



Teralba Quarry

2017 Annual Review

Project Approval PA10_0183



Prepared in conjunction with:



R.W. CORKERY & CO. PTY. LIMITED

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Teralba Quarry

2017 Annual Review

Project Approval PA10_0183

Period: 1 January 2017 to 31 December 2017

Prepared by:

Metromix Pty Ltd
ABN: 39 002 886 839
PO Box 3016
TERALBA NSW 2284

Telephone: (02) 4950 6640
Facsimile: (02) 4958 7201
Email: Bills@metromix.com.au

Prepared in conjunction with:

R.W. Corkery & Co. Pty. Limited
Geological & Environmental Consultants
ABN: 31 002 033 712

Brooklyn Office:

1st Floor, 12 Dangar Road
PO Box 239
BROOKLYN NSW 2083

Telephone: (02) 9985 8511

Email: brooklyn@rwcorkery.com

Ref No. 559/54

Orange Office:

62 Hill Street
ORANGE NSW 2800

Telephone: (02) 6362 5411

Email: orange@rwcorkery.com

Brisbane Office:

Suite 5, Building 3,
Pine Rivers Office Park
205 Leitchs Road
BRENDAL QLD 4500

Telephone: (07) 3205 5400

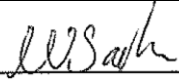
Email: brisbane@rwcorkery.com

March 2018



R.W. CORKERY & CO. PTY. LIMITED

Table 1
Title Block

| | |
|--|---|
| Name of operation | Teralba Quarry |
| Name of operator | Metromix Pty Ltd |
| Development consent / project approval # | PA10_0183 |
| Name of holder of development consent / project approval | Metromix Pty Ltd |
| Mining Lease # | Not applicable |
| Name of holder of mining lease | Not applicable |
| Water licence # | Water Access Licence 40303 |
| Name of holder of water licence | Metromix Pty Ltd |
| MOP/RMP start date | Not applicable |
| MOP/RMP end date | Not applicable |
| Annual Review start date | 1 January 2017 |
| Annual Review end date | 31 December 2017 |
| <p>I, William Sanderson, certify that this audit report is a true and accurate record of the compliance status of the Teralba Quarry for the period 1 January 2017 to 31 December 2017 and that I am authorised to make this statement of behalf of Metromix Pty Ltd.</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 | William Sanderson |
| Title of authorised reporting officer | Manager Quarries |
| Signature of authorised reporting officer |  |
| Date | 29 March 2018 |

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COMMONLY USED ACRONYMS

| | |
|----------|--|
| AHD | Australian Height Datum |
| ANZECC | Australia and New Zealand Environment and Conservation Council |
| DPE | Department of Planning and Environment (formerly DP&I) |
| DP&I | Department of Planning and Infrastructure |
| DRE | Division of Resources and Energy (within the Department of Industry) |
| DRG | Division of Resources and Geoscience (within DPE) |
| EA | Environmental Assessment |
| EP&A Act | Environmental Planning and Assessment Act 1979 |
| EPA | Environment Protection Authority |
| EPL | Environment Protection Licence |
| LMCC | Lake Macquarie City Council |
| PA | Project Approval |
| POEO Act | Protection of the Environment Operations Act 1997 |
| RWC | R.W. Corkery and Co. Pty Limited |

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1. STATEMENT OF COMPLIANCE

Table 2
Statement of Compliance

| Were all conditions of the relevant approval(s) complied with? | Yes / No |
|--|----------|
| Project Approval PA 10_0183 | No |
| EPL 536 | No |

Table 3
Non-compliances

| Relevant Approval | Condition # | Condition Description (summary) | Compliance Status | Comment | Where Addressed in Annual Review |
|-------------------|-------------|--|-------------------------------|--|----------------------------------|
| PA 10_0183 | 2(16f) | Blast Management Plan – monitoring program | Administrative non-compliance | The blast contractor failed to check that all blast monitors were in place prior to initiating a blast on 15 December 2017. Blast monitoring at Location 1 (of two locations) did not occur during this blast event. | 6.4.3 |
| PA 10_0183 | 2(21) | Meteorological monitoring | Administrative non-compliance | In the period between the 3 and 21 November 2017, the humidity reading on the weather station failed and a replacement part had to be sourced. Records were not available during this period. | 6.2 |
| EPL 536 | M4.1 | Meteorological monitoring | Administrative non-compliance | As per non-compliance for PA 10_0183 Condition 2(21). | 6.2 |
| EPL 536 | M8.1 | Blast monitoring | Administrative non-compliance | As per non-compliance for PA 10_0183 Condition 2(16f). | 6.4.3 |

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 report has been prepared by Metromix Pty Ltd (Metromix) in conjunction with R.W. Corkery & Co. Pty Limited (RWC), in accordance with *Condition 5(4)* of Project Approval PA10_0183 (PA10_0183), to record the activities and environmental monitoring undertaken within and surrounding the Teralba Quarry (“the Quarry”) during the period 1 January 2017 to 31 December 2017 (the “reporting period”). This document also outlines the activities and environmental monitoring planned to be undertaken by Metromix within and surrounding the Quarry in 2018. This *Annual Review* has been prepared based upon the approval and licencing requirements applicable for the reporting period, however, the report generally follows the format and content requirements identified in the *Annual Review Guideline* dated October 2015.

The Quarry is situated upon Lots 1 and 2 DP 224037 and was initially established in 1964, with the operation purchased by Metromix in 1986. The Teralba Quarry Extension Project was approved in February 2013 under PA10_0183. **Figure 1** displays the location of the Quarry in the local context and **Figure 2** displays the approved layout of the Quarry. PA10_0183 is reproduced in full in **Appendix 1**.

The approved Quarry activities comprise the following.

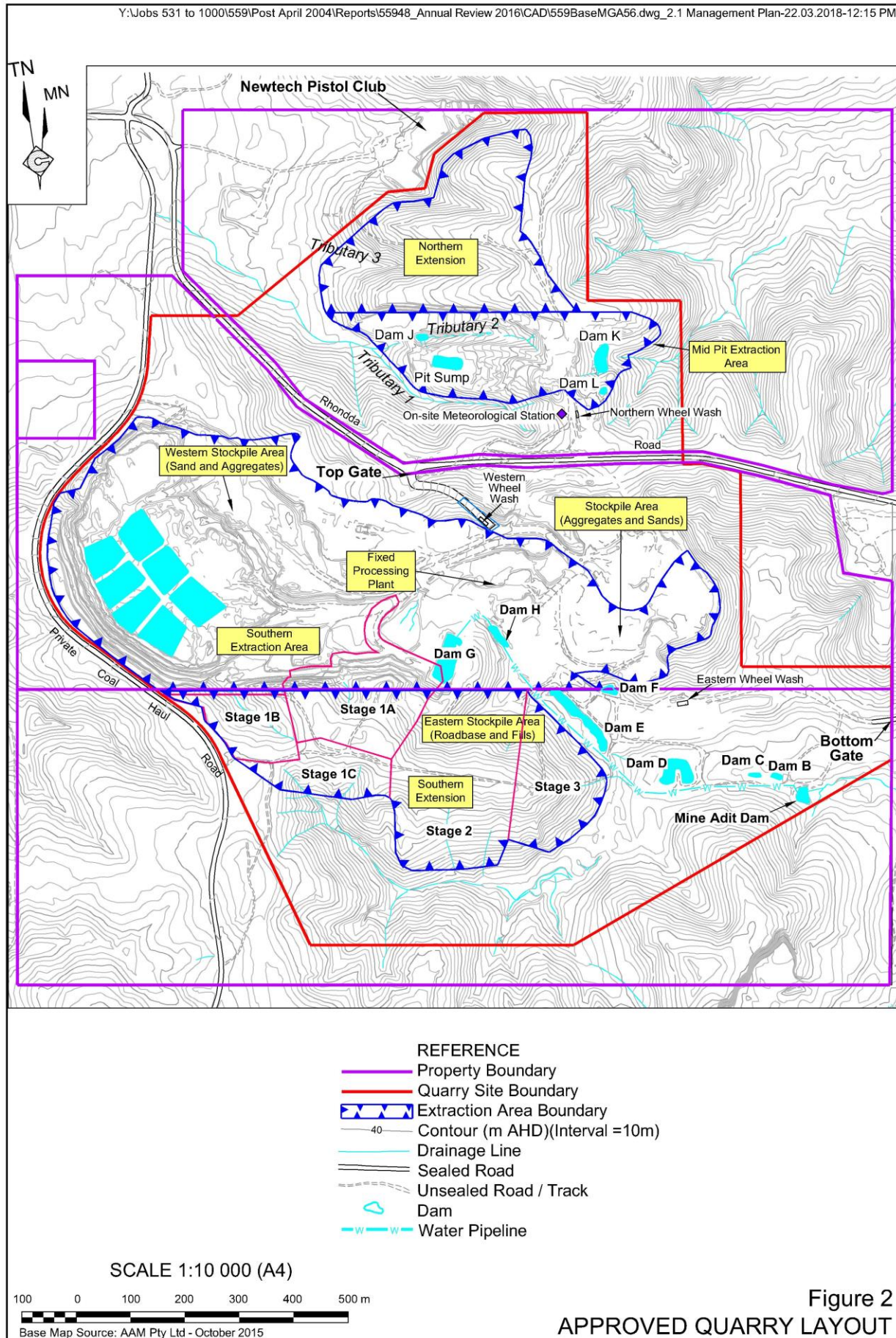
- Conglomerate extraction (blasting and excavation).
- Processing operations (size reduction, screening and blending).
- On-site load and haul operations involving off-road trucks on the internal road network conveying primary-crushed rock to the processing plant.
- Off-site transportation of products.
- Vehicle/equipment maintenance and ancillary activities and stores.
- Administration and product despatch.
- Progressive rehabilitation and maintenance.

2.2 KEY PERSONNEL CONTACT DETAILS

The management of the Teralba Quarry, to ensure all conditional requirements are satisfied, is the responsibility of the Manager Quarries, Mr William Sanderson. Day to day responsibility for Quarry Operations, including environmental monitoring and rehabilitation rests with the Quarry Manager.

Metromix employs a part-time Compliance Officer responsible for data collection, deposited dust and water sample collection, daily checks and compilation of quarry-related documentation and monitoring data.





Personnel from Carbon Based Environmental Pty Ltd assist with management of the on-site meteorological station, air quality analyses and calibration of air quality monitoring equipment.

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

| Name | Position | 24 Hour Contact |
|-------------------|------------------|------------------------|
| William Sanderson | Manager Quarries | 0418 479 087 |



3. APPROVALS

The owner and operator of the Teralba Quarry, Metromix Pty Ltd (Metromix) is required to operate the approved activities within the Quarry Site in accordance with PA10_0183 and licences listed in **Table 4**.

Table 4
Teralba Quarry – Approvals and Licences

| Approval/Licence | Original Issue Date | Current Version Issue Date | Expiry Date | Scheduled Activities |
|---|--|----------------------------|------------------|--|
| Project Approval PA10_0183 | 22 February 2013 | 22 February 2013 | 31 December 2038 | Extracting, processing product despatch and ancillary activities |
| Environment Protection Licence No 536 | 25 September 2000 | 13 November 2015 | 01 June* | Crushing, grinding or separating; Extractive activities |
| Environment Protection Licence No 13015 | 17 July 2015 | 14 October 2015 | 17 July* | Resource recovery; Waste storage |
| Water Access Licence No. 40303 | 12 October 2012 (as Bore Licence 20BL173206) | 1 July 2016 | No Expiry | Recovery and use of water from Dam A |
| * Licence Anniversary Date | | | | |

On 7 December 2017, an application to modify PA 10_0183 was submitted to DPE to modify the wording of conditions related to the biodiversity offsetting obligations of the Teralba Extension Project. The objective of the application was to modify the relevant conditions to refer only to the number and types of credits required to be offset as a result of the impacts associated with the development, rather than an approved offset area. At the time that this document was finalised, the application had not been determined.

Condition 5(4) requires the preparation of an Annual Review that contains the following.

- A description of the activities (including preparatory activities, extraction, processing and rehabilitation) that were carried out during the reporting period (see Section 4), and the activities that are proposed to be carried out during the next reporting period (see Section 12).
- A comprehensive review of the environmental monitoring results and complaints recorded during the reporting period (see Section 6, Section 7 and Section 9), including a comparison of these results against:
 - the relevant statutory requirements, limits or performance measures/criteria;
 - the monitoring results of previous years;
 - the identification of any trends in the monitoring data; and
 - the relevant predictions in the EA.
- An assessment of compliance during the reporting period with the conditional requirements of PA10_0183, and a description of what actions were (or are being) taken to ensure compliance, where necessary (see Section 11).

- Identification of any trends in the monitoring data over the life of the Quarry (see Section 6).
- A list of discrepancies between the predicted and actual impacts of the Quarry's operations, and an analysis of the potential cause of any significant discrepancies (see Section 6 and Section 7).
- A description of the measures that will be implemented throughout 2018 to improve the environmental performance of the Quarry (see Section 12).

Relevant conditions within PA 10_0183 which nominate specific environmental criteria are as follows, with **Appendix 2** providing the complete records of all monitoring results.

- *Condition 3(5): noise emissions (day shoulder, day, evening and night).*
Each of the relevant noise criteria and frequencies are presented in Section 6.2.
- *Condition 3(9): blasting overpressure and ground vibration emissions.*
Each of the relevant blasting criteria are presented in Section 6.3 in conjunction with the assembled monitoring results.
- *Condition 3(17): air quality emissions (deposited dust and particulate matter).*
Each of the relevant air quality criteria are presented in Section 6.4 in conjunction with the assembled monitoring results.
- *Condition 3(23): all surface water discharges from the site comply with the discharge limits in any EPL which regulates water discharges from the site.*
Each of the relevant water criteria are presented in Section 7.2 in conjunction with the assembled monitoring results.

In addition to the specific environmental criteria, the following conditions within PA10_0183 specifically request further information be included in each Annual Review.

- *Condition 2(20b): Production Data – the Proponent shall include a copy of this data in the Annual Review (see Section 4.2 and **Appendix 2**).*
- *Condition 5(11a): Access to Information – the Proponent shall make copies of the annual review available on its website (over the last five years).*
- *PA10_0183 Appendix 3 – Action 6.6 – Ensure all groundwater monitoring data is incorporated into each Annual Review for the Teralba Quarry (see Section 7).*
- *PA10_0183 Appendix 3 – Action 12.5 – Include annual photographs of the progressive rehabilitation of quarry benches in each Annual Review. (see Section 4).*

In addition, *Condition 3(21)* of PA10_0183 requires Metromix to ensure a suitable meteorological station is operational in the vicinity of the Quarry, complying with the requirements outlined in *Approved Methods for the Sampling and Analysis of Air Pollutants in NSW* (DECCW, 2007) and is capable of continuous real-time measurements in accordance with the *NSW Industrial Noise Policy* (EPA, 2000), or as otherwise approved by EPA. Metromix operates a comprehensive meteorological station in an elevated area adjacent to the Mid Pit Extraction Area. A summary of meteorological monitoring is provided in in Section 6.1.

The Quarry operates in accordance with the following management plans and strategies.

- Environmental Management Strategy.
- Landscape Management Plan
- Aboriginal Heritage Management Plan
- Air Quality Management Plan
- Blast Management Plan
- Bushfire Management Plan
- Lower Level Management Plan
- Noise Management Plan
- Water Management Plan
- Transport Management Plan

Feedback regarding the 2016 Annual Review was provided from the Department of Planning and Environment on 6 July 2017. No changes to management plans were requested in the feedback and no changes were deemed necessary following an internal review of the documents in accordance with *Condition 5(5)* of PA10_0183. All management plans will be reviewed in 2017 following receipt of final feedback on the Independent Environmental Audit, once the proposed modification to PA 10_0183 has been determined and following the acceptance of this document by DPE.

4. OPERATIONS SUMMARY

4.1 INTRODUCTION

Operational areas within the Teralba Quarry are referred to in the same manner as described in the 2011 *Environmental Assessment* (RWC, 2011) i.e. Northern Extension, Mid Pit Extraction Area, Southern Extraction Area and Southern Extension.

Figure 3 presents the location(s) of the activities described, including activities shown within **Plates 1** to **8**.

4.2 EXTRACTION OPERATIONS

Extraction operations continued within Stages 1A and Stage 1B of the Southern Extension in 2017 under PA10_0183, as displayed on **Figure 3**. Additional clearing activities in Stage 1B were undertaken following the translocation of 40 *Tetradlea juncea* plants from Stage 1B in 2015. A total of 35 blasts were initiated in 2017. **Plate 1** displays a view of the active extraction faces within the Southern Extension.

It is estimated that approximately 807 000t of material was extracted during the reporting period. Total product sales (products despatched from the Quarry) during the reporting period was 608 390t. This is lower than total sales in 2016 (820 362t) and the approved limit of 1 million tonnes per annum. **Table 5** records the monthly/annual sales of the various products produced at the Quarry during 2017. This data is drawn from Quarry records and is provided to the Division of Resources & Geoscience (DRG) of the Department of Planning and Environment in accordance with the requirements of *Condition 2(20)* of PA10_0183. A copy of the annual return for extractive materials to DRG for 2016/2017 is included within **Appendix 2**. It is anticipated that total sales in the next reporting period would be consistent with the current reporting period.

Table 5
Teralba Quarry Sales – 2017

| 2017 Month | Washed Products (t) | Road Pavement (t) | Other (t) | Total (t) |
|------------------|---------------------|-------------------|--------------|----------------|
| January | 25,711 | 3,564 | 83 | 29,358 |
| February | 33,199 | 13,523 | 77 | 46,799 |
| March | 35,254 | 10,822 | 842 | 46,918 |
| April | 33,767 | 10,383 | 1,370 | 45,520 |
| May | 43,391 | 19,033 | 323 | 62,747 |
| June | 32,384 | 10,312 | 2,878 | 45,574 |
| July | 42,742 | 10,866 | 37 | 53,645 |
| August | 44,237 | 18,481 | 695 | 63,413 |
| September | 47,537 | 16,610 | 422 | 64,569 |
| October | 40,681 | 13,019 | 569 | 54,269 |
| November | 45,092 | 14,227 | 1,260 | 60,579 |
| December | 30,060 | 4,903 | 36 | 34,999 |
| Total | 454,055 | 145,743 | 8,592 | 608,390 |
| Source: Metromix | | | | |



Plate 1 A view to the south towards the active extraction faces in the Southern Extension
(E559AF_010)

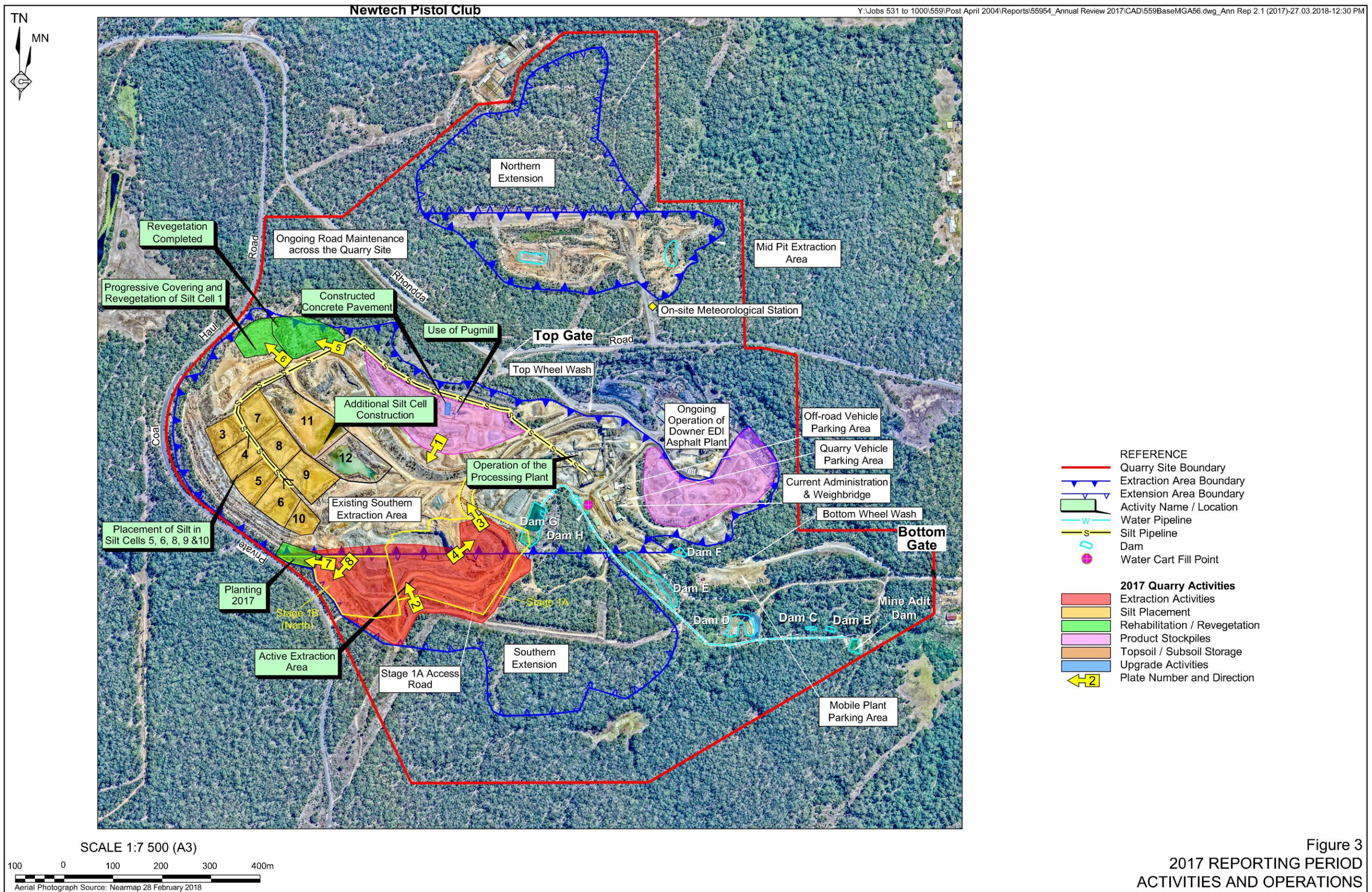
Plate 2 A view to the northwest towards the Pugmill and pugmill stockpile area
(E559AF_033)



Plate 3 A view to the northwest across all silt cells
(E559AG_044)

Plate 4 A view to the northeast towards the Processing Plant
(E559AG_053)





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Plate 5 Excellent growth on placed overburden near Silt Cell 1
(E559AG_064)

Plate 6 Initial growth of planted tube stock on Silt Cell 1
(E559AG_068)



Plate 7 A view along the upper extraction bench in Stage 1B with placed timber and plants
(E559AG_045)

Plate 8 A view of the bitumen treatment of the upper extraction bench in Stage 1B
(E559AG_055)



4.3 PROCESSING OPERATIONS

Processing operations occurred throughout the reporting period, producing washed products and road pavement products. **Plate 4** displays a view to the northeast towards the processing plant. Fill materials were not processed through the processing plant.

The only change during the reporting period when compared to 2016 was that the processing plant operated in the “wet” mode for approximately 75% of sales, compared to approximately 58% in 2016. The remaining 25 % of the total products comprised of road pavement products (24%) and fill materials (1%) respectively.

4.4 RECYCLING OPERATIONS

Of the recycled concrete that had been previously crushed and stockpiled, 2 100 tonnes of crushed concrete were despatched/sold during 2017. A total of 1 983 tonnes of concrete washout were imported during the reporting period.

4.5 OVERBURDEN AND SILT MANAGEMENT

In 2017, approximately 80 000t of overburden was removed within the existing Southern Extraction Area and Southern Extension, all of which was used for either capping Silt Cell 1 or for landform construction.

All silt produced from the processing plant was initially pumped to Silt Cells 5, 8 or 10 with overflow into Silt Cells 6 and 9.

4.6 WASTE MANAGEMENT

Silt produced as a result of processing within the processing plant is placed in the silt cells within the Southern Extraction Area as part of the Quarry final landform construction program and is consequently not classified as production waste. No other wastes produced at the Quarry are classified as production wastes.

The following non-production wastes (and quantities) were produced at the Quarry during the reporting period.

- | | |
|--|---|
| • general waste (1 x 4m ³ bin per week) | • paper and cardboard (16 x 3m ³ bins) |
| • waste oil (9 400L) | • scrap steel (23.4 tonnes) |
| • co-mingled recyclables (2 x 200L bins per fortnight) | • batteries (minor) |

All waste produced at the Quarry was removed by licenced contractors. All general waste (putrescible) was disposed of at the Awaba Waste Facility, the closest licenced facility, with the remaining industrial waste (not defined as general (putrescible)), was removed and disposed of by contractors at appropriately licenced facilities.

4.7 SITE INFRASTRUCTURE AND SERVICES

During the reporting period, a self-bunded portable oil storage container was installed on site to temporarily store oil that was delivered to the Quarry. Oil will be stored in this container until needed.



Plate 9 Portable Oil Storage Container (Ref: IMG_1308)

4.8 HAZARDOUS MATERIAL MANAGEMENT

Hazardous materials within the Quarry Site are appropriately managed with diesel fuel stored in above ground tanks with roofing and appropriate bunding (110% of the total diesel tank capacity).

Aerosols and paints continued to be stored within the designated hazardous material cabinets within the workshop area.

Hazardous waste materials such as batteries, oily rags and oil filters were stored as outlined within Metromix's waste management procedure and removed by a licenced contractor and disposed of at an appropriately licenced facility.

4.9 PRODUCT TRANSPORTATION

The transportation of products from the Quarry is limited under *Condition 2(8)* and *2(9)* of PA10_0183 to include the following transportation limits.

Condition 2(8) - The Proponent shall not:

- a) *transport more than 1 million tonnes of quarry products from the site in any calendar year;*

- b) dispatch more than 326 laden trucks from the site on any day;
- c) dispatch more than 241 laden trucks per day or 20 per hour westwards along Rhondda Road;
- d) dispatch more than 85 laden trucks per day or 8 per hour eastwards through Teralba;
- e) dispatch laden trucks for travel through Teralba between 6 pm and 6 am; and
- f) receive unladen trucks via the railway street entrance between 6 pm and 7 am.

Condition 2(9) - The Proponent shall limit the total hourly truck dispatch rates from the site to the levels shown in Table 1.

Table 1 – Truck Dispatch Hours

| Dispatch Period | Maximum Hourly Dispatch Rate |
|------------------------|-------------------------------------|
| 6:00 am – 7:00 am | Up to 28 loaded trucks |
| 7:00 am – 6:00 pm | Up to 20 loaded trucks |
| 6:00 pm – 5:00 am | Up to 6 loaded trucks |
| 5:00 am – 6:00 am | Up to 12 loaded trucks |

The approved transport corridors are displayed on **Figure 4** and summarised below.

Route 1 – Northwestern Corridor:

Westwards along Rhondda Rd, and then northwards along Wakefield Rd and Northville Rd to George Booth Drive.

Route 2 – Southwestern Corridor:

Westwards along Rhondda Rd, and then southwards along Wakefield Rd to the M1 Freeway.

Route 3 – Northeastern Corridor:

Northeast along Railway St Teralba, crossing the railway line, then southwards along York St Teralba, then northeasterly along Five Islands Road to either The Esplanade (to the east) or Lake Road (to the north).

Route 4 – Southeastern Corridor:

Northeast along Railway St Teralba, crossing the railway line, then southwards along York St Teralba and Toronto Road.

The monitoring records of truck movements between January 2017 and December 2017 are collated in **Appendix 2. Table 6** provides a summary of transportation and limit compliance during the period from January 2017 to December 2017. A review of the summary indicates that the maximum daily average for each conditional requirement is well below the approved limits in *Conditions 2(8) and 2(9)*. There were no identified non-compliance issues with the Teralba Quarry Driver's Code of Conduct during the reporting period.

4.10 VENM/ENM IMPORTATION MANAGEMENT

No Virgin Excavated Natural Material (VENM) was imported to the Quarry Site for fill purposes during the reporting period.

Table 6
Summary of Transportation Limit Compliance – 2017

| Condition Description | | | Maximum Record for 2017 | | | | | | | | | | | |
|---|---------------------------------|------------------|-------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Time Period | Condition | Approved Limits | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
| Annual | Annual Product Despatch | 1 million tonnes | 608 390 | | | | | | | | | | | |
| Daily | Total trucks per day | 326 trucks/day | 102 | 166 | 142 | 126 | 148 | 119 | 156 | 174 | 175 | 146 | 163 | 108 |
| Daily | Westwards trucks per day | 241 trucks/day | 65 | 113 | 98 | 102 | 114 | 93 | 120 | 133 | 107 | 115 | 108 | 70 |
| Daily | Eastwards trucks per day | 85 trucks/day | 38 | 53 | 52 | 46 | 41 | 65 | 57 | 47 | 68 | 68 | 55 | 57 |
| 6:00am to 7:00am | Cumulative Max Hourly | 28 trucks/hour | 10 | 9 | 11 | 10 | 12 | 13 | 11 | 9 | 12 | 8 | 11 | 11 |
| 7:00am to 6:00pm | Cumulative Max Hourly | 20 trucks/hour | 16 | 20 | 20 | 20 | 18 | 18 | 20 | 20 | 20 | 20 | 20 | 16 |
| 6:00am to 7:00am | Westwards Max Hourly | 28 trucks/hour | 9 | 8 | 10 | 10 | 10 | 12 | 10 | 7 | 12 | 8 | 9 | 7 |
| 7:00am to 6:00pm | Westwards Max Hourly | 20 trucks/hour | 8 | 16 | 14 | 16 | 16 | 15 | 16 | 16 | 17 | 15 | 16 | 11 |
| 6:00am to 6:00pm* | Eastwards Max Hourly | 8 trucks/hour | 7 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 | 8 |
| 6:00pm to 5:00am | Westwards Max Hourly | 6 trucks/hour | 6 | 6 | 6 | 5 | 6 | 6 | 6 | 5 | 6 | 5 | 5 | 6 |
| 5:00am to 6:00am | Westwards Max Hourly | 12 trucks/hour | 6 | 9 | 5 | 8 | 6 | 6 | 6 | 4 | 6 | 7 | 4 | 4 |
| | Compliance with approved limits | | | | | | | | | | | | | |
| | Exceedance of approved limits | | | | | | | | | | | | | |
| * Transport eastwards is not permitted between the hours of 6:00pm and 6:00am | | | | | | | | | | | | | | |
| Source: Metromix | | | | | | | | | | | | | | |

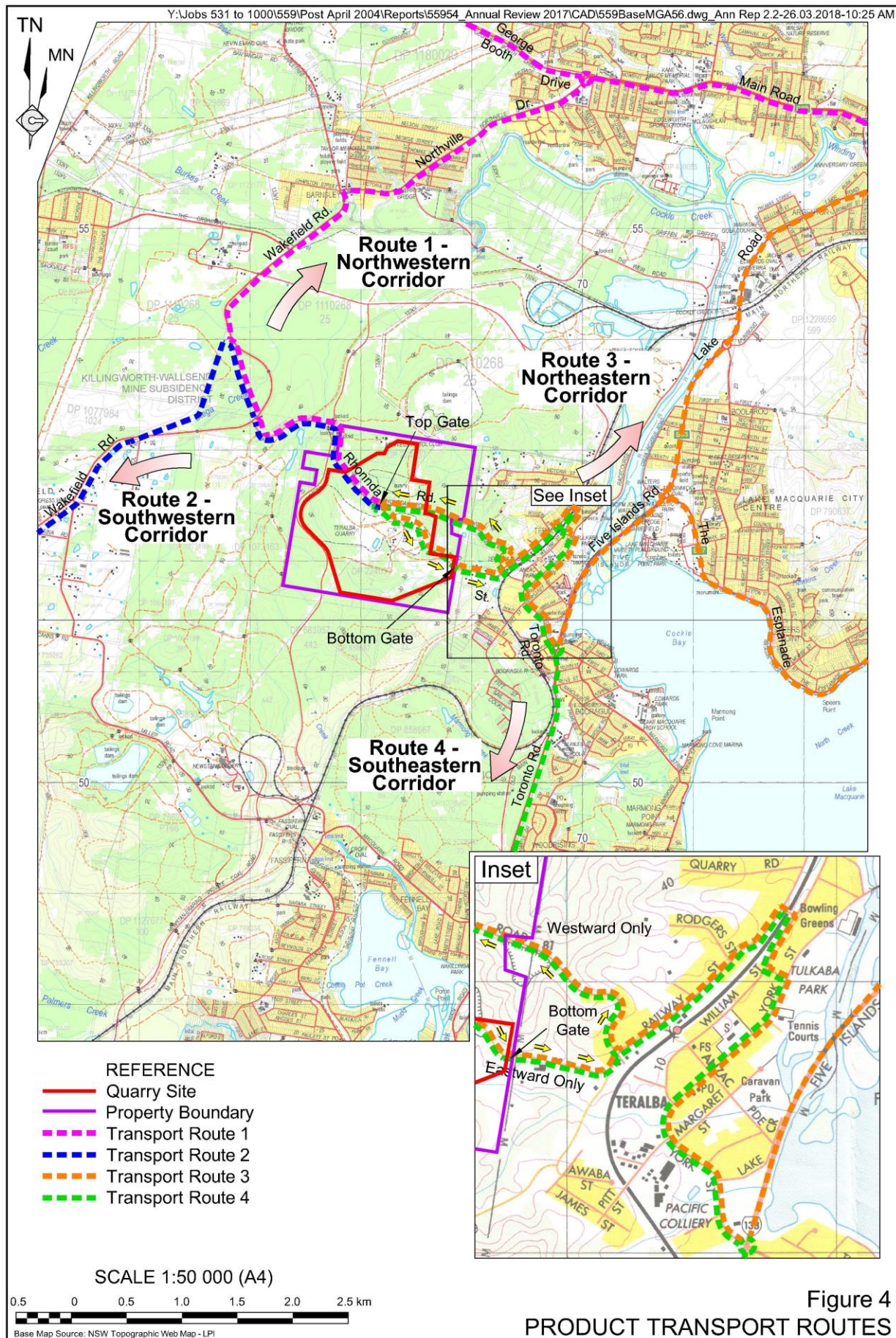
4.11 NON-METROMIX OPERATIONS

The two non-Quarry-related commercial operations located within the Quarry Site boundary, namely the Newtech Pistol Club and the Downer EDI asphalt plant, continued to operate independently of all quarry-related operations. A pugmill previously operated by Civilake is now the responsibility of Metromix. A view of the pugmill and pugmill stockpile area is displayed on **Plate 3**.

In line with the commercial agreements with Metromix to operate within the Quarry Site, regular meetings, particularly with Downer EDI, were held to discuss the ongoing operation of the Quarry and to limit interactions between the two operations. During the reporting period, a number of informal meetings were held between Metromix and Downer EDI with no follow-up actions arising from these meetings.

Metromix maintains an open-door policy with the Newtech Pistol Club with no formal discussions taking place during the reporting period.

No coal was hauled on the Coal Haul Road to Eraring during 2017.



5. ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

Correspondence from the Department of Planning and Environment regarding the 2016 Annual Review was provided on 6 July 2017. **Table 7** describes the information that the Department requested to be included in the 2017 Annual Review and where in this document that information is provided.

Table 7
Actions from the Previous Annual Review

| Action Required from Previous Annual Review | Action Taken by the Operator | Where Discussed in Annual Review |
|---|--|----------------------------------|
| Provide discussion specific to extracted material, the 2016 Report addressed only transported material quantity. | Request addressed in 2017 Annual Review | 4.2 |
| Provide comparison and trend analysis of complaint results | Request addressed in 2017 Annual Review | 9.3 |
| Provide comparison of monitoring results against relevant predictions in the EA for Air, Noise and Blasting. | Request addressed in 2017 Annual Review | 6.4 |
| Provide discussion relating to the review of management plans, within 3 months of Annual Review Submission. | Request addressed in 2017 Annual Review | 3 |
| The specific dates and times relative to non-compliances and complaints are to be provided and these should be reported to relevant Departments as required under approval conditions | Request addressed in 2017 Annual Review | 6.3.3 |
| Provide additional meteorological data as required under EPL 536. | Request addressed in 2017 Annual Review | 6.2 |
| The Department requested that the 2017 Annual review be prepared in accordance with the Annual Review Guideline, October 2015. The following specific requests were made in this regard: | | This Document |
| <ul style="list-style-type: none"> A specific statement of compliance. | Request addressed in 2017 Annual Review | 1 |
| <ul style="list-style-type: none"> Full details of non-compliance reporting to relevant Government Departments. | Request addressed in 2017 Annual Review | 6.3.3 |
| <ul style="list-style-type: none"> Discussion on the relevance of the salinity trading scheme. | Not applicable. The Quarry is not within the catchment of the Hunter River and therefore the salinity trading scheme does not apply. | 7 |
| <ul style="list-style-type: none"> Discussion on relevance on compensatory water supplied to others. | Not applicable. No compensatory water was supplied to others. | 7 |
| <ul style="list-style-type: none"> Discussion to address specific rehabilitation objectives in Schedule 3, Condition 55 of PA10_0183 and key issues that may affect successful rehabilitation. | Request addressed in 2017 Annual Review | 8 |
| <ul style="list-style-type: none"> Progress against the most recent Independent Audit Action Plan. | Request addressed in 2017 Annual Review | 10 |

6. ENVIRONMENTAL PERFORMANCE

6.1 METEOROLOGICAL MONITORING

Condition 3(21) requires that a meteorological station operate in the vicinity of the Quarry Site for the life of the Project. Metromix has installed a meteorological station (location shown on **Figure 3**), ensuring that the meteorological station complies with the requirements in the *Approved Methods for Sampling and Analysis of Air Pollutants in New South Wales* guideline.

The requirement for the meteorological station to measure the continuous real-time measurement of temperature lapse rate is not warranted given the Quarry's close proximity to the coast and Lake Macquarie.

The meteorological station currently monitors the following parameters.

- Temperature (at 2m and 10m above ground level)
- Wind Speed and Direction
- Rainfall
- Humidity
- Solar Radiation
- Barometric Pressure
- Fire Danger Index
- Sigma Theta

Review of daily rainfall data indicates that three days of data were not recorded between 24 January 2017 and 26 January 2017 by the meteorological station. However, these records have been supplemented by records from the on-site rain gauge. In the period between the 3 and 21 November 2017, the humidity sensor on the weather station failed and a replacement part had to be sourced. Further review of monitoring data indicated that the humidity sensor had been providing anomalous records for humidity at times through the year. For the purpose of this review, the data was sourced from the Bureau of Meteorology station at Newcastle University (station 061390) for humidity.

Figures 5 and **6** provide monthly wind speed and direction data recorded at the Quarry during the reporting period. The wind rose data indicates that prevailing winds between March and September were generally from the southwest and for the remainder of the year were generally from the southeast quadrant.

Table 8 presents a summary of the monitoring reports recorded during the reporting period for meteorological parameters that are required to be monitored under EPL 536. Daily rainfall data is presented in **Appendix 2**.



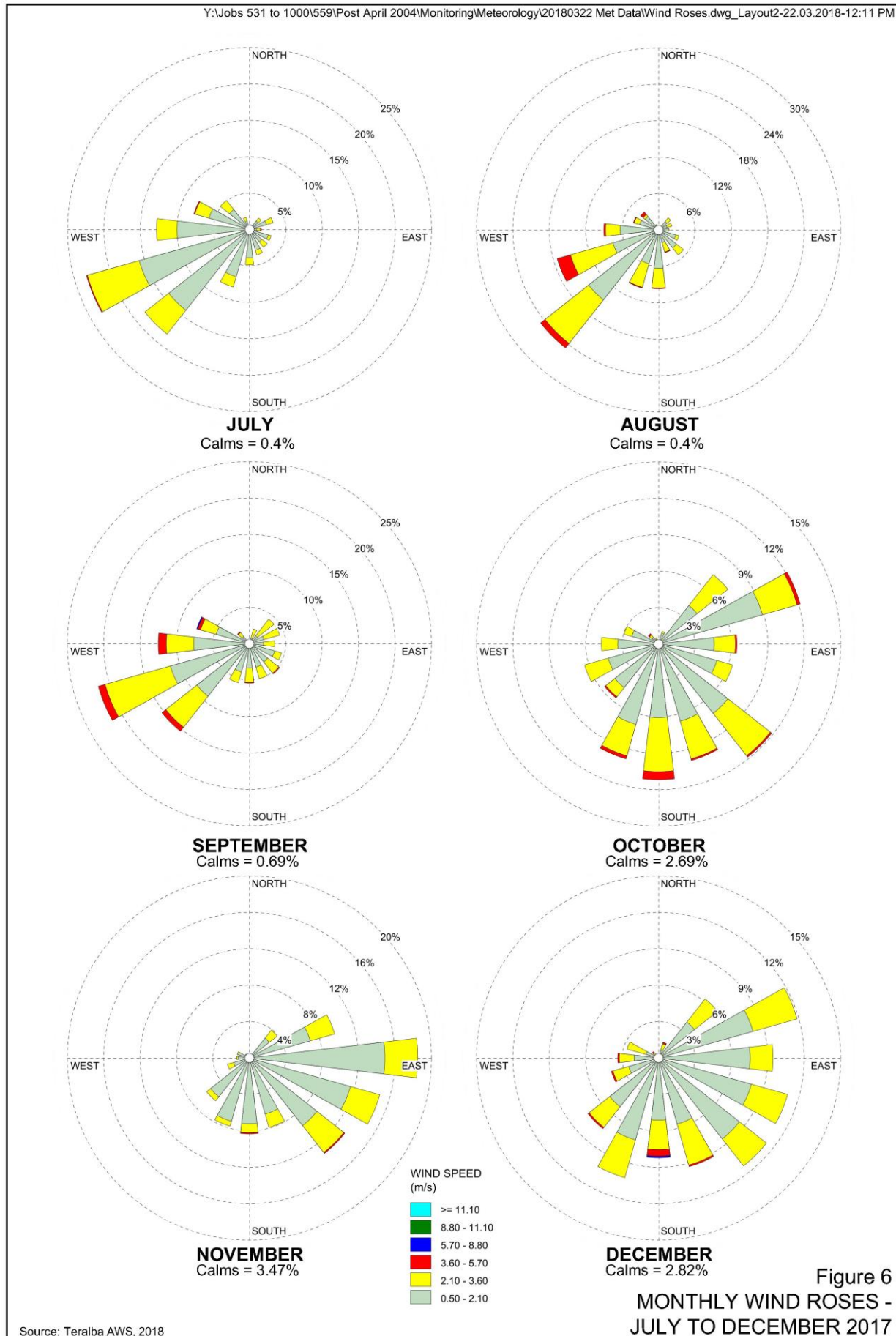


Figure 6
MONTHLY WIND ROSES -
JULY TO DECEMBER 2017

Table 8
Meteorological Data Summary – 2017

| Monitored Parameter | Jan | Feb | March | April | May | June | July | August | Sept | Oct | Nov | Dec | Annual |
|--|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Total Rainfall | 70.9 ¹ | 122.4 | 222.4 | 70.4 | 19.2 | 140.6 | 5.4 | 6.6 | 14.2 | 161.6 | 55 | 38.6 | 937.3 |
| Average Minimum Temperature (°C) at 2m | 25.0 | 24.1 | 21.4 | 17.3 | 15.2 | 13.0 | 12.7 | 13.4 | 17.2 | 19.0 | 18.8 | 23.3 | 18.3 |
| Average Maximum Temperature (°C) at 2m | 26.1 | 25.2 | 22.2 | 18.3 | 16.2 | 13.7 | 13.6 | 14.4 | 18.5 | 20.1 | 19.9 | 24.4 | 19.3 |
| Average Minimum Temperature (°C) at 10m | 24.6 | 23.8 | 21.3 | 17.6 | 15.7 | 13.4 | 13.2 | 13.8 | 17.5 | 18.9 | 18.7 | 23.0 | 18.4 |
| Average Maximum Temperature (°C) at 10m | 25.7 | 24.9 | 22.1 | 18.5 | 16.6 | 14.2 | 14.1 | 14.7 | 18.7 | 19.9 | 19.7 | 24.1 | 19.3 |
| Average Sigma Theta | 32.2 | 31.3 | 29.1 | 29.5 | 28.6 | 28.6 | 30.1 | 31.3 | 30.3 | 30.7 | 30.7 | 32.3 | 30.4 |
| Average Solar Radiation (W/m ²) | 199.7 | 187.9 | 130.7 | 130.5 | 97.8 | 67.1 | 100.3 | 130.3 | 175.2 | 171.6 | 207.2 | 206.6 | 149.6 |
| Average Relative Humidity (%) ² | N/A | 72 | 84 | 82 | 82 | 85 | 69 | 66 | 48 | 73 | 69 | 70 | N/A |
| Average Maximum Barometric (hPa) | 1002.0 | 1003.8 | 1005.2 | 1011.4 | 1012.0 | 1014.9 | 1009.8 | 1007.7 | 1005.5 | 1007.3 | 1009.3 | 1002.2 | 1007.6 |
| Average Minimum Barometric (hPa) | 1001.5 | 1003.3 | 1004.8 | 1010.9 | 1011.7 | 1014.5 | 1009.4 | 1007.2 | 1004.9 | 1006.8 | 1008.9 | 1001.6 | 1007.2 |
| ¹ Data supplemented from on-site rain gauge for period from 24 January 2017 to 26 January 2016. | | | | | | | | | | | | | |
| ² Data sourced from Bureau of Meteorology Site at Newcastle University (Station 061390). | | | | | | | | | | | | | |



6.2 NOISE

6.2.1 Introduction

The *Noise Management Plan*, prepared in accordance with *Condition 3(8)* of PA10_0183 and approved on 16 January 2014, details the locations and frequency of noise monitoring that is required to be undertaken within and surrounding the Quarry. In addition, PA 10_0183 – Appendix 3 (Statement of Commitments) details Metromix's commitment to undertake noise monitoring within three months of operations beginning in the Southern and Northern Extensions. Noise monitoring surveys were undertaken in August 2017 and November 2017 by Spectrum Acoustics (Spectrum, 2017a and 2017b) and have been included in **Appendix 2**.

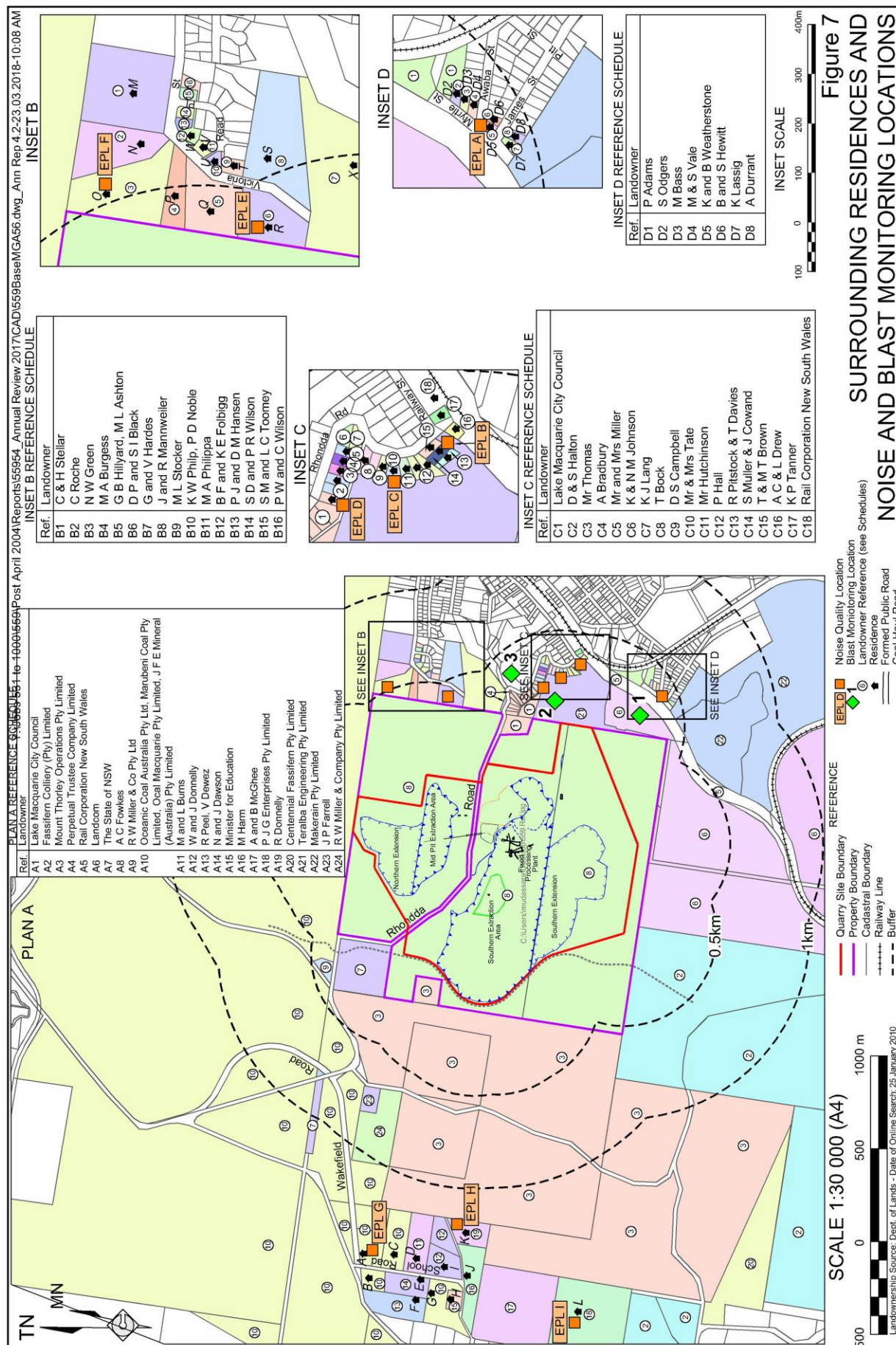
Table 9 lists the address and coordinates of each noise monitoring location and **Figure 7** displays the noise monitoring locations relative to local land holdings.

Table 9
Noise Monitoring Locations

| Noise Monitoring Locations* | Address | Easting | Northing |
|--|--------------------------|---------|----------|
| EPL-A | Awaba Street, Teralba | 369080 | 3651470 |
| EPL-B ¹ | Rhondda Road, Teralba | 369250 | 6351915 |
| EPL-C ² | Rhondda Road, Teralba | 369205 | 6352015 |
| EPL-D | Rhondda Road, Teralba | 369150 | 6352135 |
| EPL-E | Victoria Avenue, Teralba | 369060 | 6352620 |
| EPL-F ² | Victoria Avenue, Teralba | 369130 | 6352945 |
| EPL-H | School Road, Wakefield | 366210 | 6352520 |
| <p>* See Figure 7.</p> <p>¹ During monitoring on 30 August 2017, the landowner requested that monitoring be undertaken away from this property. Monitoring was undertaken at easting 369247 and northing 6351878 (approximately 30m south of the property)</p> <p>² Metromix has obtained permission for this monitoring location to be omitted as other monitoring locations are nearby and closer to quarry related noise</p> | | | |

Independent monitoring at the nominated locations was required to be undertaken at 6-month intervals during the first 2 years of operations and then revert to annual monitoring after this time. During the recent Independent Environmental Audit, it was identified that annual monitoring only had been undertaken during previous years and therefore two rounds of independent monitoring were commissioned during 2016 and again during the reporting period.

As the equipment fleet at the Quarry did not change during the reporting period, no monitoring of sound power levels was commissioned.



6.2.2 Noise Criteria

Table 10 presents the noise criteria for the Quarry during the specific time periods as nominated in *Condition 3(5)* of PA10_0183.

Table 10
Teralba Quarry – Noise Criteria

| Residence* | Time Period | | | | |
|--------------------------------|---------------------------|---------------|----------------|----------------|------------------------|
| | 6:00am-7:00am | 7:00am-6:00pm | 6:00pm-10:00pm | 10:00pm-6:00am | |
| Residence A | | | | | |
| Criterion | L _{Aeq} (15 min) | | | | L _A (1 min) |
| | 38 | 38 | 37 | 35 | 45 |
| Residence B | | | | | |
| Criterion | L _{Aeq} (15 min) | | | | L _A (1 min) |
| | 42 | 46 | 36 | 35 | 45 |
| Residence C | | | | | |
| Criterion | L _{Aeq} (15 min) | | | | L _A (1 min) |
| | 42 | 42 | 35 | 35 | 45 |
| Residence D, E, G, H, I | | | | | |
| Criterion | L _{Aeq} (15 min) | | | | L _A (1 min) |
| | 35 | 35 | 35 | 35 | 45 |
| Residence F | | | | | |
| Criterion | L _{Aeq} (15 min) | | | | L _A (1 min) |
| | 37 | 38 | 38 | 35 | 45 |
| * See Figure 7. | | | | | |

6.2.3 Noise Monitoring Results and Discussion

Attended noise monitoring was conducted during daytime, evening, shoulder and night periods between 29 August 2017 and 31 August 2017 and the program repeated between 27 November and 29 November 2017 at monitoring locations EPL-A, B, D, E and H.

Based upon the location of active quarrying activities (i.e. only within the existing Southern Extraction Area and Southern Extension), it was determined that the nominated locations identified above would only be monitored. Locations EPL-C and EPL-F were omitted from the monitoring program as compliance at these locations may be inferred from other nearby monitoring locations.

During the monitoring program in August 2017, the landowner at Residence B (EPL-B) requested that the monitoring not take place in front of their house. The monitoring location was moved 30m to the south of this location so that operators could still distinguish Quarry vehicles from other noise sources and record noise levels.

Monitoring location EPL-B is situated close to the corner of Rhondda Road and Railway Street. This monitoring location is included predominantly to measure Quarry noise from trucks exiting the Quarry along the private section of the access road (through the Teralba Business

Park). It was noted that at the time of noise measurements being undertaken, monitoring at EPL-B did not require a spotter to determine the number of quarry-related trucks from the overall truck movements, as it was possible to identify those trucks associated with Quarry activities from this monitoring location. Noise emissions at EPL-B were indistinguishable from industrial noise and other traffic noise at this location.

The results of the attended noise monitoring surveys identified that noise from the Quarry was generally inaudible in the local setting and when Quarry noise was audible and distinguishable from surrounding noise sources, $L_{Aeq}(15 \text{ min})$ and $L_{A(1 \text{ min})}$ noise emissions did not exceed the relevant criterion at any monitoring location.

Monitoring of $L_{A(1 \text{ min})}$ was undertaken to assess potential sleep disturbance during the period from 10:00pm to 7:00am. Night time monitoring of $L_{A(1 \text{ min})}$ was within the criteria of 45 dB(A) at all monitoring locations.

It is noted that the results of operational noise monitoring during 2017 are consistent with results recorded in 2015 and 2016, indicating that the Quarry remains generally inaudible in the local setting. The monitored noise levels are lower than those predicted in the EA for the Teralba Extension Project, however, it should be noted that the predictions in the EA related to worst-case scenario operations that included operations in the later stages of the Southern Extension and operations in the Northern Extension. Operations in these areas are yet to commence and it will therefore be important to continue noise monitoring as operations move closer to these residences.

6.3 BLASTING

6.3.1 Blasting Activities

All blasting during the reporting period occurred in either Stage 1A or Stage 1B of the Southern Extraction Area and Southern Extension. Blast monitoring was undertaken for each blast initiated at the Quarry throughout 2017, except for a blast on 15 December 2017 for which the contractor failed to confirm all monitors were in place prior to initiating the blast. This non-compliance was reported to DPE and is discussed below.

The *Blast Management Plan* prepared in accordance with *Condition 3(16)* of PA10_0183 and approved in October 2013, details the locations and frequency of blast monitoring that is required to be undertaken during blasts at the Quarry.

Blast monitoring continues to be undertaken at the locations nominated on **Figure 7** for each blast, i.e. at Sites 1 and 2 for blasts initiated south of Rhondda Road and Sites 2 and 3 for blasts initiated north of Rhondda Road. No blasts were initiated north of Rhondda Road during the reporting period.

6.3.2 Blasting Criteria

Table 11 presents the blasting criteria for the Quarry provided in PA10_0183 with all blasts required to occur between 10:00am to 4:00pm, Monday to Friday only, public holidays excluded.



Table 11
Teralba Quarry – Blasting Criteria

| Location | Airblast overpressure (dB(Lin Peak)) | Ground vibration (mm/s) | Allowable exceedance |
|---|---|----------------------------|--|
| Any residence on privately owned land, or any public infrastructure | 120 | 10 | 0% |
| | 115 | 5 | 5% of the total number of blasts over a 12 month period |

6.3.3 Blast Monitoring Results

Table 12 presents the results of blast monitoring undertaken throughout 2017 against the criteria for the Quarry. Airblast overpressure and ground vibration were not measured at Location 3 throughout 2017 as no blasting was undertaken north of Rhondda Road during the reporting period.

All blasts were below the nominated criteria at both monitoring locations during the reporting period. Several blasts did not trigger the blast monitor. The blast monitor trigger level generally sent to 100dB for airblast overpressure and between 0.1mm/s and 1.0mm/s for ground vibration therefore it is inferred that no blasts exceeded these levels at the monitoring locations.

All blasting was undertaken between 10:07am and 3.13pm, i.e. within of the prescribed hours for blasting.

Metromix complied with all blasting criteria for all blasts monitored during the reporting period. As outlined in Section 6.3.1, only one blast monitor was in place when the blast was initiated on 15 December 2017. Given that Metromix has not had any historic instances of blast criteria exceeded at Location 2, it is considered unlikely that the blast criteria was exceeded from this blast. The incident was reported to the EPA and DPE via email on 22 December 2017.

During 2015 and 2016, it was rare for the blasting activities to trigger the blast monitor, whereas the majority of blast events triggered the monitors in 2017. This is considered most likely due to the blasting occurring in Stage 1B and therefore being located closer to the monitoring locations. Although blasting is triggering the monitor at a greater frequency, it should be noted that there were no instances where the criteria presented in **Table 11** were exceeded. The blasting results recorded during 2017 are consistent with those predicted in the EA.

Table 12
Blast Monitoring Results – 2017

| Blast Date | Blast Time | Location 1 ¹ | | Location 2 ¹ | | Location 3 ^{1,2} | |
|-----------------|------------|--------------------------------|-------------------------|--------------------------------|-------------------------|--------------------------------|-------------------------|
| | | Airblast Over pressure (dB(L)) | Ground Vibration (mm/s) | Airblast Over pressure (dB(L)) | Ground Vibration (mm/s) | Airblast Over pressure (dB(L)) | Ground Vibration (mm/s) |
| 10 January | 12:07pm | NT | NT | NT | NT | NM | NM |
| 17 January | 11:04am | NT | NT | NT | NT | NM | NM |
| 3 February | 3:13pm | 106.0 | 0.19 | 102.8 | 0.20 | NM | NM |
| 8 February | 2:32pm | NT | NT | NT | NT | NM | NM |
| 13 February | 12:08pm | NT | NT | NT | NT | NM | NM |
| 24 February | 10:31am | NT | NT | NT | NT | NM | NM |
| 6 March | 10:15am | NT | NT | NT | NT | NM | NM |
| 9 March | 10:46am | NT | NT | NT | NT | NM | NM |
| 27 March | 10:36am | 103.1 | 0.32 | NT | NT | NM | NM |
| 10 April | 10:51am | 108.4 | 0.24 | 104.1 | 0.17 | NM | NM |
| 28 April | 10:29am | 105.9 | 0.16 | 103.9 | 0.19 | NM | NM |
| 13 April | 11:08am | 103.9 | 0.23 | 99.7 | 0.20 | NM | NM |
| 8 May | 10:07am | 104.2 | 0.22 | 103.7 | 0.18 | NM | NM |
| 17 May | 11:59am | 107.1 | 0.18 | 102.9 | 0.22 | NM | NM |
| 24 May | 11:45am | 104.9 | 0.30 | 101.0 | 0.18 | NM | NM |
| 29 May | 10:18am | 103.0 | 0.21 | NT | NT | NM | NM |
| 15 June | 2:40PM | 104.9 | 0.31 | 101.0 | 0.31 | NM | NM |
| 16 June | 10:15am | 102.2 | 0.24 | NT | NT | NM | NM |
| 29 June | 12:37pm | 105.5 | 0.24 | 101.0 | 0.18 | NM | NM |
| 4 July | 10:36am | 107.1 | 0.17 | 102.8 | 0.13 | NM | NM |
| 10 July | 1:06pm | 106.3 | 0.26 | 101.4 | 0.21 | NM | NM |
| 17 July | 11:44am | 105.7 | 0.29 | 101.6 | 0.17 | NM | NM |
| 2 August | 10:18am | 103.3 | 0.21 | 101.6 | 0.21 | NM | NM |
| 24 August | 12:52pm | 104.0 | 0.54 | 102.0 | 0.18 | NM | NM |
| 29 August | 12:56pm | 106.4 | 0.20 | 103.3 | 0.20 | NM | NM |
| 6 September | 11:47am | 83.5 | 0.51 | NT | NT | NM | NM |
| 14 September | 11:29am | 107.0 | 0.84 | NT | NT | NM | NM |
| 28 September | 10:27am | 108.6 | 0.19 | 105.9 | 0.18 | NM | NM |
| 29 September | 10:07am | 105.5 | 0.17 | NT | NT | NM | NM |
| 6 October | 11:23am | 105.9 | 0.17 | NT | NT | NM | NM |
| 23 October | 12:29pm | NT | NT | 105.8 | 0.26 | NM | NM |
| 3 November | 12:07pm | 112.8 | 0.28 | 105.7 | 0.18 | NM | NM |
| 17 November | 11:57am | NT | NT | NT | NT | NM | NM |
| 29 November | 11:17am | 107.3 | 0.24 | NT | NT | NM | NM |
| 11 December | 10:49am | 110.3 | 0.23 | 108.7 | 0.18 | NM | NM |
| 15 December | 11.17 am | NM | NM | 108.0 | 0.30 | NM | NM |
| Criteria | | 115.0 | 5.00 | 115.0 | 5.00 | 115 | 5 |

Note: NT – Not Triggered, NM – Not Measured

¹ See **Figure 7**.

² Monitoring only undertaken at Location 3 when blasting is conducted in the Mid Pit or Northern Extraction Area.



6.4 AIR QUALITY

6.4.1 Introduction

Air quality monitoring is required to be undertaken in accordance with *Condition 3(17)* and the approved *Air Quality Management Plan* required under *Condition 3(20)* of PA10_0183.

Air quality monitoring at the Quarry has historically been undertaken for deposited dust, however, *Condition (3)17* requires that Total Suspended Particulates (TSP) and PM₁₀ also be monitored through the ongoing use of a High Volume Air Sampler (HVAS). Following discussions with the EPA in 2013, it was determined that TSP was not required to be monitored as it is recognised that the concentration of PM₁₀ particles is of greater importance given its nexus with potential health issues and background deposited dust levels (<4g/m²/month). This is reflected in the current version of EPL 536 dated 13 November 2015. TSP was not monitored by Metromix during 2017 and is not reported in this document.

The HVAS required to monitor for PM₁₀ is located at EPA Point 3, at the same location as the Rodgers Street deposited dust gauge.

Whilst supplementing monitoring data relating to Teralba Quarry, it is noteworthy that the HVAS was only installed to increase the overall network of stations throughout the Hunter area to enable EPA to better understand the PM₁₀ concentrations throughout the Hunter area. The comparatively low deposited dust results for almost 10 years strongly indicate PM₁₀ dust levels attributable to the Quarry will be well within the air operating goals and that the HVAS can be removed after this relationship is confirmed, with approval of the EPA.

6.4.2 Air Quality Monitoring Locations and Frequency

The current air quality monitoring network consists of five deposited dust gauges and the HVAS (see **Figure 8**). **Table 13** provides the coordinates of each location and the date established / sampling frequency respectively. The HVAS was installed in April 2014.

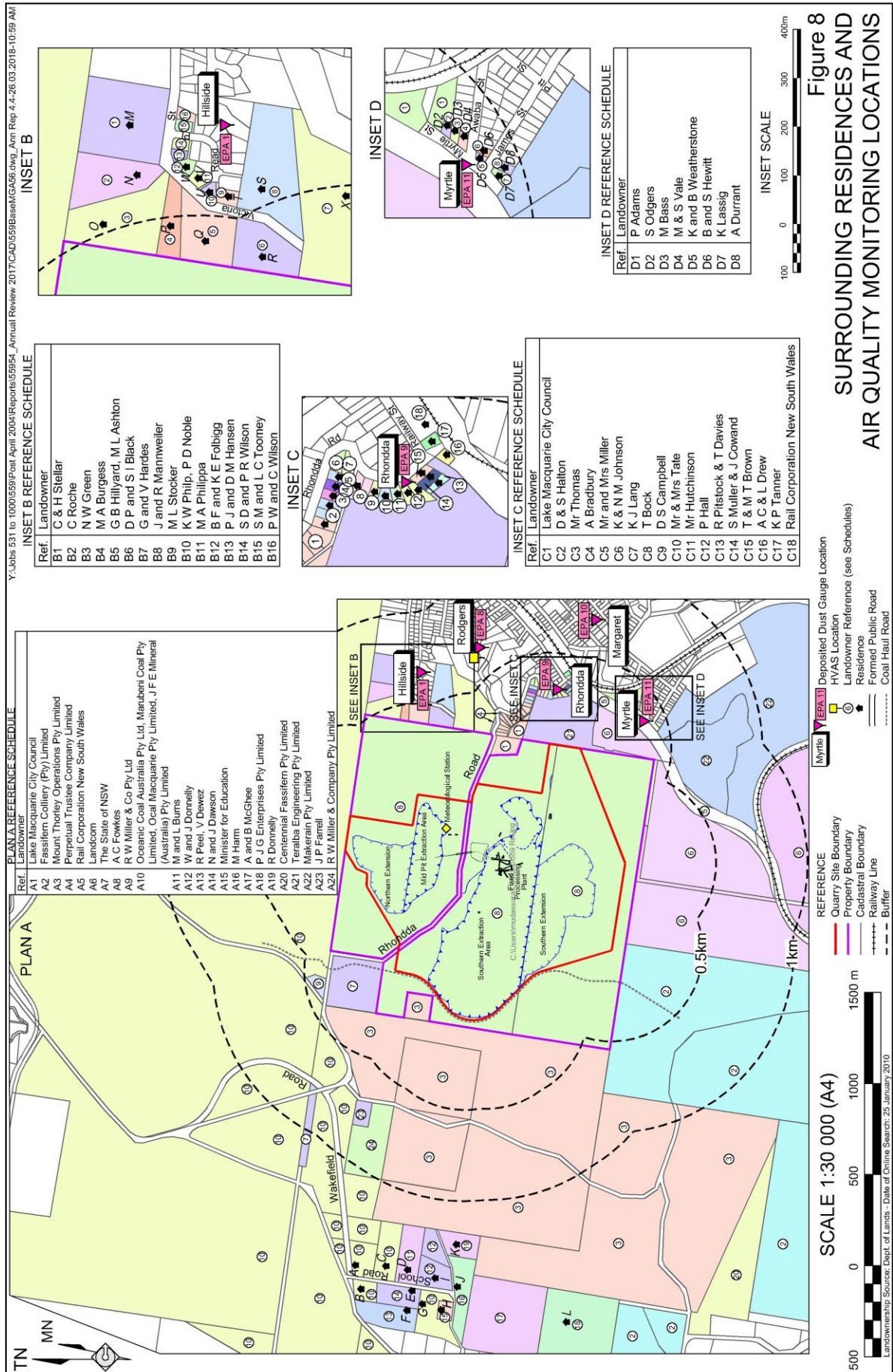
The location of the air quality monitoring equipment (primarily to the east of the Quarry / west of Teralba) was deduced given the prevailing and dominant winds originate from the southwestern quadrant during Autumn and Winter. Northerly winds and winds from the northeastern quadrant dominate during Spring and Summer.

Table 13
Locations of Air Quality Monitoring Equipment

| Monitoring Location* | Easting | Northing | Date Established | Sampling Frequency |
|----------------------|---------|----------|------------------|--------------------|
| DDG – Hillside | 369422 | 6352680 | June 2004 | Monthly |
| DDG – Margaret | 369622 | 6351763 | April 2011 | Monthly |
| DDG – Myrtle | 369071 | 6351492 | June 2004 | Monthly |
| DDG – Rhondda | 369240 | 6351972 | June 2004 | Monthly |
| DDG – Rodgers | 369467 | 6352369 | April 2011 | Monthly |
| Weather Station | 368413 | 6352751 | March 2013 | Continuous |
| HVAS | 369467 | 6352369 | April 2014 | 6 days |

* See Figure 8

DDG = Deposited Dust Gauge



6.4.3 Air Quality Criteria

The air quality criteria for the Quarry, as outlined within *Condition 3(17)* of PA10_0183, are provided in **Table 14**.

Table 14
Air Quality Criteria

| Pollutant | Criterion ^d | Averaging Period |
|--|---|---|
| Total suspended particulate matter (TSP) | 90µg/m ³ ^a | Annual mean |
| Particulate matter <10µm (PM ₁₀) | 50µg/m ³ 30µg/m ³ ^a 50µg/m ³ ^a | 24-hour maximum Annual mean (24-hour average, 5 exceedances permitted per year) |
| Deposited dust ^c | 4 g/m ² /month ^a 2 g/m ² /month ^b | Annual mean Maximum Increase |

^a No longer required under Condition M2.2 EPL 536;
^b Incremental impact (i.e.: incremental increase in concentrations due to the project on its own);
^c Deposited dust is to be assessed as insoluble solids as defined by Standards Australia, AS/NZS 3580010.1.2003: Methods for Sampling and Analysing Air-Determination of Particulate Matter – Deposited Matter – Gravimetric Method.
^d Excludes extraordinary events such as bushfires, prescribed burning, dust storms, sea fog, fire incidents, illegal activities or any other activity agreed by the Director-General in consultation with EPA.

6.4.4 Air Quality Monitoring Results

Table 15 presents the results of the deposited dust monitoring program and **Table 16** presents the results of the PM₁₀ monitoring during the reporting period.

Table 15
Deposited Dust Monitoring Results – 2017

| | Deposited Dust Levels (g/m ² /month) | | | | |
|---------------------|---|---------------------|-----------------------|----------------------|-----------------------|
| Residence ID | Rhondda ¹ | Myrtle ¹ | Hillside ¹ | Rodgers ² | Margaret ² |
| Criterion | 4 | 4 | 4 | 4 | 4 |
| Pre - 2017 Average* | 1.1 | 1.1 | 1.4 | 1.1 | 1.1 |
| 2017 Results | | | | | |
| January | 1.1 | 1.0 | 1.4 | 0.6 | 0.8 |
| February | 1.2 | 1.0 | 1.7 | 1.0 | 1.4 |
| March | 0.8 | 1.9 | 3.8 | 0.7 | 1.4 |
| April | 0.5 | 0.9 | 0.7 | 0.5 | 0.6 |
| May | 0.8 | 1.0 | 0.7 | 0.5 | 0.8 |
| June | 0.5 | 1.2 | 1.5 | 0.3 | 0.5 |
| July | 1.0 | 2.2 | 2.5 | 13.2 | 0.7 |
| August | 0.6 | 1.6 | 1.4 | 0.6 | 1.0 |
| September | 0.8 | 1.1 | 1.0 | 0.8 | 1.5 |
| October | 0.9 | 2.7 | 1.7 | 0.7 | 1.9 |
| November | 1.5 | 2.4 | 3.9 | 1.8 | 2.4 |
| December | 1.1 | 1.2 | 3.2 | 0.8 | 1.1 |
| Average | 0.9 | 1.5 | 2.0 | 1.8 | 1.2 |

* Based upon available results for deposited dust collected prior to the reporting period.
¹ Installed and operated since 2004
² Installed and operated since 2011

Table 16
PM₁₀ Air Quality Monitoring Results – 2017

| Month | Samples (Run Dates) | Monthly Average Result (µg/m ³) | Daily 24hr PM ₁₀ Exceedance | Annual Average (µg/m ³) |
|----------------|------------------------|---|---|--|
| Criteria | | 50 | 50 | 30 |
| January | 5 | 20.0 | No | |
| February | 4 | 21.3 | No | |
| March | 6 | 14.3 | No | |
| April | 5 | 7.4 | No | |
| May | 5 | 13.2 | No | |
| June | 5 | 12.4 | No | |
| July | 5 | 10.8 | No | |
| August | 5 | 14.2 | No | |
| September | 5 | 18.4 | No | |
| October | 5 | 12.6 | No | |
| November | 5 | 8.8 | No | |
| December | 5 | 20.2 | No | |
| Annual Average | | | | 14.3 |

6.4.5 Analysis of Results

The annual average deposited dust levels were compliant throughout 2017, although a single monthly exceedance of the 4g/m²/month was recorded at the Rodgers Street gauge in July (13.2g/m²/month). At the time that the dust gauge was collected, it was noted that the gauge was filled with dirt, vegetation and other matter, consistent with someone having tampered with the gauge. Monitoring throughout the remainder of the reporting period at this location was between 0.3g/m²/month and 1.8g/m²/month. As a result, no further actions were required by Metromix to reduce dust levels at this monitoring location, particularly given no complaints were submitted by the resident. It is noted that the results of deposited dust monitoring from 2017 are consistent with results recorded in 2016 and those predicted in the EA for the Quarry, though slightly elevated compared to the historic average.

There were no recorded exceedances of the maximum 24-hour PM₁₀ criteria or the annual average PM₁₀ criteria during the reporting period. This is consistent with the past years. Historical instances where particulate matter criteria have been exceeded have been caused by bush fires in the vicinity of the Quarry. There were no such events during the reporting period. The monitored particulate matter levels are lower than those predicted in the EA for the Teralba Extension Project, however, it should be noted that the predictions in the EA related to worst-case scenario operations that included operations in the later stages of the Southern Extension and operations in the Northern Extension. Operations in these areas are yet to commence and operations remain consistent with these predictions (i.e. no exceedances of the relevant criteria).

6.5 FAUNA HABITAT

6.5.1 Introduction

The installation of nesting boxes for the following species as outlined within *Condition 3(50)* was completed in April and September 2014 with their locations shown in **Figure 9**.

- 20 microbat nesting boxes.
- 20 Little lorikeet nesting boxes.
- 30 Squirrel glider nesting boxes.

During October and November 2017, a total of 18 nesting boxes were installed to replace those that had previously been damaged or destroyed. The location of the boxes was chosen to avoid the areas previously damaged by bushfire.

6.5.2 Nesting Box Usage

In order to mitigate against the impact of removal of hollow-bearing trees, nesting boxes have been installed to provide for replacement nesting sites for the targeted species. The nesting boxes were inspected between 30 October 2017 and 2 November 2017 by Kendall and Kendall Ecological Services. The Annual Nesting Box Inspection Report is provided as **Appendix 8** and provides coordinates for all nesting box locations and an update on box usage during the reporting period. In summary:

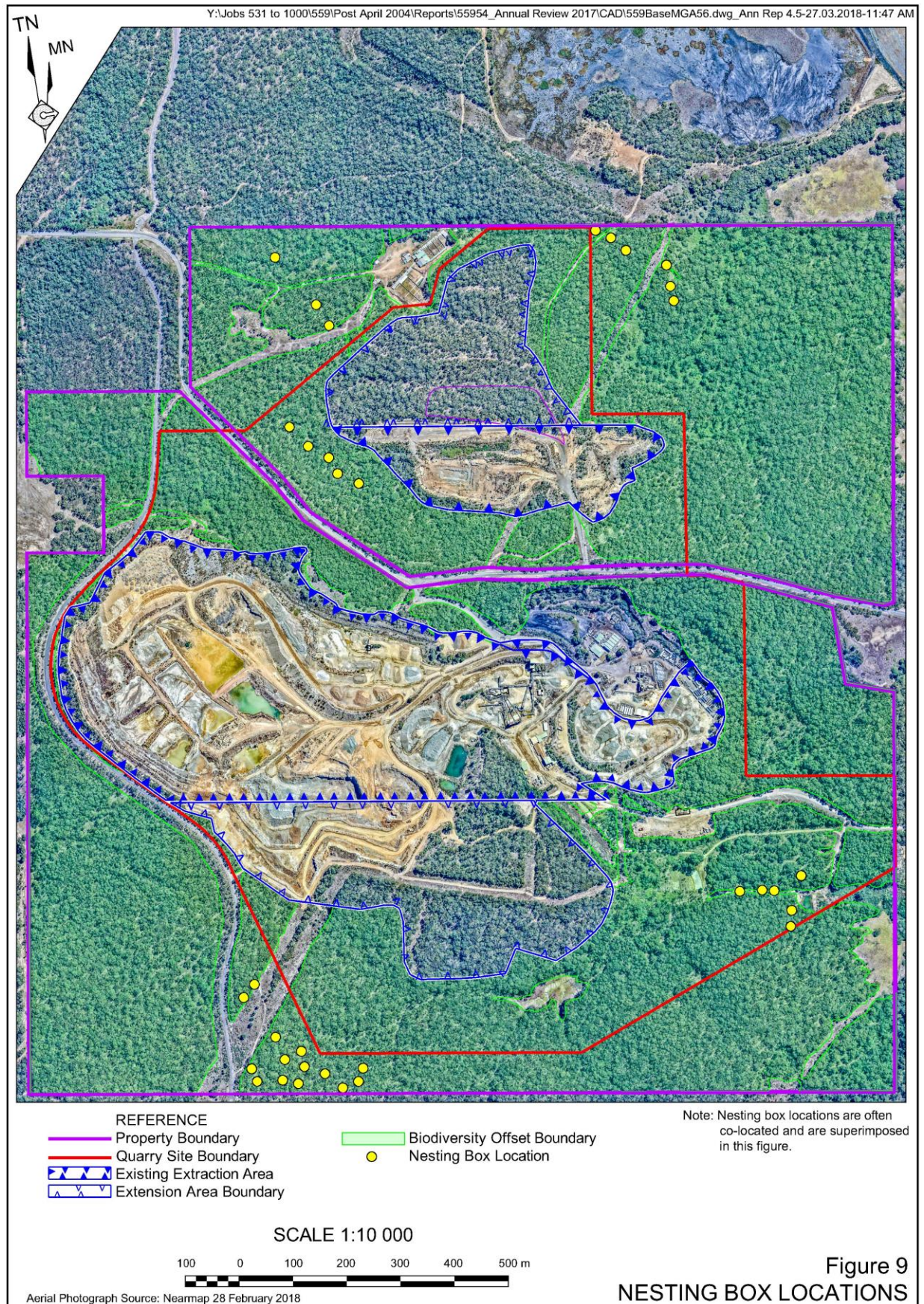
- no positive evidence of use by target species (Squirrel Gliders, Little Lorikeets or microbats) was found;
- a number of boxes had been frequented by common sugar gliders and several boxes had signs of nesting activity;
- a single bird egg shell was collected and identified as a possible white-throated treecreeper shell; and
- no feral honey bees were observed.

The Annual Nesting Box Inspection Reports again comments on the lack of success of the nesting box program given that the nesting boxes have been installed in locations to provide ideal habitat enhancement. However, there has been no evidence that the nesting boxes have been used by the target species since the boxes were installed.

6.6 VISIBILITY

During the reporting period, it was identified that the upper benches of the Southern Extension Extraction Area (Stage 1B) were visible from some parts of the residential areas in the vicinity of Speers Point. The upper benches that are visible represent only minor impacts, as Speers Point is more than 4.3km from the Quarry.

Plate 10 displays the area visible from Speers Point.



In order to mitigate visual impacts from these locations, Metromix prioritised revegetation activities on the two upper benches within Stage 1B with tubestock and placed logs, etc. (**Plate 7**) and trialled bitumen emulsion applications on the visible faces (**Plate 8**). While the bitumen emulsion trials were considered successful, it is recognised that tree screening will be important to provide a vegetated view consistent with the surrounding landscape.

Rehabilitation activities and progress are described in Section 8, however, the revegetation activities in Stage 1B had a 95% success rate during the reporting period and vegetation condition would continue to be monitored in this area.



Plate 10 **View of the Quarry from Speers Point**

7. WATER MANAGEMENT

7.1 INTRODUCTION

The most recent version of the Surface Water Management Plan for the Teralba Quarry was approved by DPE on 20 December 2016.

The surface water management system of the Quarry comprising Dams A to G continued to operate efficiently. Given the relatively dry weather conditions experienced in 2017, water was only released from site (Dam 8) on two occasions, i.e. in April 2017 and June 2017. The practice of pumping from Dam H to Dam G continued to reduce the quantity of water reporting to Dam D.

All water pumped or transferred around the Quarry was measured throughout the reporting period with a series of flow meters. No other changes to water management infrastructure occurred during 2017.

In feedback on the 2016 Annual Review for the Quarry, DPE requested that Metromix provide a summary of:

- the relevance of the Hunter River Salinity Trading Scheme; and
- the relevance of compensatory water supply.

The Hunter River Salinity Trading Scheme applies to discharge within the catchment of the Hunter River and is therefore not relevant to the Quarry as it lies within the catchment of Lake Macquarie and all water that discharges from the Quarry is discharged to Lake Macquarie, approximately 15km from the South Channel of the Hunter River.

Metromix was not required to supply water to any users whose water supply was affected by the Quarry operation. The nearest bore that is located down-gradient of the Quarry is stock/domestic well GW080494 in Fassifern Road, Fassifern, approximately 2.6km to the south. It is considered unlikely that Quarry activities will impact this bore.

7.2 WATER QUALITY

7.2.1 Introduction

Monitoring of surface water was undertaken on a monthly basis throughout the reporting period in accordance with the *Water Management Plan* for the Quarry.

It should be noted that the water monitoring program relates principally to surface water, although monitoring of water in Dam A (hereafter referred to as “Mine Adit Dam”) effectively relates to groundwater, as this water reaches the surface via a former mine adit associated with historic underground coal workings beneath the Quarry. No other groundwater monitoring is undertaken at the Quarry and based upon this, all water monitoring within this document relates only to surface water monitoring.

7.2.2 Water Quality Location, Sampling and Frequency

Water quality monitoring is required to be undertaken at EPA Point 4 (Mine Adit Dam overflow), EPA Point 5 (Discharge off site from Dam B), EPA Point 6 (Northwestern boundary into unnamed creek) and EPA Point 7 (Northeastern boundary to unnamed creek) with these locations shown on **Figure 10**.

Table 17 presents the required frequency and method of monitoring to be undertaken at the nominated EPA points, i.e. in the event water is flowing at the nominated locations.

Table 17
Surface Water Monitoring Requirements

| EPA Point | Frequency | Monitoring for: | Method |
|--|---|--|------------------------------|
| 4 | Monthly | pH, Total suspended solids (TSS), Electrical Conductivity (EC), oil and grease | Grab sample |
| 5 | Monthly and daily during discharge | pH, TSS, EC, oil and grease | Grab sample |
| 6 and 7 | Within 8 hours of discharge and weekly during discharge | pH, EC, TSS | Grab sample |
| 4 and 5 | Continuous (during discharge from monitoring point 4 – Dam B) | Flow | Flow meter/continuous logger |
| 4 and 5 ⁽¹⁾ | Monthly during discharge | aluminium, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, iron, lead, lithium, magnesium, mercury, molybdenum, nickel, selenium, silver, silica, tin, titanium, vanadium, zinc, calcium, electrical conductivity, nitrogen, phosphorus, potassium and sulphur | Grab sample |
| (1) Required as part of an EPA requested "pollution study". Metromix will make an assessment of metals in the discharge, in accordance with the ANZECC water quality guidelines and provide this to the EPA. | | | |

7.2.3 Water Quality Assessment Criteria and Results

Water quality is required to be monitored at all nominated locations for pH and total suspended solids (TSS) with Electrical Conductivity (EC) monitoring also required at EPA Points 6 and 7 in the event of water discharge from these locations. There is no requirement within EPL 536 to monitor for oil and grease, however, if oil and grease is observed during sampling on two successive monthly sampling events, a full hydrocarbon sampling suite will be conducted on the samples collected during the following monthly period. **Table 18** presents a summary of the results of the surface water quality monitoring program during the reporting period. The results of the entire surface water monitoring program are provided in full in **Appendix 2**.

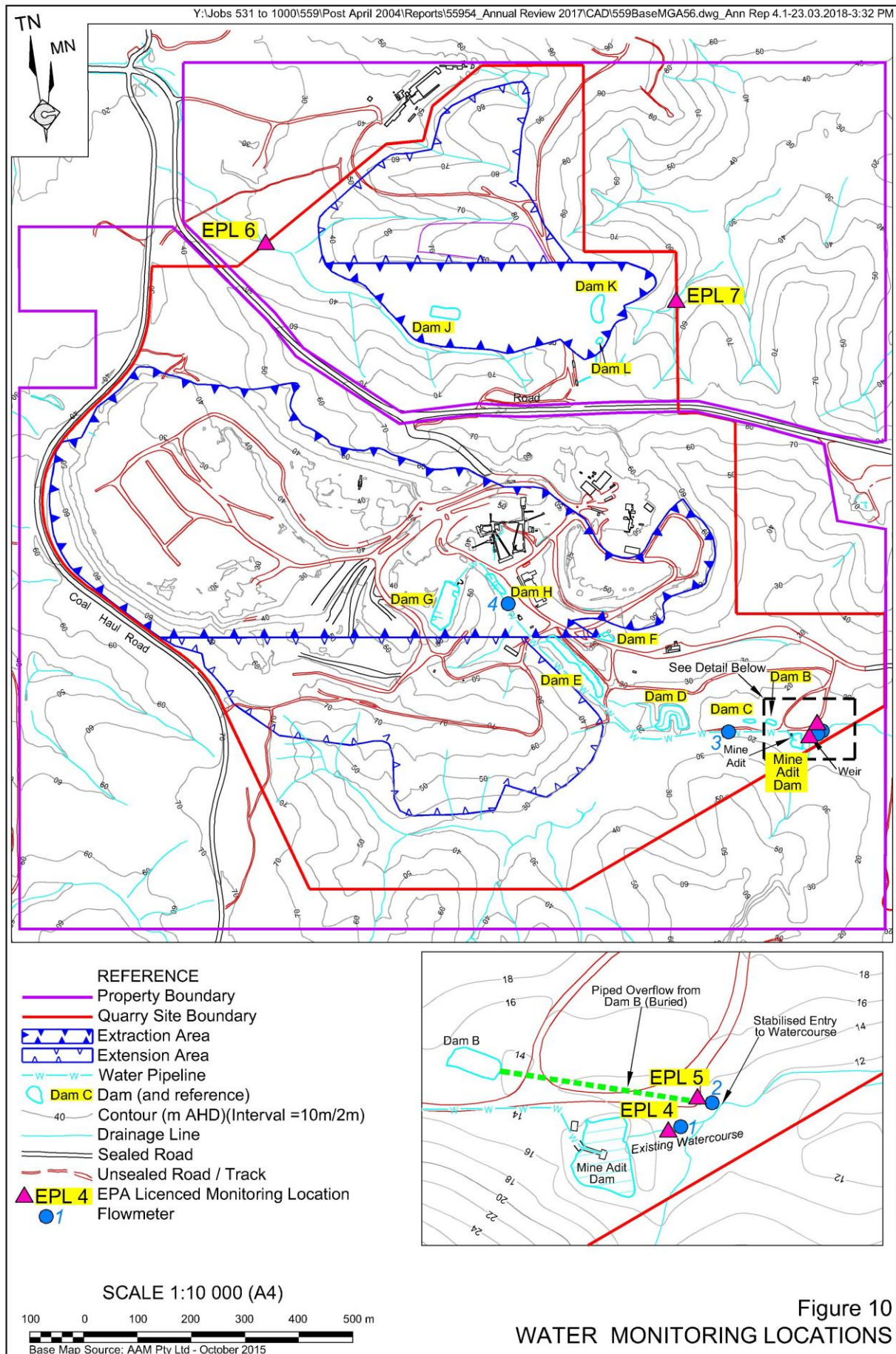


Table 18
Surface Water Monitoring Results – 2017

| | pH | EC | TSS | Comments | Method |
|--|--------------|---------------------|------|--|-------------|
| Units | pH Units | µS/cm | mg/L | | - |
| EPL Criterion* | 6.5-8.5 | NA | <50 | | - |
| ANZECC Water Quality Limits | 6.5-8.5 | NA | <50 | | - |
| EPA Discharge Point 4 – Mine Adit Dam (Monthly) | | | | | |
| January | 6.94 | 2050 | 20 | | Grab Sample |
| February | 7.13 | 1930 | 18 | | |
| March | 7.31 | 1800 | 11 | | |
| April | 7.36 | 1840 | 5 | | |
| May | 7.09 | 1750 | 8 | | |
| June | 7.49 | 1730 | 20 | | |
| July | 7.77 | 1950 | 6 | | |
| August | 7.28 | 1970 | 15 | | |
| September | 7.46 | 2520 | 8 | | |
| October | 7.42 | 2070 | 16 | | |
| November | 7.19 | 2050 | <5 | | |
| December | 7.15 | 2230 | <5 | | |
| EPA Discharge Point 5 – Dam B (Daily during Discharge) | | | | | |
| January | No Discharge | | | | Grab Sample |
| February | | | | | |
| March | | | | | |
| April | 7.07 | 1030 | 12 | EC during discharge lower than that recorded at Adit Dam | |
| May | No Discharge | | | | |
| June | 6.97 | 1020 | 10 | EC during discharge lower than that recorded at Adit Dam | |
| July | No Discharge | | | | |
| August | | | | | |
| September | | | | | |
| October | | | | | |
| November | | | | | |
| December | | | | | |
| EPA Discharge Point 6 – Northwestern Boundary to Creek (During and Following Discharge) | | | | | |
| There were no instances of water discharged from EPA Point 6 during the reporting period | | | | | |
| EPA Discharge Point 7 – Northeastern Boundary to Creek (During and Following Discharge) | | | | | |
| There were no instances of water discharged from EPA Point 7 during the reporting period | | | | | |
| * EPL 536 Condition L1.1 nominates the licensee must comply with Section 120 of the Protection of the Environment Operations Act 1997. As such, the ANZECC water quality guidelines have been adopted. | | | | | |
| NA = Not Applicable | | ND = Not Determined | | NS = Not Sampled | |

Although the Quarry does not discharge water to the Mine Adit Dam, this dam naturally discharges to the downstream watercourse on a regular basis and, as it is located within the area of management for the Quarry, Metromix has committed to monitor the water quality and discharge volumes.

Reporting is currently only required for water pumped from the Mine Adit Dam to Dam G for Department of Primary Industries – Water and represents groundwater intercepted from the Mine Adit as well as water volumes leaving site from EPA Point 4 (Mine Adit Dam) and EPA 5 (Dam B) for reporting to the EPA. **Table 19** displays the water flow measurements monitored between the Mine Adit Dam to Dam G during the reporting period.

Table 19
Surface Water Flow Measurements – Mine Adit Dam to Dam G – 2017

| Date | Flow Meter Readings | Usage (ML) |
|--------------|---------------------|----------------|
| 3/1/2017 | 1392482 | 0.0 |
| 1/2/2017 | 1443962 | 51.5 |
| 2/3/2017 | 1511683 | 67.7 |
| 5/4/2017 | 1603844 | 92.2 |
| 1/5/2017 | 1678649 | 74.8 |
| 2/6/2017 | 1784042 | 105.4 |
| 7/7/2017 | 1908661 | 124.6 |
| 1/8/2017 | 1993407 | 84.7 |
| 4/9/2017 | 2107282 | 113.9 |
| 3/10/2017 | 2210486 | 103.2 |
| 2/11/2017 | 2312157 | 101.7 |
| 1/12/2017 | 2405328 | 93.2 |
| 4/1/2018 | 2469040 | 63.7 |
| Total | | 1 076.6 |

7.2.4 Discussion of Results

In comparison to the water quality limits nominated in **Table 20**, the following comments are relevant.

1. pH values within the Mine Adit Dam varied from 6.94 to 7.77 with a median pH of 7.30. Discharge from Dam B occurred on two occasions during the reporting period, with the pH values near neutral at 6.97 and 7.07 which are within the EPL and ANZECC criterion of 6.5 to 8.5.
2. EC values were monitored within the Mine Adit Dam and recorded a range between 1 730µS/cm and 2 520µS/cm and a median value of 1 990µS/cm. EC values recorded during discharge from Dam B was generally lower than that recorded at Adit Dam.
3. TSS values were within the EPL criterion and ANZECC guideline level, with all samples returning levels below 20mg/L.

Table 20
Comparison of Guideline Trigger Values and Median Values
from Pollution Program Sampling – 2017

| Location | | EPA Point 4 | | EPA Point 5 | |
|-----------------------------|------------------------------------|--------------------|----------------------|--------------------|----------------------|
| Fraction | | Total (unfiltered) | Dissolved (filtered) | Total (unfiltered) | Dissolved (filtered) |
| Value | Guideline * | Median | Median | Median | Median |
| Analyte | | | | | |
| pH | 6.5 to 8.5 units ^a | 7.35 | N/A | 7.02 | N/A |
| Conductivity | 125 - 2200 µS/cm ^b | 2 060 | N/A | 1 025 | N/A |
| TSS | <50 ^a mg/L ^a | 11.5 | N/A | 11.0 | N/A |
| Oil and Grease | <5 mg/L ^a | <5 | N/A | <5 | N/A |
| Aluminium | <0.055 mg/L | 0.095 | 0.02 | 0.235 | <0.01 |
| Ammonia | <0.02 mg/L ^b | 0.045 | N/A | 0.04 | N/A |
| Antimony | ID | 0.001 | <0.001 | <0.001 | <0.001 |
| Arsenic | <0.013 mg/L | 0.001 | 0.001 | 0.007 | 0.001 |
| Barium | NA | 0.033 | 0.0305 | 0.0425 | 0.0265 |
| Beryllium | ID | <0.001 | <0.001 | <0.001 | <0.001 |
| Boron | <0.37 mg/L | 0.16 | 0.14 | 0.13 | 0.13 |
| Cadmium | <0.0002 mg/L | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Calcium | NA | N/A | 52 | N/A | 31.5 |
| Chromium | <0.001 mg/L | <0.001 | 0.006 | <0.001 | <0.001 |
| Cobalt | ID | 0.002 | <0.001 | 0.013 | 0.001 |
| Copper | <0.0014 mg/L | 0.001 | 0.001 | 0.002 | <0.001 |
| Iron | ID | 0.255 | <0.05 | 2.385 | 0.155 |
| Lead | <0.0034 mg/L | <0.001 | <0.001 | <0.001 | <0.001 |
| Lithium | NA | 0.0375 | 0.0325 | 0.0145 | 0.013 |
| Magnesium | NA | 62.5 | 59 | 32.5 | 33 |
| Manganese | <1.9 mg/L | 0.1575 | 0.119 | 0.3095 | 0.192 |
| Mercury | <0.0006 mg/L | <0.0001 | <0.0001 | <0.0001 | <0.0001 |
| Molybdenum | ID | 0.002 | 0.002 | 0.003 | 0.001 |
| Nickel | <0.011 mg/L | 0.007 | 0.006 | 0.007 | 0.003 |
| Phosphorous as P | <0.025 mg/L ^c | 0.01 | N/A | 0.01 | N/A |
| Potassium | NA | N/A | 8 | N/A | 5.5 |
| Selenium | <0.011 mg/L | <0.01 | <0.01 | <0.01 | <0.01 |
| Silicon as SiC ₂ | NA | 13.3 | 13.35 | 23.55 | 22.15 |
| Silver | <0.00005 mg/L | <0.001 | <0.001 | <0.001 | <0.001 |
| Sulfur as S | NA | N/A | 103.5 | N/A | 47.5 |
| Tin | ID | <0.001 | <0.001 | <0.001 | <0.001 |
| Titanium | NA | <0.01 | <0.01 | <0.01 | <0.01 |
| Vanadium | ID | <0.01 | <0.01 | <0.01 | <0.01 |
| Zinc | <0.008 mg/L | 0.009 | 0.0055 | <0.005 | <0.005 |

Key

*All values sourced from Table 3.4.1 ANZECC except where indicated

ID = Insufficient Data

NA = Not Applicable

ND = Not Determined

LOR = Limit of Reporting

^a Environment Protection Licence 536

^b Based on ANZECC Guidelines slightly disturbed lowland river ecosystems in south-east Australia (ANZECC 2000)

^c Sourced from <http://www.environment.nsw.gov.au/ieo/LakeMacquarie/report-03.htm#support1> (doi 20161404)

Values in **bold** type indicate exceedance of guideline values

7.2.5 Pollution Study Results

In August 2013, Metromix committed to undertaking a ‘pollution study’ of water from the Mine Adit, a proportion of which eventually enters Lake Macquarie, to determine the levels of suspended and dissolved metals. The results of monitoring undertaken during 2017 at EPA Point 4 and EPA Point 5 as part of this ‘pollution study’ are provided in **Appendix 2**. During 2015, Metromix continued to monitor suspended and dissolved metals, with results regularly submitted to the EPA for review. **Table 20** contains a statistical presentation of the data collected at EPA Point 4 and EPA Point 5 for the reporting period. Two samples were collected at EPA Point 5 during the reporting period (April 2017 and June 2017) as there were only two instances of discharge at this location.

The statistical methods employed for the presentation are in agreement with the Australian Guidelines for Water Quality Monitoring and Reporting (NWQMS, 2000) and ANZECC methodology for comparing test site data (e.g. EPA Point 4 and EPA Point 5) with trigger values. The trigger values utilised in this assessment were obtained from ANZECC and are for the protection of the aquatic ecosystem environmental value, as these trigger values offer the highest level of protection for the identified environmental values (aquatic ecosystem, visual amenity and secondary contact recreation), for the water type (waterway affected by urban development). This water type has previously been determined by the former Department of Environment, Climate Change and Water for the Lake Macquarie and Tuggerah Lakes catchments. The level of protection (95% of species), is that for a “slightly/moderately disturbed” system, in accordance with NSW policy.

The suggested approach to assessment of the program follows guidance contained in ANZECC, whereby the median value from sample concentrations collected as part of the program is compared with the relevant guideline value, published in Table 3.4.1 of ANZECC and applied at the 95% species protection level.

In September 2016, a report was submitted to the EPA summarising the monitoring records between September 2013 and August 2016. This report was prepared in accordance with *Conditions U1.3* of EPL 536 to complete Metromix’s requirements for this program. A copy of this report including all monitoring results between September 2013 and August 2016 is included as **Appendix 3**. A response and feedback is awaited from the EPA regarding the results and the ongoing monitoring requirements. Metromix has determined to continue monitoring until a response is received from the EPA and a decision made on the future of the pollution study.

With respect to suspended and dissolved metals, the results collected for the pollution study indicate virtually no exceedances of guideline trigger values over the course of the pollution study (see **Appendix 3**). The dissolved toxicant fraction is considered the most bioavailable and significantly influences the toxicity effects on aquatic biota arising from metals concentrations in waters (ANZECC). There was only one exceedance of the trigger guideline value for dissolved toxicants during the reporting period, which related to a single sample that contained elevated Chromium (EPA Point 4 monitoring in July 2017). All other samples did not detect Chromium and therefore this result is considered to be an anomaly.

The results of sampling and analyses for the total fraction of toxicants indicates some exceedances of guideline values. However, it should be noted that these results are derived from analyses of unfiltered samples and may be due to the presence of colloidal material. In addition, TSS results for all samples are well below the guideline values suggesting that, despite some exceedance of trigger values, it is doubtful that discharge from EPA Point 4 and EPA Point 5 significantly contribute to the total load of metals in the receiving system.

7.2.6 Conclusion

Water testing at Metromix's Teralba Quarry has demonstrated that the Quarry operations have not adversely impacted the water quality in the surrounding and downstream areas of the Quarry. This is consistent with the water monitoring results from 2015 and 2016 and indicates that the Quarry continues to operate with negligible impact to the quality of water in Lake Macquarie.

8. REHABILITATION

8.1 REHABILITATION PERFORMANCE DURING THE REPORTING PERIOD

Limited opportunities were available for rehabilitation activities during 2017 as:

- silt was actively being placed in Silt Cells 5, 6, 7, 8, 9 and 10 therefore the construction of these silt cells had not yet progressed sufficiently for rehabilitation activities to occur within this area;
- only two short active extraction benches, facing north and approximately 80m long were rehabilitated in 2017; and
- the remainder of the previously disturbed area within the Quarry Site that is not required for operational purposes has been previously rehabilitated except for the Mid Pit Extraction Area.

The status of land under rehabilitation adjacent to and above the former Silt Cell 1 is provided in **Plates 5** and **6**. The majority of rehabilitation works undertaken during the reporting period occurred within the Northern Area and non-operational areas in the form of weed reduction and eradication programs. **Figure 11** identifies the location of weeding activities undertaken throughout the reporting period.

T.E.N.T.A.C.L.E. Inc. prepared a progress report of the regeneration works undertaken during 2017 on behalf of Metromix, summarising the aims, methods and results of the rehabilitation works. A copy of the progress report by T.E.N.T.A.C.L.E Inc. is reproduced in **Appendix 7**.

A variety of weed control methods were used including the removal of target weed species through both manual and chemical controls such as cut/scrape and paint or splatter gun application of herbicide, hand removal or seed head removal. Weed management activity focussed upon the following weeds during the reporting period.

- Lantana (*Lantana camara*)
- Camphor Laurel (*Cinnamomum camphora*)
- Crofton weed (*Ageratina adenophora*)
- Asparagus Fern (*Asparagus aethiopicus*)
- Pampas grass (*Cortaderia selloana*)
- Ochna (*Ochna serrulata*)
- Wild tobacco (*Solanum mauritianum*)
- Cassia (*Senna pendula* var. *glabrata*)
- Narrow-leaf Privet (*Ligustrum sinense*)
- Bitou bush (*Chrysanthemoides monilifera*)

A targeted campaign within the operational areas of the Quarry focused on removal of Pampas grass (*Cortaderia selloana*) and was considered successful by T.E.N.T.A.C.L.E. Inc.



In 2015, a total of 40 endangered *Tetratheca juncea* were translocated with a survival rate of 80% being reported four months after translocation. Officers of T.E.N.T.A.C.L.E. Inc. revisited the translocation area during 2017 and reported that 75% of the original population survived over the past 12 months.

A total of 600 tree saplings, 720 native shrubs and over 6 000 native grasses were planted in November 2017, the majority being in the rehabilitation area over Silt Cell 1 and the remaining plants at the upper two benches of Stage 1B that faces north. Due to the dry conditions experienced over December 2017, hand watering was undertaken, as needed. At the time this document was finalised, the survival rate with both the tree saplings and the native shrubs has been well above expectations and estimated to be at 80% or above.

The 190 tree saplings were planted in 2015 on a completed section of the final landform continue to thrive.

During late 2017, preliminary activities began around the extraction limit of Stage 1B to prepare the land for rehabilitation, which is expected to commence in March and April 2018.

8.2 BIODIVERSITY OFFSET MANAGEMENT

8.2.1 Introduction

As described in Section 3, Metromix has submitted an application to modify the wording of conditions related to the biodiversity offsetting obligations of the Teralba Extension Project. At the time that this document was finalised, the application had not been determined.

However, assuming that the modification is approved, it is proposed that the following actions would be undertaken during 2018.

- A biodiversity offset strategy would be prepared and submitted for approval by DPE and OEH by 30 June 2018.
- A biodiversity bond would be lodged within 6 weeks of approval of the biodiversity offset strategy.
- By 31 December 2018, Metromix would make the necessary arrangements to commence implementing the biodiversity offset strategy.

8.2.2 Discussion

Progressive rehabilitation activities have been reviewed in relation to the rehabilitation objectives described in Condition 55 of Schedule 3 of PA 10_0183 and presented in **Table 21**.

Progressive rehabilitation activities have continued generally in accordance with the planned progress for rehabilitation described in the approved Landscape Management Plan and similar to that undertaken in previous years.

Table 21
PA10_0183 Condition 3(55) Rehabilitation Objectives

| Feature | Objectives | Comments |
|------------------------------------|--|--|
| Site (as a whole) | Safe, stable and non-polluting. | Areas subject to progressive rehabilitation satisfy this objective. Backfilling of silt cells is occurring progressively to ensure these areas are stable and suitable for revegetation activities. |
| Surface Infrastructure | To be decommissioned and removed, unless the Director-General agrees otherwise. | No areas have required decommissioning of infrastructure to date. |
| Benched Quarry Walls | Landscaped and revegetated utilising native tree and understorey species, ensuring that the tree canopy is restored and integrated with the surrounding canopy to minimise visual impacts. | Revegetation activities on the two upper benches within Stage 1B applied a selection of native tree flora species in accordance with the species described in the Landscape Management Plan. A success rate of 95% was reported by T.E.N.T.A.C.L.E. Inc. |
| Quarry Pit Floors and Silt Ponds | Landscaped and revegetated utilising native flora species and felled trees from clearing. Revegetation not required for existing and proposed industrial areas. | Revegetation activities on the Quarry floor areas to the west of the Southern Extraction Area (see Figure 11) applied available mulch and leaf litter material and a selection of native tree flora species in accordance with the species described in the Landscape Management Plan. A success rate of 95% was reported by T.E.N.T.A.C.L.E. Inc. |
| Other land affected by the Project | Restore ecosystem function, including maintaining or establishing self-sustaining eco-systems comprised of: <ul style="list-style-type: none"> • native endemic species: and • a landform consistent with Figure 8 (Appendix 6) and the surrounding environment. | Progressive rehabilitation has applied native endemic species described in the approved Landscape Management Plan. Progressive final landform development is considered to be consistent with Appendix 6 of PA 10_0183. |

8.3 REHABILITATION DURING THE NEXT REPORTING PERIOD

The subsoil, topsoil and biomass from Stage 1B will be relocated throughout 2017, together with the ongoing establishment of the proposed rehabilitation area over the remainder of Silt Cell 2 and the remaining section of Silt Cell 1. Placement of overburden and soil/biomass is proposed on the initial upper terminal bench in Stage 1B.

T.E.N.T.A.C.L.E Inc. will continue to be used on site for approximately 800-man hours per year to control weeds throughout the Quarry Site as well as plant seedlings and monitoring plant health. Lantana will again be targeted in areas defined as “poor condition”.

A further planting program will be undertaken during the reporting period, principally in an area of approximately 1.2ha above and surrounding Silt Cell 1 and on the initial upper bench completed in Stage 1B. An area of 0.8ha to 1.2ha would be prepared for future rehabilitation activities in the vicinity of Silt Cell 2.

9. COMMUNITY

9.1 SURROUNDING COMMUNITY

Figure 12 displays the land ownership and residences surrounding the Quarry. During the reporting period, it is understood that there were no changes to the land ownership surrounding the Quarry. Metromix maintained contact with its closest neighbours throughout 2017 through informal discussions and involvement with the Community Consultative Committee.

9.2 COMMUNITY CONSULTATIVE COMMITTEE MEETINGS

One meeting of the Teralba Quarry Community Consultative Committee (TQCCC) was held during the reporting period on 11 October 2017.

The minutes of the meeting is provided as **Appendix 5**. A brief overview of the meeting is provided below.

11 October 2017 CCC Meeting

Mr William Sanderson presented a report on the activities undertaken for the year to date. The committee was updated on the progress of the VPA being registered, the proposed modification for both Biodiversity Offset and future Quarry development plans.

9.3 ENVIRONMENTAL COMPLAINTS

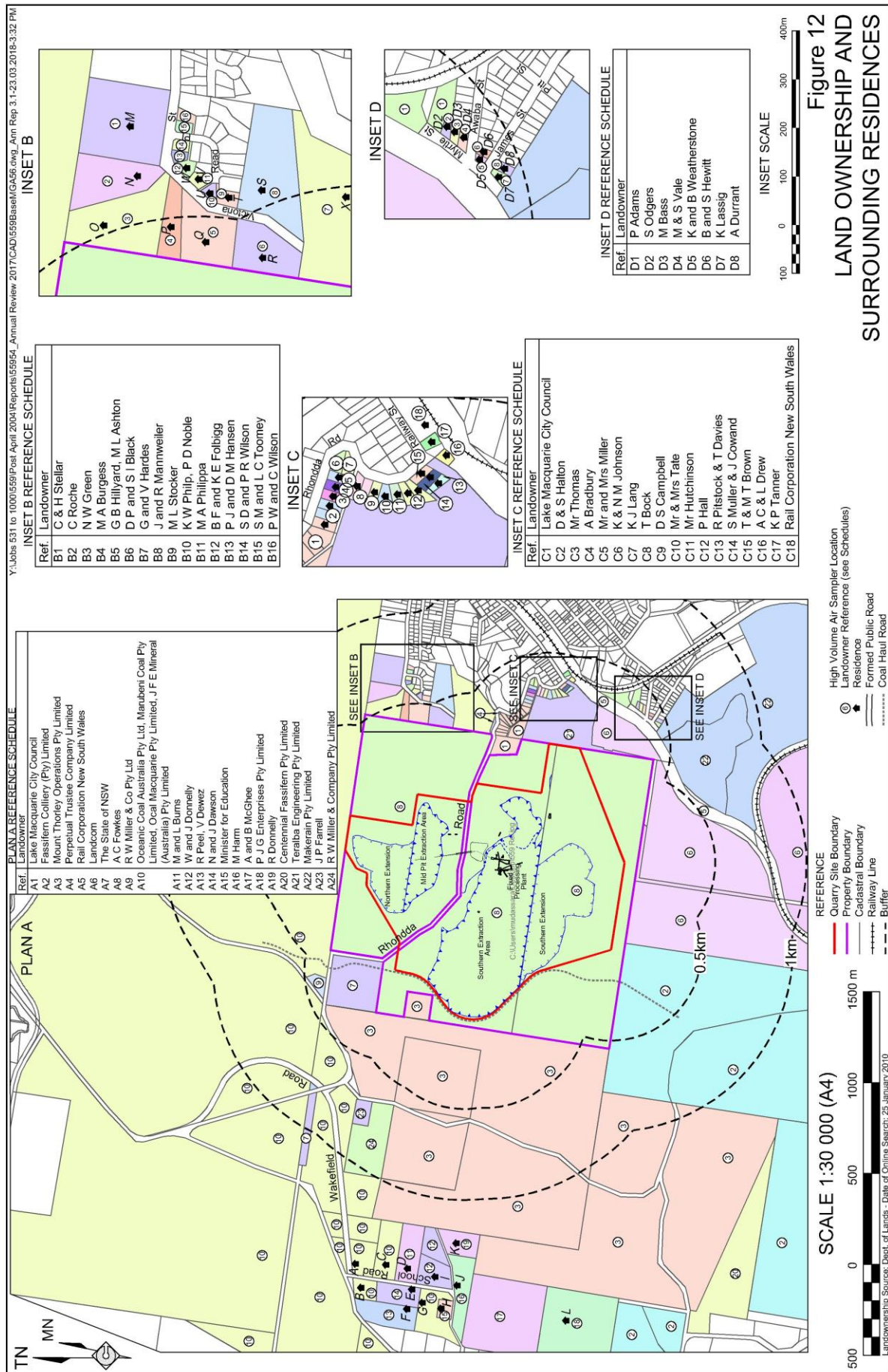
Metromix received one complaint as a result of its activities in 2017. A summary is provided below. A copy of the complaints record is provided in Appendix 6. This complaint is consistent with the history of very few complaints at the Quarry. It should also be noted that the majority of historical complaints have related to traffic or transport matters, which was not the case this year. This demonstrates Metromix's successful management of transport operations during the reporting period.

August 2017

A community member complained that the consultant conducting noise monitoring was parked outside of their house in the early hours of the morning and asked that they move. When further noise monitoring was conducted in November, the monitoring was undertaken at a location 30m to the south of the property so that the noise setting, and Quarry noise levels might be accurately recorded but the landowner would not be disturbed.

9.4 COMMUNITY INVOLVEMENT

Throughout the reporting period, Metromix sponsored one annual event at the Teralba Bowling Club and donated over \$12,000 to the Teralba Public School. Metromix also supported the Variety Club Bash.



10. INDEPENDENT AUDIT

An Independent Environmental Audit was undertaken at the Quarry by Trevor Brown & Associates on 20 and 21 February 2017 and the Audit Report was submitted to DPE in March 2017 with a Response to Audit Recommendations document. The nominated audit period was February 2014 to February 2017.

While the Audit Report focuses on the conditional requirements of PA 10_0183 (including the Statement of Commitments) and Environment Protection Licence 536, Trevor Brown & Associates also reviewed the approved management plans for the Quarry and other relevant documents pertaining to the operations of the Quarry during the audit period.

On 27 September 2017, DPE requested that the Audit Report and Response to Audit Recommendations be updated to address a range of comments that arose from the Department's review of the documents. Revised and updated documents were submitted on 3 November 2017. At the time that this document was finalised, no final response on the Audit Report and Response to Audit Recommendations had been received from DPE.

In total, the 2017 audit identified the following non-compliances for the audit period.

- Three low risk non-compliances with PA 10_0183.
- Eight administrative non-compliances with PA 10_0183.
- A single moderate risk non-compliance with EPL 536.
- A single low risk non-compliance with EPL 536.
- Six administrative non-compliances with EPL 536

However, it is noted that the single low risk non-compliance and three of the administrative non-compliances were repeated for the audits of PA 10_0183 and EPL 536 as similar conditions are included in both documents.

A summary of management measures implemented as a result of the audit process includes the following.

- Additional water sprays were been installed in June 2016 to clean down truck tyres and bodies and roads that are heavily trafficked have been sealed with concrete to limit silt and clay movement.
- The frequency of compliance noise monitoring has been increased to comply with the approved Noise Management Plan and EPL 536 in both 2016 and 2017. This frequency would be continued in 2018.
- Measures have been successfully implemented with blast contractors to ensure blast events are limited to one per day. However, it is noted that blast contractors did not monitor blast impacts at Location 1 on 15 December 2017 (a second location was monitored successfully and demonstrated compliance).
- Metromix has put in place measures to ensure that future reporting and notification of incidents, including all exceedances of criteria and matters that may be considered trivial or are beyond the control of Metromix, will occur in accordance with the conditions of PA 10_0183 and EPL 536.

- Renewed focus has been placed on operational planning, driver training and management to limit transport-related exceedances. There were no transport-related incidents or non-compliance issues during 2017.

It should also be noted that a range of technical non-compliance issues were raised but were considered beyond the control of Metromix, such as technical issues with the meteorological station that resulted in data not being recorded during some periods. In summary, the Audit Report identified that the operation and management of the Teralba Quarry remains generally compliant with the conditional requirements of PA 10_0183 and EPL 536.

11. INCIDENTS AND NON-COMPLIANCES DURING THE REPORTING PERIOD

11.1 COMPLIANCE ASSESSMENT

11.1.1 Project Approval PA10_0163

An internal environmental compliance review was undertaken in February 2018 by Mr William Sanderson (Manager Quarries) and has been included within **Appendix 4**, drawing upon the compliance tables incorporated within the independent audit undertaken by Trevor Brown & Associates (Brown, 2017).

Two non-compliance issues were identified during the reporting period, as follows.

- In the period between the 3 and 21 November 2017 the humidity sensor on the weather station failed and a replacement part had to be sourced.
- On 15 December, one blast monitor wasn't set up and working to monitor blast impacts at Location 1.

It should be noted that both issues related to monitoring activities and did not threaten environmental harm as a result of the Quarry activities.

11.1.2 Environment Protection Licence

Metromix holds Environment Protection Licence (EPL) 536 for a 'land-based' extractive industry. The licence has an anniversary date of 01 June. The Annual Return covering the reporting period to 1 June 2017 identified no non-compliances with the conditions of the licence during the period from July 2016 to June 2017.

As noted in Section 11.1.1, two non-compliance issues were identified during the second half of the reporting period. These events were not compliant with the following conditions of EPL 536.

- Condition M4.1 – meteorological conditions monitoring.
- Condition M8.1 – blast monitoring.

EPL 13015 was transferred to Metromix in July 2015 and relates to resource recovery and storage activities associated with the operation of the pugmill. These activities are relevant to PA 10_0183 and therefore not considered in this document.

11.1.3 Discrepancies with Predicted and Actual quarry operations

As prescribed by *Condition 5(4)(e)*, the identification of discrepancies between the predicted and actual impacts of the Quarry are to be provided within this document with any significant discrepancies analysed to determine the potential cause and follow-up actions taken.

An analysis was undertaken as part of the internal environmental compliance review (see **Appendix 4**), noting that "the operation of the Teralba Quarry development is generally in accordance with the predictions in the Environmental Assessment", with no significant discrepancies identified. No change occurred to the operations of the Quarry throughout 2017 that would contribute to any discrepancies in impacts.

12. ACTIVITIES TO BE COMPLETED DURING THE NEXT REPORTING PERIOD

12.1 INTRODUCTION

The following section provides a brief summary of the operational activities planned throughout the 2018 reporting period. **Figure 13** presents the location(s) of the activities described.

12.2 EXTRACTION OPERATIONS

Extraction would continue in the Southern Extraction Area within Stage 1A and Stage 1B (North) (see **Figure 13**).

12.3 PROCESSING

Processing activities will continue as per the current reporting period in 2018 with approximately 60% being washed. It is forecast that approximately 500,000t of product will be despatched from the Site.

12.4 RECYCLING OPERATIONS

Sale of the remaining material previously stockpiled as part of Civilake's operations. Metromix in 2018 to blend conglomerate and concrete washout waste to produce a saleable recyclable roadbase for the civil market.

12.5 OVERBURDEN AND SILT MANAGEMENT

Overburden will be moved in stages during the year as the Stage 1B (North) pit continues to develop. Approximately 40,000t will be moved to cover Silt Cells 3 and 4 construct other silt cells.

12.6 WASTE MANAGEMENT

General waste, co-mingled Council recycling, paper and cardboard, scrap steel, waste oil, oil filters, etc. will continue to be collected by licenced contractors and volumes and dates recorded.

12.7 SITE INFRASTRUCTURE AND SERVICES

Boundary fencing and gates at easement areas along Rhondda Rd will continue to be replaced/upgraded (see **Figure 13**).

It is also intended that Metromix will finalise design and relevant agreements to complete realignment of the power line corridor during 2018.

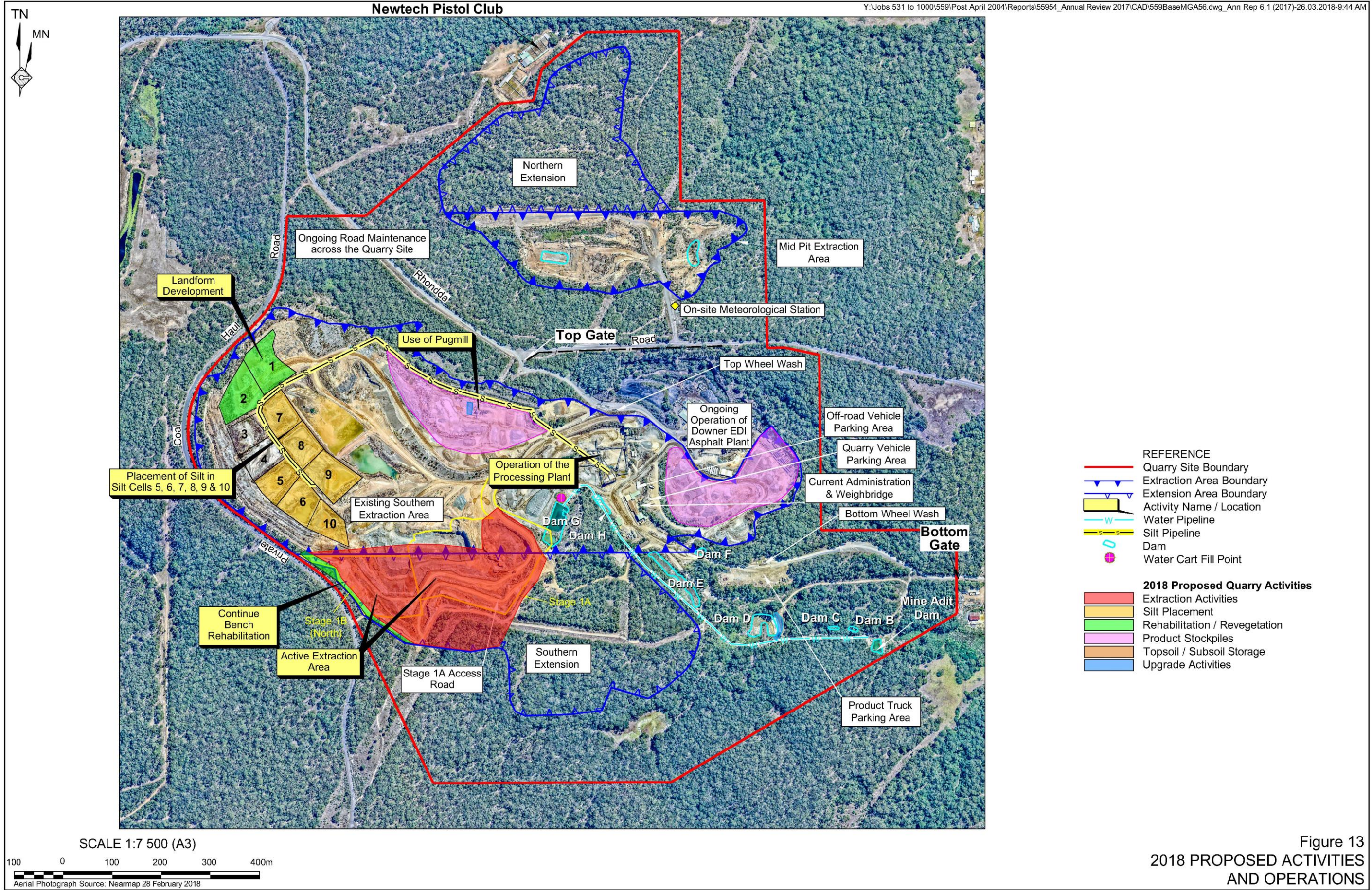


Figure 13
2018 PROPOSED ACTIVITIES
AND OPERATIONS

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12.8 WATER MANAGEMENT

Water management during the 2018 reporting period will continue to utilise the existing surface water management system of the Quarry comprising Dams A to G. Flow meters will also continue to be used to record water that is pumped from the Mine Adit Dam to Dam G.

During the 2018 reporting period, it is anticipated that Metromix will finalise the review of the water quality monitoring program at the Quarry in conjunction with the EPA and based on the results of the PRP program currently required by EPL 536.

12.9 BUSH FIRE MANAGEMENT

The *Bush Fire Management Plan* will be discussed and reviewed with both the local Teralba Fire Service and the West Wallsend Rural Fire Service in the second half of 2018.

12.10 HAZARDOUS MATERIAL MANAGEMENT

The existing diesel tank bunding and management of aerosols and paints within the workshop area would continue as is current practice. Each of these activities would be monitored as part of Metromix's internal auditing.

12.11 PRODUCT TRANSPORTATION

Product despatch will continue in the same manner as it has during the past reporting period. Truck movements will be recorded in and out of the Quarry i.e. with respect to routes, weights and times in accordance with the *Transport Management Plan*. All efforts would be placed on avoiding any exceedance of the limitations nominated in *Conditions 2(8) and 2(9)*.

12.12 VENM/ENM IMPORTATION MANAGEMENT

It is not envisaged any VENM/ENM will be imported into the Teralba Quarry during 2018. However, should it be required for rehabilitation activities, the importation, placement and/or reprocessing of VENM/ENM would not exceed the approved limit of 100 000 tonnes of VENM/ENM per year

12.13 MONITORING

Metromix will continue to undertake and/or commission the following monitoring activities throughout 2018.

- Water Quality Monitoring – Monthly and/or event-related: EPA-4, EPA-5, EPA-6 and EPA-7.
- Flow Measurements: Mine Adit Dam to Dam G.
- Operational Noise (two occasions): Residences A, B, D, E and H.



- Equipment Noise (one occasion): only if there are changes in the equipment fleet.
- Airblast Overpressure and Ground Vibration: all blasts monitored at Locations 1 and 2.
- Meteorology: all parameters – continuously.
- Deposited Dust Monitoring: five locations.
- PM₁₀: every 6 days at Rodgers Street HVAS.
- Nesting Box Usage: 3rd quarter.

The overall nesting box program will be reviewed during 2018 given:

- i) the nesting boxes have not been used by the targeted fauna species; and
- ii) the nesting boxes are located in the optimum area for the targeted fauna species.

In addition, Metromix will adopt the recommendation of Kendall and Kendall to store nesting boxes at the Quarry Site so that missing or destroyed boxes may easily be replaced.

12.14 NON-METROMIX OPERATIONS

Road surfacing company Downer EDI is expected to continue business as normal producing and supplying asphalt to the local markets. It is understood however, that Downer EDI is expected to apply to Council to install a replacement Asphalt Plant in 2018.

Some coal is expected to be hauled on the Coal Haul Road to the Eraring Power Station during 2018 as a one off.

The Newtech Pistol Club is expected to continue activities in a similar manner to previous years.

13. REFERENCES

ANZECC (2000) *Australian and New Zealand Guidelines Fresh and Marine Water Quality.*

Brown (2017) *Teralba Quarry Independent Audit*, Prepared by Trevor Brown and Associates, February 2017.

DEC (2007) *Approved Methods for Sampling of Air Pollutants in New South Wales*

DECCW (2007) *Methods for the Sampling and Analysis of Air Pollutants in NSW*

EPA (2000) *NSW Industrial Noise Policy*

NSW Minerals Council (2000) *Technical Paper – Particulate Matter and Mining Interim Report*

Spectrum (2017a) *Teralba Quarry – Results of Attended Noise Monitoring: August 2017.*
Spectrum Acoustics Pty Limited

Spectrum (2017b) *Teralba Quarry – Results of Attended Noise Monitoring: November 2017.*
Spectrum Acoustics Pty Limited

RWC (2011) *Environmental Assessment for the Teralba Quarry Extensions – November 2011.*
R.W. Corkery and Co. Pty Limited

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