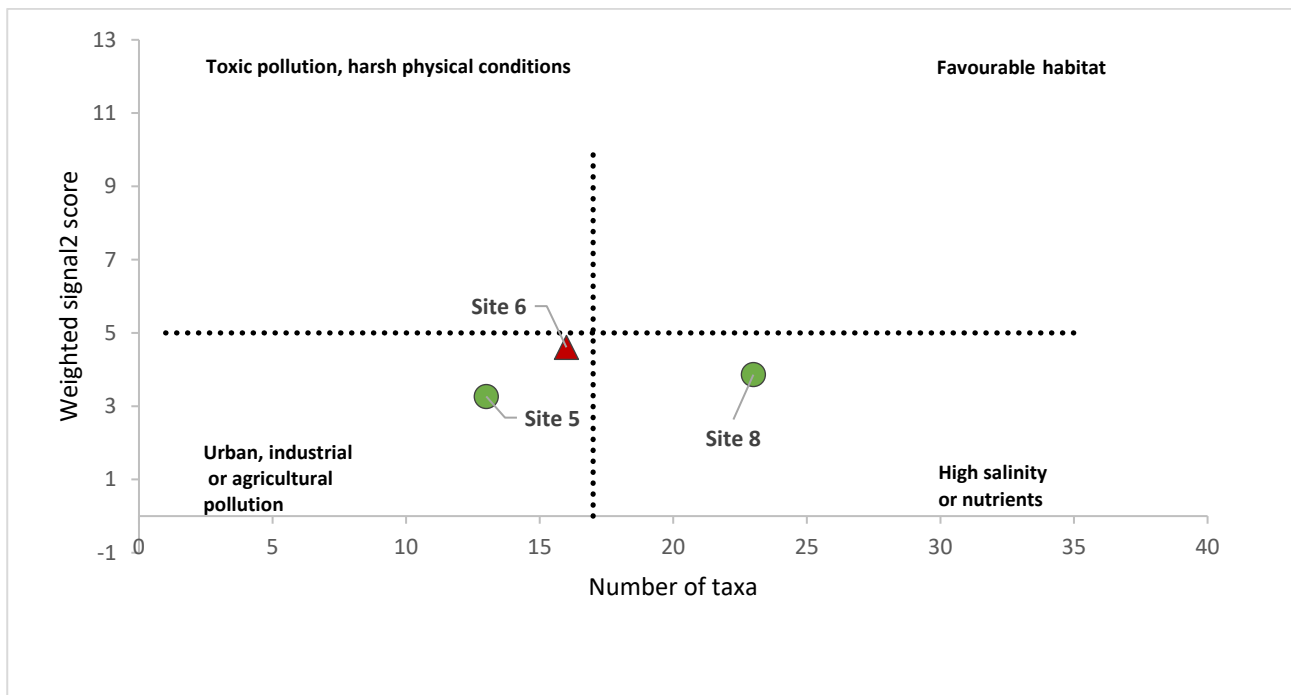
Table 15: Macroinvertebrate results

Site acronym	Number of Taxa	SIGNAL2 weighted score	AUSRIVAS Band
Reference site			
Site 1	-	-	-
Site 2	-	-	-
Site 5	13	3.26	B
Site 8	23	3.86	A
Test site			
Site 3	-	-	-
Site 4	*	*	*
Site 6	16	4.60	B
Site 7	*	*	*

Sites marked with * were unable to be sampled during the spring 2023 survey due to low water levels.

The number of taxa at the three sites ranged from 13 - 23, with the fewest taxa observed at reference site 5. AUSRIVAS scores for reference sites recorded Band A (reference condition) at Site 8 and Band B (significantly impaired) results at Site 5. While the test site 6 also recorded Band B (significantly impaired). These results indicate levels of stream impairment at Site 5 and Site 6, as they recorded fewer families than expected based upon the modelled macroinvertebrate communities using the reference site data in the AUSRIVAS model.

The low weighted SIGNAL2 scores recorded at all sites in spring 2024 indicate that the macroinvertebrate assemblage present in the streams is dominated by predominantly pollution-tolerant taxa (Table 16, Figure 3). The Biplot, indicates that no sites have favourable aquatic habitat, and all locations are exhibiting some form of pollution or natural stress. However, this appears typical for streams in the area as one reference site is clustered together with a test site in this quadrant. These results are generally indicative of harsh environmental conditions at reference Site 5 and test Site 6. Pollution-sensitive taxa recorded include Mayfly Leptophlebiidae (SIGNAL 8) observed at Sites 6 and 8, flies Dixidae (SIGNAL 7) at site 6 and mites Acarina (SIGNAL 6) at all sites.



Note: reference sites represented as green circles, while test sites represented as red triangles.

Figure 3: SIGNAL2 Bi-plot – Spring 2023

There appears to be no general trend over time in SIGNAL2 scores when the spring 2023 results for all sites sampled are considered in the context of previous results (Table 17). The SIGNAL2 results for all three sites this year have produced lower results than spring 2022 (Niche 2023). With dryer conditions in spring 2023 this has meant that less test sites could be sampled when compared to the wetter spring in 2022. Overall, the results indicate stream health conditions that are consistent with, those previously recorded as part of the aquatic monitoring program.

Table 16: Weighted SIGNAL2 scores (2015, 2018, 2019, 2020, 2021, 2022 and 2023)

Site	SIGNAL2 weighted Spring 2015	SIGNAL2 weighted Spring 2018	SIGNAL2 weighted Spring 2019	SIGNAL2 weighted Spring 2020	SIGNAL2 weighted Spring 2021	SIGNAL2 weighted Spring 2022	SIGNAL2 weighted Spring 2023
Reference site							
Site 5	2.00	3.54	3.35	2.86	3.34	4.00	3.26
Site 8	2.50	3.00	3.19	3.71	4.11	4.09	3.86
Test site							
Site 4	2.25	DRY	DRY	2.83	DRY	3.99	DRY
Site 6	3.50	2.6	DRY	2.73	3.71	5.07	4.60
Site 7	4.66	DRY	DRY	Low water level – not sampled.	DRY	4.66	Low water level – not sampled.

AUSRIVAS scores (Table 18) in general have been observed to be relatively stable over time, while the reference sites show a high degree of stability, the test site are more variable. Test Site 6 has recorded an increased AUSRIVAS Band score in 2023 when compared to the Band D result previously recorded during the program in spring 2022. Sites 4 and 7 although were not able to be sampled at the time of the 2023 surveys due to lack of water, similarly to the 2019 and 2021 survey periods.

Table 17: AUSRIVAS (2018 - 2023)

Site	Spring 2018	Spring 2019	Spring 2020	Spring 2021	Spring 2022	Spring 2023
Reference site						
Site 5	D	B	B	B	B	B
Site 8	C	B	B	B	B	A
Test site						
Site 4	DRY	DRY	B	DRY	C	DRY
Site 6	C	DRY	C	B	D	B
Site 7	DRY	DRY	Low water level – not sampled.	DRY	C	DRY

4. Discussion

4.1 Water quality

Field parameters measured during this monitoring period were within the expected range of typical disturbances found within intermittent streams. Reference Site 8 recorded higher turbidity levels than the test sites. Low dissolved oxygen levels were recorded across the sites, which is to be expected with the low water levels, limited flow and low rainfall inputs. Low pH levels were recorded at all sites; however these pH levels do not appear to have resulted in impairment to the macroinvertebrate communities present. pH levels were also comparable between test and reference sites.

4.2 SIGNAL2 scores and macroinvertebrate communities

Conditions were very dry at the time of sampling in 2023, with below average rainfall across the year leading to less permanent water levels, unable to sustain habitats within the study area throughout the year. Three sites were sampled during this monitoring period. These included site 6 (test sites), along with reference sites, site 5 and site 8. All other sites were too dry to sample.

Despite poor-moderate AUSRIVAS and low-moderate SIGNAL2 scores, the streams appear to be in reasonable health particularly considering the high frequency flooding events during 2022 and rapid transition to drier than average conditions in spring 2023. The results are indicative of macroinvertebrate assemblages and stream condition that are typical of intermittent streams which are under natural ephemeral stress. The results are considered to be representative of similar streams in the locality, with the results for the reference sites clustering together with those of the test site. As such, there appears to be no obvious disturbance resulting from the Tinda Creek Quarry operations at downstream sites.

Only one test site was sampled due to the more intermittent nature of flows at these locations, which are less stable than reference sites. This is not considered to be indicative of impacts resultant from Quarry operations as habitat conditions were observed to be stable, no indicators of acute water quality impacts were identified, and most importantly the SIGNAL2 scores were comparable to the results previously recorded as part of the program. The AUSRIVAS scores recorded during the 2023 surveys were comparable, or better than the results previously recorded as part of the program. In fact, site 8 recorded its highest score to date. The decrease in SIGNAL2 scores are attributed to a decrease in rainfall over the recent survey period (2018 – 2023), which has functioned to reduce the condition and extent of habitat available for aquatic biota.

The results in general are consistent with macroinvertebrate community's representative of low flows and intermittent streams, the fauna of which consist of generally pollution-tolerant organisms resulting in the streams having low-moderate SIGNAL2 and AUSRIVAS scores. When considering the multiple methods of data collected, the weight of evidence approach suggests that overall, stream health conditions in spring 2023 were consistent, or improved in comparison to previous years.

5. Conclusion

The general health of the vegetation and waterways of the eight sites was found to be in moderate to good health, with a return to lower levels of available aquatic habitat compared to previous surveys due to the drier conditions. Three out of the eight total sites (test site 6 and reference sites 5 and 8) were sampled using AUSRIVAS method, including water quality sampling.

Sites downstream of Tinda Creek Quarry operations continue to exhibit good riparian and channel morphology with the native riparian vegetation showing regeneration, including continued re-establishment of native groundcovers that were absent in spring 2021 monitoring.

The macroinvertebrate community at test and reference sites is in reasonable health despite some poor-moderate AUSRIVAS and low to moderate SIGNAL2 scores. The water quality results were consistent with what would be expected for ephemeral/intermittent streams in the locality.

Importantly, the stream health results recorded at test site 6 were equivalent when compared to recent surveys and comparable to the reference sites. As such no impacts to aquatic systems associated with the operation of the Tinda Creek Quarry are identified in the spring 2023 data.

6. References

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Umwelt. (2016). Tinda Creek Quarry. Landscaper Management Plan. Prepared for Prepared for AUS-10 Rhyolite Pty Ltd.

Websites

<http://ausrivas.ewater.com.au/>

<http://www.mdfrc.org.au/bugguide/>

Annex 1. Macroinvertebrate survey results

Table 18: Macroinvertebrate survey results in spring 2023

Taxa	Site 5	Site 6	Site 8
Planorbidae		1	1
Corbiculidae			22
Oligochaeta			1
Acarina	9	7	22
Ostracoda		3	5
Ceinidae			4
Atyidae	10		5
Dytiscidae	1	9	13
Hydrophilidae		2	16
Dixidae		3	
Culicidae		3	2
Ceratopogonidae		2	
Tanypodinae		25	12
Orthoclaadiinae	1		
Chironominae	5	5	4
Baetidae	1	1	
Leptophlebiidae		31	31
Veliidae			1
Corixidae	2		2
Notonectidae	7		9
Coenagrionidae	15	21	2
Megapodagrionidae			1
Aeshnidae	7		2
Synthemistidae			1
Cordulephyidae			1
Hydroptilidae	2		
Leptoceridae	1	15	4
Naucoridae	1		
Corduliidae		1	2
Dugesiidae		1	

Contact Us

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Sydney
Illawarra
Central Coast
Newcastle
Mudgee
Port Macquarie
Brisbane
Cairns



Our services

Ecology and biodiversity

Terrestrial
Freshwater
Marine and coastal
Research and monitoring
Wildlife Schools and training

Heritage management

Aboriginal heritage
Historical heritage
Conservation management
Community consultation
Archaeological, built and landscape values

Environmental management and approvals

Impact assessments
Development and activity approvals
Rehabilitation
Stakeholder consultation and facilitation
Project management

Environmental offsetting

Offset strategy and assessment (NSW, QLD, Commonwealth)
Accredited BAM assessors (NSW)
Biodiversity Stewardship Site Agreements (NSW)
Offset site establishment and management
Offset brokerage
Advanced Offset establishment (QLD)

Appendix 6

Minutes of Tinda Creek Quarry Community Consultative Committee Meetings

(Total No. of pages including blank pages = 6)



**TINDA CREEK SAND PROJECT
COMMUNITY CONSULTATIVE COMMITTEE
MINUTES OF MEETING HELD ON SITE
TUESDAY 23 MAY 2023**

	NAME	ORGANISATION
PRESENT	Lisa Andrews (LA)	Independent Chairperson
	Jane Robinson (JR)*	Putty Community Association delegate
	Bryan Grant (BG)	Hy-Tec – Quarry Manager
	Ray Campbell (RC)	Community Representative
	David Cilento (DC)	Hy-Tec – NSW General Manager
	Jocelyn Thompson (JT)	Colo Heights Rural Fire Brigade delegate
APOLOGIES	Ethan Pettiford (EP)	Hy-Tec – Quarries Operations Manager NSW
	Darryl Thiedeke (DT)	Hy-Tec – National Planning & Development Manager
	Brigitte Lewis (BL)	Community Representative


*Joined via video-conferencing

WELCOME & INTRODUCTIONS	The chair opened the meeting at 10.09 am with LA welcoming all present. LA introduced JT, a new member on the CCC representing the Colo Heights Rural Fire Brigade.										
APOLOGIES	As above. (DT & EP currently at QLD operations)										
DECLARATION OF INTEREST	LA advised that she is an approved Independent Chairperson with the Department of Planning and Environment, appointed by the Secretary to chair this CCC and engaged by Hy-Tec. LA noted that JT had completed her governance forms.	No changes to members' previous declarations									
BUSINESS ARISING	In accordance with the guidelines, the minutes from the previous meeting held on site, 18 October 2022 were finalised on 7 November 2022. <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th>ITEM</th> <th>DESCRIPTION</th> <th>RESPONSIBILITY</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1</td> <td>Write to Colo Heights Progress Association & Colo Heights Rural Fire Service inviting them to nominate a delegate on this CCC.</td> <td style="text-align: center;">LA</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Make enquires regarding sponsorship of Putty Valley Spring fair</td> <td style="text-align: center;">RC</td> </tr> </tbody> </table>	ITEM	DESCRIPTION	RESPONSIBILITY	1	Write to Colo Heights Progress Association & Colo Heights Rural Fire Service inviting them to nominate a delegate on this CCC.	LA	2	Make enquires regarding sponsorship of Putty Valley Spring fair	RC	Complete 19/10/22. Complete. JR will email DC with a proposal.
ITEM	DESCRIPTION	RESPONSIBILITY									
1	Write to Colo Heights Progress Association & Colo Heights Rural Fire Service inviting them to nominate a delegate on this CCC.	LA									
2	Make enquires regarding sponsorship of Putty Valley Spring fair	RC									
CORRESPONDENCE (as sent with Meeting Notice on 15/5/23)	<ul style="list-style-type: none"> • 19/10/22 – Letter to Colo Heights RFS inviting nomination to join CCC • 19/10/22 – Letter to Colo Heights Progress Association inviting nomination to join CCC. • 28/10/22 – Email to CCC members with the draft minutes for review 										

	<ul style="list-style-type: none"> • 29/10/22 – Email from CHRFS acknowledging letter, which was tabled at their meeting. Any interested parties will be in contact with me direct. • 3/11/22 – Email to Jocelyn Thompson, Colo Heights Rural Fire Service with nomination form to join CCC. • 7/11/22 - Email to CCC members with the finalised minutes • 7/11/22 – Letter to Ray Campbell with the same information • 8/11/22 – Email from CHRFS with nomination for this CCC. • 31/3/23 – Email to DPE with report and recommendation for RFS stakeholder membership. • 24/4/23 – Email from DPE with approval for CHRFS (JT's) nomination. • 26/4/23 – Email to JT advising of her approval by DPE as stakeholder representative for the Colo Heights Rural Fire Brigade. • 27/4/23 – Email from JT with completed governance forms. • 15/5/23 – Email to members with the Meeting Notice & Agenda for this meeting. • 15/5/23 – Letter to RC with the same information. • 22/5/23 - Email to members with the reminder for this meeting & video link to JR. 	
<p>REPORT/PROJECT UPDATE</p>	<p>BG commenced the presentation showing a large aerial map of the site. DC explained the location of the buildings, rehabilitation areas, silt ponds, current extraction activities in Domain 7, dredge operations and exhausted pits.</p> <p>BG advised that the dredge had been relocated, which was a big job requiring 2 cranes (100t & 60t) operating together for 8 hours. Maintenance was carried out over Christmas and after January the dredge was repositioned to its current extraction area.</p> <p>BG explained the sand extraction process where material is dredged, a lot of it is clay (25-30%). The dredging separates sand and is washed out. Clay used to cap off the old tailings. Top soil is placed on top for rehabilitation (seedlings & plants), eventually returning back to bush.</p> <p>The clay material will be profiled and spread around. The felled trees will be relocated to provide habitat for the fauna.</p> <p>Flooding last year created difficult ground conditions. The site had to be closed on a couple of occasions due to flooding.</p> <p>RC asked if one of the area was rehabilitated. BG responded yes, however, African Lovegrass has taken over parts. Whilst not listed as a noxious weed African Lovegrass is extremely invasive. RC commented that he will be very interested to see how the area gets back to native bush.</p>	

	<p>BG explained the management of surface water on site, stating that they operated a closed water system, ie rain that falls on site is captured via a closed water system. They are unable to discharge into adjoin bushland. Accordingly, there are lots of diversions in closed water channels to ensure compliance.</p> <p>JT asked how the site is managed in a drought. BG responded that it is very difficult as water is needed to operate.</p> <p>BG explained the silt ponds – sediment sinks out and the water gets cleaner as the return sediment loaded water moves through the diversions. Heavy clay is needed for the rehab. JT asked if the rehabilitated areas are off limits for capturing water for the site with DC responding, yes. There is a bore licence for the site, but there is limited access to this resource.</p> <p>BG advised that a lot of coordination is required to work the extraction areas due to the shape and need to complete the rehab prior to starting in the next Domain. DC discussed rehab and water flow in terms of the disturbed footprint.</p> <p>BG commented that the floods last year provided significant issues in terms of monitoring of water bores. Being the amount of surface water being created, and this being further impacted by rising ground water. Water management is the biggest issue for operations on the site.</p> <p>DC advised that Hy-Tec have lodged a request with EPA & DPE to be able to release water during flood events. The amount of water sampling undertaken will provide data and history to assist the agencies in assessing this request.</p> <p>DC stated that Hy-Tec is approved to truck in VENM & ENM to help with capping, but haven't brought in any material in the past 12 months.</p> <p>RC asked when extraction activities would be moving closer to the road. BG stated that this was the current final stage for the site and would be quite a few years away yet</p> <p>JT asked when the mine was first started. BG advised approximately 40 years ago and provided some history of the site.</p> <p>BG advised that Hy-Tec has approval to remove 300,000t of sand per year. DC advised that a new dozer has been ordered and should arrive very soon. It has special tracks (swamp tracks) for movement over sodden areas. Hy-Tec</p>	
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	<p>will keep the existing dozer on site and the additional machine will help to get through the extraction program. All operators will be trained on using the new dozer.</p> <p>Feral Animal management on site continues with baiting by LLS & Council. JT asked what animals were being found. BG advised that mainly wild dogs and deer; stating that baiting will continue. BG explained that this is a highly regulated process, with GPS coordinates, etc.</p> <p>BG advised that the old tower will be coming down and a new one erected to improve production and safety. This will be a good upgrade for the site.</p> <p>RG enquired how many people are employed at Tinda Creek. BG advised that there are 7 full time employees as well as contractors/truck drivers. BG explained the transport contractor arrangements, size of trucks, delivery points, etc.</p> <p>JR asked how many were locals? BG responded that all operators are from Colo Heights with one caretaker living on site. Stating that when recruiting for positions, Hy-Tec tries to employ people from the local area.</p> <p>JR offered to place any vacant positions on the Putty Community Association website and through her networks. Agreed.</p>	<p>BG to send any job vacancy opportunities to JR. Ongoing.</p>
<p>GENERAL BUSINESS</p>	<ul style="list-style-type: none"> • JR enquired whether there were any Flora & Fauna reports available that can be shared with the community. BG advised that all reports are available on the project website and included in the Annual Review. Action: • JR commented that it would be good to get this information out to the community, especially regarding the rehabilitation undertaken on site. • JR asked how much weight the trucks carried. BG responded that it is up to a 38t payload (PBS rated). This is highly regulated by the Heavy Vehicle regulatory agency. All trucks require permits to drive on specific roads. A lot of boxes needed to be ticked, which usually means that most of the trucks are newer models to meet the requirements. This assists in fewer truck movements as they have a higher payload. Trucks are not allowed on site unless they are fully compliant. • RC asked about the types of trees to be planted in the rehab. DC responded koala habitat trees as per the Management Plan, approved by DPE. RC stated that he is impressed with what Hy-Tec are doing on site, commenting that they are genuinely committed. • DC advised that they have commissioned a new fly-over of the site to update the aerial photographs, so looking forward to showing them at the next CCC. 	<p>LA to provide link to Annual Review.</p>

NEXT MEETING	<p>It was agreed that the CCC would move to annual meetings with LA advising that extra-ordinary meetings may be held at the request of CCC members.</p> <p style="text-align: center;"> Tuesday 11 June 2024 at 10am.</p> <p>DC suggested a viewing of the site at the next meeting. Agreed.</p>	On site.
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The meeting was closed by the chair at 10.59am with LA thanking all for their attendance.

ACTION ITEM:

ITEM	DESCRIPTION	RESPONSIBILITY
1	Provide link of Annual Review to CCC members	LA
2	Send any job vacancy advertisement to JR for distribution on Putty Valley Community Association website.	BG (onging)