

Albion Park Quarry

Water Management Plan

Version 9 | Revision 3

Issued – December 2025





ACKNOWLEDGEMENT

Cleary Bros acknowledge and pay our respects to the Traditional Custodians of the lands in NSW and Australia on which our projects are located. We value the knowledge, advice and involvement of the Elders and extended Aboriginal community that contribute to our Projects and extend our respect to all Aboriginal and Torres Strait Islander peoples.

Contents

1.	Introduction.....	7
1.1	SCOPE.....	7
1.2	OBJECTIVES AND OUTCOMES	10
1.3	CONSULTATION	10
1.4	ENVIRONMENTAL MANAGEMENT TRAINING AND RESPONSIBILITIES	16
1.5	DOCUMENT PREPARATION	16
2.	Legal and Other Requirements.....	17
2.1	DEVELOPMENT CONSENT SSD 10369	17
2.2	ENVIRONMENT PROTECTION LICENCE 299.....	22
2.3	WATER ACCESS LICENCES.....	23
2.4	STATEMENT OF COMMITMENTS	27
3.	Approved Activities.....	29
4.	Potential Risks and Assessed Impacts	31
4.1	SURFACE WATER	31
4.2	GROUNDWATER	36
5.	Surface Water Management	38
5.1	BASELINE SURFACE WATER ENVIRONMENT.....	38
5.2	ASSESSED SURFACE WATER IMPACTS	42
5.3	SURFACE WATER MANAGEMENT SYSTEM.....	43
5.4	SURFACE WATER MONITORING	53
6.	Groundwater Management.....	56
6.1	BASELINE GROUNDWATER ENVIRONMENT	56
6.2	ASSESSED IMPACTS	63
6.3	GROUNDWATER MANAGEMENT SYSTEM	66
6.4	GROUNDWATER MONITORING.....	68
7.	Water Balance	72
7.1	ESTIMATED OPERATIONAL WATER BALANCE	72
7.2	WATER SUPPLY SECURITY.....	72
7.3	WATER DISCHARGE LOCATION AND LIMITS	73
7.4	ANNUAL WATER BALANCE	73
8.	Water Licencing	76
8.1	SURFACE WATER LICENCING.....	76
8.2	GROUNDWATER LICENCING	77
9.	Reactive Management.....	79
9.1	EMERGENCY RESPONSE	79
9.2	TRIGGER ACTION RESPONSE PLAN	79
10.	Reporting and Management of Complaints and Compliance	83
10.1	REPORTING AND PUBLISHING.....	83
10.2	COMPLAINT MANAGEMENT	84
10.3	INCIDENT AND NON-COMPLIANCE IDENTIFICATION AND MANAGEMENT	84

11.	Review and Improvement	86
11.1	INDEPENDENT ENVIRONMENTAL AUDIT	86
11.2	PLAN REVIEW.....	86
12.	References.....	87

Appendices

Appendix 1 – Blue Book Sediment and Erosion Controls

Figures

Figure 1 – Locality Plan	8
Figure 2 – Key Environmental Management Documents.....	9
Figure 3 – Approved Quarry Site Layout	30
Figure 4 – Local Surface Water Catchments.....	39
Figure 5 – Project Area Catchments and Watercourses.....	40
Figure 6 – Surface Water Catchment and Controls – End Stage 7a	45
Figure 7 – Surface Water Catchment and Controls – End Stage 7b	46
Figure 8 – Surface Water Catchment and Controls – End Stage 7c	47
Figure 9 – Surface Water Catchment and Controls – End Stage 7d	48
Figure 10 – Surface Water Catchment and Controls – End Stage 7e (Pre-rehabilitation)	49
Figure 11 – Registered Bores Surrounding the Project Area.....	58
Figure 12 – Project Area Bores and Springs	59
Figure 13 – Project Area Groundwater Levels.....	61
Figure 14 – Groundwater Level Drawdown Contours at the End of Stage 7	65
Figure 15 – Conceptual Hydrological Model	75
Figure 16 – Cleary Bros Surface Water Storages	78

Tables

Table 1 – Objectives and Key Performance Outcomes	10
Table 2 – Summary of Consultation – Water Management Plan.....	11
Table 3 – Roles and Responsibilities.....	16
Table 4 – Project Approval Requirements Relating to Water	17
Table 5 – EPL 299 Requirements Relating to Water.....	22
Table 6 – Conditional Requirements of WAL and Works Approval.....	24
Table 7 – Statement of Commitments – Surface Water and Groundwater	28

Table 8 – Environmental Risk Register – Surface Water	32
Table 9 – Environmental Risk Register – Groundwater.....	36
Table 10 – Surface Water Quality.....	41
Table 11 – Minimum Storage Capacity for a 1% AEP 24-hour Storm Event.....	50
Table 12 – EPL299 Discharge Criteria – Point 6 (EPL ID6)	51
Table 13 – Surface Water Quality Monitoring Locations, Parameters and Frequency	54
Table 14 – Surface Water Quality Trigger Values.....	55
Table 15 – Registered Groundwater Bores Surrounding the Project Area	57
Table 16 – Groundwater Monitoring Bores	60
Table 17 – Groundwater Quality	62
Table 18 – Modelled Groundwater Inflow Rates	63
Table 19 – Groundwater Level Monitoring	69
Table 20 – Groundwater Quality Monitoring.....	69
Table 21 – Groundwater Level Triggers.....	71
Table 22 – Estimated Average Annual Operational Water Balance	72
Table 23 – Water-related Trigger Action Response Plan.....	80

Document Control

Version	Date	Reason	Prepared by	Reviewed by	Approved by
Ver 8 rev 1		Revision following Stage 7 approval - Draft for Cleary Bros review	PR/GSD/MB	MH	-
	4/12/23	- Draft for agency review	MB/MH	MH	-
	24/1/24	- Updated draft for DCCEEW review	MB/MH	MH	-
	31/1/24	- Final for Department of Planning and Environment approval	MB	MH	-
Ver 9 rev 1	5/3/24	- Revision following receipt of agency comments	GSD/MB/MH	MH	DPE
Ver 9 rev 2	8/10/25	Updated groundwater level triggers for spring fed dam monitoring bores and other administrative changes due to Maas acquisition	MH	MH	
Ver 9 rev 3	16/12/25	Revision following receipt of DPHI comments	MH	MH	DPHI 27/7/26

1. Introduction

1.1 Scope

Cleary Bros received State Significant Development consent (SSD) 10369 on 29 September 2023 to extend the current hard rock extraction area within the Albion Park Quarry (the Quarry) into the Stage 7 area. The Quarry is in the suburb of Croom, approximately 20km south-southwest of Wollongong and approximately 4km west of Shellharbour (**Figure 1**). Three other operational quarries are present in this area, as shown in **Figure 1**.

The Quarry involves extraction of latite and agglomerate to produce a range of high-quality aggregates, armour rock, and pavement products for use in the Illawarra-Shoalhaven and Greater Sydney Regions. The approved Quarry operations are fully described in the publicly available documents on Cleary Bros website (www.clearybros.com.au/albion-park/).

This *Water Management Plan* (the Plan) addresses water management within and immediately surrounding the Approved Project Area (Eastern Landholding - **Figure 1**) and describes the following, where relevant. This Plan does not address water management within Cleary Bros' Western Landholding.

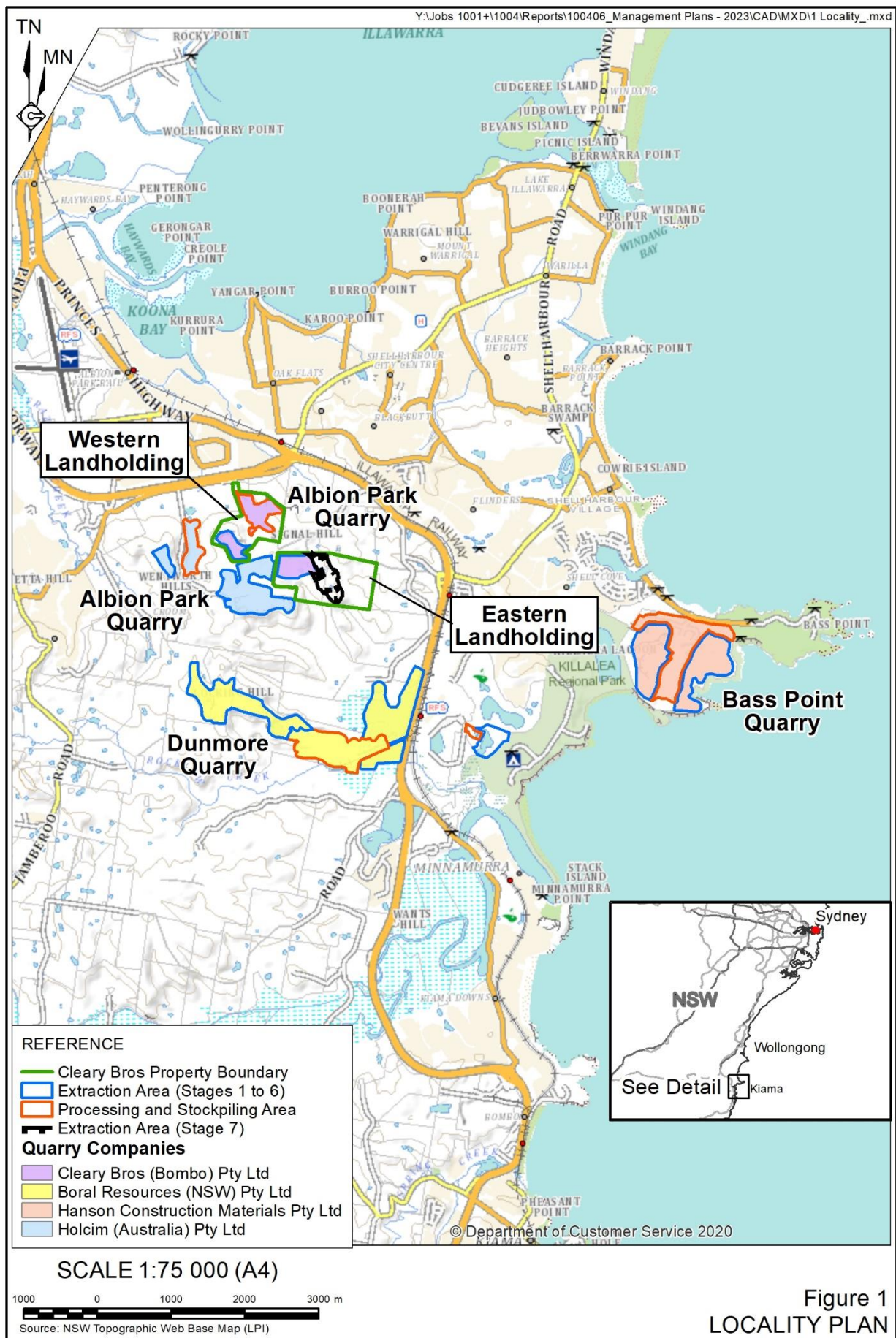
- Objectives and outcomes related to management of surface water and groundwater.
- Consultation undertaken during preparation of this Plan.
- Training requirements and roles and responsibilities of key Cleary Bros personnel.
- Legal and other statutory requirements and commitments that apply to the Quarry.
- A description of the activities approved under SSD 10369.
- Potential water-related risks associated with the Quarry.
- A description of the existing environment, assessed impacts, management systems, monitoring and triggers for both surface water and groundwater.
- A water balance.
- Water licensing requirements for the Quarry.
- An overview of reactive-management measures.
- A description of measures to manage water-related compliance matters.
- The procedures to review and update this Plan.

This Plan does not address the following.

- Aspects not relevant to management of water.
- Management of water within Cleary Bros' Western Landholding (**Figure 1**).
- Management, including management of water, of the final landform.

This Plan requires approval by the Planning Secretary and Cleary Bros will implement the approved Plan.

Figure 2 illustrates the strategic relationship, and inter-relationship, of this Plan to the Environmental Management Strategy (EMS) and other key environmental management documents.



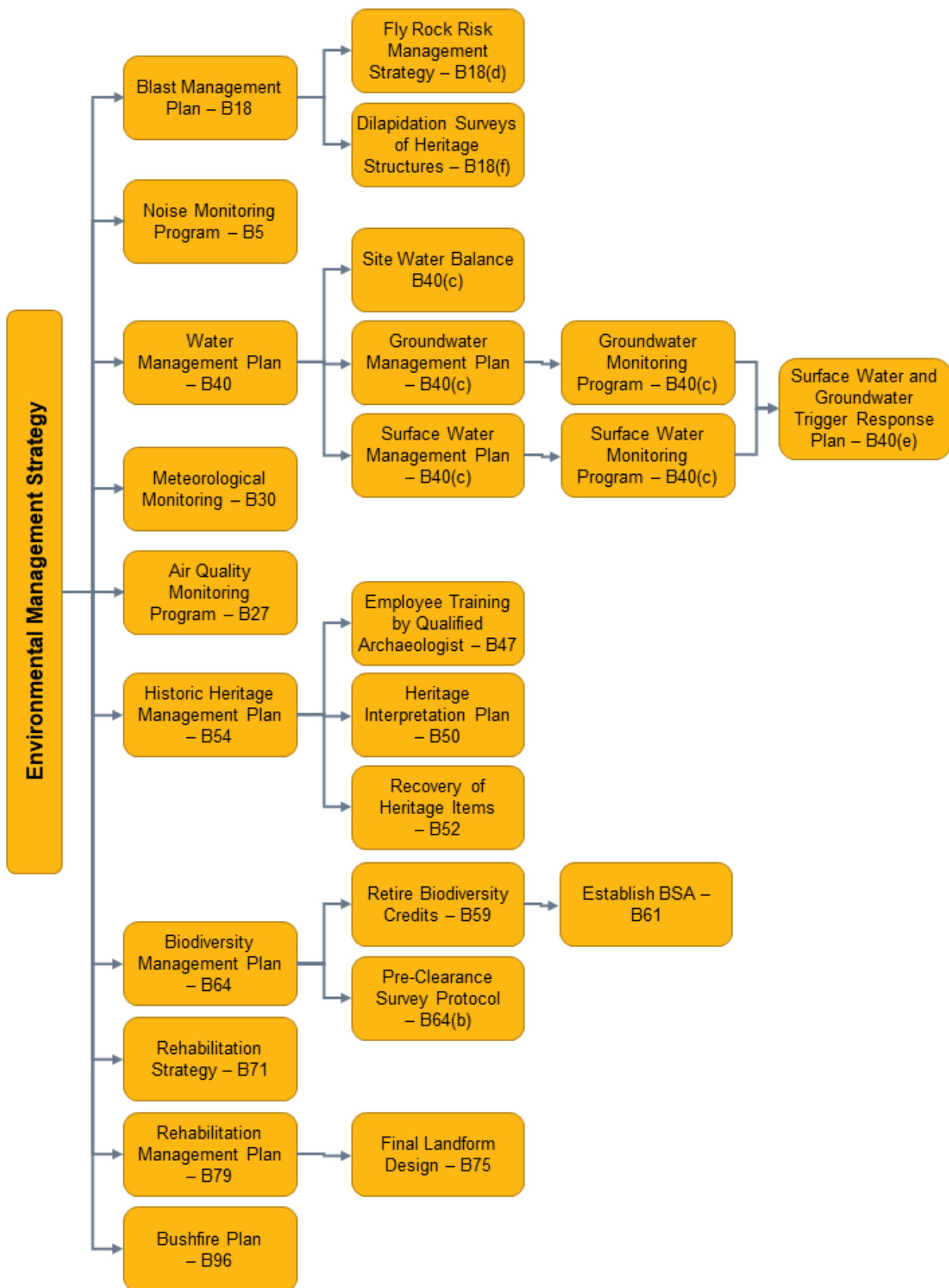


Figure 2 – Key Environmental Management Documents

1.2 Objectives and Outcomes

Table 1 presents the objectives and key performance outcomes for water management at the Quarry.

Table 1 – Objectives and Key Performance Outcomes

Objectives	Key Performance Outcomes
(a) To ensure compliance with all relevant conditions of SSD 10369, EPL 299 and WALs 41971, 44507 and 44508, stated commitments related to water management and reasonable community expectations.	(i) Implementation of this Plan. (ii) No reasonable community complaints or reportable incidents.
(b) To implement appropriate water management and mitigation measures throughout the life of the Quarry to ensure that harm to the environment is minimised.	(i) Implementation of this Plan. (ii) No discharge of water in breach of EPL 299 criteria. (iii) No reportable incidents related to water management or pollution.
(c) To implement an appropriate monitoring program which reviews compliance with relevant criteria throughout the life of the Quarry.	(i) All identified monitoring is undertaken in accordance with the relevant conditional requirements and procedures and at the relevant intervals. (ii) Monitoring results are published and reported on Cleary Bros' website and in the <i>Annual Review</i> and/or <i>Annual Return</i> .
(d) To investigate, implement and reporting on reasonable and feasible measures for continual improvement to water quality and to reduce soil loss.	(i) Regular review of this Plan, including updating as required.
(e) To implement an appropriate incident reporting program.	(i) Incidents (if any) are reported in an appropriate manner (in accordance with this Plan).

1.3 Consultation

Table 2 presents a summary of consultation undertaken with relevant stakeholders regarding preparation of this Plan. Revision 3 of Version 9 of the Water Management Plan was updated without further consultation with DCCEEW-Water (DPE Water), as the changes proposed under this revision were of a relatively minor nature, generally relate to works previously proposed under the previous version (installation and decommissioning of monitoring bores), or relate to an update of background information based on recent monitoring data. Nevertheless, as part of the revision, the previous comments provided by DCCEEW-Water were reviewed to ensure that any revisions did not conflict with advice previously provided by the agency.

Table 2 – Summary of Consultation – Water Management Plan

Date/ Agency	Agency Comments	Response	Where Addressed in this Plan
11/10/2023 DPE Water	DPE Water will review the Water Management Plan once it has been finalised and formally submitted		NA
18/1/2024 NSW DCCEEW	The proponent should provide additional details for the offsite storage dam and demonstrate how the dam meets eligibility requirements to be considered a harvestable rights dam.	Additional details have been provided	Section 8.1
	The proponent must ensure that the relevant work dealing applications for Water Access Licences have been completed prior to any water take occurring for the project	Cleary Bros holds Water Supply Work Approval 10WA122753 for the extraction area. Cleary Bros has made an application to WaterNSW to consolidate the three Water Access Licences (41971, 44507, and 44508) and include the works approval on the consolidated WAL.	Section 8.2
	The proponent should clarify how the excluded works provisions of the Water Management (General) Regulation 1028 apply to the Western and Southern Sumps in Section 8.1 of the WMP.	Additional clarification has been provided	Section 8.1
	The proponent should update references to the Water Sharing Plan (WSP) for the Greater Metropolitan Region Groundwater Sources 2023 and ensure the site remains complaint with any changes to the WSP	Reference to the 2011 WSP has been removed, except where that reference relates to assessment of groundwater impacts prior to expiry of that Plan. To the best of Cleary Bros knowledge, the approved Project is compliant with the requirements of the 2023 WSP.	Sections 2.3 and 3
	The proponent must include a replacement program for monitoring bores MW4, MW5 and MW6 due to the Stage 7 extension of the quarry	Two additional bores will be installed (Bore MW11 and MW12) to replace MW4, MW5 and MW6 prior to their removal during quarrying operations. Groundwater level triggers have been nominated for each of the proposed bores.	Sections 6.1.2 and 6.4.1
	The proponent should include management actions for exceedance of trigger action response plans (TARPs) designed to manage drawdowns exceeding the predicted drawdown.	TARP 4 identifies that an investigation into exceedance of the groundwater trigger levels would be undertaken by an independent expert to review the groundwater level monitoring data for the Quarry, determine the potential cause(s) of the exceedance and provide recommendations for further investigation or corrective actions. The TARP further commits to implementing the recommended further investigations or corrective actions.	No change

Date/ Agency	Agency Comments	Response	Where Addressed in this Plan
	The proponent should complete monitoring bores MW9S/D and MW10 prior to commencement of extraction for Stage 7 and included loggers in all bores monitoring the springs.	Cleary Bros have discussed proposed bores MW9S, MW9D, and MW10S with the landholder and are yet to receive approval to install and maintain the bores. As soon as practicable after approval is received, Cleary Bros will install and equip the proposed bores.	Section 6.4.1
	The proponent should include a commitment to “make good” if the approval holder for GW100090 exercises their right to take water.	TARP 6 has been amended to reference immediate short-term compensatory water supply, as well as long-term compensatory water supply if required.	Section 9.2
	The proponent must ensure that sufficient water licence is held for any predicted reductions in baseflow unless an exemption applies	This matter was addressed in Section 4.2.5.1 of the <i>Submission Report</i> dated October 2022¹. In summary, the <i>Groundwater Assessment</i> that accompanied the EIS determined that up to 66ML/y of groundwater would flow into the Extraction Area, with a further 2ML/y reduction in baseflow in surrounding watercourses as a result of reduced groundwater discharge. Figure 7 of the <i>Guidelines for Groundwater Documentation for SSD/SSI Projects</i> identifies that licencing for reduced baseflow resulting from a reduction in groundwater discharge should be licenced as a groundwater take. As a result, a total groundwater entitlement of 68ML/y from the Sydney Basin South Groundwater Source are required for the Quarry. Cleary Bros holds entitlement for 125ML/y from this groundwater source (See Section 2.3). Cleary Bros understands that the then DPE Water reviewed the <i>Submissions Report</i>, and no further questions were brought to the Company’s attention.	No change
	Works within waterfront land must be in accordance with the Guidelines for Controlled Activities	Offset distances to 1 st and 2 nd order creeks have been amended to reference the correct distances.	Section 5.3.4

¹ The Submissions Report is available on the Major Projects Website -

<https://majorprojects.planningportal.nsw.gov.au/prweb/PRRestService/mp/01/getContent?AttachRef=EXH-42162119%2120221102T025500.558%20GMT>

Date/ Agency	Agency Comments	Response	Where Addressed in this Plan
25/1/2024 NSW DCCEEW	DCCEEW were provided with an undated draft of the Water Management Plan on 24/1/2024 and a meeting was held to discuss the following. - Harvestable rights and interrelationship between registered landholders (Briden and Cleary Bros). - Clarification in relation to the requirement for a Miscellaneous Works Approval and excluded works. - Recommendation to decommission bore MW07 and replace with MW12. - Clarification that the “make good” commitment applied to the holder of bore GW100090. DCCEEW confirmed that further review of the Plan was not required and that once updated the Plan should be submitted to DPHI.		Various
27/02/2024 DPHI	DPHI comments on WMP requiring response/updates: Section 5.3.2 Lack of information regarding erosion and sediment control design to meet Blue Book. Need more information about dams, and other water structures and how they have been designed to meet Blue Book.	Erosion and sediment control during Stage 7 will include: - exclusion of clean water from undisturbed areas; and - retention of all dirty water from disturbed areas, with that water reporting to the Western or Southern Sumps. The capacity of the Western Sump is currently (pre-Stage 7) more than 350ML or four times the storage capacity required for a 1% AEP 24-hour storm event (see Table 11) and well in excess of that required to meet Blue Book requirements. As Stage 7 is developed, the capacity of the Western and Southern Sumps will increase substantially and will continue to exceed the Blue Book storage requirements.	Section 5.3.2
	Section 5.3.5 - Include a figure that details proposed riparian buffers - detail how site will maintain or improve baseline channel stability - Commitment to baseline survey for stability and riparian vegetation.	Figure 10 has been amended to show the riparian corridor. Commitment to baseline surveys and ongoing monitoring of watercourse stability and the condition of riparian vegetation added to Section 5.3.5.	Section 5.3.5

Date/ Agency	Agency Comments	Response	Where Addressed in this Plan
	Section 5 – Surface Water Management Section 5.3.4, 5.4.2, 7.3 only mentions LDP 6 criteria. There is also EPL criteria for LDP 004. See L2.3 • Riparian buffer zone not detailed in figures. • Table 14 missing EPL 100% concentration limits for TSS (mg/L) • Add L2.3 – LDP004 discharge criteria to these sections. • Add figure/s for all LDP locations	The EPL TSS concentration limit is only applicable to EPL Discharge Point 4 EPL Discharge Point 4 is located outside of the approval area for SSD10369 and is covered by the 1963 Council Deed EPL Discharge Point 6 added to Figure 3.	N/A
	Section 11.2 Add Condition D6 to Table 4 Add Condition numbers into Section 11.2	Condition D6 added to Section. Condition number referenced in Section 11.2.	Section 11.2
	Section 10.3 Add Condition D8 to Table 4	Condition D8 added to Table 4	Section 10.3
	Section 10.3 Add Condition D9 to Table 4	Condition D9 added to Table 4 .	Section 10.3
	Section 10.1 Add Condition D10 to Table 4 In first sentence of paragraph one in Section 10.1 change 'will be prepared' to 'must be submitted to the Department'	Condition D10 added to Table 4 . Text within Section 10.1 has been amended.	Section 10.1
	Section 11.1 Add Condition D11 to Table 4	Condition D11 added to Table 4 .	Section 11.1
	Section 11.1 Add Condition D12 to Table 4 Add Condition D12 to Section 11.1	Condition D12 added to Table 4 . Condition D12 added to Section 11.1.	Section 11.1

Date/ Agency	Agency Comments	Response	Where Addressed in this Plan
	Section 11.3 Add Condition D15 to Table 4 Add Condition D15 to new Section 11.3.	Condition D15 added to Table 4. Condition D15 added to Section 10.1 'Reporting and Publishing'	Section 11.3
	Section 5.4.2 has superscript incorrectly used in body of text to detail percentile parameters. ie ² 0% and ⁸ 0%.	Incorrect use of superscript removed.	Section 5.4.2
	Section 1 – Introduction needs to have more details about what the general modification is. We note there are some more specific details in later sections.	It is not clear what “general modification” means. As a Management Plan related to Stage 7 there is a detailed description of the approved activities in Section 3 and Cleary Bros prefers not to have duplication between documents as it risks inconsistency between documents.	No change
	Suggest remove 'Western Land Holdings' boundary on Figure 16 for ease of Management Plan interpretation.	Western land holdings have been retained on plan to address queries from DCCEEW in relation to the calculation of the harvestable right.	No change
	Erosion and sediment risks are highest during clearing. Outline details of clearance management including inspection timings and triggers to manage erosion and sediment control. More detail is needed in Section 5.3.2 regarding Stage 7a. Table 23 (TARP) should also include more details of erosion and sediment control management during clearing. Include copies of Blue Book design controls/schematics as an appendix to this management plan. Eg, Sediment dam, sediment fencing, channel design. Commitment to inspections and maintenance after defined rainfall events.	Section 5.3.2 has been amended to include additional detail in relation to establishment and progression of sediment and erosion controls. Sections 5.3.2 and 5.4.2 have been amended to include additional details in relation to inspection of sediment and erosion controls. Section 9.2 and Table 23 has been amended to present measures to be implemented in the event that inspections identify active erosion. Appendix 1 with copies of Blue Book standard drawings has been included.	Sections 5.3.2, 5.4.2 and 9.2 Table 23

1.4 Environmental Management Training and Responsibilities

The roles and responsibilities for the implementation of this Plan are shown in **Table 3**.

Table 3 – Roles and Responsibilities

Roles	Responsibilities
Chief Operations Officer - Construction Materials	• Provide strategic direction regarding environmental policy. • Provide adequate resources for implementation of this Plan.
General Manager Quarries	• Accountable for the overall environmental performance of the Quarry, including the outcomes of the Plan. • Independently review indicators of environmental performance, confirm compliance with environmental objectives and approvals. • Ensure adequate resources are available to enable implementation of the Plan. • Ensure employees are competent through training and awareness programs.
Environmental Officer	• Ensure the implementation of this Plan, including reporting of non-compliances with the trigger values, and subsequent implementation of the relevant action plan. • Ensure monitoring is undertaken in accordance with the Plan. • Ensure all internal and external reporting requirements are met. • Respond to all incidents and complaints. • Update the Plan as required. • Undertake/organise, review and analyse all monitoring data.
Operational Staff and Contractors	• Undertake all environmental training and awareness induction as directed. • Follow directions provided by the Environmental Officer, Supervisors and Quarry management. • Show due care not to cause environmental harm. • Notify Supervisor of any environmental non-compliance.

1.5 Document Preparation

This Plan has been prepared by the following, each employees of RW Corkery & Co. Pty Ltd (RWC).

- Dr Grace Scullett-Dean (BSc(hons)(Geoscience), PhD (Environmental Science)), Graduate Environmental Consultant.
- Mr Paul Ryall (B.Sc. Hydrology), Senior Environmental Consultant.
- Mr Mitchell Bland (BSc (hons), MEconGeol, LLB (hons)) Principal and Managing Director.

Mr Ryall was responsible for drafting Sections 5.4, 6.4, 7 and 9 of this document. Dr Scullett-Dean was responsible for drafting Sections 1 to 3, 5.1, 5.2, 6.1, 6.2, 10 and 11 of the document. Mr Bland prepared the remaining sections of the document and undertook an internal peer review.

Mr Ryall and Mr Bland's appointment as principal authors of this document was endorsed by the Planning Secretary on 13 November 2023.

Mr Mark Hammond (BenvSc (hons)), Quality and Environment Manager with Cleary Bros, provided a range of information presented in this document, as well as reviewing the draft and approving the final version for release. Mr Hammond updated the trigger values for the spring fed dam monitoring bores in V9 rev 3 in line with the process described in the approved WMP, as well as making other administrative updates.

2. Legal and Other Requirements

2.1 Development Consent SSD 10369

Table 4 identifies the conditional requirements of SSD 10369 relevant to this Plan and where they are addressed.

Table 4 – Project Approval Requirements Relating to Water

Cond. No.	Requirement	Plan Section	
Water Supply			
B31	The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.	7.2	
B32	The Applicant must report on water extracted from the site each year (direct and indirect) in the Annual Review, including water taken under each water licence. Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development.	7.4	
Water Management Performance Measures			
B33	The Applicant must ensure that the development complies with the performance measures in Table 6. Table 6: Water management performance measures		
	Feature	Performance Measure	
	Water management – general	- Minimise the use of clean potable water on the site - Maximise water recycling, reuse and sharing opportunities - Design, install, operate, and maintain water management systems in a proper and efficient manner - Identify, minimise, and mitigate risks to the receiving environment and downstream water users	7.2.2 7.4 5.3 and 6.3 4, 5, 6 and 7
	Clean water diversions	- Design development footprint and maintain clean water diversions to prevent the inflow of water from Watercourse 6 during a 1% AEP 72-hour rainfall event - Maximise as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site	5.3.2 and 5.3.5 5.3.2
	Fractured rock aquifer	Development does not reduce the beneficial use category of the groundwater source located more than 40 metres from the approved disturbance area	6.3.3 and 6.3.4
	Water use	Annual take of groundwater and surface water (exempt and licensed) is measured and reported against entitlements and/or licenses held	7.4
	Erosion and sediment control works	- Design, install and maintain erosion and sediment controls in accordance with the guidance series Managing Urban Stormwater: Soils and Construction including Volume 1: Blue Book (Landcom, 2004), Volume 2A: Installation of Services (DECC, 2008), Volume 2C: Unsealed Roads (DECC,2008), Volume 2D: Main Road Construction (DECC, 2008) and Volume 2E: Mines and Quarries (DECC, 2008) - Design, install and maintain any new infrastructure, or any approved disturbance within 40 metres of watercourses in accordance with the guidance series for Controlled Activities on Waterfront Land (DPI Water, 2012)	5.3.2 and 5.3.3 5.3.5
	Quarry water storages	- Design, install and maintain quarry water storage infrastructure to avoid unlicensed or uncontrolled discharge of dirty water - Operational water storages designed to contain the 1% AEP 24-hour storm event	5.3.3

Cond. No.	Requirement	Plan Section
	On-site storages are suitably designed, installed and maintained	5.3.3
	Chemical and hydrocarbon storage Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard	5.3.3
	Overburden emplacements and backfill - Design, install and maintain emplacements to encapsulate and prevent migration of potentially acid forming materials - Acidic soils neutralised to prevent the production of acid during the reuse of soil resources	6.3.2
	Riparian corridors - Maintain the inner zone of vegetated riparian zones as a vegetated buffer and minimise harm to riparian corridors - Maximise the preservation of the outer area riparian zone and where the development encroaches on the outer area riparian zone, establish an encroachment offset - Maintain or improve baseline channel stability	6.3.2
	Aquatic and riparian ecosystems - Negligible environmental consequences beyond those predicted in document/s listed in condition A2(c) - Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006) or its latest version	5.3.5
		Entire document
		5.4.2
B34	The performance measures in Table 6 apply to the entire site, including all landforms constructed under previous development consents. However, these performance measures do not require any additional earthmoving works to be undertaken for landforms that have been approved and constructed under previous consents, except where those earthworks are required for the establishment of a stable and non-polluting landform.	Noted
Compensatory Water Supply		
B35	The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted (other than an impact that is minor or negligible) as a result of the development, in consultation with Environment Protection Authority Water, and to the satisfaction of the Planning Secretary.	6.3.4
B36	The compensatory water supply measures must provide an alternative long-term supply of water that is equivalent, in quality and volume, to the loss attributable to the development. Equivalent water supply must be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.	6.3.4
B37	If the Applicant and the landowner cannot agree on whether the loss of water is to be attributed to the development or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.	Noted
B38	If the Applicant is unable to provide an alternative long term supply of water, then the Applicant must provide compensation, to the satisfaction of the Planning Secretary. Notes: The Water Management Plan (see condition B40) is required to include trigger levels for investigating potentially adverse impacts on water supplies. The burden of proof that any loss of surface water or groundwater access is not due to quarrying impacts rests with the Applicant.	6.3.4
B39	In the event of any complaint relating to a privately-owned spring fed dam or licensed groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), the Applicant must, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or the provision of an alternative long-term supply of water as required under conditions B35 and B36, to the satisfaction of the Planning Secretary.	Noted
Water Management Plan		
	The Applicant must prepare a Water Management Plan for the development. The plan must:	

Cond. No.	Requirement	Plan Section
B40	(a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary;	1.5
	(b) be prepared in consultation with DPE Water; and	1.3
	(c) include a:	
	(i) Site Water Balance that includes details of:	
	• predicted annual inflows to and outflows from the site;	7.4
	• sources and security of water supply for the life of the development (including authorised entitlements and licences);	7.2 and 8
	• water storage, use and management on the site;	5.3.3 and 7.4
	• licenced discharges points and limits;	5.3.4 and 7.3
	• reporting procedures, including the annual preparation of an updated site water balance;	7.4 and 10.1
	(ii) Surface Water Management Plan, that includes:	
	• detailed baseline data on surface water flows, water quality, riparian condition and geomorphic stability in watercourses that could potentially be affected by the development;	5.1
	• a detailed description and mapping of the surface water management system required to achieve the relevant performance measures detailed in Table 6;	5.3.2 and Figure 6 to Figure 10
	• surface water performance criteria, including trigger levels for identifying and investigating potentially adverse impacts (or trends) associated with the development and any potential non-compliance with the relevant performance measures detailed in Table 6;	5.4.2
	• a program to monitor, evaluate and report on: – compliance with the performance measures listed in Table 6 and the performance criteria in the plan; – impacts on water supply for other water users; – surface water inflows, controlled discharges, uncontrolled discharges, and storage volumes to inform the Site Water Balance; – any surface water discharges;	5.4 and 7.4
	(iii) Groundwater Management Plan that includes:	
	• detailed baseline data of groundwater levels, yield and quality for groundwater resources potentially impacted by the development, including groundwater supply for other water users;	6.1
	• a spring fed dam monitoring program to determine whether the spring fed dams identified by documents listed in condition(c) have been adversely and directly impacted as a result of the development (subject to landowner access arrangements). The program must include baseline and ongoing monitoring of water levels, groundwater flow and discharge volumes;	6.4.5
	• a detailed description of the groundwater management system required to achieve the performance measures detailed in Table 6;	6.3
	• groundwater performance criteria, including trigger levels for identifying and investigating any potentially adverse groundwater impacts (or trends) associated with the development and any potential non-compliance with the performance measures detailed in Table 6;	6.4.6
	• a program to monitor, evaluate and report on:	

Cond. No.	Requirement	Plan Section
	– compliance with the performance measures listed in Table 6 and the performance criteria in the plan; – water loss/seepage from water storages into the groundwater system, including from any final void; – groundwater inflows, outflows and storage volumes, to inform the Site Water Balance; – impacts on groundwater supply for other water users, including spring fed dams; – the effectiveness of the groundwater management system;	6.4 and 7.4
	• a protocol to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the extraction areas; and	8.2
	(d) a protocol for identifying and investigating any non-compliance with the performance measures or exceedances of performance criteria for surface water or groundwater, and relevant stakeholders of these events;	9.2 and 10.3
	(e) a trigger action response plan to respond to any exceedances of the performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water or groundwater impacts of the development.	9.2
B41	Prior to commencing quarrying operations in the Stage 7 extraction area, the Applicant must submit the Water Management Plan to the Planning Secretary for approval.	Noted
B42	The Applicant must not commence quarrying operations in the Stage 7 extraction area until the Water Management Plan is approved by the Planning Secretary.	Noted
B43	The Applicant must implement the Water Management Plan approved by the Planning Secretary.	Noted
<u>Revision of Strategies, Plans and Programs</u>		
D6	Within three months of: (a) the submission of an incident report under condition D8 or D9; (b) the submission of an Annual Review under condition D10; (c) the submission of an Independent Environmental Audit under condition D11; (d) the approval of any modification of the conditions of this consent (unless the conditions require otherwise); or (e) notification of a change in development phase under condition A13. the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.	11.2
Incident Notification		
D8	The Applicant must notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing via the Department's Major Projects Website (or other method prescribed by the Planning Secretary) and identify the development (including the development application number and name), set out the location, and nature of the incident.	10.3
Non-Compliance Notification		
D9	Within seven days of becoming aware of a non-compliance, the Applicant must notify the Department of the non-compliance. The notification must be in writing via the Department's Major Projects Website and identify the development (including the development application number and name), set out the condition of this consent that the development is non-compliant with, why it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.	10.3

Cond. No.	Requirement	Plan Section
Annual Review		
D10	By the end of September in each year after the commencement of quarrying operations in the Stage 7 extraction area, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must: (a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year; (b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, including a comparison of these results against the: (i) relevant statutory requirements, limits, or performance measures/criteria; (ii) the environmental risk assessment prepared as part of the environmental management strategy required by condition D1; (iii) requirements of any plan or program required under this consent; (iv) monitoring results of previous years; and (v) relevant predictions in the documents listed condition A2(c). (c) identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence; (d) evaluate and report on: (i) the effectiveness of the noise and air quality management systems; and (ii) compliance with the performance measures, criteria, and operating conditions of this consent; (e) identify any trends in the monitoring data over the life of the development; (f) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and (g) describe what measures will be implemented over the next financial year to improve the environmental performance of the development.	10.1
Independent Environmental Audit		
D11	Within one year of commencement of quarrying operations within the Stage 7 extraction area, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. The audit must: (a) be prepared in accordance with the <i>Independent Audit Post Approval Requirements</i> (NSW Government 2020); and (b) be submitted, to the satisfaction of the Planning Secretary, within two months of undertaking the independent audit site inspection, unless otherwise agreed by the Planning Secretary.	11.1
D12	In accordance with the specific requirements of the <i>Independent Audit Post Approval Requirements</i> (NSW Government 2020), the Applicant must: (a) review and respond to each Independent Audit Report prepared under Condition D11 of this consent; (b) submit a response to the Planning Secretary and any other NSW agency that requests it, together with a timetable for the implementation of the recommendations of the Independent Audit Report; (c) implement the recommendations to the satisfaction of the Planning Secretary; and (d) make each Independent Audit Report and response to it publicly available no later than 60 days after submission to the Planning Secretary. (e) be led by a suitably qualified, experienced, and independent auditor whose appointment has been endorsed by the Planning Secretary;	11.1

Cond. No.	Requirement	Plan Section
Access to Information		
D15	Prior to the commencement of quarrying operations in the Stage 7 extraction area until the completion of all rehabilitation required under this consent, the Applicant must: (a) make the following information and documents (as they are obtained, approved, or as otherwise stipulated within the conditions of this consent) publicly available on its website: (i) the document/s listed in condition A2(c) of this consent; (ii) all current statutory approvals for the development; (iii) all strategies, plans and programs required under the conditions of this consent; (iv) any strategy, plan, or program developed in accordance with the documents listed in condition A2(c) or the conditions of this consent; (v) the proposed staging plans for the development; (vi) minutes of CCC meetings; (vii) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs required by the conditions of this consent; (viii) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any strategies, plans and programs; (ix) a summary of the current phase and progress of the development; (x) contact details to enquire about the development or to make a complaint; (xi) a complaints register, updated monthly; (xii) the Annual Reviews of the development; (xiii) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; (xiv) any other matter required by the Planning Secretary; and (b) keep such information up to date, to the satisfaction of the Planning Secretary.	10.1

2.2 Environment Protection Licence 299

Table 5 identifies the conditional requirements of Environment Protection Licence 299 (EPL 299) relevant to this Plan and where they are addressed.

Table 5 – EPL 299 Requirements Relating to Water

Cond. No.	Requirement	Plan Section								
P1	Location of monitoring/discharge points and areas	5.4.1								
P1.3	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point. <table><tr><th>EPA ID No.</th><th>Type of Monitoring Point</th><th>Type of Discharge Point</th><th>Location Description</th></tr><tr><td>6</td><td>Effluent quality monitoring - Discharge to waters</td><td>Effluent quality monitoring - Discharge to waters</td><td>Any discharge from the quarry extension (Lot 1 DP858245), labelled as EPL ID#6 in the map titled 'EPL299 Site Map' (dated 22 May 2020) and received by the EPA on 22 May 2020.</td></tr></table>		EPA ID No.	Type of Monitoring Point	Type of Discharge Point	Location Description	6	Effluent quality monitoring - Discharge to waters	Effluent quality monitoring - Discharge to waters	Any discharge from the quarry extension (Lot 1 DP858245), labelled as EPL ID#6 in the map titled 'EPL299 Site Map' (dated 22 May 2020) and received by the EPA on 22 May 2020.
EPA ID No.	Type of Monitoring Point		Type of Discharge Point	Location Description						
6	Effluent quality monitoring - Discharge to waters	Effluent quality monitoring - Discharge to waters	Any discharge from the quarry extension (Lot 1 DP858245), labelled as EPL ID#6 in the map titled 'EPL299 Site Map' (dated 22 May 2020) and received by the EPA on 22 May 2020.							
L1	Pollution of waters									

Cond. No.	Requirement	Plan Section																		
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Noted																		
L2	Concentration limits																			
L2.1	For each monitoring/discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area, must not exceed the concentration limits specified for that pollutant in the table.	5.4.2																		
L2.2	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	Noted																		
L2.3	To avoid any doubt, this condition does not authorise the pollution of waters by any pollutant other than those specified in the table\s.	Noted																		
L2.4	Water and/or Land Concentration Limits Point 6 <table><tr><th>Pollutant</th><th>Units of Measure</th><th>50 percentile Conc. limit</th><th>90 percentile Conc. limit</th><th>3DGM Conc. limit</th><th>100 percentile Conc. limit</th></tr><tr><td>pH</td><td>pH</td><td></td><td></td><td></td><td>6.5 – 8.5</td></tr><tr><td>Turbidity</td><td>Nephelometric turbidity units</td><td></td><td></td><td></td><td>32.2</td></tr></table>	Pollutant	Units of Measure	50 percentile Conc. limit	90 percentile Conc. limit	3DGM Conc. limit	100 percentile Conc. limit	pH	pH				6.5 – 8.5	Turbidity	Nephelometric turbidity units				32.2	5.4.2
Pollutant	Units of Measure	50 percentile Conc. limit	90 percentile Conc. limit	3DGM Conc. limit	100 percentile Conc. limit															
pH	pH				6.5 – 8.5															
Turbidity	Nephelometric turbidity units				32.2															
M2	Requirement to monitor concentration of pollutants discharged																			
M2.1	For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the frequency, specified opposite in the other columns:	5.4.1																		
M2.3	Water and/or Land Monitoring Requirements Point 6 <table><tr><th>Pollutant</th><th>Units of Measure</th><th>Frequency</th><th>Sampling Method</th></tr><tr><td>pH</td><td>pH</td><td>Daily during any discharge</td><td>Grab sample</td></tr><tr><td>Total suspended solids</td><td>Nephelometric turbidity</td><td>Daily during any discharge</td><td>Grab sample</td></tr></table>	Pollutant	Units of Measure	Frequency	Sampling Method	pH	pH	Daily during any discharge	Grab sample	Total suspended solids	Nephelometric turbidity	Daily during any discharge	Grab sample							
Pollutant	Units of Measure	Frequency	Sampling Method																	
pH	pH	Daily during any discharge	Grab sample																	
Total suspended solids	Nephelometric turbidity	Daily during any discharge	Grab sample																	
M3	Testing methods – concentration limits																			
M3.2	Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.	5.4.1																		
O6	Other operating conditions																			
O6.1	FLOCCULANTS USED IN WATER TREATMENT The licensee must not use a flocculant other than gypsum, without the written approval of the Authority.	5.3.4																		

2.3 Water Access Licences

Cleary Bros holds Water Access Licence (WAL) 45278 for the Quarry, providing 125 share components to the Sydney Basin South Groundwater Source. WAL45278 was formed from the consolidation of WALs 41971 (15 shares), 44507 (60 shares), and 44508 (50 shares).

Cleary Bros also holds Water Supply Works Approval 10WA122753 for the Extraction Area, as well as a production bore (not constructed) within Lot 1, DP 858245. The approval relates to the Sydney Basin South Groundwater Source and is a nominated works on WAL45278 .

Table 6 identifies the conditional requirements of the WAL and Works Approval relevant to this Plan and where they are addressed.

Table 6 – Conditional Requirements of WAL and Works Approval

Cond. No.	Requirement	Plan Section
Water Access License Conditions		
Take of Water		
MW8849-00001	Water must only be taken under this access licence in accordance with the conditions of any approval for a water supply work which is nominated on this access licence and is used to take the water.	Noted
MW8956-00009	A. Water must not be taken from a water supply work authorised by this approval that is located on waterfront land, and under an aquifer access licence: i. unless flows in the Minnamurra River Water Source have exceeded the upper limit of the Very Low Flow Class for at least 24 consecutive hours, which means that the flow is more than 3.6 ML/day for a 24-hour period at the Minnamurra River Browns Lane gauge [No. 214010], or ii. when there is no visible flow in the river at the location closest to the work, unless that location is: a) an in-river pool at or above full capacity, or b) an in-river dam pool at or above full capacity. B. These restrictions do not apply if: i. a hydrogeological study has been submitted that, in the Minister's opinion, adequately demonstrates that the water supply work will have no more than minimal impact on base flows in the river, or ii. the water supply work used to take the groundwater is drilled into the underlying parent material and the slotted intervals of the work commence deeper than 30m.	N/A
MW9092-00001	Water must only be taken using a water supply work authorised by this approval in accordance with the conditions of any access licence which nominates the water supply work and under which the water is taken.	Noted
MW9508-00001	Under section 77 of the Water Management (General) Regulation 2025, it is a mandatory condition of an authority to which an exemption under section 75 applies in relation to a work under the authority, that the holder of the authority: A. for an exemption granted under section 76(2)(b), (c), (e), or (f) - must not take water using the work, or B. for an exemption granted under section 76(2)(d) - must not take water using the work other than in accordance with the holder's basic landholder rights. Note. This condition relates to metering requirements. More information on how to comply with this condition is available on the Department's website.	Noted
Water Management Works		
MW7053-00001	The approval holder must ensure: A. the construction of the water supply work is completed within three years of the approval being granted, and B. the water supply work is not used unless construction is completed within three years of the approval being granted.	Water supply work is quarry pit

Cond. No.	Requirement	Plan Section
MW8848-00001	If contaminated water is encountered during the construction of the water supply work, the approval holder must do the following: A. notify the Minister in writing within 48 hours of becoming aware of the contaminated water, B. take all reasonable steps to minimise contamination and environmental harm, C. ensure that the contaminated water is sealed off by inserting casing to a depth sufficient to exclude the contaminated water from the water supply work, D. place an impermeable seal in the borehole annulus when and as directed by the Minister, and E. comply with any other requirements specified by the Minister. This condition does not apply to a water supply work constructed for the purpose of monitoring or remediating contaminated water.	N/A
MA9486-00001	A. Under section 101A of the Water Management Act 2000, metering equipment must be installed, used and properly maintained in connection with all water supply works authorised by this approval, except those works to which an exemption applies as described in the Water Management (General) Regulation 2025. B. The metering equipment must comply with the applicable metering equipment standards set out in the Water Management (General) Regulation 2025. Note. This is a 'mandatory metering equipment condition'. More information on how to comply with this condition is available on the Department's website.	N/A
MW8486-00001	A. Before decommissioning a water bore, the approval holder must: i. notify the Minister in writing of the intention to decommission the water bore at least 60 days before the start of decommissioning, and ii. include a work plan for decommissioning the water bore in accordance with the Minimum Construction Requirements for Water Bores in Australia. B. The approval holder must comply with any direction received from the Minister within 60 days of the notice referred to in paragraph A, stating that the water bore: i. must not be decommissioned, or ii. must be decommissioned in accordance with the requirements specified in the direction. C. In decommissioning the water bore, the approval holder must comply with: i. the work plan specified in paragraph A, and ii. if the Minister has given a direction - the requirements referred to in the direction. D. The approval holder must, no later than 60 days after decommissioning the water bore, notify the Minister in writing that the work has been decommissioned and provide the name of the driller who decommissioned the water bore.	N/A
MW8402-00001	The approval holder must ensure that the water supply work is constructed as follows: A. the water supply work must be constructed in the location authorised in this approval, B. water must be taken through the water supply work only from the water source specified in the share component of the access licence that nominates the water supply work, C. the water supply work must be sealed off from all other water sources, D. construction of the water supply work must comply with the construction standards for the type of bore, as prescribed in the Minimum Construction Requirements for Water Bores in Australia, E. construction and use of the water supply work must prevent contamination of the aquifer and between aquifers, F. construction and use of the water supply work must prevent the flow of saline water between aquifers.	8.2 or N/A
DK8862-00001	An extraction limit of 69ML/year applies to 10WA122753, meaning the combined extraction from all works authorised by the approval cannot exceed 69 ML/year.	8.2

Cond. No.	Requirement	Plan Section
Monitoring and Recording		
MW8847-00001	A. The access licence holder must record the following information in a logbook for each period of time that water is taken: i. date, start and end time when water was taken, volume of water taken, and ii. the water supply work approval number under which the water was taken, and iii. the purposes for which water was taken. B. This condition does not apply to this access licence if the licence nominates only water supply works that have an operational: i. meter that complies with Australian Standard AS 4747 - Meters for non-urban water supply, and ii. data logger. C. This condition ceases to apply to this access licence on the day on which the relevant mandatory metering equipment condition applies as specified in clause 230(1) in the Water Management (General) Regulation 2018.	10.1
MW8481-00001	A. The approval holder must record the following information in a logbook each time that water is taken using a water supply work authorised by this approval: i. date, start and end time when water is taken, and the volume of water taken, and ii. the access licence number or the authority (such as a licence exemption) under which the water is taken, and iii. the purposes for which water is taken, and iv. details of any cropping carried out using the water taken through the water supply work including the type of crop, area cropped, and dates of planting and harvesting, and v. where metering equipment has been installed for use in connection with the water supply work, the meter reading before water is taken, and vi. where metering equipment has not been installed for use in connection with the water supply work, details of all pumping activities for the water supply work including pump running hours, pump power usage or pump fuel usage, pump start and stop times and pump capacity per unit of time. B. This condition does not apply to a water supply work that: i. is used only for the purpose of taking water under a basic landholder right, or ii. has both an operational meter that complies with Australian Standard AS 4747 - Meters for non-urban water supply, and data logger. C. This condition ceases to apply to this approval on the day that the mandatory metering equipment condition applies to this approval under the Water Management (General) Regulation 2018.	10.1
MW6612-00001	A logbook used to record water take information must be retained for five (5) years from the last date recorded in the logbook.	10.1
MW8482-00002	A. Before water is taken under this access licence, the access licence holder must confirm that cease to take conditions do not apply and water may be taken. B. Where the access licence holder is required to keep a logbook, the access licence holder must record the confirmation, including the way in which the confirmation was established, in a logbook.	10.1
MW8614-00001	A. Before water is taken through the water supply work authorised by this approval, the approval holder must confirm that cease to take conditions do not apply and water may be taken. B. Where the approval holder is required to keep a logbook, the approval holder must record the confirmation, including the way in which the confirmation was established, in a logbook. C. This condition does not apply to a water supply work that is used only for the purpose of taking water under a basic landholder right.	10.1
Reporting		

Cond. No.	Requirement	Plan Section
MR9510-00001	A. This condition applies to an authority under which a work is used to take water in conjunction with metering equipment that: i. complies with the applicable metering equipment standards set out in the Water Management (General) Regulation 2025, and ii. has telemetry capacity that transmits data relating to water measured by the meter in accordance with the approved telemetry specifications. B. The authority holder must comply with the recording and reporting requirements set out in section 106 and 108 of the Water Management (General) Regulation 2025 unless an exemption applies. Note. More information on how to comply with this condition is available on the Department's website.	Noted
MR9510-00002	A. This condition applies to an authority under which a work is used to take water in conjunction with metering equipment that: i. complies with the applicable metering equipment standards set out in the Water Management (General) Regulation 2025, and ii. does not have telemetry capacity to transmit data relating to water measured by the meter in accordance with the approved telemetry specifications. B. The authority holder must comply with the recording and reporting requirements set out in section 107 and 108 of the Water Management (General) Regulation 2025 unless an exemption applies. Note. More information on how to comply with this condition is available on the Department's website	Noted
MW7042-00001	If directed by the Minister by notice in writing, the approval holder must provide a report in the form specified in the notice detailing the quality of any water obtained using the water supply work, within the timeframe (if any) specified in the written notice.	Noted
MW7052-00001	The approval holder must submit a completed Form A to the relevant licensor within 60 days: A. of completion of the construction of the water supply work, or B. after the issue of the water supply work approval if the approval is for the amendment of an existing water supply work.	N/A
MR9509-00001	Under section 114 of the Water Management (General) Regulation 2025, it is a mandatory condition of an authority to which the mandatory metering equipment condition applies that the holder must give the Minister a copy of a certificate given by a duly qualified person to the holder under section 98 or 99 within 28 days of receiving the certificate. Note. This condition relates to metering requirements. The certificates relate to the design of open channel metering equipment (see section 98) and the validation of metering equipment (section 99). More information on how to comply with this condition is available on the Department's website.	N/A
MR9510-00003	A. This condition applies to an authority under which a work is used without metering equipment to take water. B. The authority holder must comply with the recording and reporting requirements set out in section 109 of the Water Management (General) Regulation 2025 unless an exemption applies. Note. More information on how to comply with this condition is available on the Department's website.	10.1

2.4 Statement of Commitments

Table 7 identifies Cleary Bros commitments from the *Environmental Impacts Statement* relevant to this Plan and where they are addressed. In accordance with Condition A4 of SSD 10369, the conditions of the consent

prevail over Cleary Bros' prior commitments. As a result, where the commitments presented in **Table 7** have been amended to ensure consistency with SSD 10369, the amended text is presented as underlined text.

Table 7 – Statement of Commitments – Surface Water and Groundwater

Desired Outcome	Measure	Timing	Plan Section
Surface Water			
Prevent inflows in a 1% AEP storm event entering the Extraction Area	8.1 Retain a minimum cross-sectional area of 10.2m ² (including freeboard) for Watercourse 6 beyond the Stage 7 boundary.	Following commencement of Stage 7e	5.3.5
Reduce the risk of erosion outside the approved disturbance area	8.2 Avoid concentration of surface water flows outside of existing watercourses or other stabilised pathways.	Throughout the life of the Quarry	5.3.2
Soil resources are available for rehabilitation operations	8.3 Manage topsoil and subsoil stockpiles in accordance with the methods outlined in Section 6.8.6 of the EIS.	Throughout the life of the Quarry	5.3.2
Minimise the risk of sediment-laden runoff	8.4 Regularly monitor weather forecasts when planning soil stripping and stockpiling activities.	Prior to and during soil stripping operations	5.3.2
Surface water is retained within the Extraction Area	8.5 Implement the components of the staged surface water management plans described in Appendix 2 of SEEC (2022).	Throughout the life of the Quarry	5.3.2 and Figure 6 to Figure 10
Groundwater			
Prevention of hydrocarbon contamination	9.1 Implement Cleary Bros' existing spill response procedures, including training and standard practices for hydrocarbon and chemical spill control, containment and clean up, in the event of accidental spills or leaks.	Throughout the life of the Quarry	6.3.2
Manage pollution incidents appropriately	9.2 Maintain the Pollution Incident Response Management Plan for the Quarry, including associated protocols for communicating pollution incidents to potentially affected parties, throughout the Project life.	Throughout the life of the Quarry	6.3.2
Groundwater-related impacts and monitored	9.3 Implement the existing groundwater monitoring program (see Section 6.10.6 of the EIS) throughout the Project life.	Throughout the life of the Quarry	6.4
Surrounding groundwater users are not adversely impacted	9.4 Implement appropriate make good provisions (e.g. replacement of impacted bores) in the event that existing groundwater bores are impacted beyond the relevant Aquifer Interference Policy Minimal Impact Considerations.	In the event that monitoring confirms quarry-related groundwater effects are adversely impacting groundwater users	9.2

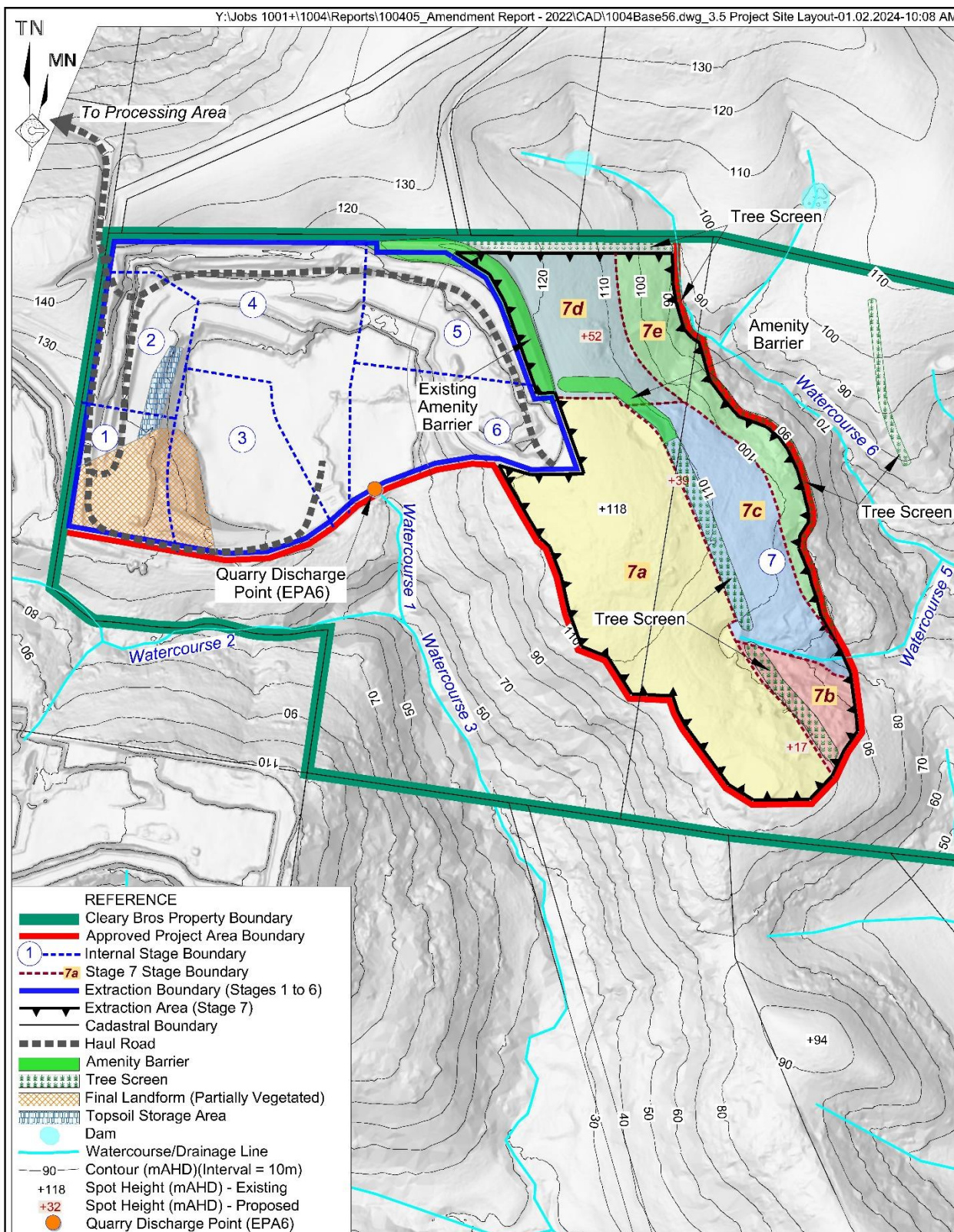
3. Approved Activities

The approved activities include the following (**Figure 3**).

- Extension of the current Stage 1 to 6 Extraction Area to include the Stage 7 Extraction Area.
- Continued staged extraction of latite, agglomerate and overburden material using free dig and drill and blast extraction methods at a maximum rate of 900,000 tonnes per annum (tpa) of material exported from the Project Area. A total of 21.5Mt of hard rock resource will be extracted over the life of the Quarry.
- Continued primary, and on occasion secondary, processing operations within the Project Area.
- Continued transportation of extracted and processed material to Cleary Bros fixed processing plant for further processing.
- Continued operation of the Quarry between:
 - 7:00am and 6:00pm Monday to Friday;
 - 7:00am to 1:00pm on Saturdays (to a maximum of 16 Saturdays per calendar year within Stage 7); and
 - at no time on Sundays or Public Holidays.
- Operation of the Quarry until 29 September 2053.
- Rehabilitation of the final landform in a manner suitable for agriculture and nature conservation, including establishment and revegetation of:
 - Quarry extraction benches, including reduced height (7m high) faces on the upper western and northern highwalls of the Stage 7 Extraction Area;
 - the floor of the Extraction Area; and
 - two quarry sumps, including a pipeline to ensure the Southern Sump is free draining.

Approved activities relevant to this Management Plan include disturbance of the following.

- Surface water management through the construction of diversion banks to re-direct clean runoff away from the active extraction area, and sumps within the active extraction area to control sediment-laden runoff.
- Continued discharge of water from the existing Quarry Discharge Point (EPA Point 6) in accordance with the requirements of EPL299.
- Interception of up to approximately 68ML per year of groundwater from the Sydney Basin South Groundwater Source.



Note: Some boundaries are coincident and are offset for clarity

SCALE 1:7 500 (A4)

100 0 100 200 300 400m

Contour Data Source: Geoscience Australia (External to Project Area)
Cleary Bros (Internal Mapping)

4. Potential Risks and Assessed Impacts

4.1 Surface Water

Table 8 presents an extract of the Environmental Risk Register from the Environmental Management Strategy, showing risks related to surface water. For further information on the risk assessment process including the risk matrix, refer to the Environmental Management Strategy.

Table 8 – Environmental Risk Register – Surface Water

Risk Issue	Cause	Impact(s)	Existing Controls	Severity	Likelihood	Risk Rating	Additional Controls	TARP Reference
Surface water quality impacts during routine quarrying operations	Discharge of water that exceeds the EPL299 criteria from the Western or Southern Sumps	Reduction in water quality in local watercourses within the Rocklow Creek catchment.	Daily testing of water quality prior to and during discharge Maintain adequate stormwater storage capacity in the Western and Southern Sumps	2 Minor	2 Unlikely	5 Low	N/A	1

Risk Issue	Cause	Impact(s)	Existing Controls	Severity	Likelihood	Risk Rating	Additional Controls	TARP Reference
Surface water quality impacts during construction of amenity barrier	Ineffective sediment control measures Poor stabilisation of amenity barrier	Reduction in water quality in local watercourses within the Rocklow Creek catchment	Erosion and Sediment Control Plan prepared and implemented. Permit to disturb process includes ESCP check. Amenity barrier to be stabilised and hydroseeded at earliest opportunity. Follow up treatment as required. Extensive grass buffer around amenity barrier to be retained.	2 Minor	2 Unlikely	5 Low	N/A	2

Risk Issue	Cause	Impact(s)	Existing Controls	Severity	Likelihood	Risk Rating	Additional Controls	TARP Reference
Surface water quality impacts during soil stripping activities	Ineffective sediment control measures	Reduction in water quality in local watercourses within the Rocklow Creek catchment.	Erosion and Sediment Control Plan prepared and implemented. Permit to disturb process includes ESCP check. Soil stockpiles to be located within excavation footprint as far as reasonably practicable.	2 Minor	2 Unlikely	5 Low	N/A	2
Reduction in creek flows due to diversion of catchments	Quarry excavation diverts existing runoff into quarry pits.	Reduction in flows in surrounding watercourses impacts riparian vegetation communities	Captured water within the Western or Southern Sumps to be returned to the Rocklow Creek catchment following settling of suspended solids. Biodiversity Management Plan includes regular assessment of riparian vegetation condition.	3 Moderate	2 Unlikely	9 Moderate	N/A	3
Watercourse temporarily diverted into Quarry pit during high creek flows	Quarrying too close to Watercourse 6	Reduction in water flows in creek. Inundation of quarry pit with clean water	Modelling of 1:100 flows undertaken Standoff calculated based on existing 2m contours Permit to disturb process to prevent over-stripping	2 Minor	3 Possible	8 Moderate	Watercourse 6 and surrounds to be surveyed to improve accuracy of flood modelling and to inform an updated offset distance	-

Risk Issue	Cause	Impact(s)	Existing Controls	Severity	Likelihood	Risk Rating	Additional Controls	TARP Reference
Contamination of water resources during refuelling or servicing activities	Inadequate equipment for spill clean up Workers unaware of actions to take in the event of a spill	Water quality within Western or Southern Sumps inadequate to permit discharge, requiring substantial clean up	Spill kits located on site and with refuellers. Bulk hydrocarbons stored in bunded areas. PIRMP in place and tested annually. Workers trained in spill response. Preventative maintenance of equipment scheduled through MEX fleet management software. Water tested prior to discharge and retained onsite if quality insufficient for discharge.	2 Minor	2 Unlikely	5 Low	N/A	-
Final landform becomes inundated with water	Blockage or failure of proposed water discharge pipeline	Unlicensed take of water Reduction in land capability Creation or unwanted legacy for the site	Preliminary designs prepared which would minimise ongoing maintenance and risk of blockage. Design and backfilling of western section of the Extraction Area to maximise passive overflows via Watercourse 1. Final design to consider redundancies in design to reduce likelihood of a blockage or failure.	4 Significant	3 Possible	18 High	Detailed feasibility study and final landform design to be undertaken	Refer to Rehabilitation on MP

4.2 Groundwater

Table 9 presents an extract of the Environmental Risk Register from the Environmental Management Strategy, showing risks related to groundwater.

Table 9 – Environmental Risk Register – Groundwater

Risk Issue	Cause	Impact(s)	Existing Controls	Severity	Likelihood	Risk Rating	Additional Controls	TARP Reference
Quarry operations result in reductions in groundwater level greater than that predicted	Modelling does not accurately reflect impact	Reduced groundwater levels and availability of groundwater for existing groundwater users	Water licences secured for modelled take of groundwater. Groundwater monitoring program assesses groundwater levels around Extraction Area. Make good provisions in the event groundwater impact exceeds that modelled.	2 Minor	2 Unlikely	5 Low	N/A	4
Quarry operations impact groundwater availability in local watercourses	Modelling does not accurately reflect impact	Reduced baseflow contribution to local watercourses within the Rocklow Creek catchment	Water licences secured for modelled take of groundwater. Groundwater monitoring program assesses groundwater levels around extraction area.	3 Moderate	2 Unlikely	9 Moderate	N/A	4
Quarry operations impact groundwater quality	Seepage of poor-quality water or water contaminated with chemicals or hydrocarbons into the underlying aquifer(s)	Reduced groundwater quality	Spill kits located on site and with refuellers Bulk hydrocarbons stored in bunded areas PIRMP in place and tested annually Workers trained in spill response Preventative maintenance of equipment scheduled through MEX	2 Minor	2 Unlikely	5 Low	N/A	5
Quarry operations reduce groundwater in flows to spring-fed dams	Modelling does not accurately reflect impact	Reduced baseflow contribution to spring-fed dams resulting in insufficient water for watering livestock	Groundwater monitoring program includes monitoring of spring-fed dams Make good provisions in the event spring-fed dams are impacted by quarrying activities	3 Moderate	2 Unlikely	9 Moderate	N/A	6

Risk Issue	Cause	Impact(s)	Existing Controls	Severity	Likelihood	Risk Rating	Additional Controls	TARP Reference
Groundwater inflows exceed licenced allocation	Modelling does not accurately reflect impact	Unlicenced groundwater taken	Annual water balance includes an estimate of groundwater inflow Water licences held for approximately double estimated groundwater inflow	3 Moderate	2 Unlikely	9 Moderate	N/A	7

5. Surface Water Management

5.1 Baseline Surface Water Environment

5.1.1 Watercourses and Catchments

The Project Area is located within the Rocklow Creek catchment with runoff from the Project Area generally flowing in a southeasterly direction before joining Rocklow Creek and the Minnamurra River, which drains into the Tasman Sea at Minnamurra (**Figure 4**). The watercourses within and draining from the Project Area are divided into three catchments, namely the Western, Southern and Eastern Catchments (**Figure 5**). Runoff from the Western and Southern Catchments enters the dredge ponds associated with Boral's Dunmore Sand and Soil Quarry whilst Eastern Catchment runoff enters the Princes Highway drainage infrastructure that discharges into Rocklow Creek immediately east of the Illawarra Railway Line. There is limited agricultural use of the water downstream of the Project Area, principally given the intermittent nature of the flows.

Unnamed watercourses immediately surrounding the Project Area are presented in **Figure 5**. The Western Catchment includes Watercourses 1 and 2, which merge to form Watercourse 3 which runs along the western flank of Stage 7. The Southern Catchment includes two small un-named watercourses draining the southern part of the Stage 7 area, which combine to form Watercourse 4. The Eastern Catchment includes a number of tributaries (including Watercourse 5) that merge to form Watercourse 6 on the eastern side of Stage 7.

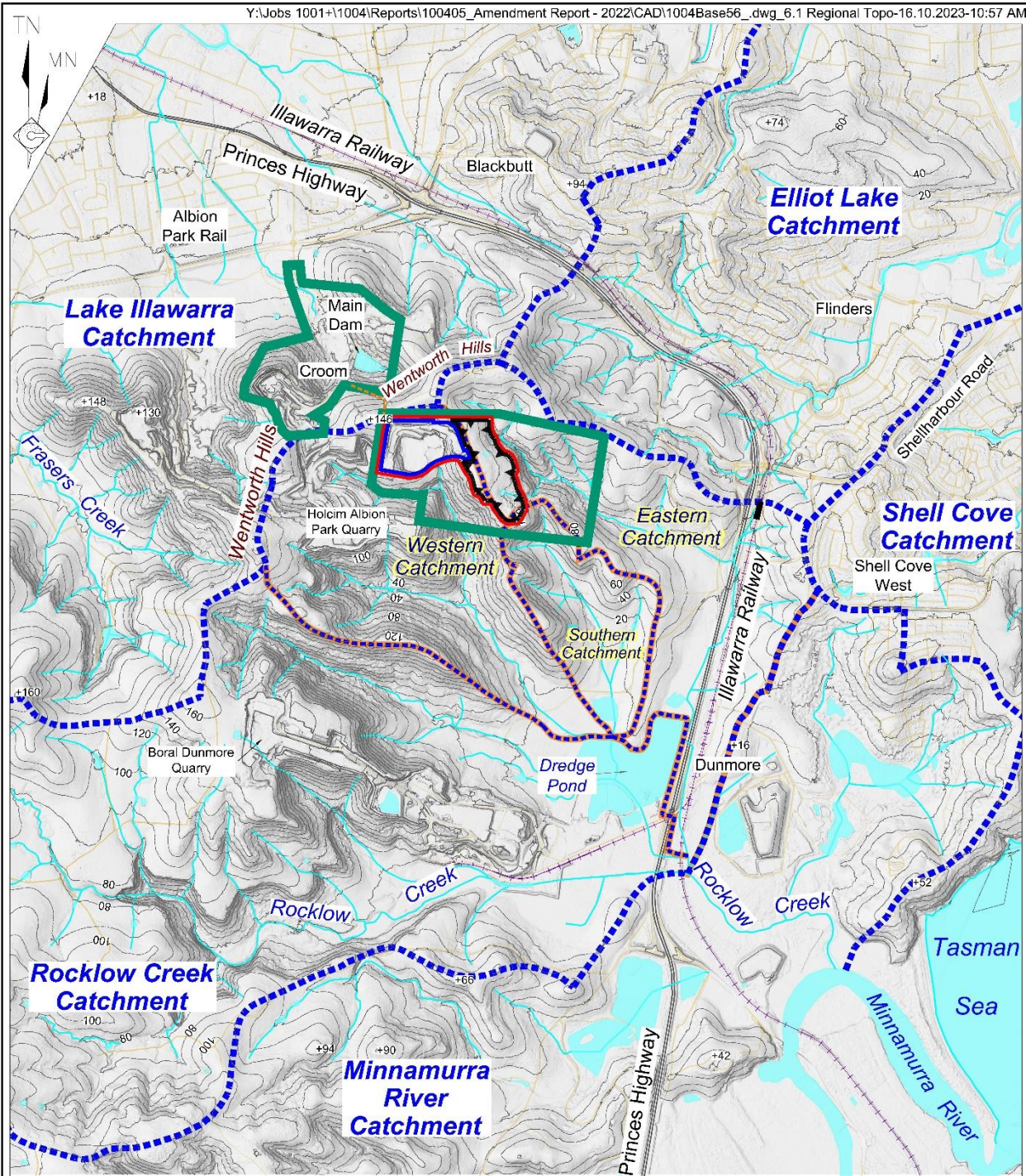
5.1.2 Surface Water Flow

Strategic Environmental and Engineering Consulting (SEEC) Pty Ltd modelled the existing surface water flows in catchments impacted by the Project throughout the Project life (see Part 7 of the *Specialist Consultant Studies Compendium* that accompanied the EIS (SEEC, 2021)). In summary, flows in the surrounding catchments may be described as follows.

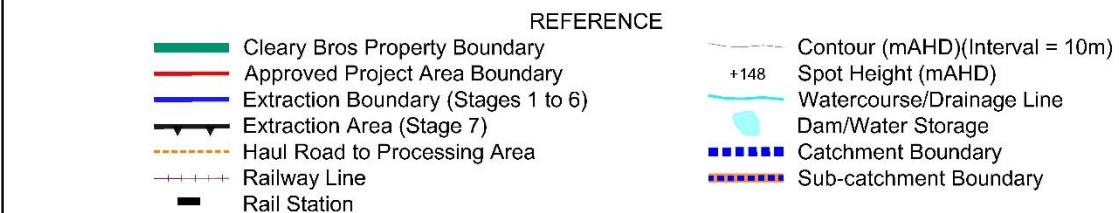
- Western Catchment (Flow Location 8) – flows vary from approximately 265ML/day during a 50% Annual Exceedance Probability (AEP) storm event to approximately 730ML/day during a 1 in 100 year or 1% AEP storm event.
- Southern catchment (Flow Location 7) - flows vary from approximately 79.5ML/day during a 50% AEP storm event to approximately 217ML/day during a 1 in 100 year or 1% AEP flood event.
- Eastern catchment (Flow Location 10) - flows vary from approximately 436ML/day during a 50% AEP storm event to approximately 1,200 ML/day during a 1 in 100 year or 1% AEP storm event.

5.1.3 Surface Water Quality

Cleary Bros has monitored surface water quality at monitoring sites WC1 and WC2 since 2009. A single monitoring event was undertaken at WC3 on 10 February 2021. WC4 was dry on that day and no sample was collected. **Table 8** presents the results of the surface water monitoring program to date.



Note: Some boundaries are coincident and are offset for clarity



SCALE 1:40 000 (A4)

0.5 0 0.5 1.0 1.5 2.0 km

Contour Data Source: Geoscience Australia

Figure 4
LOCAL SURFACE
WATER CATCHMENTS

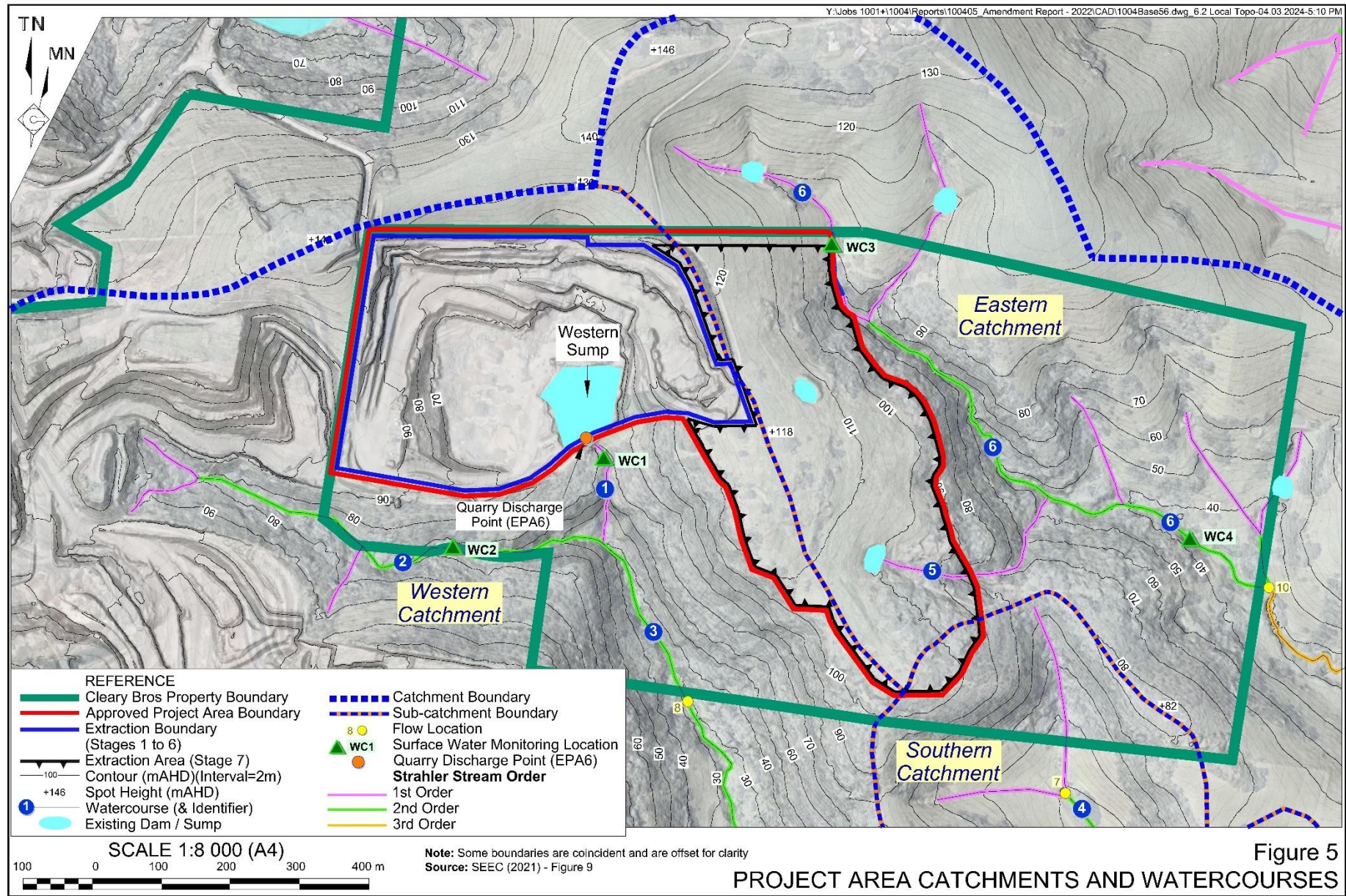


Table 10 – Surface Water Quality

Sample Location		Units	WC1	WC2	WC3
Date First Sample			20/2/2009	20/2/2009	10/2/2021
Date most Recent Sample			20/9/2023	20/9/2023	
pH	pH units	Samples	134	113	7.4
		Minimum	6.0	6.9	
		Median	7.4	7.7	
		Maximum	8.3	8.7	
Turbidity	NTU	Samples	133	112	-
		Minimum	2.0	0.5	
		Median	12.8	6.0	
		Maximum	5,890	5,040	
Oil and grease	mg/L	Samples	52	33	-
		Minimum	0.0	0.0	
		Median	2.5	2.5	
		Maximum	7.0	6.0	
Total Suspended Solids	mg/L	Samples	54	40	<5
		Minimum	0	0	
		Median	12	6	
		Maximum	699	2,600	
Electrical Conductivity	µS/cm	Samples	134	113	603
		Minimum	160	443	
		Median	454	1,060	
		Maximum	1140	2,100	
Total Dissolved Solids	mg/L	Samples	52	33	372
		Minimum	135	320	
		Median	310	696	
		Maximum	756	1,500	

5.1.4 Riparian Condition and Geomorphic Stability

Plates 1 to 4 present views of watercourses surrounding the Extraction Area. In summary, the watercourses are ephemeral first or second order within moderately to steeply incised drainage lines. There is limited bed and bank development.

Within non-Cleary Bros owned agricultural land to the north (upstream) and south (downstream) of the Extraction Area, riparian vegetation is largely absent. Within Cleary Bros-owned land, riparian vegetation typically comprises dense to very dense vegetation consistent with PCT 1300 – Whalebone Tree – Native Quince dry subtropical rainforest. Weed density is variable, with lantana and other weed species common in places.

	
Plate 1 – WC2 on Watercourse 2 – 14/11/2023	Plate 2 – WC1 on Watercourse 1 – 13/11/2023
	
Plate 3 – WC3 on Watercourse 6 – 13/11/2023	Plate 4 – WC4 on Watercourse 6 – 13/11/2023

5.2 Assessed Surface Water Impacts

Assessed surface water impacts associated with the Quarry include the following.

- Progressive reduction during Quarry operations of 16.3ha in catchment area discharging to natural drainage. Following the completion of quarry operations, discharge to natural drainage from the final landform will be reestablished, albeit with some flow diversion from Watercourse 6 to Watercourse 3.
- During Quarry operations, SEEC (2021) determined that peak flows in catchments adjacent to and immediately downstream of the Extraction Area are expected to be reduced by between 18% and 26%.
- Following completion of Quarry rehabilitation operations, passive discharge to Watercourse 3 would be reestablished via the approved low flow pipe. Peak flows in the western catchments adjacent to and immediately downstream of the Extraction Area are expected to be marginally

reduced from the delayed discharge of stormwater associated with the proposed final landform low flow pipe. However, the total volume of water entering the downstream catchments is expected to be largely unchanged.

- Watercourse stability, flooding and water quality impacts are expected to be negligible.

5.3 Surface Water Management System

5.3.1 Surface Water Management Strategy

Surface water management strategies within the Project Area will ensure the following.

- Compliance with the performance measures identified in Condition B33 of SSD10396, EPL299 and the WAL's (see Sections 2.1 to 2.3).
- Diversion of clean water, namely water from undisturbed sections of the Project Area and surrounding lands, away from disturbed lands as far as reasonably practicable.
- Retention and management of potentially sediment-laden water from disturbed sections of the Extraction Area.
- Management of surface water storages to ensure controlled discharge of water from the Extraction Area only in accordance with the requirements of EPL299.
- Management of riparian corridors and ecosystems adjacent to the downslope of the Extraction Area.
- Retention of a buffer alongside Watercourse 6 representing as a minimum the flood level from a 1% AEP 72-hour rainfall event.

The following subsections describe each of the above strategies in detail.

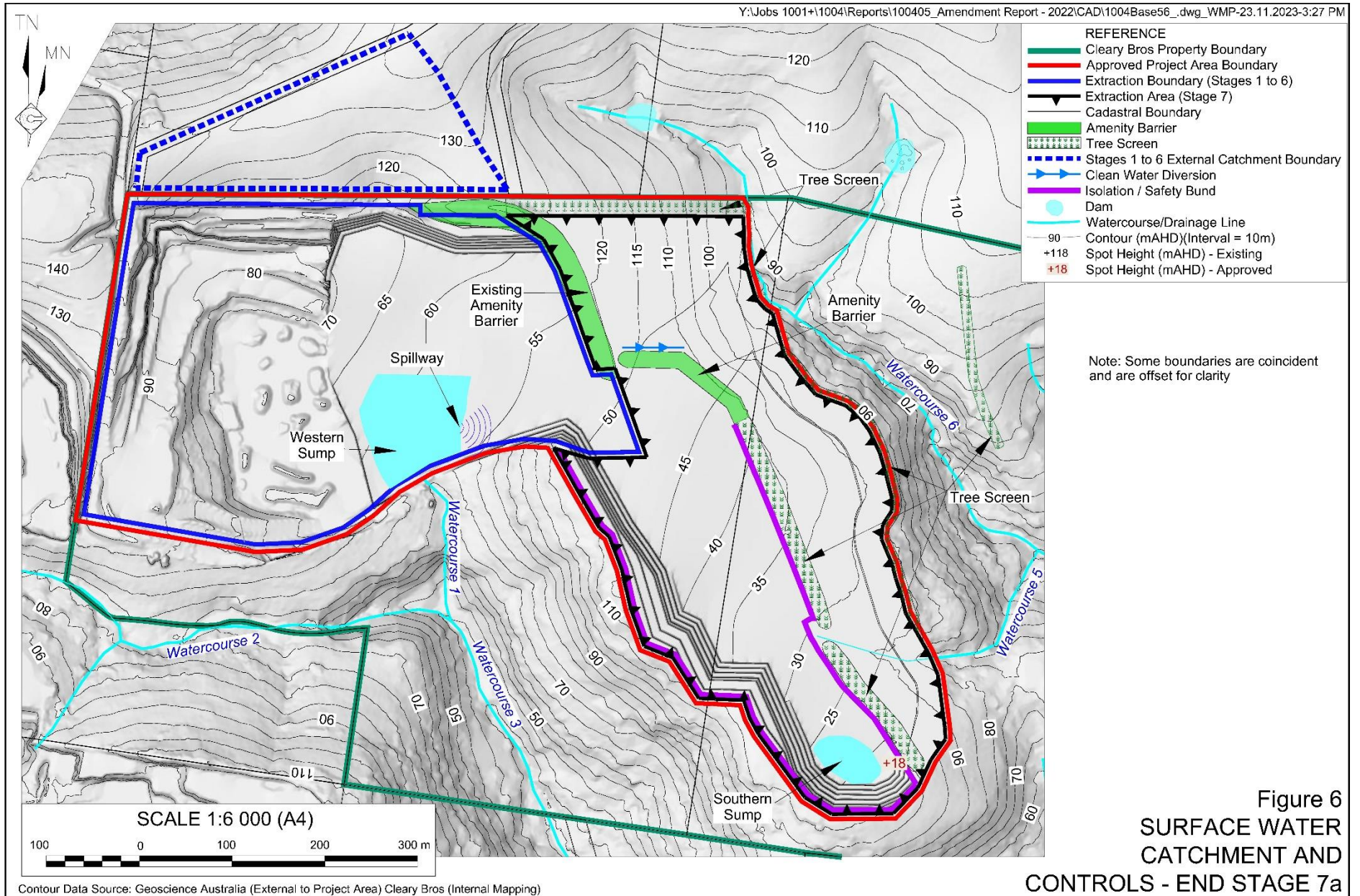
5.3.2 Quarry Staging, Catchments and Erosion and Sediment Control

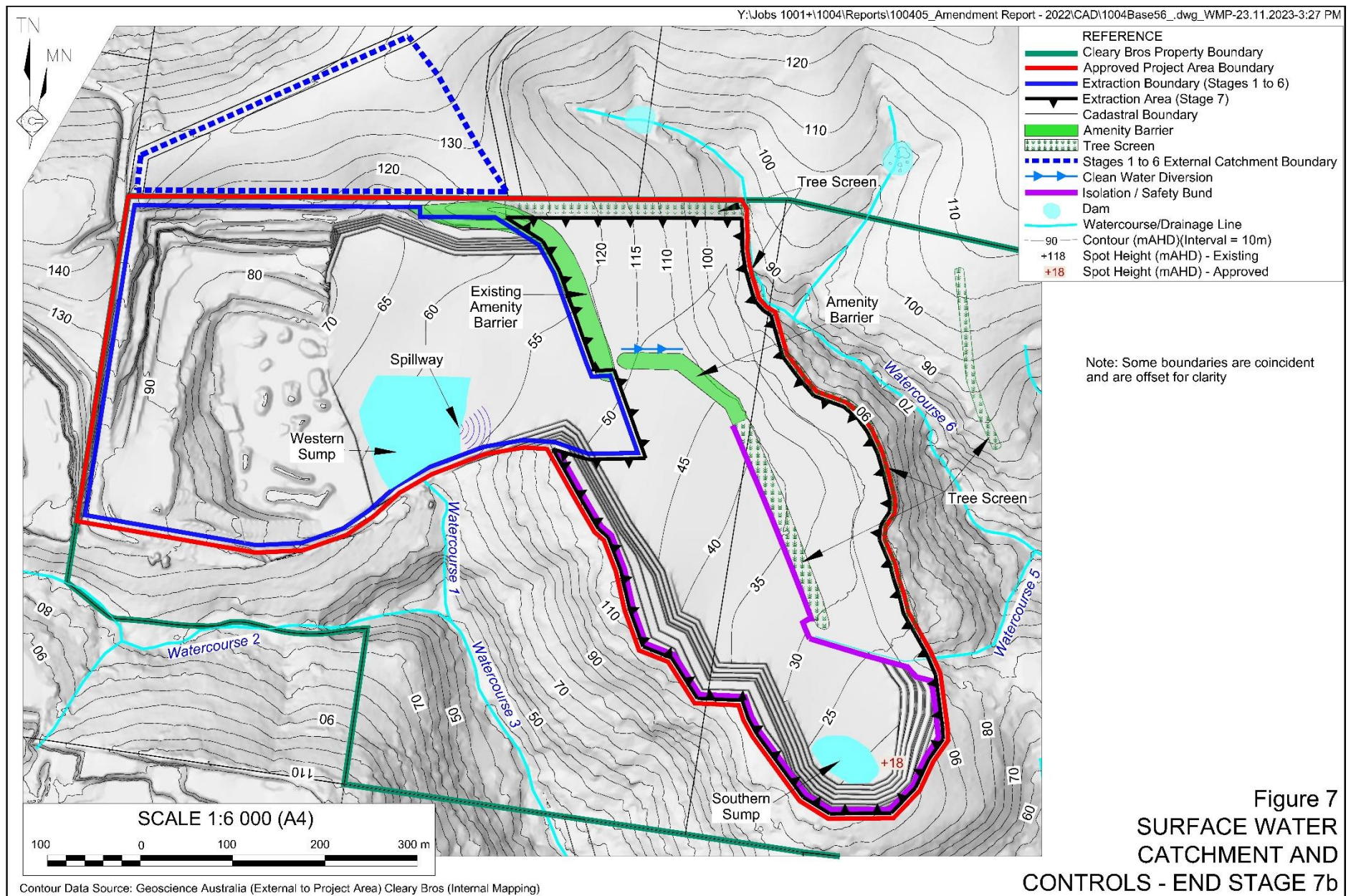
Figures 6 to 10 present the Quarry's surface water controls that will be constructed during each stage of the Quarry. In summary, these may be described as follows.

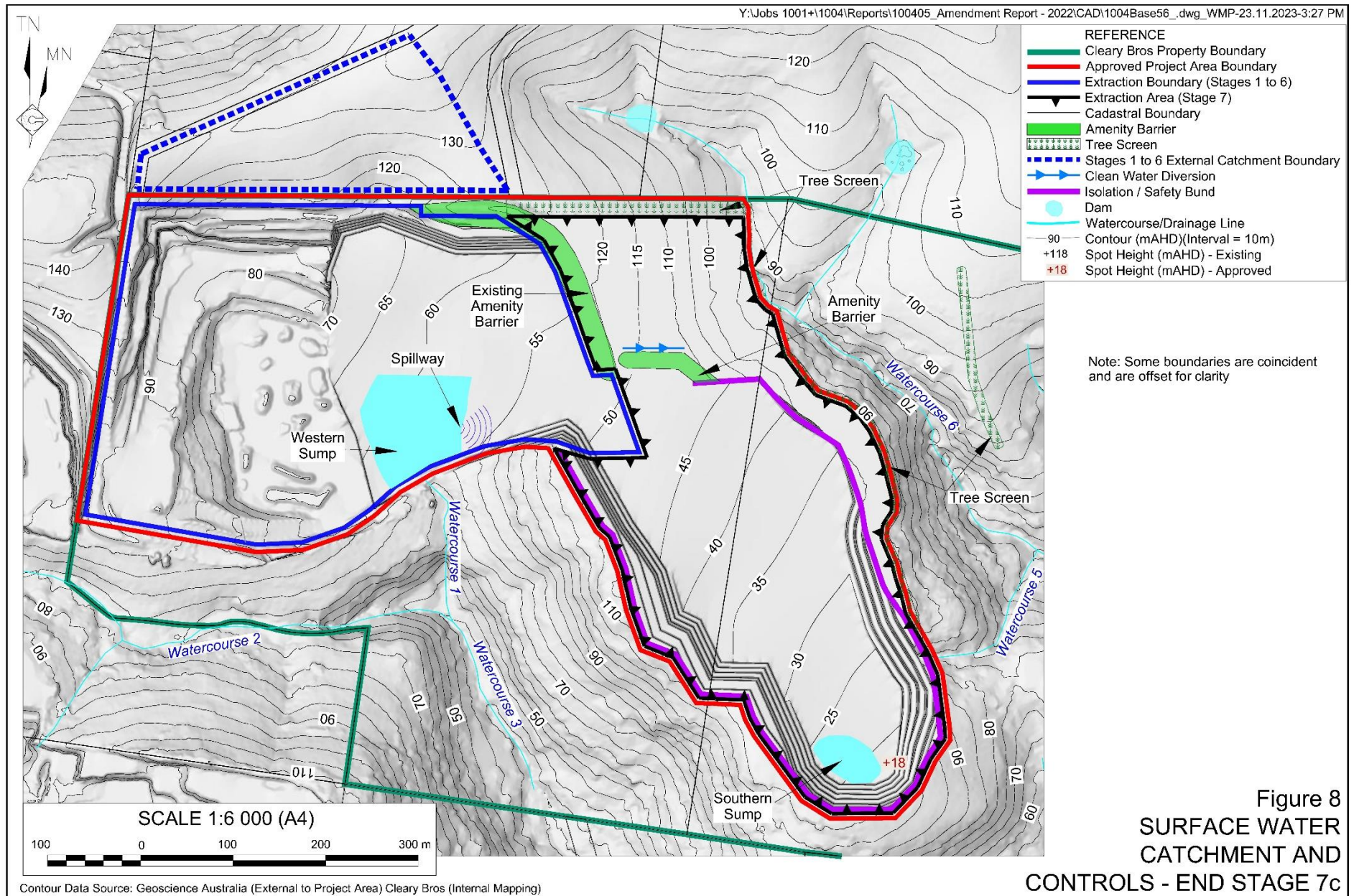
- The catchment for the Stages 1 to 6 Extraction Area includes the Extraction Area as well as an area of external catchment located to the north of the Extraction Area. All surface water within this catchment reports to the Western Sump from where it is either used for Quarry-related purposes or discharged in accordance with the procedures described in Section 5.3.4. The current (pre-Stage 7) capacity of the Western Sump is well in excess of 350ML. Following the commencement of Stage 7, the combined capacity of the Western and Southern Sumps would be expected to increase substantially depending on the volume of rock removed during quarrying operations.
- During Stage 7a the following surface water controls will be installed and land clearing protocols will be implemented (**Figure 6**).
 - Prior all the commencement of all surface disturbing activities, a sediment fence will be established at the outer limit of the proposed disturbance in accordance with Standard Drawing SD 6-8 of *Urban Stormwater: Soils and Construction Volume 1* (Landcom, 2004) (**Appendix 1**).

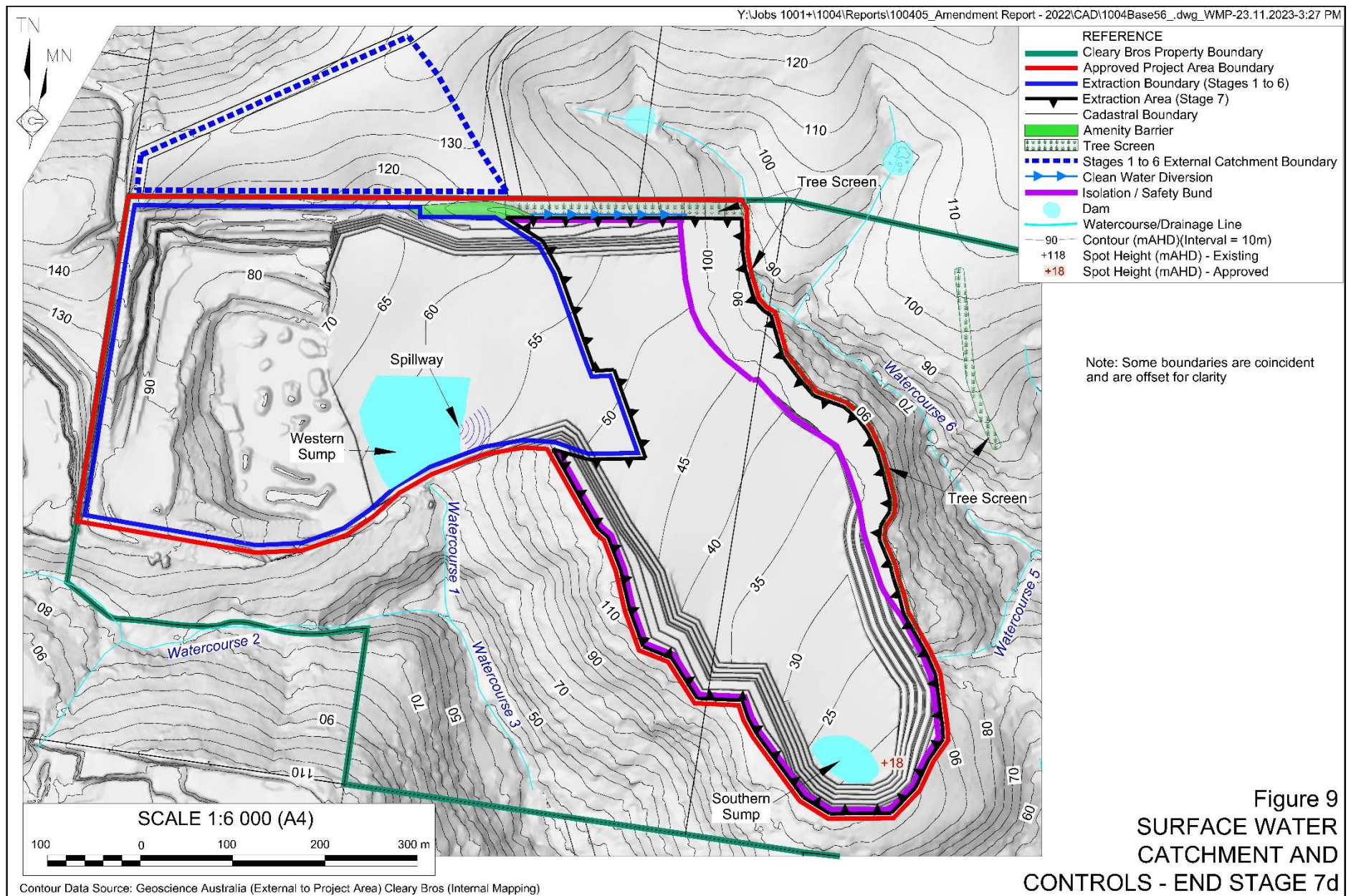
- At the commencement of Stage 7a, the existing Amenity Barrier will be extended to the east. As Stage 7a progresses, an Isolation Bund will be progressively constructed and extended. The outer face of the Amenity and Isolation Bunds will be rehabilitated to achieve a minimum 70% surface coverage within 3 months of construction in accordance with Landcom (2004). Perimeter sediment fencing will be maintained until a minimum 70% ground coverage is achieved and there is no evidence of active erosion.
- Initial surface disturbing activities within the area inside the Amenity and Isolation Bunds, including soil stripping, will not be undertaken when there is a >50% probability of more than 5mm of rain over the next 24-hour period.
- All areas of surface disturbance within the area inside the Amenity and Isolation Bunds will be shaped to ensure that surface water flows passively to Extraction Area and the Western or Southern Sumps within 72 hours.²
- Daily inspection of all areas of surface disturbance will be undertaken within the area inside the Amenity and Isolation Bunds until the area has been shaped to passively flow to the Extraction Area.
- Inspection of all clean water diversions will be undertaken quarterly or following rainfall of >50mm in 24 hours.
- Ensure accumulated water within the Southern or Western Sumps is used for Quarry-related purposes or is treated (if required) and discharged in accordance with the procedures described in Section 5.3.4.
- During Stages 7b, 7c and 7d the Isolation Bund will continue to be progressively extended, soil will be stripped, and overburden removed as described above. In addition, the capacity of the Southern Sump will be progressively increased as the catchment of the Extraction Area progressively increases (see Section 5.3.3).
- During Stage 7e, the riparian buffer zone required adjacent to Watercourse 6 will be determined in accordance with the procedures described in Section 5.3.5. Once determined, the Isolation Bund will be constructed as described above and in a manner that will ensure no ground disturbing activities within the riparian buffer zone adjacent to Watercourse 6.

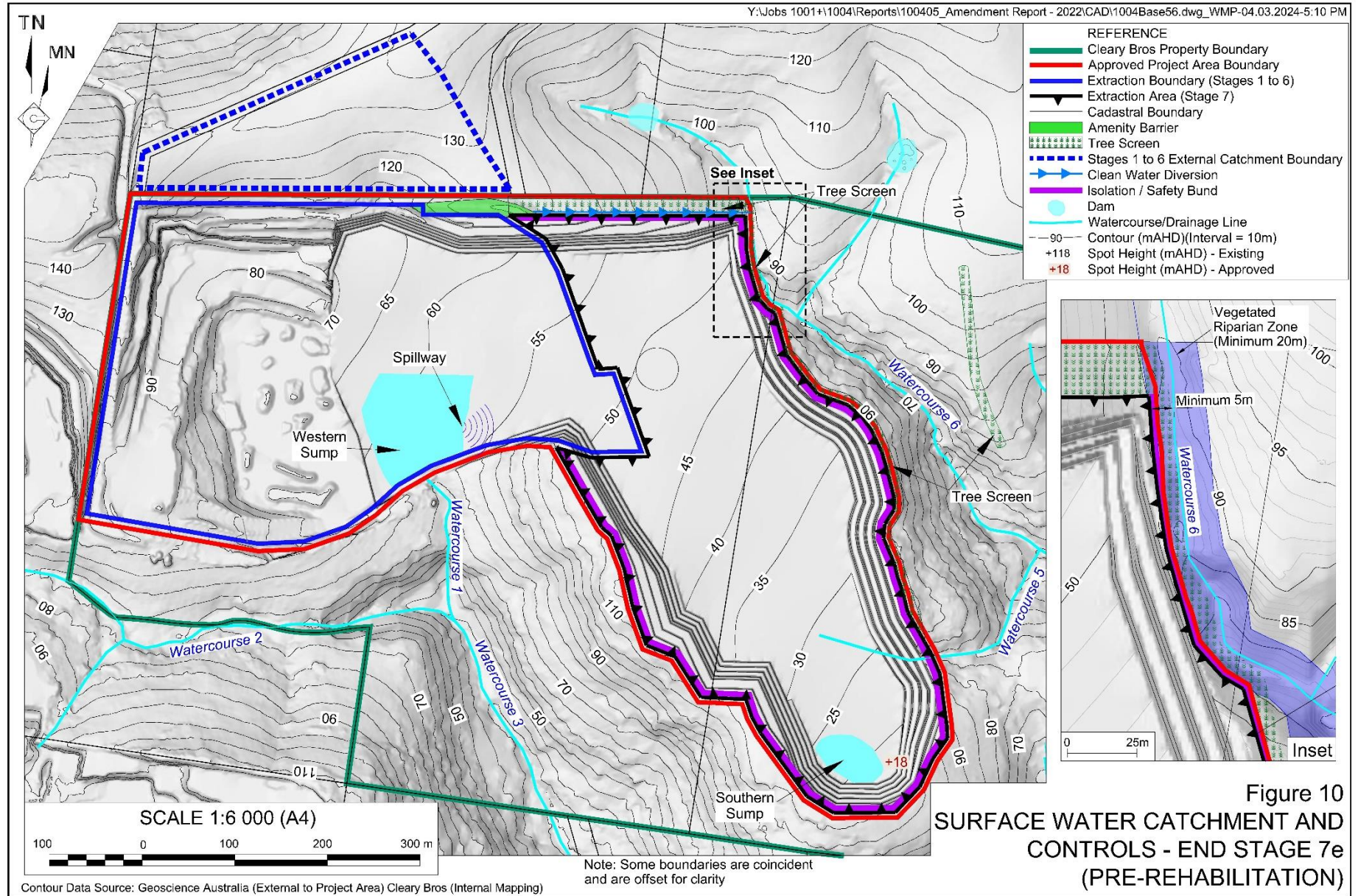
² The storage capacity of the sumps is and will continue to be well in excess of 350ML, substantially more than that required by Landcom (2004).











5.3.3 Surface Water Storages

Incident rainfall within the Extraction Area will report to the Western or Southern Sumps. In order to prevent uncontrolled discharge of surface water, the sumps will be managed as follows.

- Prior to the commencement of Stage 7, the water level within the Western Sump was approximately 66m AHD, or approximately 6m below the invert to Watercourse 1. In the event of an extreme rainfall event, if the volume of accumulated water in the Extraction Area exceeds the capacity of the sump, it would simply spread out onto the lower working bench of the Extraction Area and would not discharge to the environment. The current (pre-Stage 7) capacity of the Western Sump is more than 350ML.
- Once the Stage 7 Extraction Area is sufficiently developed, a spillway will be constructed from the Western Sump towards the Stage 7 area. After that time, should the volume of accumulated water in the Extraction Area exceed the capacity of the Western Sump, water would discharge towards the Stage 7 area from where it would flow to the Southern Sump. In the event that the volume of accumulated water exceeds the capacity of the Southern Sump, it would similarly spread out onto the lower working bench of the Extraction Area and would not discharge to the environment. The capacity of the combined western and Southern Sumps will be substantially more than 350ML.

Table 11 presents the estimated runoff volume and therefore the minimum available storage capacity required to capture a 1% Annual Exceedance Probability (AEP) 24-hour storm event during each stage of the life of the Quarry. Cleary Bros will ensure that the required capacity is available at all times throughout the life of the Quarry. In reality, the available storage capacity of the Western and Southern Sumps would very substantially exceed those identified in **Table 11**.

Table 11 – Minimum Storage Capacity for a 1% AEP 24-hour Storm Event

Quarry Stage	1% AEP 24-hour Rainfall Depth (mm) ¹	Stage 1 to 6 External Catchment		Active Extraction Area		Runoff Volume/Required Cumulative Storage Capacity (ML)
		Area (ha)	Runoff Coefficient	Area (ha)	Runoff Coefficient	
Stages 1 to 6	398	3.86	0.82 ²	17.5	0.90 ²	75.28
End Stage 7a				25.6		104.30
End Stage 7b				26.5		107.52
End Stage 7c				29.3		117.55
End Stage 7d				31.7		126.15
End Stage 7e				33.7		133.31

Note 1: Source – Bureau of Meteorology - <http://www.bom.gov.au/water/designRainfalls/revised-ifd/>

Note 2: Source – Landcom (2004) – Table F3 – maximum runoff coefficient for Type B and Type D soils

Accumulated water within the Western and Southern Sumps will be used for Quarry-related purposes or would be treated and discharged in accordance with the procedures identified in Section 5.3.4.

5.3.4 Controlled Discharge of Surface Water

Excess stormwater that is not used for Quarry-related purposes within the Southern and Western Sumps will be managed as follows.

- Southern Sump – excess water will be either pumped to the Western Sump or tested and pumped to Watercourse 4, 5 or 6 in accordance with the requirements of EPL299.
- Western Sump – excess water will be tested and pumped to Watercourse 1 in accordance with the requirements of EPL299.
- In summary, discharge procedures are and will continue to be as follows.
 - Test accumulated water in the relevant sump in accordance with the requirements of Condition P1.3 of EPL299 for the parameters identified in **Table 12**.
 - In the event that the water quality does not comply with the identified discharge criteria in **Table 12**, retest the following day or treat using gypsum or similar EPA approved flocculant and retest.
 - Once water quality within the sump complies with the identified discharge criteria, commence pumping from the sump to designated watercourse. Ensure that the volume of water pumped is measured and that water is discharged in a manner that does not result in erosion within the watercourse or flooding of downstream properties.
 - Retest water within the sump daily during discharge and only continue pumping if the criteria identified in **Table 12** continue to be complied with.
 - Record and report on the results of all testing and volumes of water pumped each day as described in Section 7.4 and 10.1.

Table 12 – EPL299 Discharge Criteria – Point 6 (EPL ID6)

Pollutant	Unit	Frequency of monitoring	Discharge Criteria
pH	pH unit	Daily during discharge	6.5 – 8.5
Turbidity	nephelometric turbidity units		32.2

5.3.5 Management of Riparian Corridors and Ecosystems

Sections of the Stage 7 Extraction Area will be established in close proximity to Watercourses 5 and 6 (**Figure 5**).

Measures to protect the aquatic and riparian ecosystems adjacent to and downstream of the Extraction Area will be undertaken as follows.

Watercourse 5

The upper section of Watercourse 5 will be removed during the early part of Stage 7c. Prior to commencing Stage 7c, Cleary Bros will undertake a baseline survey of Watercourse 5 to determine baseline watercourse stability and the condition of riparian vegetation.

Measures to protect the stability and the condition of riparian vegetation within Watercourse 5 will be undertaken in accordance with *Controlled activities – Guidelines for instream works on waterfront land* or its latest version. In summary, these would include the following.

- Ensure that Stage 7b disturbance, including the Isolation/Safety Bund, will be no closer than 10m from the Watercourse, thereby preserving the existing riparian vegetation prior to the commencement of Stage 7c.
- Ensure that Stage 7c is progressively developed from the head of Watercourse 5 downstream, with the upper sections of the watercourse removed initially, followed by the lower sections.
- Ensure that surface water within disturbed areas is not permitted to flow to Watercourse 5 as described above.
- Undertake annual monitoring of watercourse stability and the condition of riparian vegetation within Watercourse 5 following the commencement of Stage 7c.

Watercourse 6

The upper section of Watercourse 6 will be located in close proximity to the Stage 7e Extraction Area boundary. Risks related to the protection of the riparian zone and downstream aquatic ecosystems within Watercourse 6 include the following.

- Peak flows within Watercourse 6 break through into the Extraction Area, diverting the watercourse, at least temporarily.
- Surface disturbing activities encroach into and adversely impact upon the riparian corridor associated with Watercourse 6.

Measures to address each of these risks would include the following.

- Ensure during Stages 7a to 7d that surface disturbance does not extend beyond the eastern boundary of Stage 7d.
- Immediately prior to the commencement of Stage 7e undertake the following.
 - Undertake a baseline survey of Watercourse 6 to determine baseline watercourse stability and the condition of riparian vegetation.
 - Undertake a high-resolution survey at least 20m either side of Watercourse 6 corridor adjacent to the Stage 7 Extraction Area.
 - Calculate peak flows within Watercourse 6 adjacent to the Extraction Area under the 1% AEP critical duration design rainfall event using climate and storm flow assessment methods applicable at the time.
 - Determine based on the above the cross-sectional area required to convey the 1% AEP peak flow.
 - Determine the minimum offset distance from the limit of disturbance to the centreline of Watercourse 6 that will ensure the required cross-sectional areas is maintained (flood flow offset).

- Determine the minimum offset distance from the limit of disturbance to the centreline of Watercourse 6 in accordance *Controlled activities – Guidelines for riparian corridors on waterfront land* (DPE, 2022). In summary, that distance is:
 - 10m for a first order watercourse; and
 - 20m for a 2nd order watercourse.

These distances may be reduced by 50% provided the overall width or area of the vegetated riparian zone is maintained. **Figure 10** presents the minimum riparian zones to be retained in accordance with DPE (2022). The identified riparian zone may be increased to ensure that the minimum cross-sectional area required to pass a 1% AEP peak flow event is maintained.

- Engage a surveyor to mark the outer limit of ground disturbing activities in the vicinity of Watercourse 6 and ensure no ground disturbing activities occur within that zone.
- Undertake annual monitoring of watercourse stability and the condition of riparian vegetation within Watercourse 6 following the commencement of Stage 7e.

Other Watercourses

In addition to the above, further measures to protect aquatic and riparian ecosystems adjacent to and downstream of the Extraction Area are as follows.

- Undertake a baseline survey of Watercourses 1 to 3 to determine baseline watercourse stability and the condition of riparian vegetation.
- Ensure that all ground disturbing activities are limited to the approved disturbance area only.
- A permit to disturb process will be implemented to ensure that each ground disturbance event is limited to the approved area.
- Ensure that uncontrolled discharges from the Extraction Area do not occur and manage controlled discharges in accordance with Section 5.3.4.
- Continue to monitor surface water quality as described in Section 5.4.
- Undertake an annual photographic record from surface water monitoring locations WC1 to WC4. The photographs will be compared and any observable change in channel morphology or riparian vegetation will be investigated as described in Section 9.2. The photographs from each monitoring event at each location will be presented in the Annual Review.

5.4 Surface Water Monitoring

5.4.1 Monitoring Locations, Parameters and Frequency

The purpose of the surface water monitoring program is to measure and record the quality and quantity of water discharged from the Quarry and the quality of water in the receiving environment. **Figure 5** and **Table 13** present surface water monitoring locations, the parameters to be monitored at each location, the frequency and the purpose for monitoring. In addition, a photographic record of monitoring locations WC1 to WC4 will be collected during each monitoring event to document the condition of the watercourse and riparian vegetation.

Table 13 – Surface Water Quality Monitoring Locations, Parameters and Frequency

ID	Location (see Figure 5)	Parameter	Frequency	Sampling Method	Purpose
EPL ID6	Western Sump	pH	Daily during discharge	Grab sample	Compliance with EPL299
		Turbidity (NTU)		Inline meter or pump rate and hours	WAL reporting and water balance
		Discharge (ML/d)	Monthly	Visual inspection of level gauge	
	Southern Sump	Water level (m AHD)		Visual inspection of level gauge	
		Water level (m AHD)	Monthly	Visual inspection of level gauge	
		Discharge (ML/d)	Daily during discharge	Inline meter or pump rate and hours	Compliance with EPL299
		pH		Grab sample	
		Turbidity (NTU)			
WC1	Watercourse 1 downstream of EPL ID6	Conductivity (µS/cm)	Biannually	Grab sample	Water quality downstream of the Stages 1 to 6 Extraction Area
WC2	Watercourse 2 upstream of Watercourse 1	pH			Water quality upstream of the Stages 1 to 6 Extraction Area
		Oil and grease (mg/L)			
		Turbidity (NTU)			
WC3	Watercourse 6 upstream of the Stage 7 Extraction Area	Total Dissolved Solids (mg/L)			Water quality upstream of the Stage 7 Extraction Area
		Major Ions (Ca, K, Mg, Na, Cl, SO ₄)			
WC4	Watercourse 6 downstream of the Stage 7 Extraction Area				Water quality downstream of the Stage 7 Extraction Area

5.4.2 Surface Water Monitoring Criteria and Triggers

Surface Water Quality

Site-specific in-stream water quality triggers have been developed in accordance with the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000).

Long term monitoring of water quality has occurred at WC1 and WC2 (**Figure 5**). WC1 is located downstream of the Quarry Discharge Point in Watercourse 1 and WC2 is located in Watercourse 2. WC2 is not affected by surface water flows from Cleary Bros' Extraction Area, however, receives inflows from Holcim's Albion Park Quarry (**Figure 5**). Notwithstanding this, WC2 has been used as the reference site for establishing trigger levels for the Quarry.

ANZECC (2000) recommends comparison of samples at a test site with the 80th percentile for a particular parameter at a reference site. Computation of the 80th percentile at the reference site should be based on the most recent 24 monthly observations over a 2-year period. Sampling at WC2 has been undertaken either quarterly or biannually and on occasions, samples are unable to be taken because the watercourse is dry. As a result, the most recent 24 samples from WC2 have been used to establish water quality triggers for the Quarry.

Table 14 presents the 80th percentile and 20th percentile (where a lower limit is applicable) values for selected water quality parameters at WC2, calculated from the most recent 24 values. **Table 14** also presents ANZECC (2000) Trigger Values for Lowland Rivers as well as EPL 299 discharge limits.

Table 14 – Surface Water Quality Trigger Values

	pH	Turbidity (NTU)	Oil and Grease (mg/L)	TSS (mg/L)	TDS (mg/L)
Site Specific Trigger Values – from Watercourse 2 (WC2)²					
Lower Limit (20 th percentile)	7.6				
Upper Limit (80 th percentile)	8.0	26	<5	37	842
ANZECC Trigger Values (Lowland River) (ANZECC (2000) - Table 3.3.2, Table 3.3.3, Table 3.4.1.)					
Lower Limit	6.5	6			
Upper Limit	8.0	50	10 ³		
EPL 299 Discharge Limits (Point 6)					
Lower Limit	6.5				
Upper Limit	8.5	32.2			
Note 1: Grey highlighted cell = Adopted Surface Water Trigger Values for sites WC1 and WC4					
Note 3: WC2: Most recent 24 samples collected from 15/8/2012-20/9/2023 (pH, TDS, Turbidity, Oil and Grease); 3/6/2011-20/9/2023 (TSS).					
Note 4: Source – commonly applied EPL criteria					

Table 14 also presents the adopted site-specific trigger values for water quality. In summary, trigger values are selected from WC2, except where ANZECC (2000) values were deemed more appropriate. In addition, compliance criteria from EPL299 are also presented. Trigger values will be applied to the two downstream monitoring sites (WC1 and WC4) to investigate any surface water impacts that may be attributable to quarrying activities, and with reference to the corresponding upstream monitoring sites (WC2 and WC3).

Trigger values will be updated using the above methodology and using updated water quality results when this Water Management Plan is revised. This will allow the trigger values to reflect temporal trends and the effects of extraneous factors such as climate variability.

Channel Stability and Riparian Vegetation

A photographic record of surface water monitoring locations WC1 to WC4 will be taken during each surface water sampling event. The photographs will be compared and any observable change in channel morphology or riparian vegetation will be investigated as described in Section 9.2. The photographs from each monitoring event at each location will be presented in the *Annual Review*.

Sediment and Erosion Control

Inspect all areas of surface disturbance and surface controls as follows.

- Surface disturbance within the area inside the Amenity and Isolation Bunds – daily until the area has been shaped to passively flow to the Extraction Area.
- All other clean water diversions - quarterly or following rainfall of >50mm in 24 hours.

Section 9.2 presents the measures to be implemented in the event active erosion or evidence of active erosion is observed.

6. Groundwater Management

6.1 Baseline Groundwater Environment

6.1.1 Groundwater Systems

Jacobs Australia Pty Limited (Jacobs) prepared the groundwater assessment for the Stage 7 application. That report is presented as Part 8 of the *Specialist Consultant Studies Compendium* that accompanied the EIS (Jacobs, 2021). The groundwater environment in the vicinity of the Quarry may be summarised as follows.

- The following broad groundwater systems exist in the vicinity of the Project Area.
 - A shallow (<10 metres below ground level) water table system, which is generally consistent with, and likely associated with, an upper weathered zone in the latite and agglomerate.
 - Intermediate depth, unconfined to semi-confined groundwater system(s) in the latite and agglomerate underlying the shallow water table system. Flow in these systems is almost exclusively dependent upon fracture/defect extent and unit contact planes (i.e. contact of latite and agglomerate).
 - Deep, semi-confined to confined groundwater system(s) within the underlying Kiama Sandstone are thought to underly the intermediate depth groundwater systems. As quarrying operations would not penetrate the Kiama Sandstone, the Quarry would not intersect these systems.

Due to inferred poorly connected fractured flow paths and negligible matrix hydraulic conductivity within the latite and agglomerate, poor hydraulic connection is conceptualised between:

- the water table and underlying intermediate and deep groundwater systems;
- the intermediate groundwater systems themselves; and
- the deep sandstone groundwater system and overlying intermediate system.

Groundwater system storage³ within the Project Area is inferred to be low for the latite/agglomerate.

Groundwater recharge within the Project Area is inferred to be low based on low formation hydraulic conductivity and connectivity, clay overburden and relatively steep slopes which encourage runoff. Relatively higher recharge may occur on ridge top areas.

Groundwater discharge within the Project Area is conceptualised to occur through:

- evapotranspiration;
- discharge to springs; and
- discharge as base flow to watercourses.

³ Groundwater system storage is the capacity of a groundwater system to release water, is defined in terms of specific yield and specific storage.

- Specific yield, also known as the drainable porosity, is generally less than or equal to the effective porosity (i.e. total connected pore space).
- Specific storage is the amount of water that a groundwater system releases from storage, per unit mass or volume of a groundwater system, per unit change of head, whilst remaining fully saturated.

Jacobs (2021) considered the baseflow contribution to watercourses in the vicinity of the Project Area as negligible due to low hydraulic conductivity with correspondingly insignificant influence on the existing environment.

Springs fed dams exist approximately 200m north of the boundary of Stage 7 (**Figure 12**). These dams and are used by neighbouring landholders for agricultural purposes. Jacobs (2021) considered these springs to be controlled by the shallow groundwater system that is poorly connected to underlying deeper groundwater systems.

6.1.2 Groundwater Bores and Yield

Regional Bores

Registered groundwater bores within a 5km radius of the Project area are shown in **Figure 11**. **Table 15** provides a summary of the three registered groundwater bores closest to the Project Area. Recorded yields within these bores are negligible. Furthermore, an attempt was made to locate GW100090 without success. The current landholder has stated that they are unaware of this bore. As a result, that bore is unlikely to be still in existence nor in a serviceable condition.

Jacobs (2021) determined that groundwater is discharging to the existing Stage 1 to 6 Extraction Area at very low rates (i.e. less than evaporation).

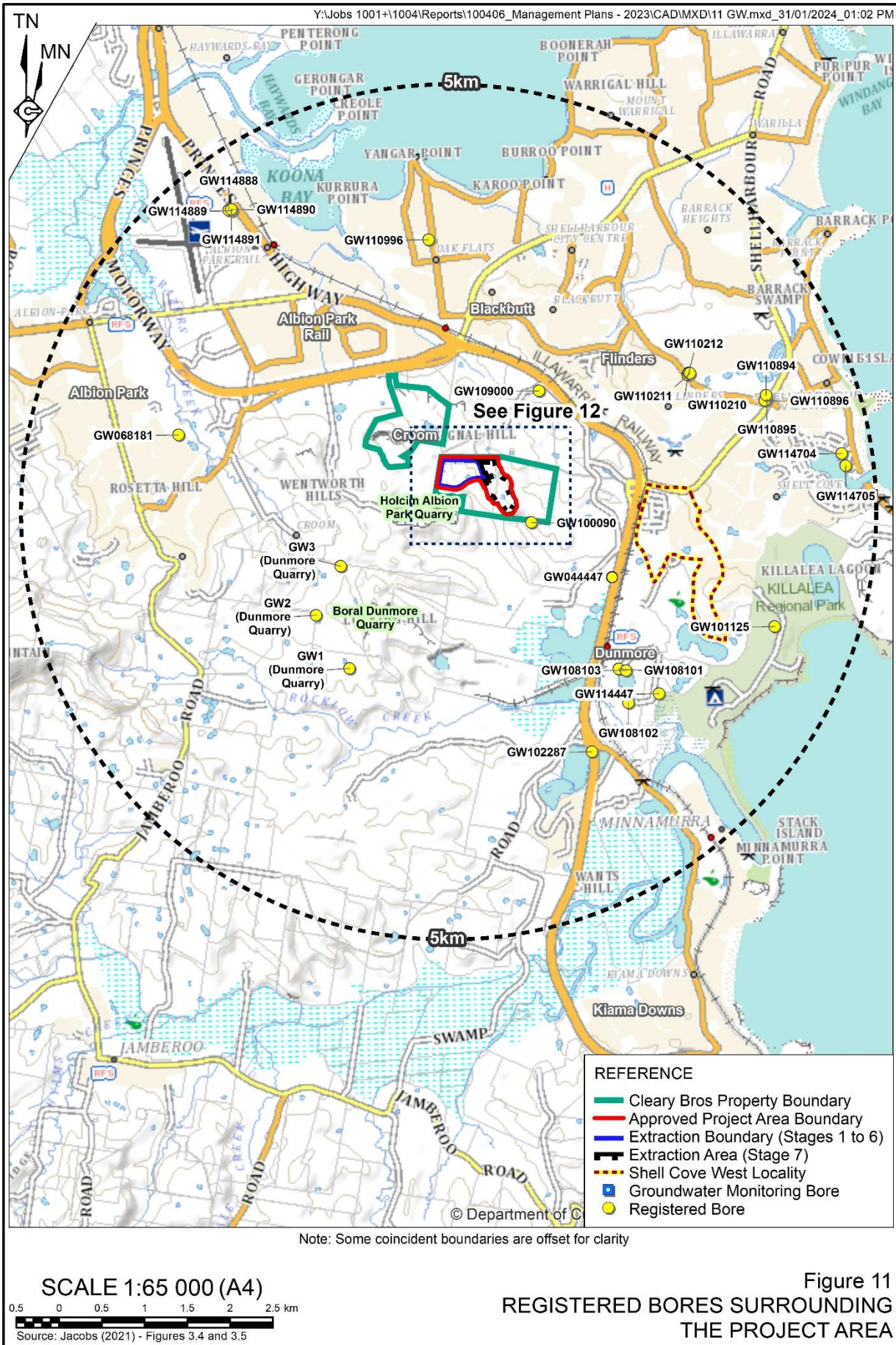
Table 15 – Registered Groundwater Bores Surrounding the Project Area

Bore ID	Purpose	Distance from Stage 7	Bore Depth (m)	Yield (L/S)	Standing Water Level (mBGL)
GW100090	Water supply	160m – 200m southeast	66	0.1	0.3
GW109000	Water supply	900m northeast	78	0.8	27
GW044447	Stock and domestic	1,250m southeast	0	No data	No data

Source: Jacobs (2021) – Table 3.5

Project Area Bores

Figure 12 and **Table 16** presents the location of the existing and proposed groundwater monitoring network within and surrounding the Quarry.



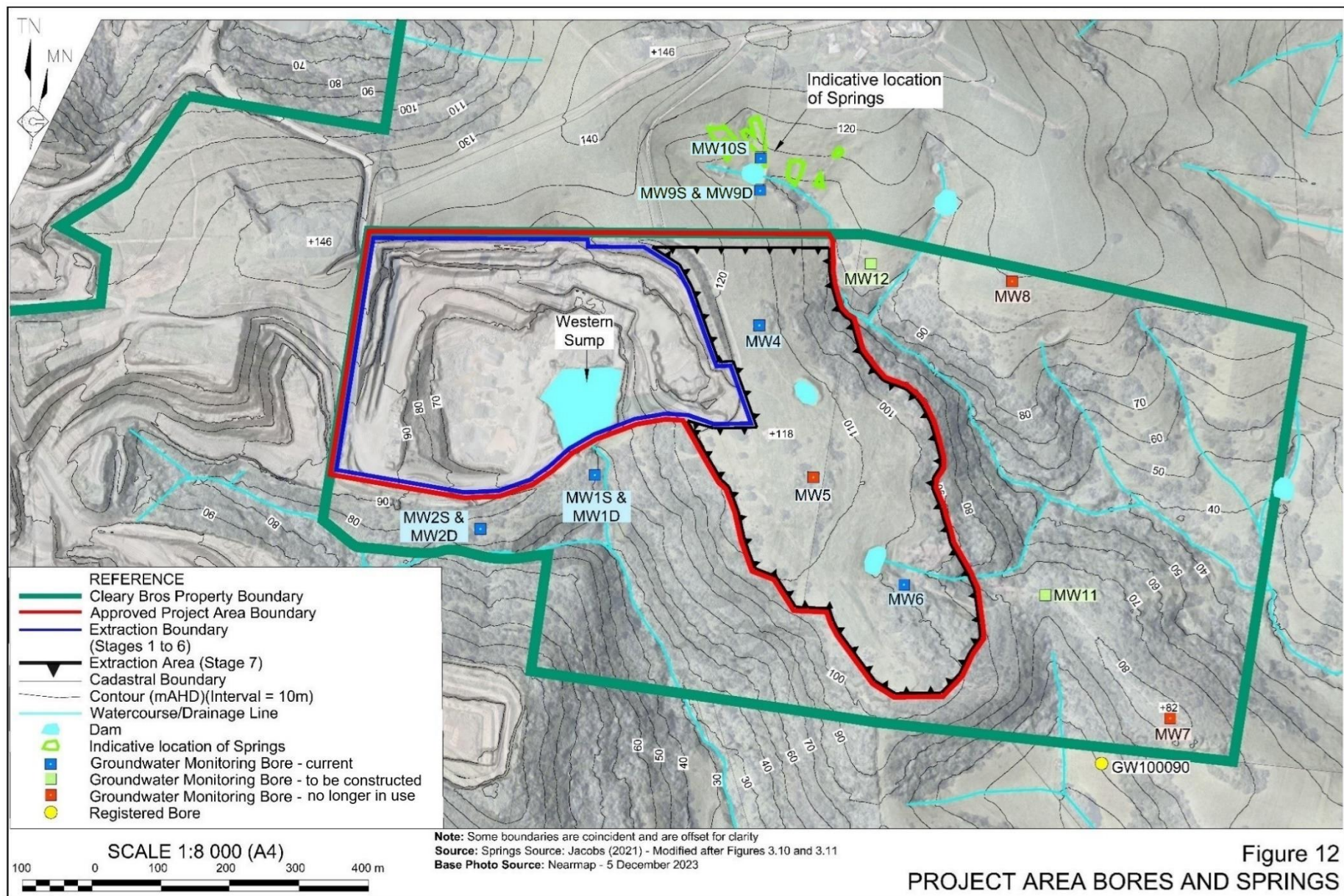


Table 16 – Groundwater Monitoring Bores

Monitoring bore	Co-ordinates (MGA94z56)		Ground level (mAHD)	Screen depth (mBGL) and length (m)	Screen Length (m)	Targeted Groundwater System
	Easting	Northing				
Pre-existing Bores						
MW1S	300328	6170396	69.84	4.50 - 10.29	5.79	Shallow
MW1D			69.84	18.30 – 25.11	6.81	Intermediate ¹
MW2S	300163	6170318	74.32	6.50 – 13.00	5.50	Shallow
MW2D			74.40	18.50 – 24.37	5.87	Intermediate
MW4	300565	6170612	116.92	11.00 – 27.00	16.0	Intermediate
MW5 ⁴	300643	6170392	116.89	36.00 – 56.00	20.0	Intermediate
MW6	300774	6170237	94.77	5.80 – 43.80	38.0	Intermediate
MW7	301158	6170044	81.75	8.00 – 21.00	13.0	Intermediate
MW8	300930	6170676	109.18	7.00 – 21.00	14.0	Intermediate
Spring Fed Dam Monitoring Bores						
MW9S ³	300571	6170803	104.53	1.0 – 4.7	3.7	Shallow
MW9D ³	300569	6170804	104.57	8.0 – 23.8	15.8	Intermediate
MW10S ³	300561	6170853	105.40	1.0 – 6.3	5.3	Shallow
Replacement Bores ²						
MW11	TBC	TBC	TBC	TBC	TBC	Intermediate
MW12	TBC	TBC	TBC	TBC	TBC	Intermediate
Note 1:	Bore MW1D was intended to target the intermediate groundwater system, however, monitoring indicates connectivity to the shallow groundwater system					
Note 2:	MW11 and MW12 would be installed prior to the decommissioning of MW6 and MW4 respectively and each bore would be equipped with a data logger.					
Note 3:	Bores MW9S, MW9D, MW10S installed March 2024.					
Note 4:	Bore MW5 decommissioned early 2025.					

6.1.1 Groundwater Levels

Figure 13 presents groundwater level monitoring data from monitoring bores MW1S, MW1D, MW2S, MW2D (dip meter) and MW4 to MW8 (data logger). **Figure 13** also presents daily rainfall totals sourced from the SILO database.

In summary, monitoring data indicates that the standing water level within the bores is predominantly influenced by rainfall recharge events. In particular, water levels in bores MW4 and MW6 exhibit a strong rainfall response whilst bore MW8 has a more subdued response. In each of these bores, standing water levels gradually decrease to a baseline water level following rainfall.

Standing water levels in bore MW7 exhibited a strong response to rainfall recharge events. Following rainfall, standing water levels decrease without apparently reaching a baseline before the next rainfall event. Jacobs (2021) inferred that MW7 is screened in an isolated non-permanent groundwater source.

Standing water levels in bore MW5 gradually increased from approximately 78m AHD in August 2020 to approximately 87m AHD in 2022 before declining gradually to approximately 82m AHD in October 2023. Water levels in bore MW5 do not show a similar response to individual rainfall events as those of MW4, MW6 or MW8. However, the gradual increase then decrease in standing water level is generally attributed to the higher rainfall period experienced during late 2021 and 2022. Bore MW5 was decommissioned in early 2025 as quarrying passed through the bore.

Finally, water levels in bores MW1S, MW1D, MW2S and MW2D have been monitored quarterly or biannually, with standing water levels in MW1D approximately 15m lower than in the other bores. The frequency of monitoring of these bores is insufficient to identify water level response to individual rainfall events.

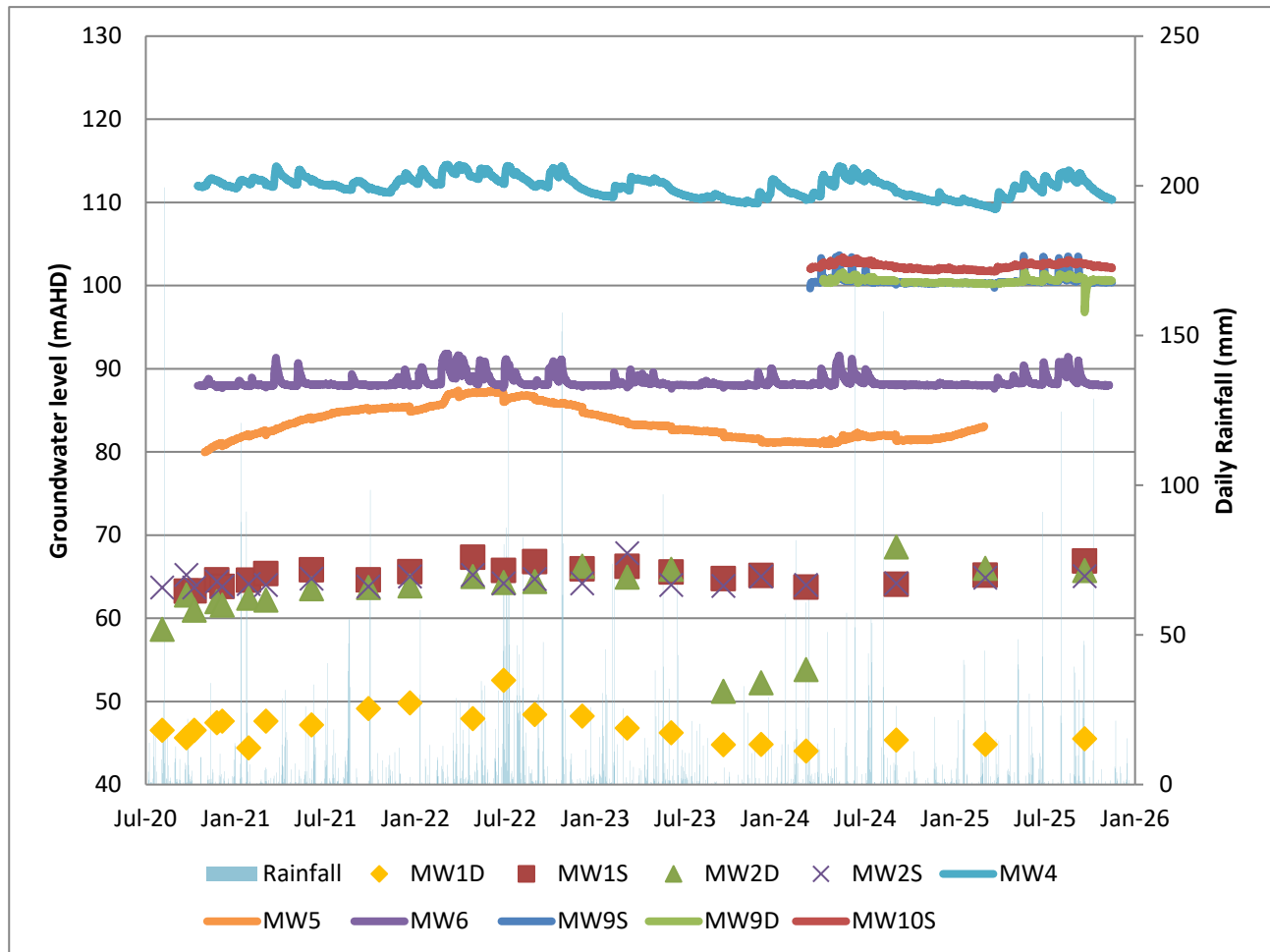


Figure 13 – Project Area Groundwater Levels

6.1.2 Groundwater Quality

Groundwater quality monitoring has been undertaken on a biannual or quarterly basis since 2008 for groundwater monitoring bores MW1S, MW1D, MW2S and MW2D and, more recently, on a quarterly basis for groundwater monitoring bores MW4 to MW8. **Table 17** presents the summary results of groundwater monitoring at sites MW1S, MW1D, MW2S and MW2D and MW4 to WC8.

Table 17 – Groundwater Quality

Sample Location			MW1D	MW1S	MW2D	MW2S	MW4	MW6	MW9S	MW9D	MW10S
Date First Sample			1/6/2009				31/7/2020		6/3/2025		
Date most Recent Sample			24/9/2025				24/9/2025		24/9/2025		
pH	pH units	Samples	51	49	51	49	21	19	4	4	4
		Minimum	6.5	5.9	6.4	6.0	7.0	6.0	7.0	6.4	5.9
		Median	7.3	6.6	7.3	6.9	7.4	7.2	7.5	6.6	6.0
		Maximum	7.7	7.0	7.7	7.4	8.0	9.6	7.8	7.9	6.4
Electrical Conductivity	µS/cm	Samples	51	49	51	49	21	19	4	4	4
		Minimum	110	211	40	358	730	507	325	211	190
		Median	1160	958	1710	1080	852	707	1540	6323	287
		Maximum	2500	2040	2010	1390	919	858	2300	1480	439
Redox Potential	mV	Samples	3	3	3	3	3	3	3	3	3
		Minimum	19	115	150	130	-164	-28	-61	173	161
		Median	48	129	200	206	-64	57	47	187	198
		Maximum	203	282	248	258	101	118	150	283	282
Temperature	°C	Samples	51	49	51	49	21	19	4	4	4
		Minimum	13.5	14.9	14.7	14.7	17.0	18.1	16.6	17.7	16.2
		Median	18.4	18.5	18.3	18.6	18.4	19.0	18.7	18.6	17.0
		Maximum	27.3	24.9	24.8	24.3	20.6	20.5	18.8	20.7	19.8
Calcium	mg/L	Samples	51	49	51	49	21	19	4	4	4
		Minimum	7	7	5	14	53	18	7	70	3
		Median	79	60	109	72	64	52	50	125	9
		Maximum	250	164	133	130	91	82	75	139	13
Magnesium	mg/L	Samples	18	18	18	18	18	16	4	4	4
		Minimum	4	15	1	9	19	11	5	34	3
		Median	6	24	48	32	24	16	24	64	8
		Maximum	11	50	60	47	29	21	43	74	10
Sodium	mg/L	Samples	51	49	51	49	21	19	4	4	4
		Minimum	7	22	4	21	89	56	32	112	33
		Median	198	103	183	119	97	68	69	205	43
		Maximum	321	158	272	160	120	96	165	237	60
Potassium	mg/L	Samples	51	49	51	49	21	19	4	4	4
		Minimum	<1	<1	<1	<1	<1	1	<1	2	<1
		Median	<1	2	2	<1	<1	7	1	3	<1
		Maximum	14	17	13	6	<1	50	2	3	<1
Chloride	mg/L	Samples	51	49	51	49	21	19	4	4	4
		Minimum	8	19	4	24	34	50	20	201	32
		Median	63	79	277	56	40	70	106	444	52
		Maximum	210	402	456	170	61	98	255	539	79
Sulphate	mg/L	Samples	51	49	51	49	21	19	4	4	4
		Minimum	3	23	<1	53	24	13	8	30	11
		Median	281	177	187	221	28	17	26	41	20
		Maximum	877	319	270	425	33	23	52	52	27

6.1.3 Groundwater Dependent Ecosystems

Jacobs (2021) assessed the potential occurrence of groundwater dependent ecosystems (GDEs) through a review of the Bureau of Meteorology's (BoM) GDE Atlas, mapping presented within the groundwater assessment report prepared for the Albion Park Rail Bypass (RMS, 2015) and high priority GDE mapping in the *Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources* (NSW Government, 2011).

Jacobs (2021) partially inspected the vegetated area mapped as high potential terrestrial GDE located to the east of the Stage 7 area (see Figure 6.10.3 of the EIS) and noted that the inspected areas did not appear to host potential GDEs and considers the likelihood of GDEs to be low.

6.2 Assessed Impacts

6.2.1 Groundwater Inflow

Table 18 presents the groundwater inflow rates for the Quarry determined by Jacobs (2021). The results may be summarised as follows.

- Stage 1 to 6 Extraction Area – modelled inflow was 38kL/day.
- Stage 7 Extraction Area - the modelled groundwater inflow rate is expected to gradually increase as the footprint of the Extraction Area increases, peaking at approximately 187kL/day or 68.3ML/year.

Table 18 – Modelled Groundwater Inflow Rates

Extraction Stage	Groundwater Inflow (ML/year)
Current Extraction Area	13.9
End of Stage 7a	45.6
End of Stage 7b	48.9
End of Stage 7c	54.4
End of Stage 7d and 7e	68.3

6.2.2 Groundwater Drawdown

Figure 14 presents the modelled groundwater drawdown in the vicinity of the Project Area at the end of Quarry life. In summary, groundwater drawdown greater than 2m is expected to extend to a maximum of approximately 250m to the west within the existing Quarry footprint and approximately 50m to the east of the Stage 7 Extraction Area.

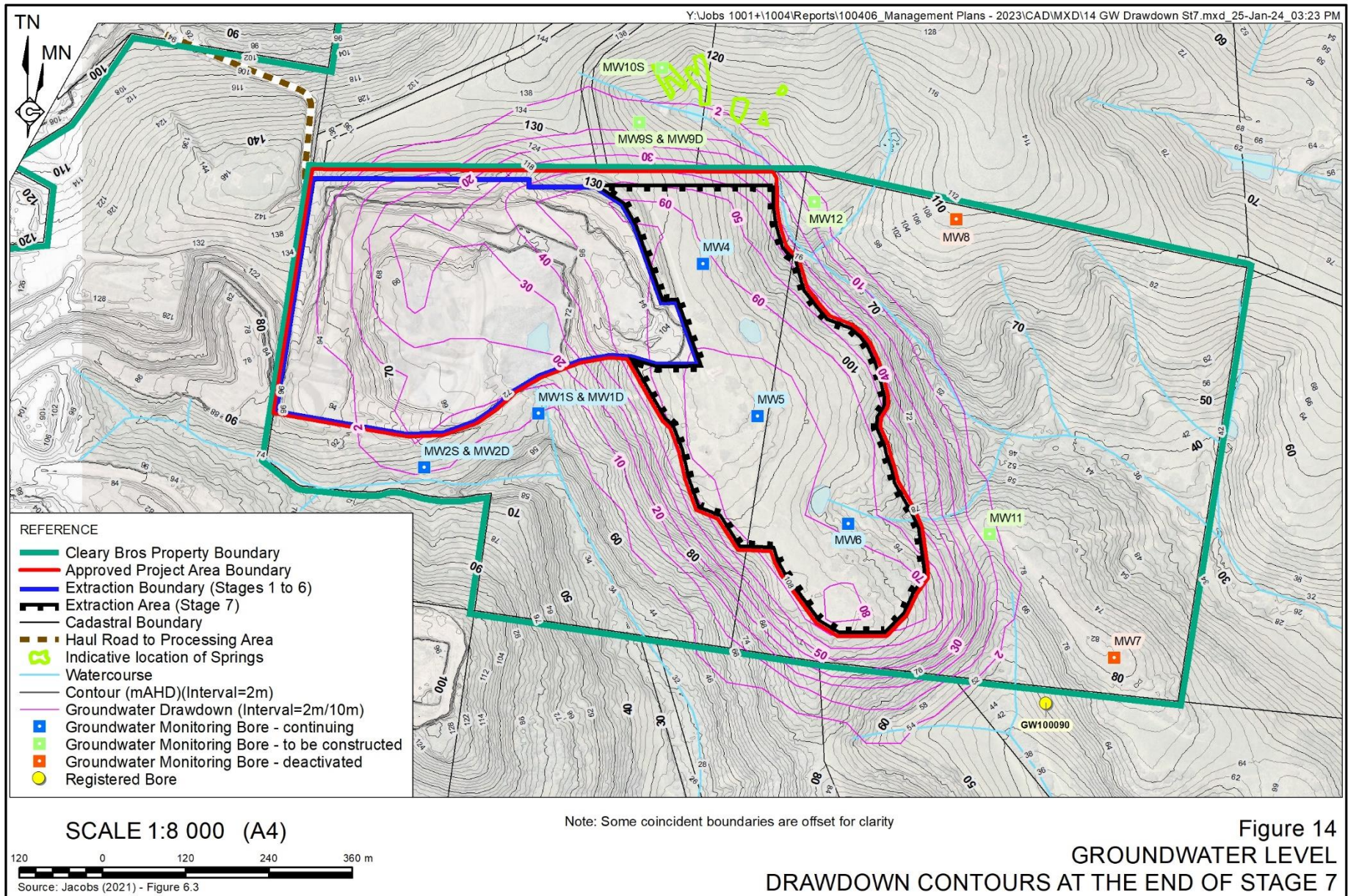
The modelled 2m drawdown contour does not affect any existing registered groundwater bore or the springs mapped to the north of the Project Area. Similarly, the modelled drawdown does not encroach on any mapped potential high priority GDEs.

6.2.3 Baseflow Reduction

Jacobs (2021) determined that groundwater level drawdown from Quarry-related activities has the potential to reduce baseflow to watercourses in the vicinity of the Project Area by less than 1kL/d in early years of the Quarry before steadily increasing to peak of less than 5kL/d.

6.2.4 Groundwater Quality

Contamination of groundwater as a result of spills or leaks of hazardous materials (e.g. fuels, lubricants or hydraulic oils) is the principal Quarry-related risk to groundwater quality. Jacobs (2021) determined the risk of groundwater contamination to be low.



6.3 Groundwater Management System

6.3.1 Groundwater Management Strategy

Groundwater management strategies within the Quarry will ensure the following.

- Protection of groundwater quality.
- Protection of the beneficial use of groundwater surrounding the Quarry.
- Implementation of make good provisions in the event that groundwater monitoring identifies groundwater-related impacts greater than those described in Section 6.2.

The following subsections describe each of the above strategies in detail.

6.3.2 Protection of Groundwater Quality

Groundwater quality within and surrounding the Quarry is described in Section 6.1.2. Measures to prevent adverse impacts to groundwater quality within and surrounding the Quarry will be as follows.

- Store hydrocarbons and chemicals in appropriately bunded storages in accordance with Australian Standard AS 1940 and Safety Data Sheet requirements.
- Implement spill response procedures, including training and standard practices for hydrocarbon and chemical spill control, containment and clean up, in the event of accidental spills or leaks.
- Maintain the Pollution Incident Response Management Plan for the Quarry, including associated protocols for communicating pollution incidents to potentially affected parties, throughout the Project life.
- Ensure that all VENM/ENM accepted on site complies with the relevant requirements of the POEO (Waste) Regulation, is inspected on receipt and, if required, is tested to ensure compliance with the relevant waste exemption order. In particular ensure that imported material is free of acid forming materials.
- Ensure that all overburden and VENM/ENM is placed within completed sections of the Extraction Area and that all water draining from that material flows to the Southern or Western Sumps.

Overburden and soil materials within the Project Area are non-acid forming and, as a result, these materials do not require targeted management to prevent generation of acidic runoff.

6.3.3 Protection of Beneficial Use

Condition B33 of SSD10369 requires that the Quarry not lower the beneficial use category of groundwater at a distance of more than 40m from the Extraction Area. Beneficial use categories of groundwater surrounding the Project Area include:

- aquatic ecosystems (due to groundwater providing potential baseflow to watercourses); and
- primary industries.

The beneficial use category for groundwater may be affected by the following.

- Reduction in water quality.
 - Section 6.3.2 described the measures that will be implemented to ensure that there is no reduction in groundwater quality as a result of the quarrying activities.

- Reduction in groundwater level.
 - A reduction in groundwater level may result in:
 - reduced baseflow in surrounding watercourses and associated impacts to aquatic ecosystems; or
 - reduced discharge to spring-fed dams or lowered water levels within surrounding bores used for agricultural purposes.
 - Section 6.2.2 depicts the modelled groundwater drawdown at the end of Stage 7 and demonstrates that the modelled 2m drawdown contour does not encroach on any existing groundwater bores or the mapped springs to the north of the Project Area. Similarly, the modelled drawdown does not encroach on any mapped potential high priority GDEs.
 - As a result, the Quarry is not expected to lower the beneficial use category for groundwater surrounding the Project Area.
 - Notwithstanding, Section 6.4 presents the groundwater monitoring that will be undertaken to ensure that assessed impacts are not exceeded and Section 6.3.4 presents the make good measures that will be implemented in the event that a reduction in beneficial use is observed.

6.3.4 Make Good Provisions

In the event that groundwater monitoring and any subsequent investigation (see Section 10.3) identifies that the Quarry has resulted in groundwater drawdown greater than presented in Section 6.2.2 or a reduction in groundwater quality such that the beneficial use is altered, the following makegood measures will be implemented as soon as practicable once identified.

- The affected landholder will be notified of the results of the investigation described in Section 10.3.
- Potential adverse impacts on the landholder's activities attributable to the unanticipated impacts will be determined in consultation with the landholder.
- In the event that the unanticipated impacts would result in a lowering of the beneficial use category, Cleary Bros will provide makegood provisions in consultation with the landholder for any lost water supply. This may include any of the following.
 - Re-drilling any affected bore to a depth that provides suitable access to groundwater.
 - Drilling of a new bore at an agreed location.
 - Provision of water from an external supply.

The compensatory water supply measures will provide a long-term supply of water that is equivalent in quality and volume to the loss attributable to the Quarry. If an alternative long-term supply of water cannot be provided, then Cleary Bros will provide reasonable compensation to the affected landholder for the loss, to the satisfaction of the Planning Secretary.

In addition, in the event a landholder believes that the Quarry has adversely impacted a privately-owned spring fed dam or licensed groundwater bore, they may notify Cleary Bros via the complaints line or any other mechanism. Cleary Bros would then follow the process described in Section 10.3 to investigate the complaint and follow the make good provisions in this subsection if required.

6.4 Groundwater Monitoring

6.4.1 Groundwater Monitoring Locations

Figure 12 presents the existing and proposed groundwater monitoring locations and **Table 16** presents construction details for each of the monitoring bores.

Bores MW1S, MW1D, MW2S, MW2D, MW4, MW6, MW9S, MW9D, and MW10S are currently being monitored and will continue to be monitored for the life of the Quarry or until the bores are removed as the Stage 7 Extraction Area is developed.

Bores MW9S, MW9D, and MW10S are intended to allowing monitoring of the spring fed dams to the north of the Project Area. The springs are conceptualised to be controlled by shallow groundwater flow systems that are poorly connected to underlying deeper groundwater systems that will be intersected by the Quarry (Jacobs, 2021). In order to assess any Quarry-related impacts on the springs, bores MW9S and MW10S have been constructed to test the shallow aquifer, with a deep bore (MW9D) also installed alongside MW9S.

- Shallow bores – screened in shallow, weathered latite, above the base of weathering. The shallow bores intersects the shallow, likely perched groundwater above the contact between weathered and unweathered latite.
- Deeper bore – screened in the deeper, unweathered or fresh latite. The deeper bore intersects the intermediate fractured rock aquifer that will be intersected by the Quarry.

Bores MW11 and MW12 are proposed to replace Bores MW04 and MW06 respectively and would be screened in the deeper, unweathered or fresh latite to intersect the intermediate fractured rock aquifer that will be intersected by the Quarry. MW11 and MW12 would be installed prior to the decommissioning of MW6 and MW4 respectively and each bore would be equipped with a data logger.

Bores MW7 and MW8 would be deactivated and would not be monitored for the following reasons. The bores would remain in place and would be available to be reactivated in the future if required.

- Bore MW7 – as identified in Section 6.1.1, this bore exhibits a strong response to rainfall recharge events. Following rainfall, standing water levels decrease without apparently reaching a baseline before the next rainfall event. As a result, water levels in this bore are unlikely to provide useful information in relation to groundwater drawdown at the Quarry.
- Bore MW8 – This bore is located well outside the proposed zone of groundwater drawdown and would only detect excessive groundwater drawdown once it was well developed. Proposed bore MW12 will provide a more suitable monitoring location.

6.4.2 Groundwater Level

Table 19 presents the groundwater level monitoring that will be undertaken throughout the life of the Quarry.

Table 19 – Groundwater Level Monitoring

Monitoring Bore	Frequency	Method
MW1S	Biannual	Dip meter
MW1D		
MW2S		
MW2D		
MW4 ¹	6-hourly with biannual download	Data logger
MW6 ¹		
MW9S		
MW9D		
MW10S		
MW11 ²		
MW12 ²		
Spring-fed dams	Biannual (during water quality monitoring)	Photographs
Note 1: Until decommissioned		
Note 2: Once constructed		

6.4.3 Groundwater Quality

Table 20 presents the groundwater quality monitoring program for the Quarry. Parameters to be monitored will be reassessed after two years and adjusted, if required.

The need for groundwater monitoring post-extraction would be determined based on an assessment of groundwater conditions at the end of the extractive activities within the Project Area.

Table 20 – Groundwater Quality Monitoring

Monitoring Bore	Frequency	Parameters
MW1S	Biannual	Field measurements - Electrical conductivity - pH - Redox - Temperature Laboratory analysis - Major cations (calcium, magnesium, sodium, potassium) and anions (chloride, sulphate)
MW1D		
MW2S		
MW2D		
MW4 ¹		
MW6 ¹		
MW9S		
MW9D		
MW10S		
MW11 ²		
MW12 ²		
Note 1: Until decommissioned		
Note 2: Once constructed		

6.4.4 Groundwater Inflow

Groundwater inflow will be monitored as described in Section 7.4.

6.4.5 Spring-fed Dam Monitoring Program

Initial consultation with the landholders to the north of the Project Area has supported the implementation of a monitoring program to measure any changes to the spring-fed dams on this property. To minimise the ongoing impact of this program, the spring-fed dam monitoring program will rely on water level monitoring within MW9S and MW10S, together with biannual water quality monitoring and photographs showing the water levels within the dams.

These bores are screened within the shallow aquifer and water levels are expected to fluctuate in response to climatic conditions. Two sampling locations have been selected, one to south of Watercourse 6 and one to the north of the watercourse. In the absence of quarry-related impacts, water levels within the bores would be expected to respond in a similar manner. If the Quarry adversely impacts on the shallow aquifers that feed the dams, it is expected that MW9S would be affected initially. As a result, a divergence of responses in MW9S and MW10S to climatic conditions may indicate adverse impacts on the spring-fed dams. The monitoring program will be continued while access is granted to the property, and will be paused in the event access is not provided by the property owner.

6.4.6 Groundwater Monitoring Triggers

Groundwater Level Triggers

Table 21 presents the groundwater level triggers for the Quarry. These have been determined based on the following.

- Bores MW4 and MW6 are predicted to be within the zone of groundwater drawdown for the Quarry. Bores MW11 and MW12 are predicted to be on the eastern edge of the drawdown zone. As a result, the groundwater trigger levels have been determined based on the drawdown predicted by numerical modelling during the staged development of the Extraction Area (Jacobs, 2021). These water levels are those predicted at the end of each modelled stage. Drawdown greater than that predicted would act as the trigger during each respective stage.
- Bores MW1S, MW1D, MW2S, MW2D are predicted to be on the edge of the zone of groundwater drawdown for the Stage 7 extraction area. The trigger values for these bores are therefore set as the minimum historical groundwater level observed since monitoring commenced (December 2008 to September 2023) minus the drawdown predicted by numerical modelling during the staged development of the Extraction Area (maximum drawdown of 1.82m for MW1S/D and 1.44m for MW2S/D at End Stage 7e) (Jacobs, 2021). A measured groundwater level below this would act as a trigger.
- For bores MW9S and MW10S, trigger values are a notable divergence from the water level in the companion bore. Given that bore MW9S would be located closer to the Stage 7 Extraction Area than bore MW10S, adverse Quarry-related impacts, should they occur, would be expected to be observed in bore MW9S earlier than in bore MW10S. Following collection of two years of data, trigger values would be reassessed for these bores.
- Bore MW9D is predicted to be on the north edge of the drawdown zone for the Quarry. As a result, groundwater trigger levels will be determined following collection of two years of data, and would represent the minimum groundwater level recorded over this time, minus the predicted drawdown for each stage of the Quarry.

Table 21 – Groundwater Level Triggers

Bore ID	Groundwater Level (m AHD)				
	End Stage 7a	End Stage 7b	End Stage 7c	End Stage 7d	End Stage 7e
Pre-existing Bores					
MW1S	60.87	60.50	60.48	60.47	60.47
MW1D	43.01	42.64	42.62	42.61	42.61
MW2S	61.24	61.24	61.24	61.24	61.24
MW2D	53.74	53.74	53.74	53.74	53.74
MW4 ¹	105.8	103.6	103.3	To be removed during Stage 7d	
MW6 ¹	64.7	To be removed during Stage 7b			
Spring Fed Dam Monitoring Bores					
MW9S	Notable divergence from groundwater level response in MW10S				
MW9D ⁴	0.00	0.00	0.00	-2.19	-5.39
MW10S	Notable divergence from groundwater level response in MW9S				
Replacement Bore					
MW11 ³	71.93	70.99	70.35	70.27	70.26
MW12 ³	94.18	94.18	94.17	94.16	92.41
Note 1: Until decommissioned					
Note 2: Once constructed					
Note 3: Trigger values to be confirmed following construction					
Note 4: Values represent drawdown – to be calculated following collection of 2 years of data					
Predicted Groundwater Level Source: Jacobs					

Groundwater Quality Triggers

Table 20 presents the groundwater quality monitoring to be undertaken. As the Extraction Area is expected to be a groundwater sink, not a flow-through system, and there are no activities or materials that would be likely to result in groundwater quality impacts, no groundwater quality triggers are proposed. Nevertheless, groundwater quality monitoring results will be reviewed on receipt to detect any changes that may be attributable to quarrying activities. The results of that analysis will be reported in the *Annual Review* for the Quarry.

Water Supply Triggers

The groundwater modelling has indicated that the Quarry is unlikely to impact the groundwater supply to any surrounding landholders. The spring-fed dam monitoring program described in Section 6.4.5 will be used to assess any impact to this water supply. The trigger for further investigation of potential impacts to the spring-fed dams would include a statistically significant divergence of groundwater level responses between MW9S and MW10S when compared with the previous two years of monitoring data.

7. Water Balance

7.1 Estimated Operational Water Balance

Section 6.9.3.3 of the EIS and Section 4.2.5 of the accompanying *Soil and Surface Water Assessment* (SEEC 2021) present the estimated water balance for the Quarry as it was originally proposed. **Table 22** presents the updated estimated water balance under average rainfall conditions taking into consideration amendments to the design and staging of the Extraction Area. In summary, between approximately 157ML and 262ML of water is expected to be discharged from the Extraction Area annually during the life of the Quarry.

Table 22 – Estimated Average Annual Operational Water Balance

End Quarry Stage	Cumulative Catchment Area (ha)	Annual Rainfall (mm)	Runoff Coefficient	Average Annual Runoff (ML)	Estimated Sump Area (m2)	Morton's Shallow Lake Evaporation (mm)	Average Annual Evaporation Loss (ML)	Estimated Dust Suppression (ML)	Total Annual Surplus (ML)
Stages 1-6 (external)	3.86	1,097	0.4	17	1,500	1,280	2.3	9.6	156.8
Stages 1-6	19.76	1,097	0.7	152					
Stage 7a	26.66	1,097	0.7	205	3,200	1,280	4.1	17.1	183.5
Stage 7b	27.46	1,097	0.7	211	4,000	1,280	3.6	17.1	190.2
Stage 7c	30.26	1,097	0.7	232	6,300	1,280	5.6	9.6	217.1
Stage 7d	32.76	1,097	0.7	252	7,300	1,280	6.5	7.0	238.0
Stage 7e	36.06	1,097	0.7	277	8,800	1,280	7.9	7.0	262.0

7.2 Water Supply Security

7.2.1 Operational Water Supply

As identified in Section 7.1, the Quarry is expected to have a surplus of water in an average rainfall year. The driest year on record at the Bureau of Meteorology's Albion Park Post Office Station (Station #68000 – 1892 to present) recorded 469mm of rain. Under such conditions, the Quarry would experience a shortfall of water of up 2.5ML per annum during Stage 7a and 1.5ML during stage 7b, while an annual water surplus for Stages 7c to 7e would be between 5.9ML and 10.4ML.

Should water not be available for dust suppression and other essential purposes, quarrying would cease until water is available.

7.2.2 Potable Water Supply

Potable water will be transported to the Quarry from the processing area in water tankers or smaller containers for use in ablutions facilities and for drinking purposes. Potable water will not be used for any other purpose.

7.3 Water Discharge Location and Limits

The licenced discharge point for the quarry excavation area under EPL299 is shown on **Figure 5. Table 12** presents the licenced discharge limits for that location as follows.

- pH – between 6.5 and 8.5.
- Turbidity – 32.2 NTU

Section 5.3.4 describes the protocol for discharging surface water from the Extraction Area.

7.4 Annual Water Balance

Condition B40 of SSD10369 and the condition of the WAL's require annual water usage to be reported. As a result, the water balance will be updated for the 12 months to 30 June each year, with the updated water balance presented in the *Annual Review* and the estimated groundwater inflows reported under the WALs.

Figure 15 presents a conceptual hydrological model of the Quarry. In summary, the components of the water balance are as follows.

- Water inputs.
 - Incident rainfall onto the water storages and Extraction Area.
 - Groundwater inflow.
- Water storages.
 - Western Sump.
 - Southern Sump.
- Water outputs.
 - Evaporation from the water storages and Extraction Area.
 - Water pumped from the water storages for dust suppression and other Quarry-related uses.
 - Water pumped offsite from the sumps to surrounding watercourses.

Direct measurements or calculated estimates for each of the relevant inputs and outputs will be used to estimate the annual water balance, with the exception of groundwater inflow.

Section 6.10.5.1 of the EIS estimates that groundwater inflow to the Extraction Area will be between 13.9ML/y and 68.3ML/y. Most of this inflow is expected to seep onto the Quarry faces and evaporate. As a result, little to no groundwater inflow to the quarry sumps may be observed.

In order to allow an estimate of groundwater inflows to the Extraction Area, the annual water balance will be estimated using the methodology described in Attachment 1 to the Guideline *Quantifying the volume of associated water taken under a mining lease or mineral development licence* published by The Queensland Department of Natural Resources, Mines and Energy on October 2020 (DNRME, 2020).

Equation 1 presents the water balance methodology derived from DNRME (2020).

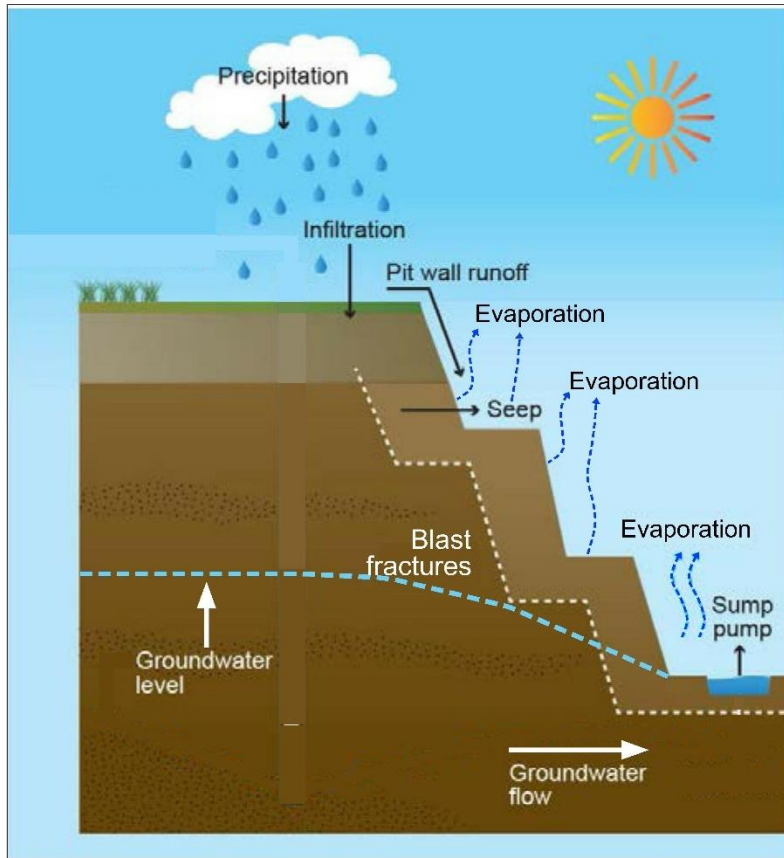
$$\text{Groundwater inflow (ML)} = (Ev_r - R_D) + T_{OUT} + (\Delta S - R_O) \quad (1)$$

Where

- **Ev_r** = Cumulative evaporation from the Western and Southern Sumps (ML).
This would be derived using the daily Morton's shallow lake evaporation (mm) obtained from SILO for the reporting period and the average area of each of the Western and Southern Sumps derived from aerial photography or satellite imagery throughout the Reporting Period to derive the evaporation volume in ML.
- **R_D** = Direct rainfall onto Western and Southern Sumps (ML).
This would be derived using the rainfall measured at the Quarry's meteorological station for the reporting period and the average area of each of the Western and Southern Sumps determined as described above to derive the volume of incident rainfall in ML.
- **R_O** = Runoff entering the Western and Southern Sumps from the Extraction Area (ML).
This would be derived using the rainfall measured at the Quarry's meteorological station for the reporting period and the catchment area multiplied by a runoff coefficient to derive the volume in ML.
- **T_{OUT}** = Water pumped to Watercourse 1 or used for dust suppression (ML)
This would be derived from in-line metres or pump rate and hours during the reporting period to derive the volume in ML.
- **ΔS** = Change in cumulative storage within the Western and Southern over the reporting period (ML).
The volume of each Sump would be determined at the start and end of each reporting period based on water level gauges and a surveyed water level vs volume relationship. The estimated change in volume would be determined by subtracting the starting volume from the final volume to derive the change in volume in ML.

It is noted that the estimated volume of groundwater inflow into the Extraction Area is relatively small (13.9ML/year to 68.3ML/year) when compared with the anticipated volume of runoff within the Extraction Area (169ML/year to 294ML/year) or discharge from the Extraction Area (156.8ML/year to 262ML/year). In addition, annual estimates of groundwater inflow will be strongly influenced by assumptions in relation to the runoff coefficient assumed for *R_O* in Equation 1 in particular. As a result, it is highly likely that groundwater inflow estimates determined using Equation 1 may initially not accurately reflect actual groundwater inflow.

In order to ensure continual improvement in the accuracy of the annual water balance, Cleary Bros will refine the estimate methodology following each Annual Review period. That review process will continue until there is confidence that the assumptions used reasonably reflect the actual water balance, include annual groundwater inflows. Until that time, reliance will be placed on the modelled groundwater inflows for the purposes of determining annual groundwater inflows to the Extraction Area.



Source: DNRME (2020) - After Figure 2

Figure 15
CONCEPTUAL HYDROLOGICAL MODEL

8. Water Licencing

8.1 Surface Water Licencing

Cleary Bros relies on its harvestable right under the *Water Management Act 2000* (WM Act) and excluded works provisions of the *Water Management (General) Regulation 2018* (WM Reg) for the following water storages.

- Offsite Storage Dam

The Storage Dam is located within Lot 420, DP1252087 within Cleary Bros' Western Landholding and is not within the area covered by this Plan. The Dam does not require a water access licence, water supply work approval or water use approval in accordance with the harvestable right provisions of Section 53 of the WM Act and the relevant *Harvestable Rights (coastal-draining catchments) Order 2022* for the following reasons.

- The Dam is not on, in or within 40m of any river or stream that is not a minor stream.

The Dam is located on an ephemeral, 1st Order Stream on the NSW Hydroline Map (**Figure 16**).

- The Dam is not on a floodplain.

The Dam is located in the upper section of the catchment on sloping land that does not form the floodplain for any watercourse or river.

- The Dam is not upstream of a RAMSAR wetland.

The closest RAMSAR wetland is associated with the Myall Lakes National Park, located approximately 260km to the northeast of the Dam.

- The capacity of the Dam, and all other assessable dams within the landholding is less than the relevant harvestable right volume.

The relevant landholding comprises the Eastern and Western landholdings, which are linked by the Haul Road (**Figure 16**). The Eastern Landholding is owned by Bridon Pty Ltd while the Western Landholding is owned by Cleary Bros (Bombo) Pty Ltd, with both organisations under the same ownership and control. The Haul Road is operated under a deed of agreement with Holcim Australia Pty Limited. As a result, the two parcels of land were determined by the then Department of Primary Industries on 12 October 2016 to be a single, contiguous landholding for the purposes of estimating the applicable harvestable right. The above advice nominated that Cleary Bros harvestable right was 18.56ML. In approximately 2017, the capacity of the Storage Dam was reduced in volume to approximately 18ML to comply with the above advice, with all other water storages within Cleary Bros landholdings having a capacity of less than 0.56ML.

- Cleary Bros are permitted to use the water for any purpose.

The Dam is a Type 1 Dam under the *Harvestable Rights (coastal-draining catchments) Order 2022*. As a result, the captured water may be used for any purpose.

- Cleary Bros only use water within its own property and does not transfer water from the Dam to any other dam or excluded work.

Water from the Storage Dam is only used within Cleary Bros property for Quarry or processing-related purposes and the water is not and will not be transferred to the Western Sump (or Southern Sump once constructed) or any other dam or storage.

- Extraction Area and the Western and Southern Sumps.

These structures are defined as excluded works under Item 3 of Schedule 1 of the *Water Management (General) Regulation 2018* (WM Regulation) as the sumps are used solely for the capture, containment and recirculation of potentially contaminated water, consistent with best management practices. Clause 12(1) of Schedule 4 of the WM Regulation identifies that a Water Access Licence is not required in relation to the taking of water from an excluded work.

As a result, no surface water licences are required for the Quarry during the operational period.

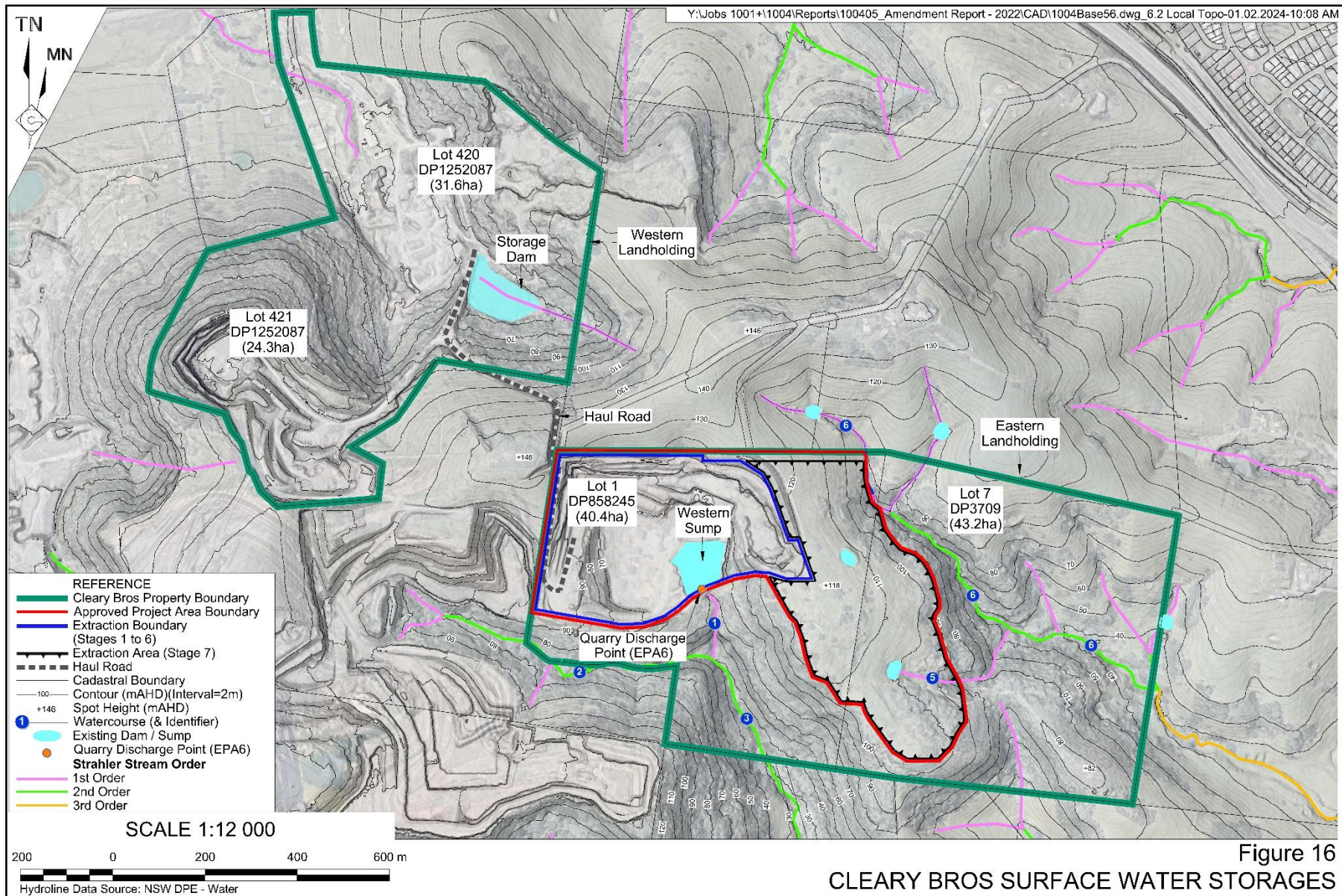
The approved final landform includes two free draining sumps. Cleary Bros will ensure that the capacity of all water storages within its landholdings comply with its harvestable right. As a result, no surface water licences will be required for the Quarry during the post-operational period.

8.2 Groundwater Licencing

Cleary Bros holds WALs sufficient to cover 125ML of groundwater inflow to the Extraction Area. This compares with a predicted maximum annual groundwater inflow of 68.3ML. In the event that monitoring during the Quarry's operational period indicates that groundwater inflows exceed the licenced volume, Cleary Bros will obtain additional WALs to cover the shortfall, either through a purchase on the open market or through a controlled allocation of available water. This commitment will only apply once the water balance and groundwater inflow monitoring methodology described in Section 7.4 has been verified and validated. Until that time, reliance will be placed on the modelled groundwater inflows for the purposes of determining annual groundwater inflows to the Extraction Area.

Cleary Bros holds Works Approval 10WA122753 for the extraction area excavation, and have applied to WaterNSW to add this Works Approval to a consolidated WAL.

Cleary Bros will retain sufficient groundwater allocations to cover the measured or estimated groundwater inflows to the final void and will ensure that should the land be transferred to a subsequent landholder, that adequate permanent entitlements will be transferred as well to cover the observed take into perpetuity.



9. Reactive Management

9.1 Emergency Response

Emergency management at the Quarry is managed in accordance with Cleary Bros's Pollution Incident Response Management Plan and Emergency Management Plan. All employees, contractors and visitors receive training in these plans commensurate with their level of responsibility.

During emergencies, including emergencies related to water management, the Site Emergency Controller will determine the level of response (i.e. internally manageable or requiring external resources). All personnel and contractors will be required to assist emergency services if, and when, directed. Cleary Bros will also provide appropriately trained personnel as requested and required, including those trained to act as first responders. In the event of an emergency requiring external resources, emergency vehicles will be met at the gates and escorted to the emergency.

9.2 Trigger Action Response Plan

Table 23 presents consolidated water-related triggers and associated Corrective actions.

Table 23 – Water-related Trigger Action Response Plan

TARP			
No.	Parameter	Trigger	Action and Response
1	Discharge water quality	Water quality within one of the sumps does not meet the discharge criteria identified in EPL299 (see Table 12).	- Do not discharge water and either retest the following day or treat the sump with gypsum or an alternative flocculant approved by the EPA. - Retest the water within the sump and do not commence discharging that water until the discharge criteria are complied with.
2	Surface water quality	Surface water quality monitoring results at monitoring locations WC1 or WC4 exceed the surface water trigger values in Table 14 .	- Instigate a preliminary internal investigation to determine the nature of the exceedance and potential causes. - In the event that Quarry operations may be contributing to the exceedance, identify and implement corrective actions to restore water quality, and to prevent a recurrence. - Prepare a report into the investigation(s) completed and, if required, the corrective actions, and append the report to the <i>Annual Review</i>.
3	Channel stability and riparian vegetation	Photographs of surface water monitoring locations WC1 to WC4 indicate changes in channel morphology or riparian vegetation.	- Instigate a preliminary internal investigation to determine the nature of the changes and potential causes. - In the event that Quarry-related operations may be contributing to the changes, identify and implement corrective actions to restore channel stability and riparian vegetation, and to prevent a recurrence. - Prepare a report into the investigation(s) completed and, if required, the corrective actions, and append the report to the <i>Annual Review</i>.

TARP			
No.	Parameter	Trigger	Action and Response
4	Erosion and sediment control	Active erosion or evidence of active erosion observed	• Instigate a preliminary internal investigation to determine the potential causes of the observed erosion and/or sedimentation. • Undertake works to rectify the observed erosion and/or sedimentation, including addressing the cause(s). • If required, engage a specialist to review the extent and cause of the erosion or sedimentation and recommend corrective actions to be undertaken
5	Groundwater levels	Groundwater levels at monitoring bores MW1S, MW2S, MW4, MW5, MW6, MW9D, MW11 or MW12 fall below the trigger values in Table 21 .	• Engage an independent expert to review the groundwater level monitoring data for the Quarry and determine the potential cause(s) of the exceedance and provide recommendations for further investigation or corrective actions. • Implement the further investigations or corrective actions. • Prepare a report into the investigation(s) completed and, if required, the corrective actions, and append the report to the <i>Annual Review</i>.
6	Groundwater quality	Groundwater quality monitoring identifies changes in groundwater quality that may be attributable to the Quarry.	• Engage an independent expert to review the groundwater quality monitoring data for the Quarry and determine the potential cause(s) and provide recommendations for further investigation or corrective actions. • Implement the further investigations or corrective actions. • Prepare a report into the investigation(s) completed and, if required, the corrective actions, and append the report to the <i>Annual Review</i>.
7	Water Supply	Groundwater level monitoring indicates that statistically significant divergence of groundwater level responses in bores MW9S and MW10S. OR Complaint or notification in relation to a reduction in surface water or groundwater supply received from neighbouring or surrounding landholders, including the approval holder for GW100090 should they exercise their right to take water under that approval	• Immediately provide suitable short-term compensatory water supply or other suitable arrangement consistent with Condition B35 and B36 of SSD10369 until completion of the investigations described below. • Instigate a preliminary internal investigation to determine the nature of the exceedance and potential causes. • Provide the preliminary investigation to the complainant and seek agreement in relation to the extent and cause of the reduced water supply and, if required, corrective action. • If agreement is not reached, – engage an independent expert to review the extent and cause of the reduced water supply and, if required, further investigations or corrective actions to be undertaken.

TARP			
No.	Parameter	Trigger	Action and Response
			– Provide the experts report to the complainant and seek agreement in relation to the extent and cause of the reduced water supply and, if required, corrective or compensatory action. • If agreement is reached, implement the corrective or compensatory action, including supply of long-term compensatory water supply or other suitable arrangement consistent with Condition B35 and B36 of SSD10369. • If agreement cannot be reached, refer the matter to the Planning Secretary, together with all reports and consultation notes in accordance with the provision of Condition B37 of SSD10369.
8	Groundwater Licencing	Annual water balance estimation determines that the likely volume of groundwater flowing into the Extraction Area exceeds the allocation held by Cleary Bros.	• Engage an independent expert to review the water balance estimation and groundwater monitoring data for the Quarry and determine whether the water balance estimation is accurately reflecting actual groundwater inflows and provide recommendations for further investigation or corrective actions. Append the report to the <i>Annual Review</i>. • Implement the further investigations or corrective actions, including purchase of additional allocation in required.

10. Reporting and Management of Complaints and Compliance

10.1 Reporting and Publishing

An *Annual Review* must be prepared and submitted to the Department by 30 September each year addressing the matters identified in Condition D10 of SSD10369. The *Annual Review* will include all water-related monitoring and other relevant matters for the 12-month period to the preceding 30 June, as well as measures to be implemented for the following 12-month period.

The *Annual Review* will include information relevant to:

- Activities undertaken during the year, and activities planned to be carried out over the next year.
- A review of all monitoring results associated with this plan, including how they compare to the limits and performance criteria identified in this plan, the risk assessment in Section 4, previous years monitoring results, the predictions from the EIS, and any trends observed.
- Details of compliance and any non-compliance with the conditions and the plans, and any incidents.
- Details of any complaints received, and how Cleary Bros has responded to them.
- Any discrepancies between the observed impacts of the Quarry and that predicted by the EIS.
- Any measures that will be implemented in the next year to improve the environmental outcomes of the Quarry.

The *Annual Review* will be uploaded to the Planning Portal or otherwise submitted to the Planning Secretary in line with the current submission process.

In addition, the following annual reporting required under the following approvals will be prepared. These reports will not be made available on the Cleary Bros website, however, information contained within the reports will be presented in the *Annual Review*.

- EPL299 – Annual Return
- WAL45278 – annual water take.

In accordance with condition D15 of SSD 10369, Cleary Bros will make the following information and documents publicly available on its website:

- the EIS;
- all current statutory approvals for the Quarry;
- all strategies, plans and programs required under the conditions SSD 10369;
- any strategy, plan, or program developed in accordance with the EIS or the conditions of this SSD 10369.
- the proposed staging plans for the Quarry;
- minutes of CCC meetings;
- regular reporting on the environmental performance of the Quarry in accordance with the reporting requirements in any plans or programs required by the conditions SSD 10369;

- a comprehensive summary of the monitoring results of the Quarry, reported in accordance with the specifications in any conditions of SSD 10369, or any strategies, plans and programs;
- a summary of the current phase and progress of the Quarry;
- contact details to enquire about the Quarry or to make a complaint;
- a complaints register, updated monthly;
- the Annual Reviews of the Quarry;
- audit reports prepared as part of any *Independent Environmental Audit* of the Quarry and the Cleary Bros' response to the recommendations in any audit report; and
- any other matter required by the Planning Secretary.

All information will be regularly updated.

10.2 Complaint Management

Section 9.2 addressed measures to be undertaken to address complaints in relation to water supply. The *Environmental Management Strategy* sets out the procedures to be implemented in the event of complaints related to other water-related matters.

10.3 Incident and Non-compliance Identification and Management

Conditions D8 and D9 of SSD10369 require Cleary Bros to notify the Department of Planning and Environment and any other relevant government agency of incidents or non-compliances with the conditions of the consent. Similar conditions are included in EPL299 and the WALs held for the Quarry.

For the purposes of this Plan, an incident or non-compliance is as follows.

- Incident - An occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance. Material harm is defined as

“harm to the environment that:

- *involves actual or potential harm to the health or safety of human beings or to the environment that is not trivial; or*
- *results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000, (such loss includes the reasonable costs and expenses that would be incurred in taking all reasonable and practicable measures to prevent, mitigate or make good harm to the environment)”*

Material harm does not include “harm” that is authorised under SSD10369 or any other statutory approval.

- Non-compliance - An occurrence, set of circumstances or development that is a breach of this consent.

Cleary Bros will notify the Department immediately on becoming aware of an incident, or within 7 days of becoming aware of a non-compliance. The notification will identify the location and nature of the incident of non-compliance, and the reasons for the non-compliance (where applicable).

In accordance with the Conditions of Consent, where any exceedance of the criteria or performance measures outlined within this document has occurred, Cleary Bros will:

- a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur;
- b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and
- c) implement reasonable remediation measures as directed by the Planning Secretary.

Cleary Bros has adopted a Trigger Action Response Plan (TARP) methodology for identifying key risks to the successful achievement of water performance criteria.

11. Review and Improvement

11.1 Independent Environmental Audit

In accordance with Condition D11 of SSD 10369 and Condition 25 of 2020-8871, Cleary Bros will engage a third party to undertake an independent environmental audit of the conditions of these approvals and the implementation of the Water Management Plan. The first audit will be undertaken within 12 months of commencement of quarrying activities under SSD 10369, and will be undertaken every three years thereafter. The Independent environmental audit will be undertaken as per the process described in the Environmental Management Strategy.

In accordance with D12 of SSD 10369, Cleary Bros will review each *Independent Environmental Audit* and submit a response to the Planning Secretary and any other relevant agencies. The response will include a timetable for the implementation of the recommendations of the Independent Environmental Audit. The *Independent Audit Report* and Response will be made available on the Cleary Bros' website within 60 days following submission to the Planning Secretary.

11.2 Plan Review

In accordance with Condition D6 of SSD 10369, this Plan will be reviewed, and if necessary revised, within three months of any of:

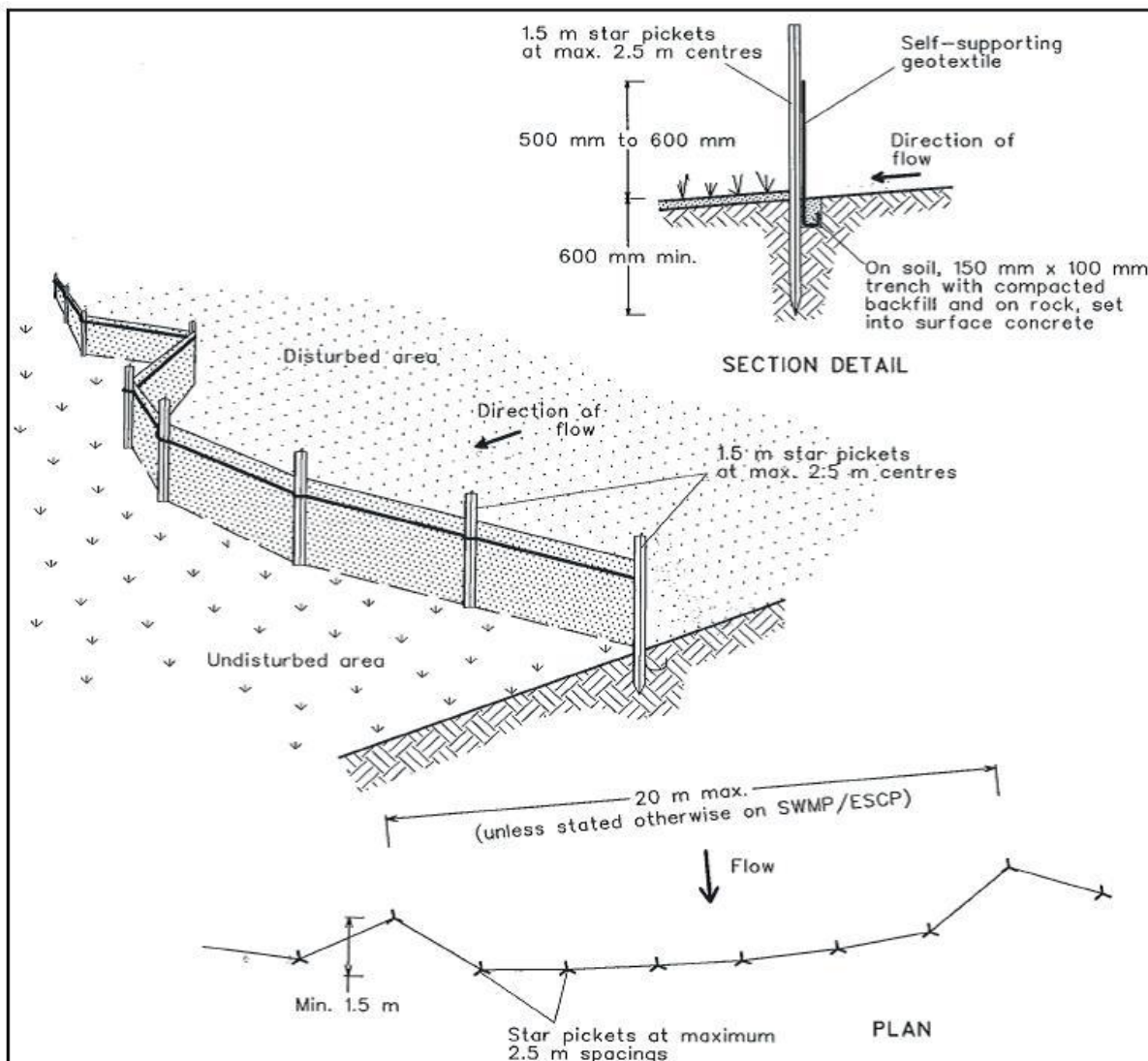
- the submission of an incident report related to water management at the Quarry under any approval;
- the submission of an *Annual Review*;
- the submission of an *Independent Environmental Audit*;
- the approval of any modification of the conditions of SSD10369; or
- commencement of each Stage of the Quarry.

12. References

ANZECC & ARMCANZ 2000. Australian guidelines for water quality monitoring and reporting. National Water Quality Management Strategy Paper No 7, Australian and New Zealand Environment and Conservation Council & Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

Appendix 1

Blue Book Sediment and Erosion Controls



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE

SD 6-8