

Surface Water Assessment

Proposed Karuah Pit Consolidation Project

Karuah East Quarry (MP09_0175) (MOD 11)
Blue Rock Close, Karuah

Prepared on behalf of Karuah East Quarry Pty Limited



Document Control Sheet					
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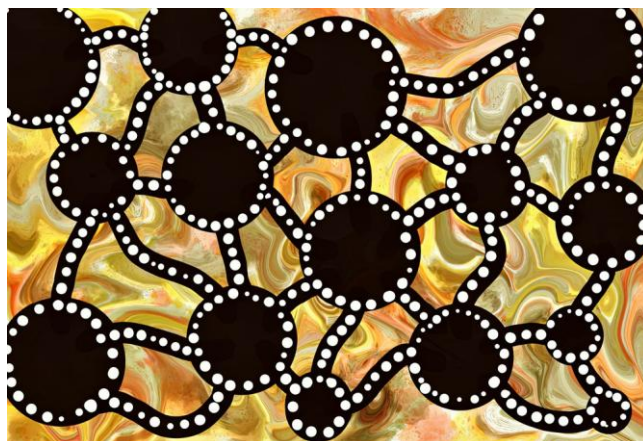
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Acknowledgement of Country

We, ADW Johnson, acknowledge the Traditional Custodians of the land where we live and work, the country of Awabakal, Darkinjung and the Eora Nation.

We recognise their continuous connection to the land and waters of our beautiful regions. We pay our respects to Aboriginal and Torres Strait Islanders Elders past, present and emerging.

Artwork created by Joe Griffin, a proud Aboriginal man, descendant of the Awabakal people.



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1.0 Introduction

Karuah East Quarry Pty Limited (KEQPL) owns and operates the Karuah East Quarry (KEQ), and together with Hunter Quarries Pty Ltd (HQPL) who owns and operates the Karuah Hard Rock Quarry (KHRQ), forms the Karuah Quarry Complex located approximately 5 kilometres (km) northeast of Karuah at Blue Rock Close / Andersite Road, Karuah.

The KEQ and KHRQ sites produce a high-quality andesite resource which is supplied to construction, infrastructure, and other development projects across Greater Newcastle, the Hunter Valley and Mid-North Coast regions.

KEQPL and HQPL are proposing to modify the State Significant Development (SSD) approvals for the Karuah East Quarry (MP09_0175) and the Karuah Hard Rock Quarry (DA 265-10-2004) under the provisions of Section 4.55(2) of the Environmental Planning and Assessment Act 1979 (EP&A Act). The applications are being referred to as the Karuah Pit Consolidation Project (KPC) and will consist of two concurrent modification applications to the SSD approval for each quarry, that will be known as KEQ MOD 11 and KHRQ MOD 2.

HQPL has recently acquired Lot 11 DP 1024564 (Lot 11), enabling HQPL and KEQPL to control all landholdings within the Karuah Quarry Complex. This acquisition now allows KEQPL and HQPL to readily extract previously sterilised resource from the remnant dividing highwall between the KEQ and KHRQ extraction pits forming a Consolidated Extraction Area (CEA). The purpose of the pit consolidation project is to primarily enable the extraction of the previously sterilised andesite resource from the remnant dividing highwall as well as within other cleared areas from the KEQ & KHRQ sites in a coordinated approach.

ADW Johnson has been engaged by KEQPL to assess surface water management and impacts associated with the Karuah Pit Consolidation Project. Specifically, this letter addresses the proposed surface water management system and sizing of sediment controls for the KEQ MOD 11 project, which should be read in conjunction with the concurrent KHRQ MOD 2 surface water assessment.

This letter gives consideration to KEQ's approved Surface Water Assessment, prepared by GSSE dated July 2013 and should be regarded as an addendum to the approved document. This document has also been prepared with regard to the approved KEQ Water Management Plan (SLR, dated May 2019).

Based on the outcomes of this assessment, it is considered that the proposed MOD 11 project is acceptable in terms of surface water management considerations.

2.0 Background

2.1 Karuah East Quarry

The operation of KEQ and KHRQ contribute towards satisfying significant and ongoing market demand associated with various State Significant Infrastructure (SSI) projects in the Newcastle, Hunter Valley and Mid-North Coast regions. These projects are critical to deliver improved connectivity of the Mid North Coast to Newcastle, the Hunter Valley and Sydney and include the Newcastle Inner-city Bypass (SSI-6888), Pacific Highway widening at Hexham Straight, Singleton Bypass, and the M1 Pacific Motorway extension to Raymond Terrace (SSI-7319).

KEQPL supplies high quality quarry products to a large and rapidly emerging customer base that includes Transport for NSW, a number of local Councils, the Port of Newcastle, Ausgrid, Newcastle Airport, Tier 1 infrastructure providers as well as the general construction, development and infrastructure industries within greater Newcastle, Hunter Valley and the Mid North Coast Regions. KEQPL also supplies and supports downstream businesses, including the Tea Gardens Hunter Ready-mix Concrete Plant, which in turn contributes to the local construction industry.

Project Approval (PA) MP09_0175 was granted for the KEQ on 17 June 2014 under the provisions of Section 75J of the EP&A Act 1979.

The KEQ is well established and operational. The KEQ is operated by KEQPL, a company affiliated with Hunter Quarries Pty Ltd (HQPL), who also operate the KHRQ.

The key features of the current Project Approval include:

- Quarrying operation is permitted on the site until 31 December 2034;
- Establishment and use of quarry plant and associated infrastructure;
- The extraction (excluding overburden), processing, stockpiling and transport of quarry products is limited to 1.5 million tonnes in any calendar year;
- A total permitted disturbance area of 40.18ha;
- Roadworks to secure access to the site including upgrade and extension of Blue Rock Close, realignment of the Andersite Road and Blue Rock Close intersection and adjust road markings at Branch Lane and Andersite Road intersection;
- Establishment of a land-based biodiversity offset as follows:
 - Eastern Biodiversity Offset Area (EBOA) on Part Lot 13 DP 1024564, Lot 14 DP 1024564, Lot 5 DP 838128; and
 - Western Biodiversity Offset Area (WBOA) on Part Lot 201 DP 1042537;
- Conditions apply to manage / mitigate potential impacts associated with a range of environmental conditions including noise; blasting; air quality; soil and water; transport; biodiversity; heritage; emergency and hazards management and waste; and
- Progressive rehabilitation of the subject site.

Existing and approved site improvements include:

- Quarry pit (extraction area);
- Crushing plant and processing infrastructure;
- Wash plant and workshops;
- Stockpiling areas;
- Internal haulage roads;
- Weighbridge office;
- Weighbridge (two weighbridges approved);
- Stormwater management infrastructure including three (3) dams;
- Parking areas for light and heavy vehicles;
- Administration office;
- Amenity facilities;
- Other minor structures; and
- Fencing and access gates.

2.2 Karuah Pit Consolidation Project (KEQ MOD11 and KHRQ MOD2)

The KEQ was approved to operate as a stand-alone quarry operation on Lots 12 and 13 DP 1024564 in June 2014 (MP 09_0175 (as modified)).

During assessment of the KEQ application, one of the items that was considered by the Environment Assessment (ADW Johnson, January 2013) and NSW Planning's assessment was alternate ways to extract the known resource from Lot 12 and Lot 13 (which now contains the KEQ pit). At the time of preparation of the original KEQ application, one alternate option considered was extending the KHRQ extraction area from Lot 11 directly into Lot 12 and Lot 13; however, this was not possible because at that time HQPL only had rights conferred under specific license terms with the landowner of Lot 11. The terms of the license did not provide a legal right of way across Lot 11 for extraction of material within Lot 12 and Lot 13. Efforts were made by HQPL to secure access across Lot 11 however an agreement was unable to be achieved. Therefore, the KEQPL had no other option than to pursue a stand-alone quarry on Lot 12 and 13 (the KEQ site).

The approval of the KEQ resulted in the side-by-side operation of two independently operated quarries, being the KEQ and the KHRQ, with a remnant dividing highwall located in between the quarry pits consisting of sterilised material. This outcome was understood by KEQPL and that the removal of the remnant structure could readily occur, subject to appropriate approvals. The recent acquisition of Lot 11 now allows HQPL make application to remove the remnant dividing highwall.

Figure 1 overleaf shows the location of the KEQ and KHRQ in the Karuah Quarry Complex. In particular the figure shows:

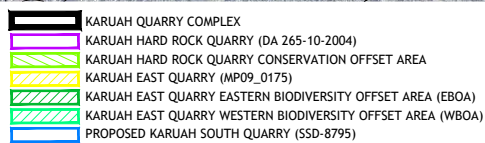
- The Karuah Quarry (DA 265-10-2004);
- The Karuah East Quarry (MP 09_0175);
- Proposed Karuah South Quarry (SSD 8795);
- The conservation offset area established for the KHRQ; and
- The eastern and western biodiversity offset areas established for the KEQ.

In relation to the proposed Karuah South Quarry (KSQ) application at Lot 11 DP 1024564 (located to the west of KEQ and the south of the existing KHRQ extraction area), the following is noted:

- The KSQ proposal seeks to extract the remaining resource south (of KHRQ) and southwest (of KEQ) of the existing quarry's limit of extraction.
- The quarry is proposed to be a conventional drill and blast operation with rock collected and processed onsite. Processed product is proposed to be stockpiled onsite with a loader used to load trucks for transport off-site when required.
- The proposed annual production limit is 600,000 tonnes.

Following acquisition of Lot 11 DP 1024564, HQPL (and affiliated companies) is also the proponent for the proposed KSQ. The following has been confirmed by HQPL in relation to the proposed KSQ relevant to the consideration of cumulative impacts:

- If approved, KSQ will not commence operations until after operations at KHRQ have ceased;
- HQPL are currently reviewing the business case for the proposed KSQ; and
- Any future revision or amendment to the proposed KSQ project will be supported by an updated Surface Water Assessment that accounts for the proposed Karuah Pit Consolidation Project.



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3.0 Proposed Development

The proposal seeks to enable the extraction of previously sterilised andesite resource from the remnant dividing highwall and all disturbed areas at the KEQ (MOD 11 to MP09_0175) and KHRQ (MOD 2 to DA 265-10-2004) in a coordinated approach. The proposal does not seek to increase the approved annual throughputs at either quarry (1.5 Mtpa at KEQ and 500,000 tpa at KHRQ). There will be no intensification of annual quarry operations.

For completeness, full details of the proposal relevant to each modification application are provided below. It is noted that this SWA has been prepared specifically to support the MOD 11 application to the KEQ, with a separate, concurrent report prepared for the MOD 2 application to the KHRQ.

Figures 2 and 3 provide the proposed site plan for the KEQ within the consolidated extraction area. The proposed site plan is provided in full as *Appendix B*.

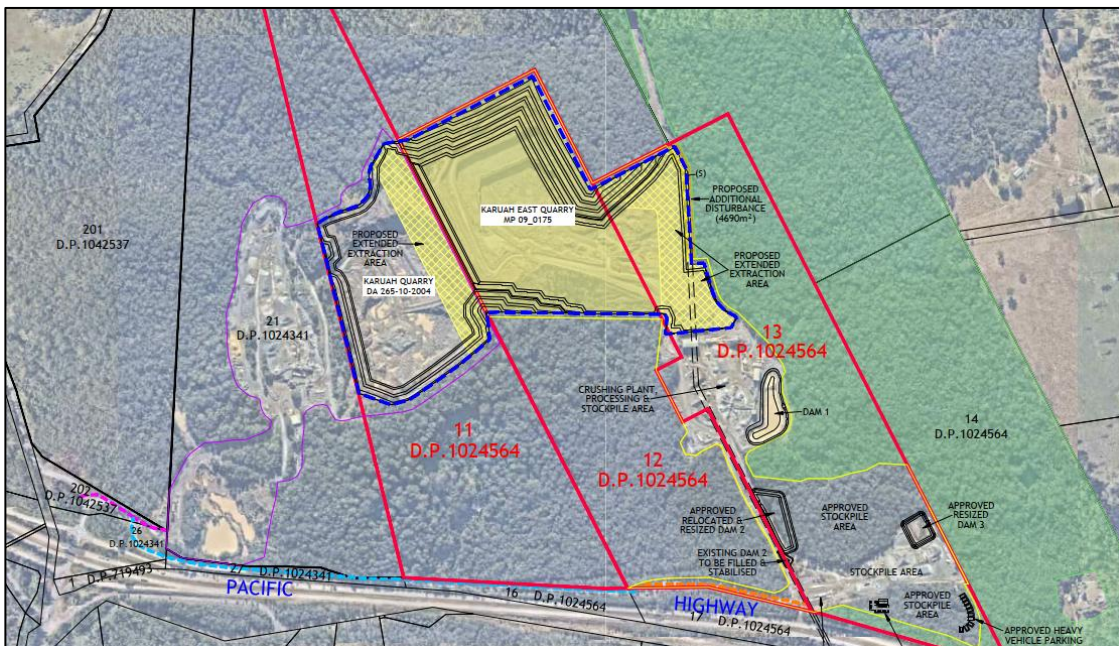


Figure 2: Karuah East Quarry – Proposed Site Plan.

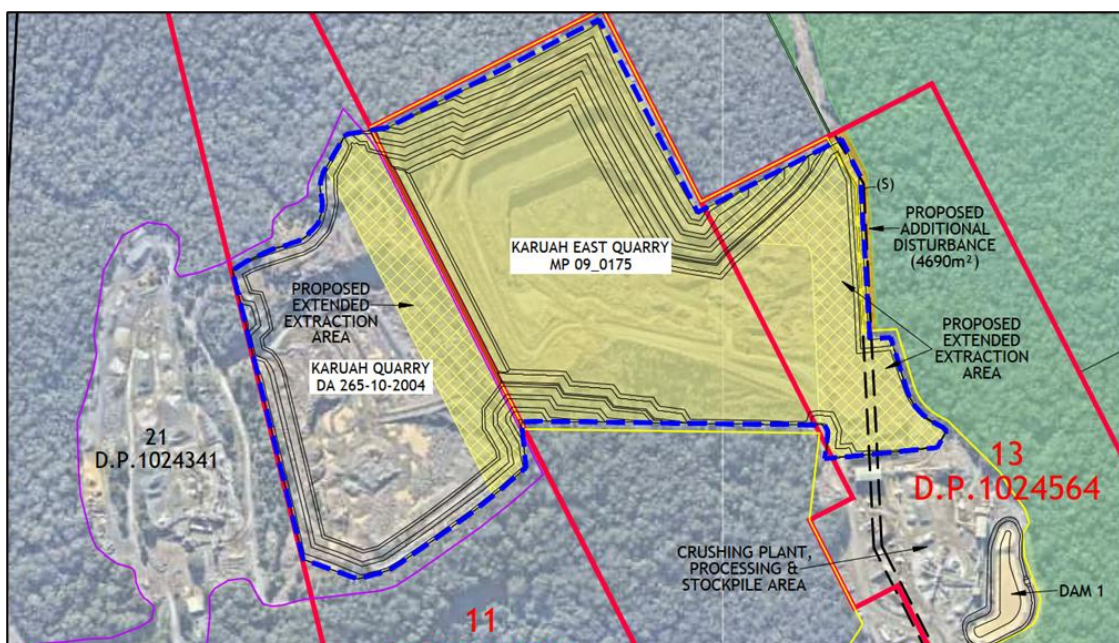


Figure 3: Site Plan of Proposed KEQ within Consolidated Extraction Area.

Karuah East Quarry MP09_0175 (MOD 11)

The proposed Modification to the KEQ (MOD 11 to MP 09_0175) consists of the following key components:

- Concurrently modify both the KEQ and KHRQ consents to extract the known resource contained within already disturbed areas of Lot 12, Lot 13 and Lot 11 including the dividing highwall, within the currently approved excavation depths of RL45 at KEQ and RL65 at KHRQ.
- Formalise a total life of quarry extraction at KEQ of 28.33 Mt (a nominal reduction from the 29 million tonnes anticipated in the original KEQ Project Approval documentation).
- Minor extension and overlap of extraction boundary of both KEQ (into Lot 11) and KHRQ (into Lot 12) extraction areas to holistically encompass the highwall structure, inclusive of appropriate safety offsets.
- Extension of the KEQ extraction area to the west (highwall removal) and to the east.
- Material sourced from the overlapping area of the CEA will be transported by internal haul road to either the KEQ or KHRQ for processing, stockpiling, sale and transport to market within currently approved throughput rates.
- A minor extension of 4,690 m² to the KEQ disturbance area. This area is located at the north-eastern boundary of the approved KEQ and is highly degraded and comprised entirely of exotic grasses and disturbed vegetation that has been historically cleared and managed to support a now redundant powerline corridor (infrastructure has been previously removed). This area is proposed to form a minor extension of the approved disturbance area and is incorporated into the consolidated extraction area. With the inclusion of this area, the total site disturbance area of KEQ will increase nominally from 40.18 Ha to approximately 40.65 Ha (an increase of 1.2%).
- Changes to blasting activities (cumulative reduction across both the KEQ and KHRQ sites from 3 to 2 and extending blasting hours to 9am to 5pm weekdays).

Karuah Hard Rock Quarry DA265-10-2004 (MOD 2)

The separately proposed Modification to the KHRQ (MOD 2) development consent consists of the following key components:

- Concurrently modify both the KHRQ and KEQ consents to extract the known resource contained within already disturbed areas of Lot 12, Lot 13 and Lot 11 including the dividing highwall, within the currently approved excavation depths of RL65 at KHRQ and RL45 at KEQ.
- Minor extension and overlap of extraction boundary of both KHRQ (into Lot 12) and KEQ (into Lot 11) extraction areas to holistically encompass the highwall structure, inclusive of appropriate safety offsets.
- Material sourced from the overlapping area of the combined extraction area (CEA) will be transported by internal haul road to either the KHRQ or KEQ for processing, stockpiling, sale and transport to market within currently approved throughput rates.
- An extension of the life of quarrying operations from 3 June 2027 to 31 December 2034 to align with the approved operational timeframe of the KEQ.
- Increase in approved total resource volume from 11.20 Mt to 13.20 Mt (18% increase).
- Extended operating hours to match the approved hours of operation of the KEQ.
- Changes to approved blasting activity as noted above.
- Revised final landform resulting in a free-draining landscape of the current extraction area, resulting in reduced geotechnical risks over the long-term and a landform with greater consistency with the existing surrounding environment.
- Environmental safeguards incorporated into Management Plans that are in place for the KHRQ operation will be reviewed and updated (where required) to accommodate the proposal.

No change is necessary to the Development Consent as it relates to annual extraction, processing and transport rates (capped at 500,000 tpa).

Extraction Staging Sequence

The following coordinated extraction sequence between the KEQ and KHRQ will be generally undertaken to complete the Karuah Pit Consolidation Project (inclusive of remnant highwall removal):

- Stage 1: Extract the current top benches of the remnant highwall (RL135 m) down to RL90 m (currently lowest KEQ bench at the time of writing (March 2026)), forming a single extraction level/area on Lot 12. This approach is needed to safely remove the peak of the dividing highwall and make the extraction area level with the current KEQ extraction area.
- Stage 2: Extract Lot 12 from RL90 m (currently lowest KEQ bench at the time of writing (February 2025)), down to RL65 m in line with KHRQ pit floor and KEQ boot-bin levels, forming a single extraction level/area over the entire Consolidated Extraction Area.
- Stage 3: Extract final benches at KEQ (Lots 12 & 13) from RL65 m down to RL45 m. The KHRQ pit floor is to remain at RL65 m.

4.0 Previous Reporting

KEQ has been the subject of extensive previous surface water reporting and surface water management at the site is well understood given that KEQPL have operated the KEQ in accordance with MP 09_0175 since late 2016.

A Surface Water Assessment (titled Surface Water Assessment – Hard Rock Quarry, Karuah East, NSW) was prepared by GSS Environmental in July 2013 as part of the Environmental Impact Statement which was approved under MP 09_0175. ADW Johnson prepared a further Surface Water Management Assessment dated November 2022 which specifically related to the increased disturbance area (primarily for increased stockpiling area) approved MOD 10 in May 2023. At the time of writing (April 2026), KEQPL are continuing to secure secondary approvals for MOD10 and, as such, construction of the project has not yet commenced.

The site also operates in accordance with the KEQ Water Management Plan (SLR, dated May 2019).

This report has been prepared specifically to address the MOD 11 component of the proposed Karuah Pit Consolidation Project and should be considered an addendum to the approved Surface Water Assessment.

4.1 Environmental Assessment Requirements

This Surface Water Assessment has been prepared in accordance with the Assessment Requirements issued by the NSW Department of Planning, Housing & Infrastructure (NSW Planning) issued on 1 October 2025, that requires the Modification Application to consider water resources.

5.0 Site Description

The KEQ is located off Blue Rock Close, approximately 5km northeast of Karuah on the following lands:

- Lot 12 & Lot 13 DP 1024564 (the KEQ site);
- Lot 202 DP 1042537, Lots 26 & 27 DP 1024341 and Lots 16 & 17 DP 1024564 (quarry access via an extension of Blue Rock Close); and
- Lot 14, Part Lot 13 DP 1024564, Lot 5 DP 838128 and Part Lot 201 DP 1042537 (biodiversity offset area).

The current extraction area for KEQ is located at the northern portion of Lots 11 and 12 with the quarry's processing plant, stockpile areas, office and weighbridge located predominantly on the central and southern portions of Lot 13.

The latest approved KEQ site plan (approved by MOD 10 in May 2023) is presented in **Figure 4**.

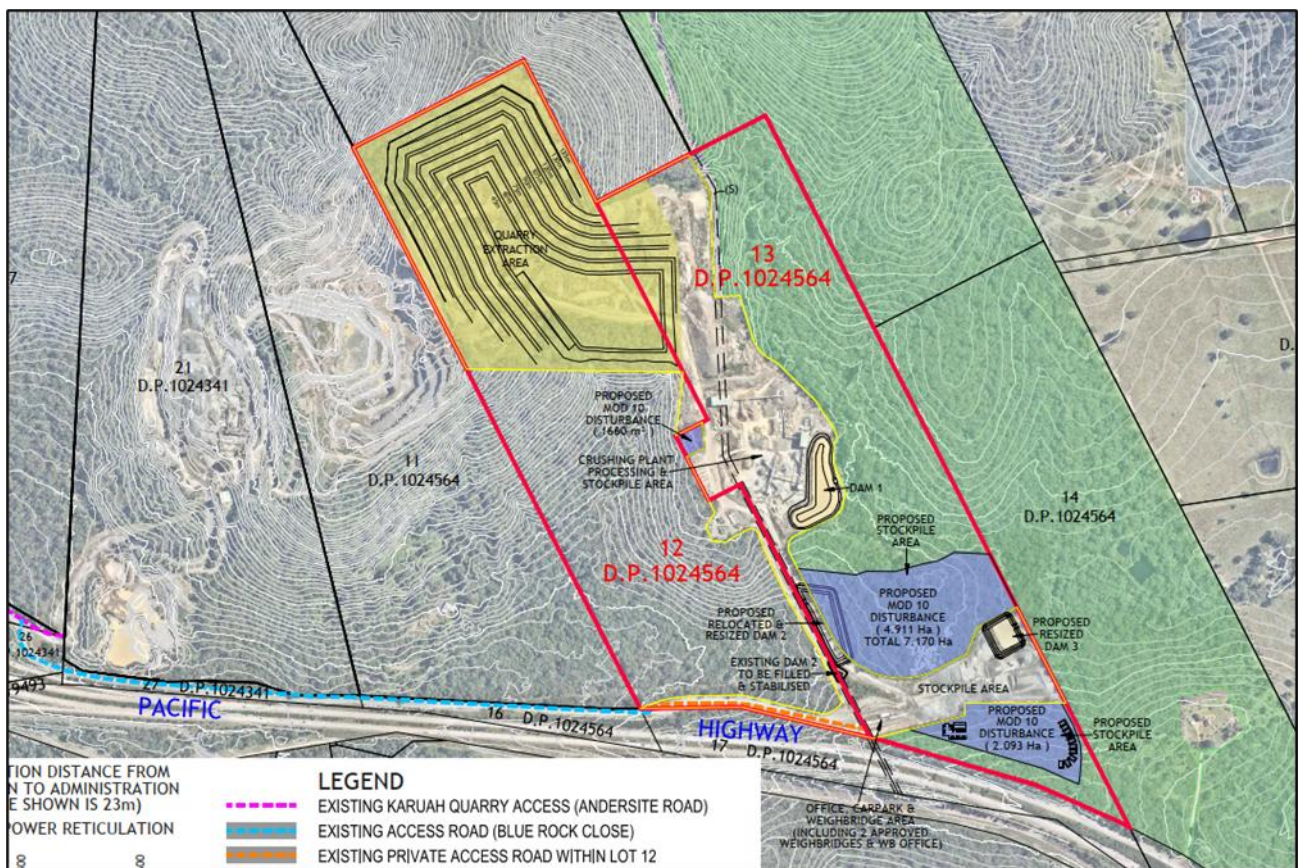


Figure 4: Extract of Approved Karuah East Quarry Site Plan (MOD 10)

6.0 Surface Water Strategy

6.1 Existing Surface Water Management System

Surface Water runoff from KEQ's disturbance areas is diverted and captured into three (3) sediment dams as follows:

- Dam 1 is the largest dam at KEQ (12 ML per the approved Surface Water Assessment [GSS Environmental, 2013]). It is located at the eastern edge of the KEQ and receives runoff from KEQ's crushing and processing plant area. Dam 1 is a mixed-use dam and serves as the primary water storage for KEQ and provides water for processing, crushing plant and dust suppression.
- Dam 2 is located at the south-western corner of the KEQ and has a 0.5 ML capacity. It receives a small catchment of approximately 0.7 Ha and is designed to manage runoff from the existing weighbridge and parking area.
- Dam 3 is located at the south-eastern section of the KEQ and is designed to manage runoff from the existing stockpile area near the site's eastern boundary. Dam 3 has a capacity of 2 ML.

Dams 1 and 3 drain eastwards via tributaries of Bulga Creek, whilst Dam 2 drains westward via a tributary of Yalimbah Creek. Each dam is subject to a Licensed Discharge Point (LDP) under Environmental Protection License (EPL), EPL 20611, which establishes water quality and reporting requirements.

Water generated within the active quarry extraction area, primarily as a result of rainfall/runoff, is managed within the extraction area via an in-pit sump. Water is directed to and contained within the in-pit sump until it is necessary to pump the water out so as to not impede quarrying activities. As noted in the approved Surface Water Assessment and the KEQ Water Management Plan, this water is pumped into a rock lined table drain adjacent to the main haul road, where it flows via a rock lined drop structure to Dam 1.

The existing surface water management system is described in the approved Surface Water Assessment (GSS Environmental 2013) and the KEQ Water Management Plan (SLR 2019).

7.0 Changes to Surface Water Catchments

Appendix C presents the revised catchment plan for KEQ.

Catchment mapping has confirmed that the extraction area catchment will increase from 14.4 Ha to 20.62 Ha associated with the proposed MOD 11 development. The proposed additional extraction area is located almost entirely within the existing area of disturbance of the approved KEQ footprint. The proposed extended additional disturbance area also includes a small portion of land within the redundant powerline corridor (approximately 0.21 Ha).

The remainder of the additional disturbance area (0.26 Ha, being the eastern portion of the redundant powerline corridor) would continue to fall eastward. This catchment will bypass both the in-pit sump and dam 1 until extraction had sufficiently progressed during Stage 3.

In summary, there is no negligible net change to KEQ's surface water catchments arising from the Karuah Pit Consolidation Project.

8.0 Surface Water Management Strategy

Proposed MOD 11 will result in minor changes to KEQ's surface water catchments which can be readily managed by way of amendments to the existing surface water management system as described above.

- The in-pit sump will be proportionally resized (enlarged) to cater for the additional extraction area (**Section 9**) to be established associated its extension to the south and east and including the area of additional land disturbance area of the redundant powerline corridor. The sump will be sized according to Landcom's Managing Urban Stormwater – Soils and Construction Volume 2E: Mines and Quarries procedures for permanent sediment dams. Consistent with the approved KEQ Water Management plan, water collected in the sump will be pumped to Dam 1 for storage and/or discharge as required.
- There will be negligible increase in overall catchment reporting to Dam 1, noting that the proposed additional extraction area is located almost entirely within the existing area of disturbance of the approved KEQ footprint. This area, under existing arrangements, reports to Dam 1. MOD 11 therefore proposes no changes to Dam 1.
- The proposed additional disturbance area of 4,690 m² adjacent to the eastern edge of the KEQ is also already heavily disturbed, having been historically used for the purposes of a powerline corridor which is now redundant. This area will be managed as follows:
 - The western portion of this area, which will form part of the extended extraction area, will be considered in resizing of the in-pit sump; and
 - The eastern edge of the proposed additional disturbance area can be readily managed with erosion and sediment controls (Section 6.9).
- There are no changes proposed to Dams 2 and 3 (or their respective catchments).

The focal point of this addendum letter is the modification to the extraction area and additional disturbance area of 4,690 m² proposed by MOD 11. **Sections 9 to 15** of this report address surface water management outcomes relating to the extraction area and additional disturbance area.

8.1 Staging of Surface Water Controls

The site's catchments, and therefore its surface water controls, will evolve with each extraction sequence stage of the project. Table 1 summarises the landform and surface water controls which are unique to each stage of extraction.

Table 1 – KEQ Staged Surface Water Controls associated with Extraction Sequencing

Stage	Description	Surface Water Controls
Stage 1	Extraction to RL 90 m	General controls described in this report
Stage 2	Extraction to RL 65 m (KHRQ pit floor)	General controls described in this report Establishment of a bund wall to segregate KEQ and KHRQ catchments Strategic blasting to maintain westward flows in KHRQ and eastward flows in KEQ
Stage 3	Extraction of KEQ to RL 45 m (KEQ pit floor)	General controls described in this report Maintenance of dividing bund
Post-extraction	Rehabilitation	Refer Section 14 for closure arrangements

9.0 Sediment Controls

The proposed removal of the remnant dividing highwall and the increase in extraction area to the east represents an increase in the size of the KEQ extraction pit and therefore its catchment. The size of the in-pit sump has been assessed according to the provisions of Landcom's *Managing Urban Stormwater – Soils and Construction Volume 2E: Mines and Quarries* (the 'Blue Book'). The 'Blue Book' implements a Revised Universal Soil Loss Equation (RUSLE) to estimate soil loss from a disturbed area which informs sump sizing.

9.1 Surface Water Catchments

As noted in Section 7, the extraction pit catchment will increase from 14.4 Ha to 20.62 Ha associated with the proposed MOD 11 development.

A small catchment in the eastern portion of the redundant powerline corridor has been considered as bypassing the in-pit sump and Dam 1, until extraction had sufficiently progressed during Stage 3. This residual catchment is approximately 0.21Ha.

9.2 Soil Classification

Both dispersive and non-dispersive soils are expected at the site. Dams were therefore sized assuming Type D (dispersive) soils.

9.3 Design Storm

A 5-day, 95th percentile design rainfall depth has been adopted as recommended by the Blue Book for permanent controls upstream of sensitive environments. The design rainfall depth is 90.6 mm.

9.4 Rainfall Erosivity Factor

The Rainfall Erosivity Factor (R-Factor) was calculated using the equation offered by the Blue Book, Volume 1, Appendix A2. Using Bureau of Meteorology Intensity-Frequency-Duration (IFD) rainfall data, an R-Factor of 2600mm was calculated.

9.5 Soil Erodibility Factor

An erodibility factor (K-Factor) of 0.045 was adopted for the subject site and is consistent with reporting for the adjoining KEQ catchment.

9.6 Volumetric Runoff Coefficient

A Volumetric Runoff Coefficient (CV) of 0.79 was adopted. This is the default value for Type D soils with high runoff potential.

9.7 In-Pit Sump Sizing

RUSLE calculations for each catchment are provided as Appendix D. Type D sediment controls consist of two volumetric components: a settling zone, in which runoff is detained for settlement of fine particles; and a storage zone, in which settled sediment is retained. Minimum volume calculations for the in-pit sump are presented in Table 2.

Table 2 - Minimum Sediment Dam Size (In Pit Sump)

Parameter	Value
Predicted soil loss (m ³ /Ha/Year)	42
Storage zone ¹ (ML)	14.91
Settling zone (ML)	0.67
Minimum volume (ML)	15.57

1. Selected to provide 12 months' sediment storage.

9.8 Impacts to Dam 1

Consistent with the approved KEQ Water Management Plan, water collected in the in-pit sump will be pumped into Dam 1 as necessary via existing infrastructure. It is noted that a majority of the additional extraction area is located within an existing disturbance area within the KEQ footprint which presently reports to Dam 1. Only a small portion of the extraction area is located within new disturbance area, amounting to approximately 0.21 Ha within the former powerline corridor.

The additional disturbance area represents a negligible increase to Dam 1's overall catchment (being the sum of its surface water catchment and the extraction area). Dam 1's inflow volumes will remain generally equivalent to existing arrangements, notwithstanding the negligible additional disturbed catchment and the potential for increased evaporative losses from the in-pit sump.

It follows that enlarging the in-pit sump as detailed in **Section 9.7** will allow Dam 1 to continue operating generally in accordance with existing arrangements.

9.9 Additional Disturbance Area

A portion of the proposed additional disturbance area – approximately 0.26 Ha – will bypass the in-pit sump and Dam 1 until extraction has sufficiently progressed during Stage 3.

RUSLE calculations have projected an annual soil loss of less than 79 m³ from this small disturbance area. Section 6.3.2 of the Blue Book notes that sediment basins may not be required for catchments whose annual soil loss is 150 m³; in such scenarios, other erosion and sediment control devices may be utilised instead.

It is considered that a sediment basin would be inefficient for the residual catchment given its size and shape. Instead, sediment fencing is to be installed along the disturbance area's eastern boundary and shall be the subject of routine inspection and maintenance.

10.0 Interaction with Karuah Hard Rock Quarry

The proposed KEQ MOD 11 project seeks to remove the remnant dividing highwall between the KEQ and KHRQ in a coordinated approach. KEQ will extract to a depth of RL45 m consistent with the currently approved extraction depth under MP09_0175.

The adjoining KHRQ, has an approved extraction depth of RL65 m (under DA 265-10-2004). A typical section of the proposed remnant highwall removal is provided as Figure 5. Figure 5 is taken from a site section looking northwest through the proposed pit design (VGT, 2026).

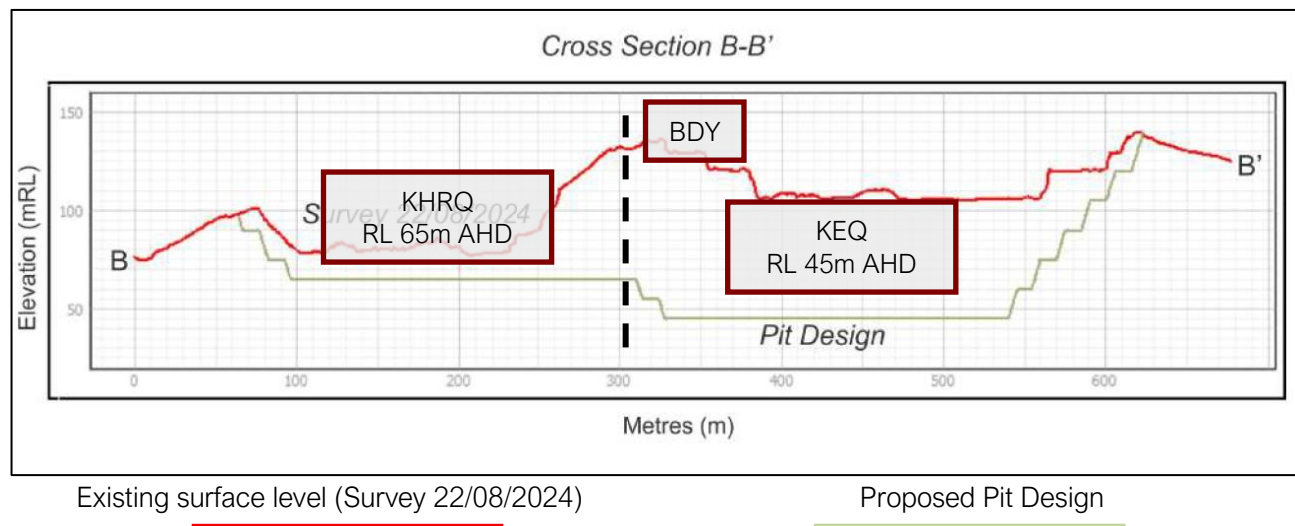


Figure 5: Typical Section of Remnant Dividing Highwall Removal on KEQ/KHRQ Boundary.
(Source: VGT 2026).

As shown on the approved KHRQ quarry site plan, KHRQ's pit floor falls westward, away from KEQ, at slopes in the order of 1%. As noted in the KHRQ MOD 2 surface water addendum, a sump will be provided in the KHRQ pit which will have a storage volume of 8.95ML. Additionally, a bund wall will be established along the Lot 11/Lot 12 boundary (for the extent of the adjoining KEQ and KHRQ extraction areas) to assist with drainage and safety. As detailed in the KHRQ MOD 2 surface water addendum, the sump and bund wall will ensure that surface water from KHRQ would never overflow into KEQ.

Reciprocally, runoff from the KEQ pit will continue to flow to the east towards Dam 1, via the in-pit sump, through strategic blast design during Stage 2 operations to maintain this flow regime.

During Stage 3, extraction will be below RL65 m, preventing any flows from KEQ to KHRQ.

The results of this assessment confirm that the established KEQ and KHRQ surface water management systems operate entirely independent of one another at present and will continue to do so following completion of the proposed Karuah Pit Consolidation Project. There is no interaction of runoff between the KEQ and KHRQ pit catchments. The existing management systems at KEQ and KHRQ are not impacted by the proposed Karuah Pit Consolidation Project.

11.0 Water Balance

The proposed development does not create any additional site water demands. The KEQ disturbance area is only modestly increased by the proposed MOD 11 development. The site water balance presented in the approved KEQ Water Management Plan (SLR, 2019) is representative of KEQ prior to and following completion of proposed MOD 11.

12.0 Groundwater

As identified in the approved 2013 Environmental Assessment Report (EAR) (ADW Johnson) that informed MP 09_0175, *“the typical groundwater RL at the proposed quarry site is greater than 10 m below the planned quarry base”*. Groundwater levels and quality have been monitored via a network of monitoring bores since the project’s commencement in accordance with the KEQ Water Management Plan (SLR, 2019).

The approved KEQ Water Management Plan reports that *“to date, no groundwaters have been intercepted during exploration drilling, blast drilling and operational excavation and quarrying activity”*. This is also supported by ongoing monitoring activity.

The proposed MOD 11 development does not seek to change the approved and established pit floor level of RL45 m at the KEQ. Groundwater interception is therefore not expected.

In addition to the above, a Groundwater Assessment Report has been prepared to support the proposed MOD 11 application. The report confirms that groundwater level under the KEQ extraction area ranges between RL 32 to 39m which is below the final pit floor level at RL 45 m. The Groundwater Assessment Report also provides a range of best practice management controls which will be adopted by KEQPL.

13.0 Environmental Protection Licence

The KEQ is subject to Environmental Protection Licence (EPL) 20611 (latest amendment 4 September 2025). The EPL establishes a Licensed Discharge Point (LDP) for discharge of waters from each of the site's three (3) sediment dams.

Pollutant concentration limits are defined in Section L2 of the EPL and in **Table 3** below.

Table 3 – EPL 20611 Concentration Limits (Points 1, 2, 3)

Pollutant	Unit of Measure	100 Percentile Concentration Limit
Oil and grease	Visible	5 &/or non-visible
pH	pH	6.5-8.5
Total Suspended Solids	Milligrams per litre	40

The MOD 11 proposal does not seek any additional LDPs or changes to the existing LDP. Additionally, the MOD 11 proposal does not propose any variation to concentration limits established by the existing EPL. No variations to EPL 20611 are required in relation to water management.

14.0 Closure Agreements

A concept final rehabilitation plan has been prepared for the proposed MOD 11 development (reference 11819-SITE-022-C, ADW Johnson 11/02/26) (extract provided below).

The currently approved Landscape and Rehabilitation Management Plan (Revision 5C, IEMA, October 2024), shows the final land use of the KEQ void incorporating areas of rehabilitated woodland and wetland. Sediment dams are shown to remain as permanent waterbodies.

By virtue of the removal of the remnant dividing highwall and pit extension, the proposed amended final landform will become free-draining to Dam 1 via a shaped drainage channel. The pit shell will be rehabilitated as native woodland vegetation.

The in-pit sump will remain in place and utilised as a sediment dam until active management has ceased. Additional closure and rehabilitation details are provided in the Rehabilitation and Closure Strategy (IEMA, 2026).

An extract of the proposed Concept Final Rehabilitation Plan is provided in *Figure 6*.

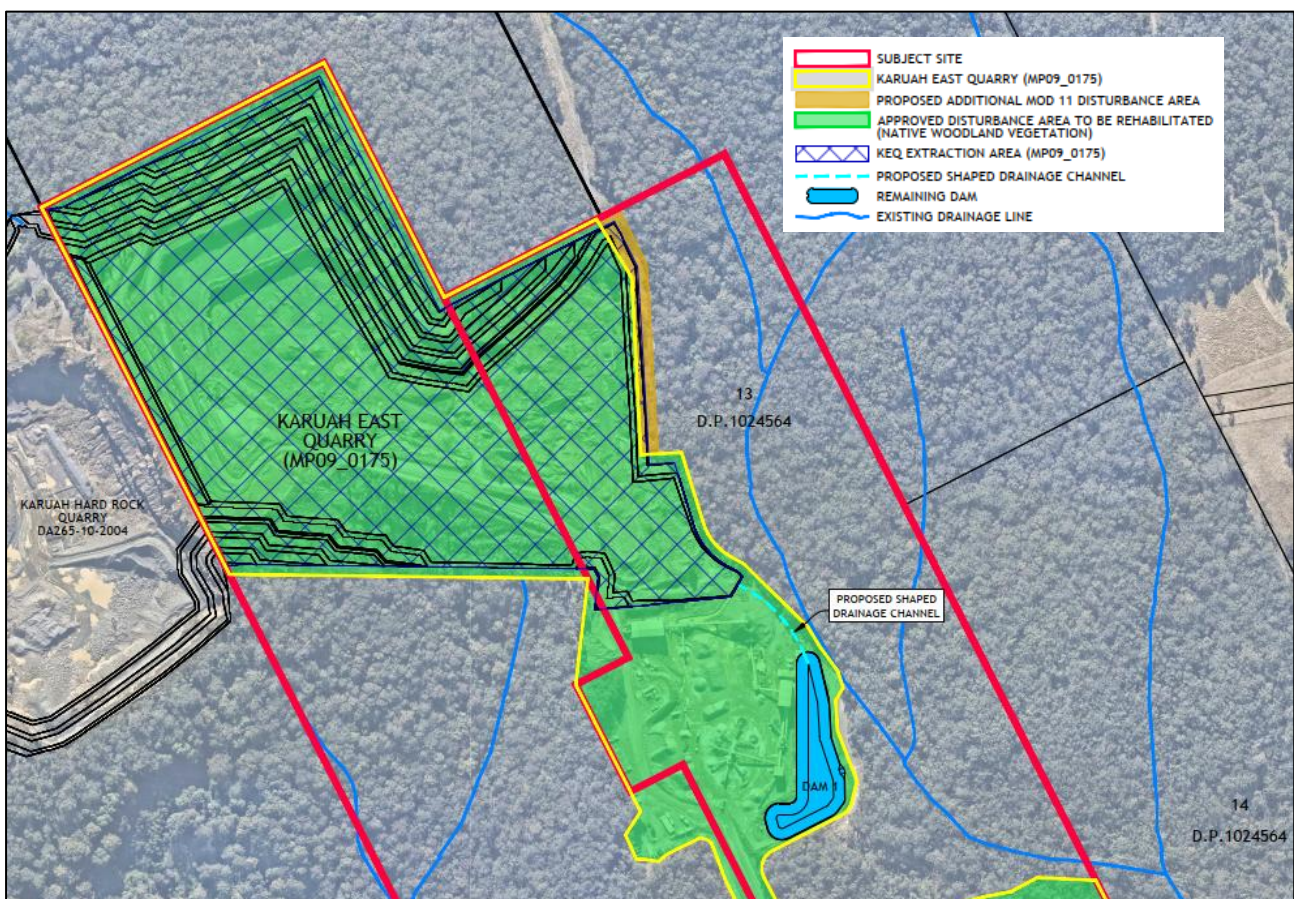


Figure 6: Final Concept Rehabilitation Plan

15.0 Maximum Harvestable Rights

The Water Management Act (2000) (WMA), as well as the Water Act (1912) establish requirements for water harvesting and reuse. The WMA defines licensing requirements for water storages which exceed maximum harvestable rights.

The MOD 11 proposal seeks to upgrade the established in-pit sump to account for the minor changes to the pit floor's catchment. The in-pit sump is proposed to remain exclusively for sediment control and will not be used for water take/reuse. According to Schedule 1(3) of the Water Management Regulation (2018), dams used solely to prevent pollution of receiving waters are exempt from Maximum Harvestable Rights. The proposed upgrade to the in-pit sump is therefore exempt from Maximum Harvestable Rights Calculations and does not contribute to KEQ's Maximum Harvestable Rights Dam Capacity (MHRDC).

All other site water storages will remain consistent with existing arrangements with respect to volume and use.

16.0 Recommended Mitigation Measures

The following measures are recommended to accommodate the proposed MOD 11 project at KEQ:

- The approved KEQ Water Management Plan (SLR, May 2019, Revision 1) will be updated to incorporate the proposed Karuah Pit Consolidation Project;
- The in-pit sump, approved under the Site Water Assessment (GSS Environmental, July 2013), will be proportionally upgraded according to Section 6 of this report;
- A bund wall is to be constructed on the Lot 11 / 12 boundary for the extent of the extraction area at the time the KEQ is extracted to approximately RL65 m. Sizing shall be subject to further detailed design and consideration of hazard. This information will be included in the update to the approved KEQ Water Management Plan (SLR, May 2019, Revision 1);
- During Stage 2 of the extraction sequence, strategic blasting is to be undertaken to maintain eastward flows in KEQ and westward flows in KHRQ; and
- Erosion and sediment controls will be implemented in accordance with the Blue Book Volume 2E (Mines & Quarries). This includes the small catchment within the powerline easement which bypasses the extraction area and Dam 1 until extraction has sufficiently progressed.

17.0 Conclusion

This assessment has been prepared in support of the proposed Karuah Pit Consolidation project within the KEQ (MP 09_0175 (MOD 11)). Specifically, this letter addresses the existing and proposed Surface Water Management System, sizing of sediment controls and interactions with the adjoining KHRQ (DA 265-10-2004).

This letter reviews the proposed MOD 11 project in relation to the KEQ's approved Surface Water Assessment (GSS Environmental, July 2013), the currently approved and implemented Site Water Management Plan (SLR, May 2019) and existing site arrangements. This letter should be considered an addendum to the approved Surface Water Assessment.

The approved KEQ surface water management system incorporates an in-pit sump which is pumped to an existing sediment dam identified as 'Dam 1' within the approved Surface Water Assessment and approved Site Water Management Plan. Dam 1 receives a disturbed catchment including KEQ's processing plant area. The proposed MOD 11 development does not propose any significant departures from the approved and established general arrangement of KEQ's surface water management system.

The MOD 11 proposal will result in a modest change in catchment areas within the KEQ extraction area. The additional extraction area proposed by MOD 11 is almost entirely located within an existing disturbance area within the KEQ footprint, under existing arrangements, reports to Dam 1. It follows that changes to Dam 1's overall catchment - being its surface water catchment plus the extraction area) – are negligible.

Sediment basin sizing in accordance with Landcom's 'Blue Book' has been undertaken to estimate the size of the in-pit sump following removal of the remnant dividing highwall. No changes are necessary or proposed to any other catchments or sediment controls which are addressed in the approved Surface Water Assessment.

MOD 11 proposes to establish a small additional disturbance area of approximately 4,690 m² adjacent to the north-eastern edge of the KEQ disturbance footprint, within a redundant powerline corridor. A portion of this area is within the proposed extraction area catchment and has been considered in sizing of the in-pit sump. The remaining area, which bypasses the sump and Dam 1, is well suited to other erosion and sediment controls including sediment fencing.

The potential for interaction of surface water between the KEQ and KHRQ extraction area pits following completion of the Karuah Pit Consolidation Project has been assessed. Preliminary design has confirmed there is a substantial surface water storage in the KHRQ pit to be exhausted before runoff from KHRQ could ever overflow into KEQ. Reciprocally, KEQ's ultimate floor level is 20m lower than KHRQ's ultimate floor level, meaning KEQ's runoff would be contained. The KEQ and KHRQ surface water management systems operate entirely independent of one another, at present and following the completion of the pit consolidation project.

The proposed development does not create any additional site water demands. No change is necessary to the water balance outcomes established within the approved Site Water Management Plan, and it remains representative following completion of MOD 11.

The proposed project does not introduce any groundwater impacts. No variations to existing Environmental Protection License EPL20611 will be required in relation to water management. A Rehabilitation and Closure Strategy has been developed for the project which appropriately considers drainage of the final, rehabilitated landform.

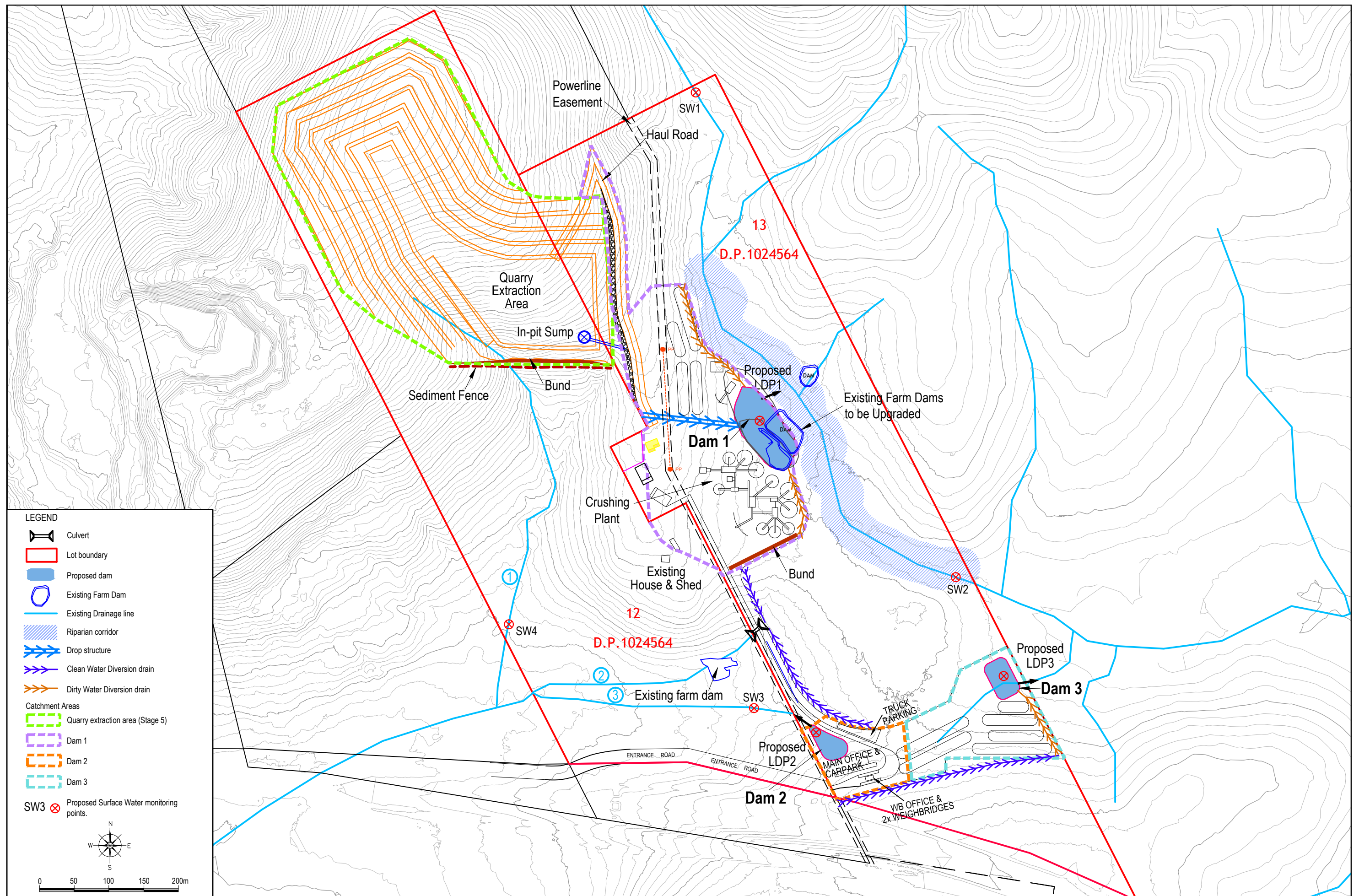
The results of this Surface Water Assessment confirm that the proposed MOD 11 project is acceptable and can be readily managed in terms of surface water considerations.

Mitchell Knox

MITCHELL KNOX
SENIOR CIVIL ENGINEER
MIEAust CPEng NER 4582634
ADW JOHNSON PTY LTD
Hunter Office

Appendix A

Appendix A – Site Water Management Plan



V:\633.10196\Figures\CAD\Current\Fg3_HQP05-008_SWPlan_130710_MS.dwg
To be printed A3

Proposed Surface Water Management Plan
FIGURE 3

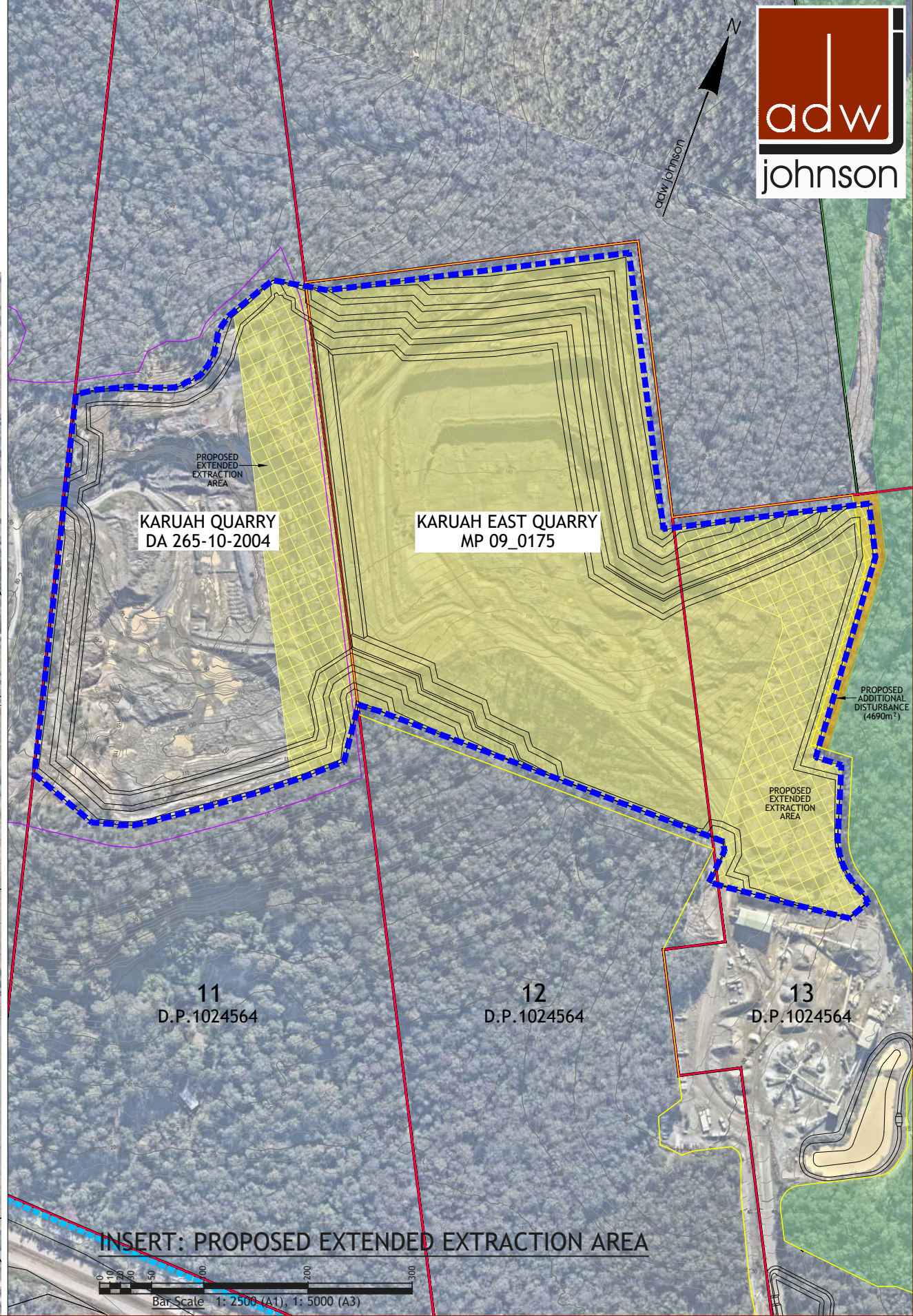
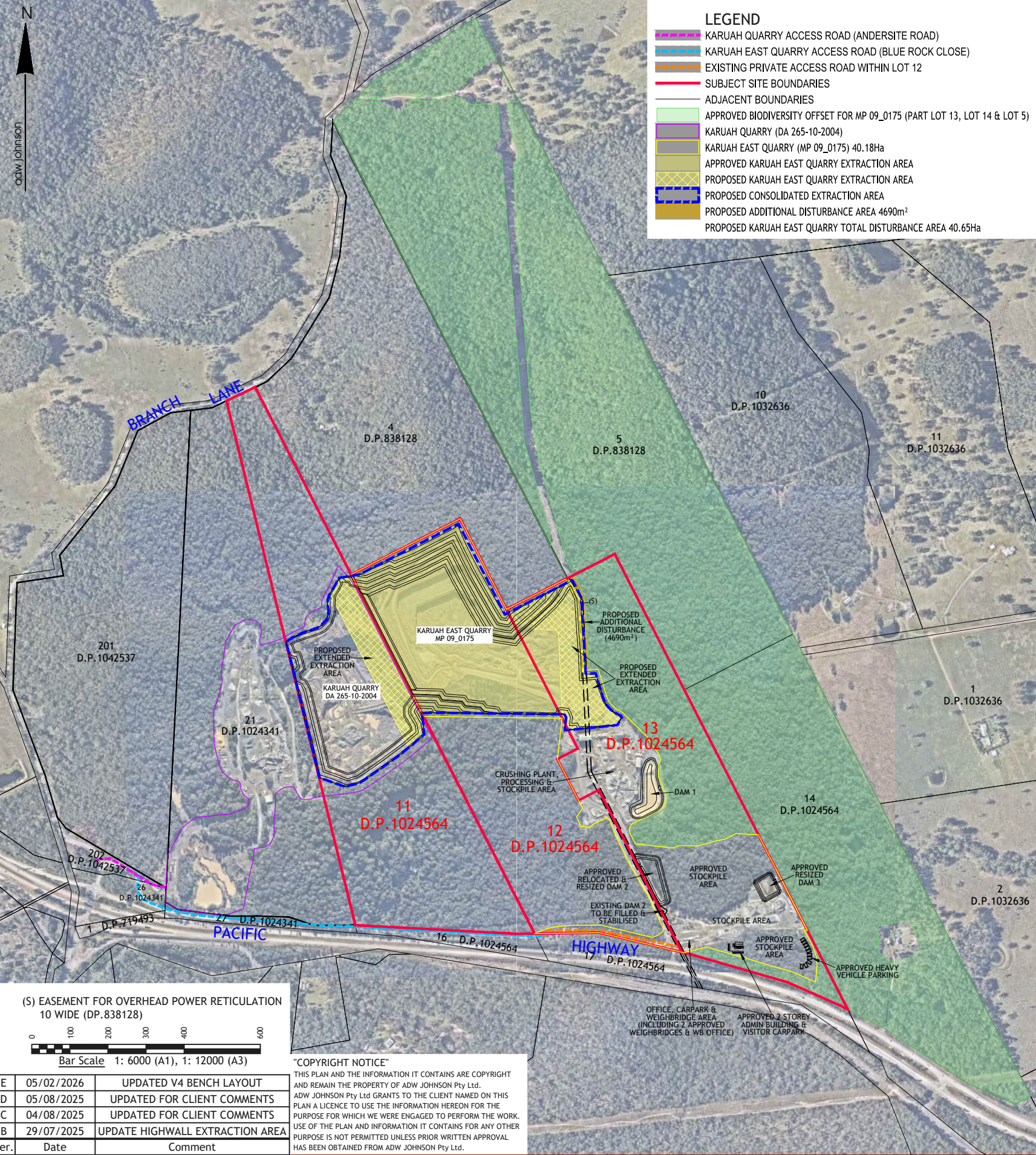
Appendix B

Appendix B – Proposed Site Plan

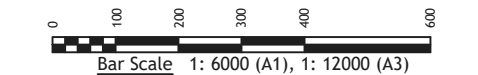
PROPOSED SITE PLAN
KARUAH EAST QUARRY
LOTS 11, 12 & 13 D.P.1024564
ANDERSITE ROAD & BLUE ROCK CLOSE, KARUAH

Location: Andersite Road &
Blue Rock Close
Karuah
Council: Mid Coast

Datum: A.H.D.
Origin: Lidar Data
Projection: M.G.A.
Origin: Grid
North Direction: Grid
Contour Interval: 2.0m
Create Date: 23rd July 2025
Sheet: 1 of 1
Plan By: ZJ
Project Manager: MR
Office: Hunter
Plan Purpose: Scoping
Version: E (05/02/2026)
Client: Hunter Quarries Pty Ltd
Survey: N/A
AutoCAD: Dwg\11819-SITE-018-E
Our Ref: 11819



(S) EASEMENT FOR OVERHEAD POWER RETICULATION
10 WIDE (DP.838128)

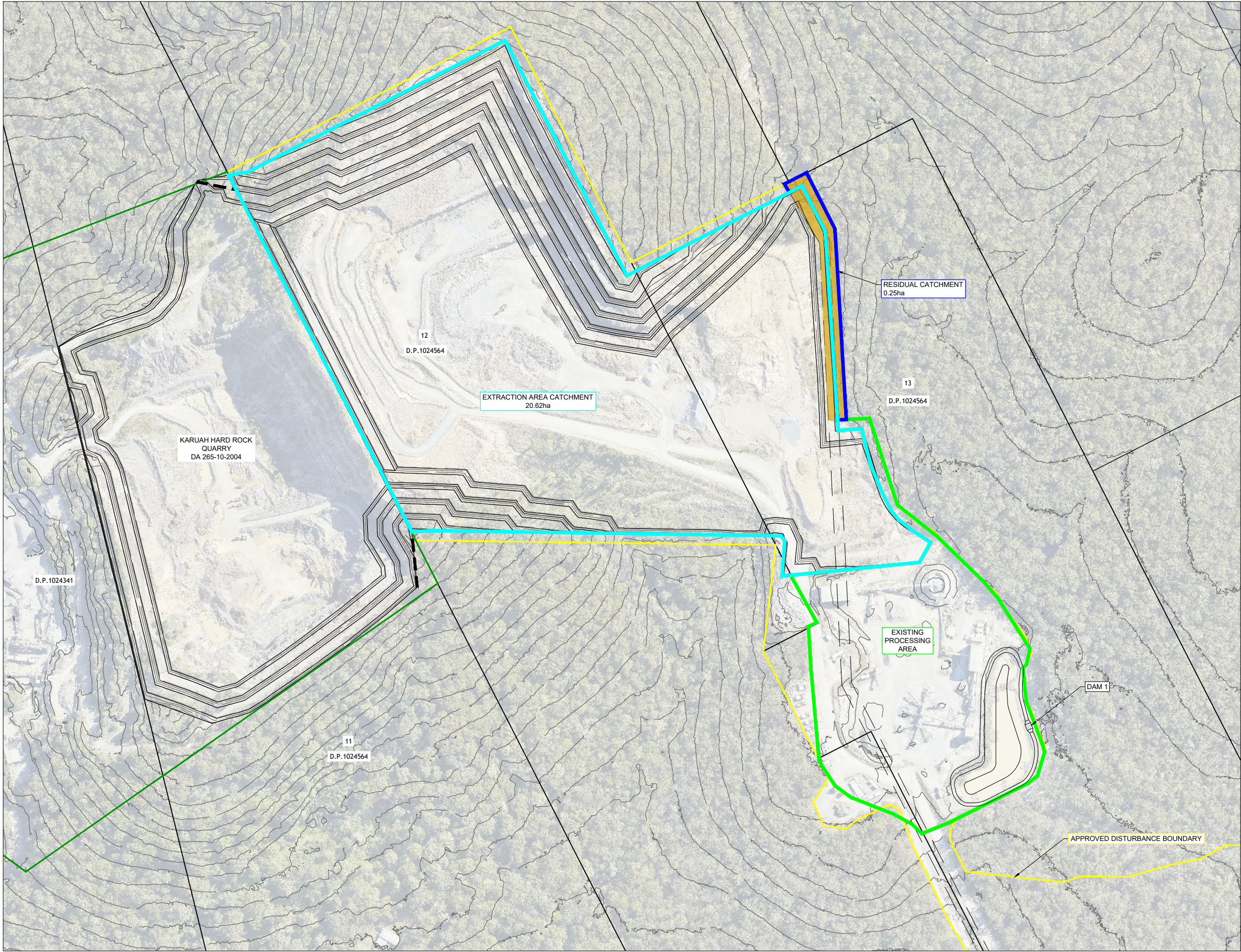


E	05/02/2026	UPDATED V4 BENCH LAYOUT
D	05/08/2025	UPDATED FOR CLIENT COMMENTS
C	04/08/2025	UPDATED FOR CLIENT COMMENTS
B	29/07/2025	UPDATE HIGHWALL EXTRACTION AREA
Ver.	Date	Comment

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Appendix C

Appendix C – Catchment Plan



M.G.A.

LEGEND

KARUAH QUARRY DA 265-10-2004

KURAH EAST QUARRY MP 09_0175

PROPOSED QUARRY PIT

PROPOSED CONTOURS

EXISTING LOT BOUNDARY

ELECTRICAL EASEMENT

PROPOSED CONSOLIDATED EXTRACTION AREA

PROPOSED HIGHWALL BUND (REFER SURFACE WATER ADDENDUM FOR DETAILS)

EXISTING CATCHMENT AREA

APPROVED DISTURBANCE BOUNDARY

PROPOSED EXTRACTION AREA

RESIDUAL CATCHMENT AREA

ADDITIONAL DISTURBANCE AREA

CONTOUR INTERVAL = 5.0m

NOTE:
1. EXISTING CATCHMENT BASED ON APPROVED KARUAH HARD ROCK QUARRY PIT SHELL (DA 265-10-2004). PIT SHELL IS BASED ON ULTIMATE EXTRACTION LANDFORM AND BENCH LAYOUT 'V4' BY VGT. PROPOSED IN-PIT SUMP IS OMITTED FOR CLARITY.



NOT FOR CONSTRUCTION

CATCHMENT PLAN
SCALE 1:2000

REV.	DATE	AMENDMENT	DESIGN	DRAWN	CHECKED	APPROVED	SCALES	 Central Coast 5 Pioneer Avenue, P.O. Box 3717, Tuggerah N.S.W. 2259 Phone: (02) 4305 4300 Fax: (02) 4305 4399 email: coast@adwjohnson.com.au www.adwjohnson.com.au ABN 62 129 445 398	CLIENT		PROPERTY DESCRIPTION			PROJECT		
A	02.12.24	INITIAL ISSUE	CL	MS	MK	MR	 ALL DIMENSIONS ARE IN METRES. DO NOT SCALE		KARUAH HARD ROCK QUARRY LOT 11 DP 1024564 LOT 21 DP1024341 ANDERSITE ROAD, KARUAH			KARUAH EAST QUARRY PIT CONSOLIDATION				
B	23.02.26	ADD SUMP							CATCHMENT PLAN			PLAN TITLE				
									SURVEYED ADW Johnson			DISCIPLINE ESK				
									DATUM GDA94 M.G.A. ZONE 56 A.H.D.			NUMBER 102				
											PROJECT No. 11683(2) -			REV. B		

Appendix D

Appendix D – RUSLE Calculations

SEDIMENT CONTROL - SEDIMENT BASIN PARAMETERS

IN ACCORDANCE WITH 'MANAGING URBAN STORMWATER:SOILS AND CONSTRUCTION'
VOLUME 1 4TH EDITION LANDCOM (2004)

SITE CATCHMENT AREA - KEQ IN-PIT SUMP		
CATCHMENT	VALUE	UNITS
TOTAL AREA	20.62	ha
DISTURBED AREA	20.62	ha

SITE PARAMETERS	
CONSTRAINT	VALUE
SOIL MATERIALS	DISPERSIBLE SOILS
SOIL TEXTURE GROUP	D
EROSION HAZARD	Low-moderate
DESIGN RAINFALL DEPTH (DAYS)	5
DESIGN RAINFALL DEPTH (PERCENTILE)	95th
DESIGN RAINFALL DEPTH (mm)	91.5
VOLUMETRIC RUNOFF COEFFICIENT (CV)	0.79

RUSLE FACTORS		
CONSTRAINT	VALUE	UNITS
RAINFALL EROSIVITY (R-FACTOR)	2600.00	mm
SOIL ERODIBILITY (K-FACTOR)	0.045	
SLOPE LENGTH	300	m
SLOPE GRADIENT	1	%
LENGTH/GRADIENT (LS-FACTOR)	0.27	
EROSION CONTROL PRACTICE (P-FACTOR)	1.3	
GROUND COVER (C-FACTOR)	1	

CALCULATIONS		
CONSTRAINT	VALUE	UNITS
SOIL LOSS	42	m ³ /ha/yr
SETTLING ZONE VOLUME	14906	m ³
SEDIMENT STORAGE VOLUME	667	m ³
TOTAL BASIN VOLUME REQUIRED	15573	m ³

SEDIMENT CONTROL - SEDIMENT BASIN PARAMETERS

IN ACCORDANCE WITH 'MANAGING URBAN STORMWATER:SOILS AND CONSTRUCTION'
VOLUME 1 4TH EDITION LANDCOM (2004)

SITE CATCHMENT AREA - KEQ POWERLINE EASEMENT		
CATCHMENT	VALUE	UNITS
TOTAL AREA	0.26	ha
DISTURBED AREA	0.26	ha

SITE PARAMETERS	
CONSTRAINT	VALUE
SOIL MATERIALS	DISPERSIBLE SOILS
SOIL TEXTURE GROUP	D
EROSION HAZARD	Low-moderate
DESIGN RAINFALL DEPTH (DAYS)	5
DESIGN RAINFALL DEPTH (PERCENTILE)	95th
DESIGN RAINFALL DEPTH (mm)	91.5
VOLUMETRIC RUNOFF COEFFICIENT (CV)	0.79

RUSLE FACTORS		
CONSTRAINT	VALUE	UNITS
RAINFALL EROSIVITY (R-FACTOR)	2600.00	mm
SOIL ERODIBILITY (K-FACTOR)	0.045	
SLOPE LENGTH	200	m
SLOPE GRADIENT	5	%
LENGTH/GRADIENT (LS-FACTOR)	2.00	
EROSION CONTROL PRACTICE (P-FACTOR)	1.3	
GROUND COVER (C-FACTOR)	1	

CALCULATIONS		
CONSTRAINT	VALUE	UNITS
SOIL LOSS	305	m ³ /ha/yr
SETTLING ZONE VOLUME	188	m ³
SEDIMENT STORAGE VOLUME	61	m ³
TOTAL BASIN VOLUME REQUIRED	249	m ³

Hunter

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Tuggerah NSW 2259
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