



ABN: 90 009 679 734

Water Management Plan

for the

Sancrox Quarry Expansion Project

Prepared by:



RWCorkery&co

June 2026



ACKNOWLEDGEMENT

R.W. Corkery & Co. 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.



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Prepared for:

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1. Introduction

1.1 Scope

This Water Management Plan (WMP) has been prepared by R.W. Corkery & Co Pty Limited (RWC) on behalf of Heidelberg Materials Australia Pty Ltd (Heidelberg) for the Sancrox Quarry (the Quarry). The Quarry is located approximately 8km to the west of Port Macquarie, in the Port Macquarie-Hastings Local Government Area (LGA) on the Mid-North Coast of NSW (**Figure 1**). Access to the Quarry is via the public road network of Orleans Avenue from a dedicated intersection with Sancrox Road. The Pacific Highway runs adjacent to the east of the Quarry. The Quarry has been owned and operated by Heidelberg since 1998.

The Sancrox Quarry Expansion Project (the Project) is an open cut hard rock extraction operation with approval under SSD 7293 (the Approval) to extract, process, stockpile, and transport extractive materials on the site (including concrete batching and recycling, and asphalt production) and the associated removal of vegetation, topsoil and overburden. The Approval was granted on 26 November 2024, allowing for transport of hard rock material up to 530,000 tonnes per annum (tpa) for 30 years, and processing up to 185,000tpa until the quarry processing plant is relocated.

This WMP has been prepared for implementation:

- As a practical tool for managing landscape-related water risks during the ongoing operation of the Quarry.
- In accordance with SSD7293 Condition B29 (See Section 2.1) which requires the development of a Water Management Plan for the Quarry.
- In accordance with Commitment 1.1 of the Statement of Commitments (see Section 2.2), which requires incorporation of surface water management procedures.

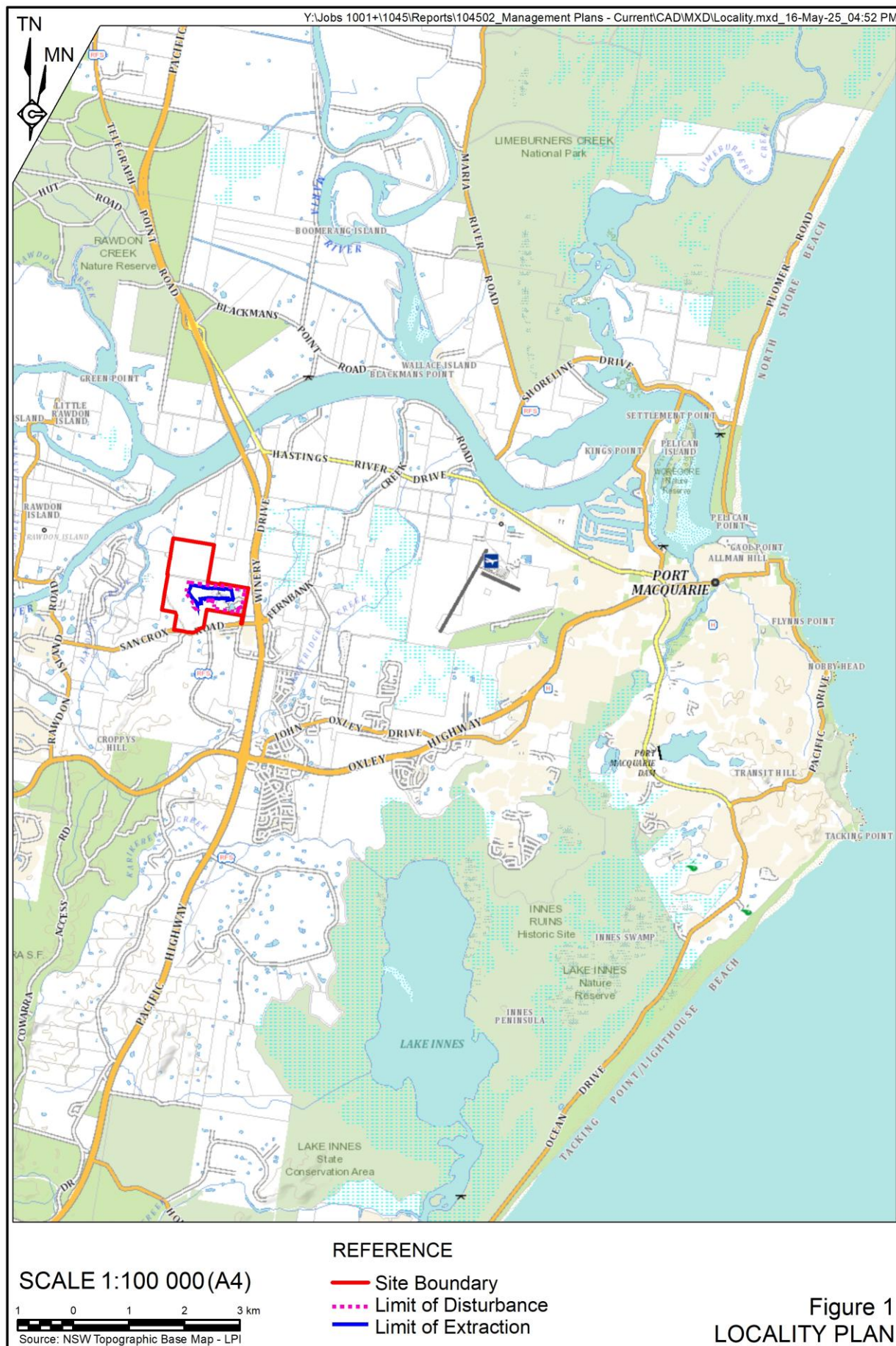
The WMP synthesises information, recommendations, and water management concepts presented in documents prepared to support the Environmental Impact Statement for the Sancrox Quarry Expansion Project (ERM 2019), including the following.

- Hydrogeological Assessment, prepared by Water Technology, 2022
- Surface Water Assessment, prepared by ERM, 2023
- Amendment Report, prepared by Ethos Urban, 2024
- Final Mitigation Measures, Attachment C to the Response to Submissions, 2024

Water management design aspects of this plan have been guided by the Managing Urban Stormwater: Soils and Construction, Volume 1 (Landcom, 2004) and Volume 2E: Mines and Quarries (DECC, 2008), collectively referred to as the “Blue Book.”

Copies of the WMP and the above documents are available on the Heidelberg website.

This WMP must be approved by the Planning Secretary, with Stage 1 of the development not commencing until this approval has been received.



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 7293, EPL 5289, and stated commitments related to water management and reasonable community expectations.	(i) Compliance is achieved with all relevant criteria and reasonable community expectations, as determined in consultation with relevant government agencies.
(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 WMP. (ii) No discharge of water contrary to the requirements of this WMP. (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 the Company website and in the Annual Review and/or Annual Return.
(d) To investigate, implement and report on reasonable and feasible measures for continual improvement to water quality and to reduce soil loss.	(i) Regular review of this WMP, 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 WMP).

1.3 Environmental Management Training and Responsibilities

All Heidelberg personnel and contractors and their employees will undergo water management awareness training as part of the site induction and re-induction program. Additional training may occur through targeted Toolbox training sessions as required. Relevant information will be available to all personnel, such as signs and regularly updated operational maps, procedures, company guidelines and fact sheets.

Table 2 presents the roles and responsibilities of personnel with reference to water management.

Table 2
Roles and Responsibilities

Roles	Responsibilities
Quarry Operator	- Comply with applicable laws, regulations, licences and approvals. - Ensure all contractors, sub-contractors and service personnel are appropriately qualified and/or licenced to undertake the required work and have good environmental performance records. - Ensure that appropriate resources are available to site management and personnel to enable the implementation of this WMP.
Quarry Manager / Leading Hand	- Ensure monitoring is undertaken in accordance with this WMP. - Ensure adequate resources are available to enable implementation of the WMP. - Ensure employees are competent through training and awareness programs. - Respond to all incidents and complaints. - Input for the review and analyse of monitoring data as required.
Environmental Manager	- Accountable for the overall environmental performance of the Quarry, including the outcomes of this WMP. - Ensure the implementation of this WMP, including reporting of non-compliances with the trigger values, and subsequent implementation of the relevant trigger action response plan. - Ensure all internal and external reporting requirements are met. - Undertake/organise, review and analyse all monitoring data. - Respond to all incidents and complaints. - Review and update this WMP as required.
All Personnel	- Operate in a manner that minimises risks of incidents to themselves, fellow workers and water values of the Quarry Site. - Ensure operations are undertaken in accordance with instructions. - Ensure appropriate notification and response in the event of an environmental incident. - Show due care not to cause environmental harm. - Follow direction provided by the Environmental Manager. - Show due care not to cause environmental harm. - Notify Quarry Manager and/or Environmental Manager of any environmental non-compliance.

1.4 Consultation

The following consultation was undertaken during preparation of this WMP (Table 3). All feedback received as part of the consultation process has been incorporated, where required, into the final WMP. A copy of all comments received during consultation, actions taken and the response to all comments are provided as **Appendix 1**. There are no outstanding matters relating to the comments received.

Table 3
Summary of Consultation – Water Management Plan

Stakeholder	Date	Comments	Where Addressed in this WMP
DCCEEW – Water Group	23/03/2026	DCCEW requested revision to address potential supply shortfalls, clarification on relevant water licences and strengthened response protocols for monitoring exceedances.	S6.4, S2.3, S8.4

1.5 Document Preparation

This document has been prepared by Mr Paul Ryall (B.Sc (Hydrology and Water Resources)) Senior Environmental Consultant with RWC and Ms Brittini Nicol (B.Sc (Geol & Geophys, Geog)), Environmental Consultant with RWC. Mr Ryall has prepared numerous approved water management plans for State Significant Development in NSW. Internal review of this document was undertaken Matthew Ayre (BEnvScMgt (Earth Systems & Ecosystems and Biodiversity)) Senior Environmental Consultant. External review was undertaken by Ms Belinda Pignone (B.Env.Man & Sc.), Environmental, Planning & Compliance Coordinator with Heidelberg, and Rick Johnstone, Quarry Manager at the Sancrox Quarry. Ms Pignone has also reviewed and implemented numerous water management plans for State Significant Developments operated by Heidelberg in NSW. This collective experience has been applied in preparation of the Plan.

2. Legal and Other Requirements

2.1 Development Consent SSD 7293

State Significant Development Consent (SSD-7293) was granted on 26 November 2024 for the expansion of extraction, processing, and product transport operations within the Quarry Site (the Project). Once commenced, SSD-7293 will supersede the development consent under which the Quarry is currently operated. **Table 4** identifies the conditional requirements of SSD-7293 relevant to this WMP and where they are addressed.

Table 4
Development Consent Conditions (SSD 7293) - Water

Page 1 of 3

Cond No.	Requirement	Plan Section
Water Supply		
B21	The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development, within the limits of consent set out in Part A of Schedule 2, to match its available water supply.	Noted
B22	Prior to the installation of any new groundwater bores, the Applicant must prepare an updated groundwater impact assessment for the development to the satisfaction of the Planning Secretary. This assessment must: (a) be prepared by a suitably qualified and experienced person/s; (b) be prepared in consultation with NSW DCCEE – Water Group; and (c) include assessment of the impacts to: i) groundwater levels, yield and quality of groundwater resources potentially impacted by the development; ii) groundwater dependent ecosystems; and iii) groundwater supply for other water users.	5.1.2
B23	The Applicant must report on water take 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.	5.3.3
Compensatory Water Supply		
B24	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 NSW DCCEE – Water Group, and to the satisfaction of the Planning Secretary.	8.3
B25	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 should be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.	8.3
B26	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.	8.3
B27	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. Note: The Water Management Plan (see condition B29) is required to include trigger levels for investigating potentially adverse impacts on water supplies.	8.3

Table 4 (Cont'd)
Development Consent Conditions (SSD 7293) - Water

Page 2 of 3

Cond No.	Requirement	Plan Section
Water Discharges		
B28	The Applicant must ensure that all surface water discharges from the site comply with all relevant provisions of the POEO Act, including any discharge limits (both volume and quality) set for the development in any EPL.	4.3.4
Water Management Plan		
B29	The Applicant must prepare a Water Management Plan for the development to the satisfaction of the Planning Secretary. This plan must: a) be prepared by suitably qualified and experienced person/s whose appointment has been endorsed by the Planning Secretary; b) be prepared in consultation with EPA and NSW DCCEEW – Water Group; and c) include a: i) Site Water Balance that: • includes details of: – sources and security of water supply; – water use and management on the site; – any off-site discharges or water transfers; – reporting procedures, including the annual preparation of a site water balance; and • minimises clean and potable water use on the site; ii) Surface Water Management Plan that includes: • detailed baseline data on surface water flows, water quality, riparian condition and geomorphic stability in watercourses and/or water bodies that could potentially be affected by the development; • surface water impact assessment criteria, including trigger levels for investigating any potentially adverse impacts, and surface water management performance measures;	This Plan
	• a detailed description of the surface water management system on the site, including the: – clean water diversion system; – erosion and sediment controls; – dirty water management system; and – water storages;	4.2
	• a program to monitor and report on: – any surface water discharges (including surface seepages to adjoining properties); – stream stability, riparian condition and geomorphic processes in receiving watercourses; – the effectiveness of the water management system; and – surface water flows and quality in watercourses and/or waterbodies that could potentially be impacted by the development; and	4.3
	• a protocol for identifying and investigating any exceedances of the surface water impact assessment criteria and for notifying the Department and relevant stakeholders of these events; and a	4.3, 8.4

Table 4 (Cont'd)
Development Consent Conditions (SSD 7293) - Water

Page 3 of 3

Cond No.	Requirement	Plan Section
Water Discharges		
B29 Cont'd	iii) Groundwater Management Plan that includes: - detailed baseline data on groundwater levels, yield and quality for groundwater resources potentially impacted by the development, including groundwater supply for other water users and groundwater dependent ecosystems; - a detailed description of the groundwater management system; - groundwater performance criteria, including trigger levels for investigating any potentially adverse groundwater impacts;	5.1, 5.2, 5.3, 8.4
	- a program to monitor and report on: - groundwater levels, yield and quality of groundwater resources potentially impacted by the development; - groundwater inflows into the extraction areas; - seepage/leachate into the surrounding groundwater system; - impacts of the development on groundwater dependent ecosystems; and - impacts of the development on groundwater supply for other water users;	5.3
	a protocol for identifying and investigating any exceedances of the groundwater performance criteria and for notifying the Department and relevant stakeholders of these events; and	8.4
	a protocol to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the extraction areas.	2.3
B30	The Applicant must not commence construction or quarrying operations until the Water Management Plan is approved by the Planning Secretary.	Noted
B31	The Applicant must implement the approved Water Management Plan.	This Plan

2.2 Statement of Commitments

Heidelberg's commitments to environmental management at the Quarry are presented in the Summary of Management and Mitigation Measures appended to the Amendment Report (Ethos Urban, 2024).

Table 5 identifies the Quarry's commitments relevant to the management of surface water and groundwater and where they are addressed. In accordance with Condition A4 of SSD-7293, where there is any inconsistency, ambiguity or conflict between these commitments and the conditions of SSD-7293, the conditions of SSD-7293 prevail.

Table 5
Statement of Commitments – Surface Water and Groundwater

Page 1 of 6

Measure	Document Reference
Surface Water	
1.1 Prepare and implement a Water Management Plan for the Project that incorporates surface water management procedures.	This Plan

Table 5
Statement of Commitments – Surface Water and Groundwater

Page 2 of 6

Measure	Document Reference
Stormwater Diversion	
1.2 Stormwater diversion will be required within both clean and dirty catchments throughout the development of the Project; 1.3 Diversions in the form of bunds or drains, as fitted to the topography of the specific catchment, will be implemented to allow for the diversion of sediment-laden-run-off to sediment basins and in a few circumstances to divert clean run-off from entering the site; 1.4 Diversions with clean catchments are to be stabilised quickly through covering of the diversion channel with geofabric or revegetation 1.5 Diversion measures within dirty catchments will incorporate rock check dams to reduce sediment loads within the run-off prior to reaching the basin (to maximise efficiency of the basin and reduce desilting requirements) and where possible have low grade to lower flow velocities.	4.2
Erosion Control	
Mulch 1.6 The mulch will be mixed with topsoil and applied to batters and other locations requiring rehabilitation, acting as both an addition of organic matter to boost the soil quality (along with other ameliorants) and act as an erosion control measure; 1.7 Mulch will be used as a replacement to sediment fences, by creating a bund of between 300 and 500mm high; and 1.8 Mulch can also be applied as a blanket, of approximately 150mm thick, to cover disturbed areas and prevent erosion. Site stabilisation and rehabilitation 1.9 A progressive site rehabilitation approach will be adopted, whereby stabilisation works (either by revegetation, hard armouring or allowing hard rock finishes to remain where no sediment-laden-run-off will be generated) is undertaken immediately following the completion of the activity. Key principles of progressive rehabilitation include Availability of acceptable soil materials; – Correct site preparation and replacement of topsoil; – Selection of the most suitable establishment technique; – Selection of appropriate plant species, fertilisers and ameliorants; – Application of sufficient water germination and to sustain plant growth if rainfall is insufficient; – An adequate maintenance program; and – areas not satisfactorily revegetated will be investigated to determine the reason for failure. Appropriate remedial action will be undertaken, including replacing any lost topsoil and re-sowing the site.	7
Sediment Control	
General 1.10 Sediment basins are required for the management of disturbed locations. Conceptual locations are shown in Figure 1.3 of the Hydrology Impact Assessment Chapter; preliminary basin sizes are provided in the Hydrology Assessment (ERM 2018b); 1.11 The Proponent must restore the design storage capacity to ensure basin within five days of the cessation of a rainfall event that causes run-off to occur on the site	4.1, 4.3, 5.3, 7

Table 5
Statement of Commitments – Surface Water and Groundwater

Page 3 of 6

Measure	Document Reference	
Sediment Control (Cont'd)		
1.12 A basin register will be applied to the Environment Protection License (EPL 5289) to allow for progressive integration of the basins to the licence as each stage of work commences; and	4.1, 4.3, 5.3, 7	
1.13 Sediment basins will be established prior to the removal of all vegetation across each stage, where practicable. Essentially, this will require clearing a path to the basin location, removing the vegetation, constructing the basin and the clearing the remainder of the catchment.		
Basin Desilting		
1.14 All sediment basins will be inspected regularly for accumulated sediment. Graduated makers placed within the basin will assist in measuring sediment depths. Sediment to be removed prior to reaching capacity.		
Water treatment and flocculation		
1.15 water quality testing will determine compliance, and identity if pH modification (through use of products such as lime or hydrochloric acid) or TSS modification (through the use of gypsum) is required.		
Pollution Control		
General		
1.16 Waste receptacles will be provided for the safe and efficient storage of all construction and miscellaneous wastes, as necessary;	4.2	
1.17 recyclable materials should be separated and recycled where possible. Otherwise, disposable wastes should be removed from site regularly and disposed of by approved means;		
1.18 spent chemical and hydrocarbon drums should be removed from site regularly to limit the potential for spills of the remnant product;		
1.19 refuelling within active quarry areas should be carried out using a mobile fuel cart fitted with an electronic fuel pump; and		
1.20 routine maintenance of all plant and machinery should be carried out in the designated maintenance area adjacent to the site office to minimise the potential of accidental contamination of water.		
Spill Management		
1.21 spill kits should be provided at active work locations, the workshop area, refuelling areas and adjacent to pump locations. Training of site personnel in their use will ensure that in the event of any spills appropriate action can be taken rapidly to prevent and minimise impacts to surface waters;		
1.22 Material Safety Data Sheets (MSDS) for all chemicals stored on-site are to be collected and maintained by the quarry manager and made available to site personnel. Site personnel should be informed of their location as a part of the site induction;		
1.23 an impervious bund should be constructed to contain any spills of more than 110% of the volume of the largest container in the bunded area, should none be present in the workshop area. Any spillage should be immediately contained and absorbed with a suitable absorbent material;		
1.24 storage and transport of Dangerous Goods, Flammable and Combustible Liquids will comply with AS 1940 1993 The Storage and Handling of Flammable and Combustible Liquids and National Code of Practice for the Storage and Handling of Workplace Dangerous Goods [NOHSC: 2017 (2001)].		

Table 5
Statement of Commitments – Surface Water and Groundwater

Page 4 of 6

Measure	Document Reference
Asphalt Production	
1.25 clean water diversions around the asphalt production plant site to limit catchment to smallest footprint possible and prevent clean water run-on;	4.2
1.26 the proposed sediment basin should be contrasted to capture sediment-laden run-off from the plant catchment area;	
1.27 a triple interceptor or similar pollution control device should be utilised as a “first flush” for the potential hydrocarbon contaminated areas in the plant site;	
Plant Controls	
1.28 all oils, fuels, lubricants, liquids and chemicals should be stored in appropriately bunded areas;	4.2
1.29 bitumen, diesel and other chemicals handling should be undertaken within a contained (bunded) area. Any spillages should be immediately ameliorated; and	
1.30 the sediment basin servicing the plant catchment should be fitted with a floating hydrocarbon boom as a precautionary measure to contain any potential loss of hydrocarbons from the plant catchment.	
Concrete Batching Plant Controls	
1.31 the footprint of the plant should be limited to the smallest extent practicable to reduce the area from which contaminated stormwater can be generated (EPA Victoria, 1998);	4.2
1.32 all contaminated stormwater and process wastewater should be collected and recycled at the earliest possible opportunity (EPA Victoria, 1998);	
1.33 a dedicated, paved and bunded washout area should be established for the following locations: – truck washing and agitator drum washout area; – the concrete batching area; and – any other location that will generate stormwater contaminated with cement dust or residues.	
1.34 the stormwater from these locations should be direct to a first flush system. The OEH (2015) recommended design criteria for first flus containment systems utilised for concrete batching plants must be able to contain 10mm of rainfall;	
1.35 a bypass to the first flush system is to be created to allow for run-off from larger storm events (greater than 20mm) to bypass the collection system for when the first flush collection is full;	
1.36 dry cement should be stored where it cannot generate fugitive dust or be exposed to water and generate run-off;	
1.37 the sediment collected in the first flush must be regularly cleaned out; and	
1.38 whenever wet weather discharges occur from the catchment system within the plant, pH and total suspended solid monitoring should be undertaken (EPA Victoria, 1998). EPA Victoria (1998) also states run-off after heavy rainfall (more than 20mm over 24 hours) contains very small quantities of wastes and is unlikely to pose a significant threat to the environment.	
Monitoring	
1.39 site inspection of erosion and sediment controls should be undertaken at least monthly and always following rainfall events (greater than 20mm rainfall); and	4.3, 5.3
1.40 the EPL 5289, and the surface water monitoring requirements remain relevant to the Project.	

Table 5
Statement of Commitments – Surface Water and Groundwater

Page 5 of 6

Measure	Document Reference
Groundwater	
Licensing Requirements	
2.1 The Project would comply with the rules of any relevant water sharing plans	2.3
2.2 The NSW Aquifer Interference Policy specifies that all water taken during an activity must be accounted for, and that a water licence is required irrespective of whether the water is taken for consumptive use or whether water is taken incidentally in the course of undertaking the activity. Depending on specifics of licences currently being held a new licence may need to be applied for.	2.3
Water Level Drawdown	
2.3 Mitigation measures for the potential impacts associated with drawdown on bores GW303749 and GW306269 will vary dependant on the extent of the impact, but may include: – lowering the bore pump in the bore casing; – drilling a deeper bore; or – providing an alternative water source as part of “make good” arrangements.	5.2.3
Groundwater Monitoring Program	
2.4 A groundwater monitoring plan will be developed that includes specifics of such a monitoring program, including threshold trigger values as well as a contingency strategy if triggers are exceeded. While the development of such a plan falls outside the scope of this assessment, recommendations for monitoring requirements are outlined below.	5.3
Water Take	
2.5 It is recommended that monitoring of inflows should be undertaken to the extent feasible as part of water balance activities. This can be done by metering water being pumped from the in-pit sumps. An estimation of rainfall contribution to water being pumped from the in-pit sumps can then be made on an annual basis by factoring in rainfall data and the pit extent after which the groundwater component can be estimated. Groundwater take should be estimated and reported in this manner on an annual basis.	4.3
2.6 If geological/hydrogeological observations during quarry extension vary significantly from that considered for the groundwater flow model the groundwater flow model should be re-evaluated. The model re-evaluation may include running the existing groundwater model for different stages of pit development and including transient analysis in the modelling to evaluate contributions from aquifer storage (which may require additional pumping tests and observations bore installation).	5.3
Water Levels	
2.7 The groundwater monitoring program should include monitoring of water levels at the potentially affected groundwater bores. In order to be able to identify over or under predictions by the modelling in a reasonable way, it is recommended that all bores showing a > 0.5m of simulated drawdown should be included in the monitoring program. This would include bores GW303436, GW303749 and GW306269.	5.3

Table 5
Statement of Commitments – Surface Water and Groundwater

Page 6 of 6

Measure	Document Reference
Water Levels (Cont'd)	
2.8 As the predicted drawdown is based on steady state drawdown associated with the final stage of pit extension (the maximum drawdown expected over the life of the Project), initial monitoring of water levels can serve as a baseline against which to compare future water level measurements. Monitoring frequency should be adaptable (depending on trends observed and stages of the quarry development) with twice annual monitoring recommended for the first year of monitoring. Water level data should be reported on an annual basis along with the reporting of the water take estimates.	5.3 (Cont'd)
Water Quality	
2.9 Water quality monitoring is recommended at the in-pit sump(s) and existing monitoring bores while they remain accessible. Parameters monitored should include standard field parameters (pH, EC, temperature, ORP and DO) and laboratory analysis of TDS. Monitoring frequency of these sampling locations should be adaptable (depending on trends observed) with twice annual monitoring recommended for the first year of monitoring. Water quality results should be reported on an annual basis along with the reporting of the water take estimates. 2.10 Monitoring water quality of water discharges from the site should continue as per the conditions specified in the site Environmental Protection Licence (EPL). In addition to the current suite of parameters, it is recommended that consideration should be given to including EC and TDS in the EPL related compliance monitoring. 2.11 ERM (2018c) outlines that pit lake modelling may be required prior to closure of the quarry.	4.3, 5.3
2.12 Prepare and implement a Water Management Plan for the Project that incorporates groundwater management procedures including the following. – Sediment and Erosion Control Plan – Site Water Balance – Monitoring and Reporting – Contingency Response Plan	This Plan

2.3 Water Licencing

The following Water Access Licences (WALs) and associated Works Approvals are held by the Company.

- Water Access Licence (WAL) 42524 – 6.00 share components (ML/year) – source: Coastal Hastings Water Source, management zone: Coastal Hastings Non-Tidal Pool Management Zone.
 - Works Approval: 30WA322549
- WAL 44557 – 38.00 share components (ML/year) – source: Hastings River Coastal Floodplain Alluvial Groundwater Source.
 - Works Approval: Not listed

WAL 42524 is an historic licence held by Heidelberg Materials for the pumping of water from the Hasting River. It is not currently in use, although Work Approval 30WA322549 nominates a pump and water storage dam in the event water is required from this source in accordance with the conditions of the WAL (see **Table 6**). WAL 42524 will also account for the take of surface water over and above the Maximum Harvestable Rights Capacity of the land on which the Quarry is located. However, this is not anticipated to be needed.

WAL 44557 provides for the take of water from the coastal floodplain alluvial aquifer. However as the Quarry is not located in this aquifer there is no expected groundwater take from this water source.

The groundwater assessment prepared for the Quarry identified the Hastings Unregulated and Alluvial Water Sources (2019) as the applicable water source for the Quarry development. At the time of the assessment, the water sharing plan for this water source was in draft and was yet to be gazetted. It has since been identified that the hard rock material being extracted for sale from the Quarry is within the New England Fold Belt Coast Groundwater Source, under the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*. Accordingly, Heidelberg Materials must acquire a Water Access Licence under the New England Fold Belt Coast Groundwater Source. The volume required will be 22ML that can be acquired through temporary transfer or outright purchase, subject to availability.

Review of licence data for the New England Fold Belt Coast Groundwater Source indicates the following.

- There are a total of 667 WALs within this source with 17,014.9ML of water made available. A total share component of 17,819.9ML is available within the aquifer.
- The long term annual average extraction limit identified for the water source is 60,000ML/yr¹.
- There is 24,532ML/yr of water in the water source that is considered ‘unassigned water’ and that may be made available at the discretion of the Minister for the Environment (for example, through a controlled allocation order)¹.
- In the 2024/25 water year a total of 18 water transfers occurred ranging from 3ML to 100ML.
- In the 2025/26 water year (to date) a total of 16 water transfers occurred ranging from 3ML to 45ML.
- Indicative pricing from transfer records is \$1,000 per share (ML/yr).

There is sufficient depth and regular water trading/transfer transactions to demonstrate that the necessary water entitlement may be readily secured prior to the take of groundwater for the Quarry.

Table 6 identifies the specific conditions of WAL 42524 relevant to this Plan and where they are addressed. **Table 7** presents the conditions of WAL 44557.

¹ See [Background document - Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources](#)

Table 6
Conditional Requirements of WAL 42524

Page 1 of 2

Cond No.	Requirement	Plan Section
Take of water		
MW6594-00002	Water must not be taken from an in-river pool when the volume of water in that pool is less than the full capacity of the pool.	Noted
MW6644-00001	If a water supply work nominated on this access licence: A. is capable of being used to take water from the upriver alluvial sediments, and B. is located 40m or less from the top of the high bank of a river, then: water must not be taken when there is no visible flow in the river immediately adjacent to the water supply work from which the water is taken.	Noted
MW6627-00001	From 1 July 2019 until 30 June 2022, the total volume of water taken under this access licence in these three (3) waters years must not exceed a volume equal to: A. 50% of the water allocations accrued to the water allocation account for this access licence from available water determinations in the first water year (1 July 2019 until 30 June 2020), plus B. the sum of water allocations accrued to the water allocation account for this access licence from available water determinations in the second and third water years, plus C. the net amount of any water allocations assigned to or from the water allocation account under a water allocation assignment in those 3 water years, plus D. any water re-credited to the water allocation account for this access licence in those 3 water years.	Noted
MW6629-00001	The maximum water allocation that can be carried over from one water year to the next water year in the water allocation account for this access licence is equal to: A. 100% of the access licence share component for access licences with share components expressed as ML/year, or B. 1ML/unit share of the access licence share component for access licences with share components expressed as a number of unit shares.	Noted
MW6594-00001	Water must not be taken from an off-river pool when the volume of water in that pool is less than the full capacity of the pool.	Noted
MW6626-00001	Water must only be taken if there is visible flow in the water source at the location where water is taken. This restriction does not apply if water is taken from: A. upriver alluvial sediments, or B. an in-river pool, off-river pool, runoff harvesting dam or in-river dam pool.	Noted
MW6628-00001	From 1 July 2020, the total volume of water taken in any three (3) consecutive water years under this access licence must not exceed a volume which is equal to the lesser of either: A. the sum of: i. water allocations accrued to the water allocation account from available water determinations in those 3 consecutive water years, plus ii. the water allocations carried over in the water allocation account for this access licence from the water year prior to those 3 consecutive water years, plus iii. the net amount of any water allocations assigned to or from the water allocation account for this access licence under a water allocation assignment in those 3 consecutive water years, plus iv. any water allocations re-credited to the water allocation account in those 3 consecutive water years,	Noted

Table 6 (Cont'd)
Conditional Requirements of WAL 42524

Page 2 of 2

Cond No.	Requirement	Plan Section
Take of water (Cont'd)		
MW6628-00001 (Cont'd)	B. the sum of: i. the share component of this access licence at the beginning of the first year in those 3 consecutive water years, plus ii. the share component of this access licence at the beginning of the second year in those 3 consecutive water years, plus iii. the share component of this access licence at the beginning of the third year in those 3 consecutive water years, plus iv. the net amount of any water allocations assigned to or from the water allocation account for this access licence under a water allocation assignment in those 3 consecutive water years, plus v. any water allocations re-credited to the water allocation account for this access licence in those 3 consecutive water years.	Noted
Monitoring and recording		
MW6615-00001	The volume of water taken from 1 July 2019 until 30 June 2022 must be recorded in a logbook at the end of 30 June 2022. The maximum volume of water permitted to be taken in those water years must also be recorded in a logbook.	6.6
MW6614-00001	The following information must be recorded in a logbook for each period of time that water is taken: A. the date, volume of water taken on that date, the start and end time when water was taken, B. the access licence number under which the water is taken, C. the volume of water taken for domestic consumption and/or stock watering, and D. the purposes for which water is taken. This requirement does not apply if water is taken through a water supply work with: E. an operational meter that complies with Australian Standard 4747 – Meters for non-urban water supply (AS4747), and F. an operational data logger.	6.6
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.	6.6
MW6616-00001	The volume of water taken in any three (3) consecutive water years from 1 July 2020 must be recorded in a logbook at the end of those three water years. The maximum volume of water permitted to be taken in those years must also be recorded in a logbook.	6.6
Reporting		
MW6037-00002	Once the water access licence holder becomes aware of a breach of any condition on this water access licence, the water access licence holder must notify the Minister as soon as practicable. The Minister must be notified by: A. email: nrar.enquiries@nrar.nsw.gov.au, or B. telephone: 1800 633 362. Any notification by telephone must also be confirmed in writing within seven (7) days of the telephone call.	Noted

Table 7
Conditional Requirements of WAL 44557

Cond No.	Requirement	Plan Section
Take of water		
MW6640-00001	The total volume of water taken under this access licence in any water year must not exceed a volume equal to: A. the sum of water allocations accrued to the water allocation account for this access licence from available water determinations in that water year, plus B. the net amount of any water allocations assigned to or from the water allocation account under a water allocation assignment in that water year, plus C. any water allocations re-credited to the water allocation account for this access licence in that water year.	Noted
MW6595-00001	Water allocations remaining in the water allocation account for this access licence must not be carried over from one water year to the next water year.	Noted
Monitoring and Recording		
MW6615-00001	The volume of water taken from 1 July 2019 until 30 June 2022 must be recorded in a logbook at the end of 30 June 2022. The maximum volume of water permitted to be taken in those water years must also be recorded in a logbook.	6.6
MW6614-00001	The following information must be recorded in a logbook for each period of time that water is taken: A. the date, volume of water taken on that date, the start and end time when water was taken, B. the access licence number under which the water is taken, C. the volume of water taken for domestic consumption and/or stock watering, and D. the purposes for which water is taken. This requirement does not apply if water is taken through a water supply work with: E. an operational meter that complies with Australian Standard 4747 – Meters for non-urban water supply (AS4747), and F. an operational data logger.	6.6
MW6617-00001	From 1 July 2019, the volume of water taken in any water year must be recorded in a logbook at the end of the water year. The maximum volume of water permitted to be taken in that water year must also be recorded in a logbook.	6.6
Reporting		
MW6037-00002	Once the water access licence holder becomes aware of a breach of any condition on this water access licence, the water access licence holder must notify the Minister as soon as practicable. The Minister must be notified by: A. email: nrar.enquiries@nrar.nsw.gov.au, or B. telephone: 1800 633 362. Any notification by telephone must also be confirmed in writing within seven (7) days of the telephone call.	Noted

Should Heidelberg determine that an additional groundwater supply bore is required, the bore will be subject to the relevant statutory approvals. Where a Water Supply Works Approval is required under the *Water Management Act 2000*, Heidelberg Materials will obtain that approval prior to construction and operation of the bore.

2.4 Environmental Protection Licence

Table 8 identifies the conditional requirements of Environment Protection Licence 5289 (EPL 5289) relevant to this Plan and where they are addressed.

Table 8
EPL 5289 Requirements Relating to Water

Page 1 of 2

Cond No.	Requirement	Plan Section																								
P1	Location of monitoring/discharge points and areas																									
P1.1	The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.	Noted																								
P2.2	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. Water and land <table><tr><th>EPA Identification No.</th><th>Type of Monitoring Point</th><th>Type of Discharge Point</th><th>Location Description</th></tr><tr><td>1</td><td>Discharge and Monitoring</td><td>Discharge and Monitoring</td><td>Point 1 as shown on plan titled "EPL 5289 Premises Plan" dated xxxxxx. EPA reference DOC22/xxxxxx. (Licensee to provide updated plan)</td></tr></table>	EPA Identification No.	Type of Monitoring Point	Type of Discharge Point	Location Description	1	Discharge and Monitoring	Discharge and Monitoring	Point 1 as shown on plan titled "EPL 5289 Premises Plan" dated xxxxxx. EPA reference DOC22/xxxxxx. (Licensee to provide updated plan)	Noted																
EPA Identification No.	Type of Monitoring Point	Type of Discharge Point	Location Description																							
1	Discharge and Monitoring	Discharge and Monitoring	Point 1 as shown on plan titled "EPL 5289 Premises Plan" dated xxxxxx. EPA reference DOC22/xxxxxx. (Licensee to provide updated plan)																							
L1	Pollution of Waters																									
L1.1	Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.	Noted																								
L1.2	Exceedance of a quality limit specified in this licence for the discharge of total suspended solids from Point 1 is permitted if the discharge from Point 1 occurs solely as a result of rainfall at the premises exceeding a total of 70.0 millimetres over any consecutive 5-day period.	4.3.4.1																								
L2	Concentration limits																									
L2.1	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	Noted																								
L2.2	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																								
L2.3	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.	Noted																								
L2.4	Water and/or Land Concentration Limits POINT 1 <table><tr><th>Pollutant</th><th>Units of Measure</th><th>50 percentile concentration limits</th><th>90 percentile concentration limits</th><th>3DGM concentration limit</th><th>100 percentile concentration limits</th></tr><tr><td>Oil and Grease</td><td>Milligrams per litre</td><td>-</td><td>-</td><td>-</td><td>5 &/or Not Visible</td></tr><tr><td>pH</td><td>-</td><td>-</td><td>-</td><td>-</td><td>6.5 – 8.5</td></tr><tr><td>Total suspended solids</td><td>Milligrams per litre</td><td>-</td><td>-</td><td>-</td><td>30</td></tr></table>	Pollutant	Units of Measure	50 percentile concentration limits	90 percentile concentration limits	3DGM concentration limit	100 percentile concentration limits	Oil and Grease	Milligrams per litre	-	-	-	5 &/or Not Visible	pH	-	-	-	-	6.5 – 8.5	Total suspended solids	Milligrams per litre	-	-	-	30	Noted
Pollutant	Units of Measure	50 percentile concentration limits	90 percentile concentration limits	3DGM concentration limit	100 percentile concentration limits																					
Oil and Grease	Milligrams per litre	-	-	-	5 &/or Not Visible																					
pH	-	-	-	-	6.5 – 8.5																					
Total suspended solids	Milligrams per litre	-	-	-	30																					
L2.5	The concentration limits in the above table do not apply to any discharge from Point 1 solely arising from rainfall exceeding the 90th percentile 5-day (consecutive days) rainfall volume of 70.0mm.	4.2.4																								

Table 8 (Cont'd)
EPL 5289 Requirements Relating to Water

Page 2 of 2

Page 2 of 7

Cond No.	Requirement	Plan Section																
O5	Processes and management																	
O5.9	The licensee must ensure that sampling point(s) for water discharged from the sediment basin(s) are provided and maintained in an appropriate condition to permit: the clear identification of each sediment basin and discharge point; the collection of representative samples of the water discharged from the sediment basin(s); and access to the sampling point(s) at all times by an authorised officer of the EPA.	7.2																
M1	Monitoring records																	
M1.1	The results of any monitoring required to be conducted by this licence, or a load calculation protocol must be recorded and retained as set out in this condition.	Noted																
M1.2	All records required to be kept by this licence must be: in a legible form, or in a form that can readily be reduced to a legible form; kept for at least 4 years after the monitoring or event to which they relate took place; and produced in a legible form to any authorised officer of the EPA who asks to see them.	Noted																
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: the date(s) on which the sample was taken; the time(s) at which the sample was collected; the point at which the sample was taken; and d) the name of the person who collected the sample.	Noted																
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:	Noted																
M2.2	Water and/ or Land Monitoring Requirements POINT 1 <table><tr><th>Pollutant</th><th>Units of measure</th><th>Frequency</th><th>Sampling Method</th></tr><tr><td>Oil and Grease</td><td>Visible</td><td>Special Frequency 1</td><td>Visual Inspection</td></tr><tr><td>pH</td><td>pH</td><td>Special Frequency 1</td><td>Probe</td></tr><tr><td>Total suspended solids</td><td>Milligrams per litre</td><td>Special Frequency 1</td><td>Grab sample</td></tr></table> Note: For the purposes of the above table Special Frequency 1 means: Sampling once <48 hours prior to a controlled discharge; and Daily during discharge.	Pollutant	Units of measure	Frequency	Sampling Method	Oil and Grease	Visible	Special Frequency 1	Visual Inspection	pH	pH	Special Frequency 1	Probe	Total suspended solids	Milligrams per litre	Special Frequency 1	Grab sample	4.2.4
Pollutant	Units of measure	Frequency	Sampling Method															
Oil and Grease	Visible	Special Frequency 1	Visual Inspection															
pH	pH	Special Frequency 1	Probe															
Total suspended solids	Milligrams per litre	Special Frequency 1	Grab sample															
M3	Testing methods – concentration limits																	
M3.1	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.	4.2.4																

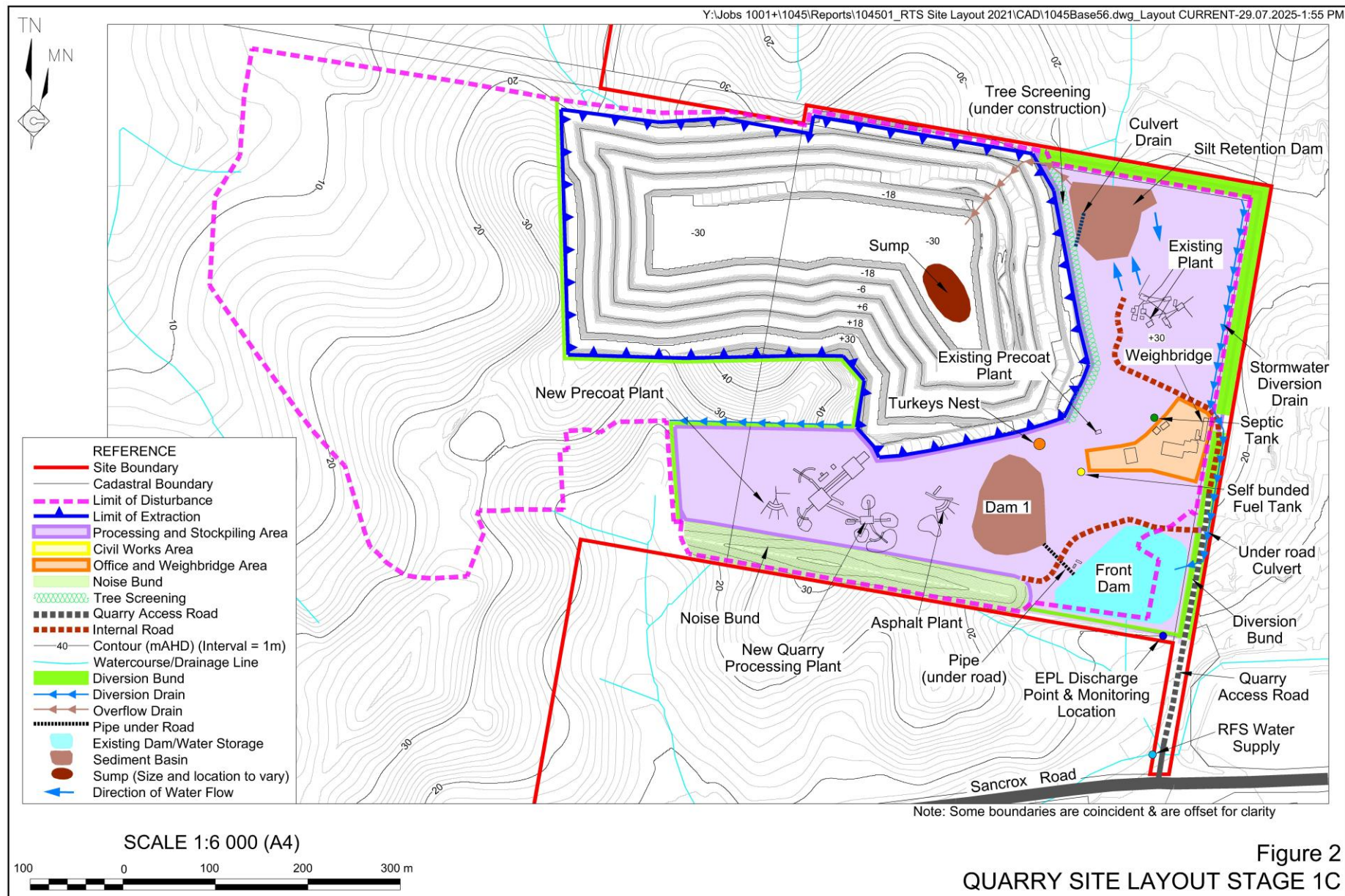
3. Approved Activities

SSD-7293 approves Heidelberg to undertake the full range of activities described in the consent, once commenced. The Quarry is approved for the extraction, processing, stockpiling and transportation of extractive materials (including concrete batching and recycling, and asphalt production) and the associated removal of vegetation, topsoil and overburden. These approved activities are outlined as follows and the approved Quarry layout is shown on **Figure 2**.

- Extraction of hard rock material up to 530,000 tonnes per annum (tpa) working east to west (Stage 1, 2, 3).
- On-site processing operations (sizing, screening, blending) up to 185,000tpa until the processing plant is relocated.
- Receipt and on-site processing of up to 20,000tpa of concrete for recycling and bitumen required for asphalt production.
- On-site stockpiling of extractive materials.
- On-site concrete batching, concrete recycling and asphalt production.
- Off-site transportation of no more than 50 truck movements per hour or 400 truck movements per day, including:
 - up to 530,000tpa of Quarry products; and/or
 - 20,000tpa of concrete; and/or
 - 50,000tpa of asphalt from the site in any calendar year.
- Vehicle/equipment maintenance and ancillary activities and stores.
- Administration and product despatch.
- Progressive rehabilitation and maintenance.

These activities are supported by a range of environmental management plans, including this Water Management Plan, which outlines the measures to manage surface water, groundwater, and water quality impacts associated with the approved operations.

The spatial extent and configuration of these activities are illustrated in **Figure 2**.



4. Surface Water Management Plan

4.1 Baseline Surface Water Environment

Figure 3 presents the surface water environment and monitoring locations within the Quarry site. **Figure 4** illustrates the local topography, and drainage features relevant to the catchment delineation.

The Sancrox Quarry is located within a landscape of floodplains and low hills, with maximum elevations reaching approximately 60m AHD. The site is hydrologically positioned within the Hastings River catchment, with two key sub-catchments influencing the site: Haydon's Creek and Fernbank Creek.

The existing quarry footprint occupies approximately 20 hectares. Surface water runoff from most of the disturbed areas flows internally into the quarry pit, where it is collected and pumped to water holding dams located in the southeastern corner of the site. These dams serve as operational storages for reuse and controlled discharge.

The western portion of the site lies within the Haydon's Creek catchment, which drains northward and joins the Hastings River approximately 700m northwest of the site. The southern portion of the site is within the Fernbank Creek catchment, with surface flows likely converging with a third-order watercourse before discharging into the Hastings River.

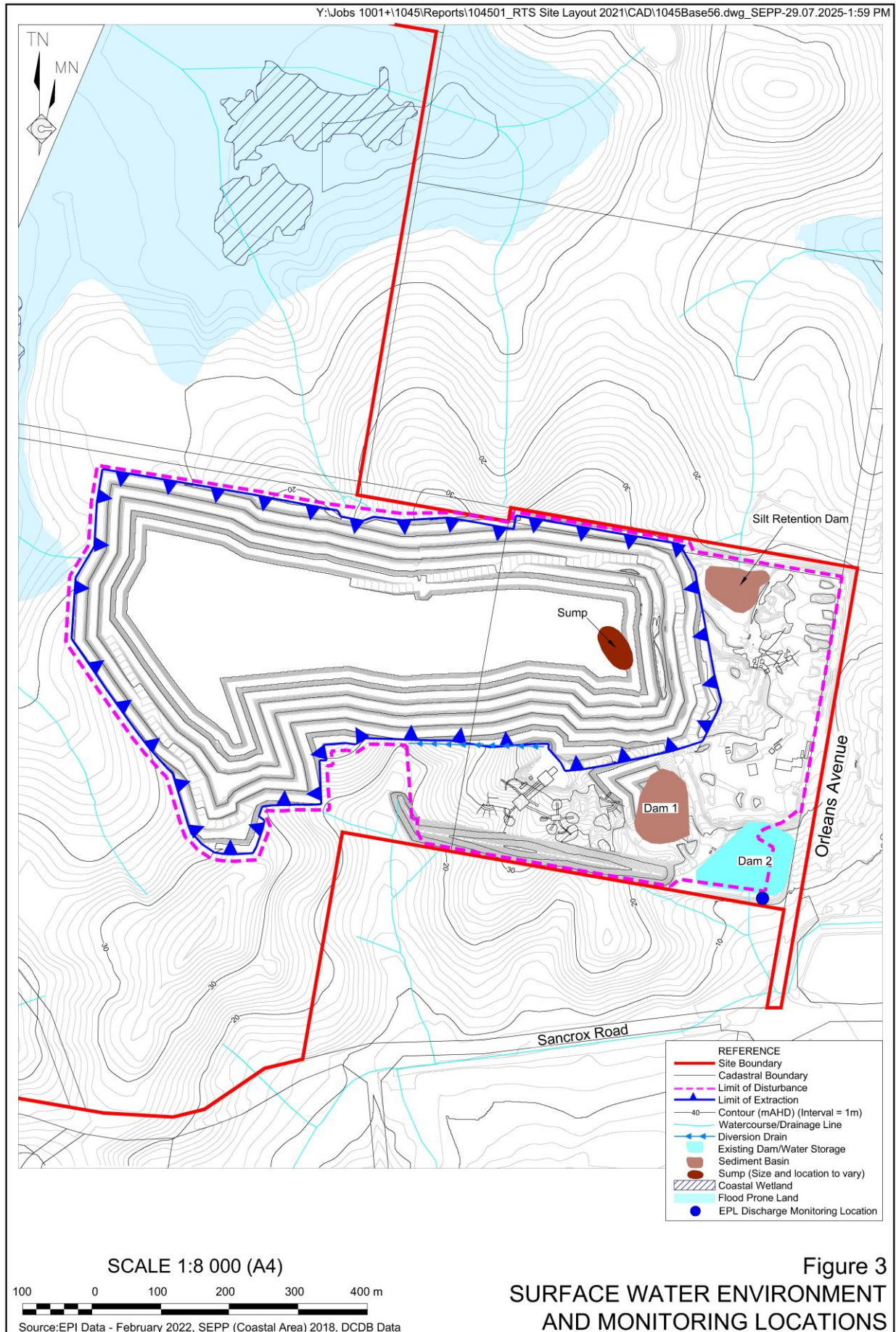
The site is underlain by the Byabbara Beds, a fractured rock aquifer system composed of lithic sandstone, siltstone, tuff, shale, and limestone. These formations influence both surface and groundwater flow, with low permeability and limited connectivity between fractures. Groundwater flow is generally directed northwest toward the Hastings River.

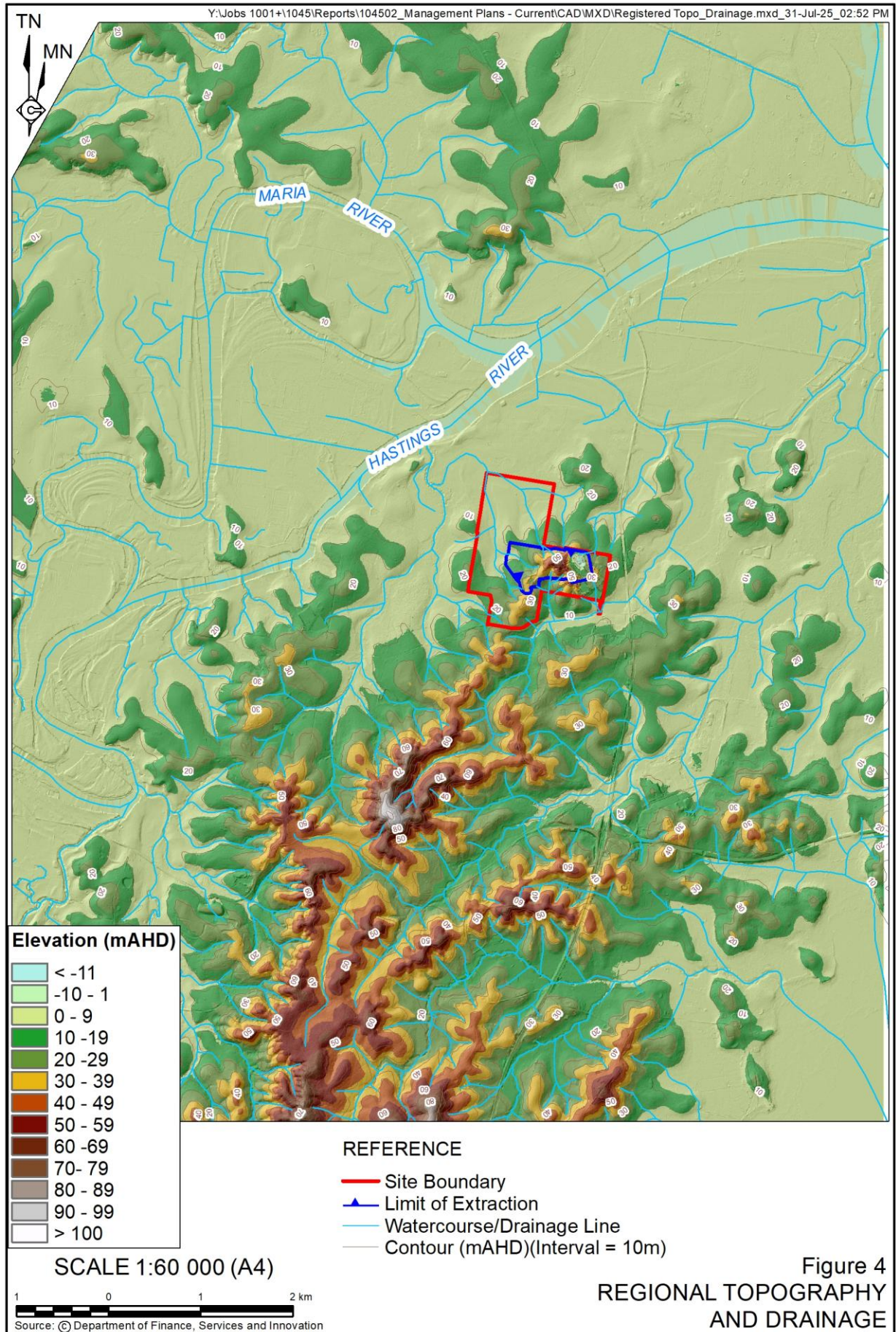
Hydrological modelling using the Australian Water Balance Model (AWBM) indicates that the Fernbank Creek catchment covers approximately 496ha and the Haydon's Creek catchment approximately 812ha. The Quarry development is expected to reduce these catchment areas by 1.1% and 2.4%, respectively. Flow reductions are minor, with median daily runoff decreases of approximately 0.3m³/day for Fernbank Creek and 1.1m³/day for Haydon's Creek, indicating negligible impact on environmental flows.

4.1.1 Watercourses and Catchments

The following watercourses are relevant to the site (**Figure 4**).

- Fernbank Creek: A third-order watercourse located approximately 1.5km northeast of the Quarry. It receives runoff from the southern portion of the site and is part of the Hastings River system. Flow modelling indicates minimal impact from the quarry expansion.
- Haydon's Creek: Located approximately 650m west of the Quarry, this creek drains the western portion of the site and joins the Hastings River. The catchment area is reduced slightly by the expansion, with negligible impact on flow volumes.
- Hastings River: A major regional watercourse located approximately 1.3km northeast of the Quarry. It is the receiving waterbody for both Fernbank and Haydon's Creeks and represents the ultimate discharge point for surface water leaving the Quarry catchments.





The Quarry Site's surface water management system is designed to intercept and manage runoff from both disturbed and undisturbed areas. Catchments are classified as:

- Clean: Runoff from undisturbed vegetated areas.
- Dirty: Sediment-laden runoff from disturbed quarry areas.
- Combined: Catchments receiving both clean and dirty runoff.

Table 9 summarises the existing catchments within the Quarry site, including runoff types and receiving environments (**Figure 3**).

Table 9
Existing Quarry Catchments

Catchment	Description	Runoff Type	Receiving Storage / Catchment Outlet
Fernbank Creek	Southern portion of the Quarry site; flows toward a third-order watercourse.	Clean	Natural discharge to Fernbank Creek catchment.
Haydon's Creek	Western portion of the Quarry site; drains northward to Hastings River.	Clean	Natural discharge to Haydon's Creek catchment.
Pit Catchment	Internally draining disturbed area within the quarry pit.	Sediment-laden	Water collected in pit sump or the sediment retention dam and pumped to either Dam 1 or Dam 2.
Infrastructure Area	Processing and stockpiling zones; includes disturbed and minor undisturbed areas.	Combined	Runoff directed to Dam 1 or Dam 2 for collection and reuse or discharged depending on quality.
Eastern Vegetated Areas	Undisturbed vegetated zones east of the pit.	Clean	Natural discharge or diverted via bunds to nearby creeks.

Catchment delineation and runoff classification are used to inform sediment basin design and water quality management strategies. These are further detailed in Section 4.2.

4.1.2 Surface Water Quality and Hydrological Conditions

At the time of preparation of the Surface Water Assessment (ERM (2023)), no surface water quality sampling data were available for Haydon's Creek or Fernbank Creek.

Baseline hydrological conditions for Haydon's Creek and Fernbank Creek were established through modelling using long-term climate data and the Australian Water Balance Model (AWBM). The modelled flow rates for both creeks indicate highly variable conditions, with low baseflows during dry periods and substantial runoff during wet conditions. These flow regimes suggest that both creeks have sufficient dilution capacity to accommodate controlled discharges from the Quarry, provided appropriate sediment and pollution controls are in place.

Table 10 presents the modelled baseline flow rate percentiles for Haydon's Creek and Fernbank Creek, which serve as a proxy for surface water availability and potential assimilative capacity.

Table 10
Baseline Flow Rate Percentiles

Flow Rate		
Percentile	Haydon's Creek (m ³ /day)	Fernbank Creek (m ³ /day)
5%	<0.1	<0.1
10%	<0.1	<0.1
30%	1.2	0.7
50%	46.4	27.3
70%	505.6	297.6
90%	7119.6	4191.0
95%	20138.8	11854.9

4.1.3 Riparian Condition and Geomorphic Stability

The Sancrox Quarry is located within the Hastings River catchment, with the site intersecting two sub-catchments: Haydon's Creek to the west and Fernbank Creek to the south (**Figure 4**). These watercourses contribute to the broader riparian corridor of the Hastings River, which supports aquatic and terrestrial habitat connectivity in the region.

The surrounding landscape includes floodplains and low hills, with remnant vegetation primarily located outside the active Quarry footprint. The existing Quarry site is approximately 20 hectares in size and is largely cleared, with vegetation limited to perimeter areas and undisturbed zones. The expansion disturbance footprint is expected to result in minor reductions to the contributing catchment areas of Haydon's Creek (2.4%) and Fernbank Creek (1.1%), focused on headwater zones with higher elevation and vegetation cover.

While the Surface Water Assessment (ERM (2023)) did not include a detailed ecological survey of riparian vegetation, the modelling indicates that the hydrological changes resulting from the Quarry expansion are minimal and unlikely to significantly affect riparian condition or connectivity. Predicted reductions in median daily runoff—approximately 1.1 m³/day for Haydon's Creek and 0.3 m³/day for Fernbank Creek—are consistent with the small proportional reductions in catchment area and are not expected to alter geomorphic processes or riparian stability.

Dominant geomorphic processes relevant to the site include the following.

- Catchment headwater modification, due to minor reductions in vegetated contributing area.
- Internal drainage and sediment capture, through pit sump and sediment basin infrastructure.
- Controlled discharge, which may influence downstream flow regimes if not properly managed.

The Quarry's surface water management system is designed to mitigate potential geomorphic impacts by capturing potentially sediment-laden runoff for reuse or treatment prior to discharge. This includes the use of dams, bunds, and internal drainage systems that reduce the risk of discharge.

Future rehabilitation of disturbed areas, including revegetation of bunds and perimeter zones, will contribute to improved geomorphic stability and erosion control. These measures will be detailed in the Quarry's *Biodiversity and Rehabilitation Management Plan* and implemented progressively as extraction advances.

4.1.4 Flooding

This section provides an overview of flood behaviour and potential flood impacts within and surrounding the Sancrox Quarry site. The information is primarily sourced from:

- the Surface Water Assessment prepared by ERM (2023), and
- the Hastings River Flood Study Update prepared by Advisian (2018) for Port Macquarie-Hastings Council.

The Sancrox Quarry is located within the lower Hastings River floodplain, a region characterised by low-lying terrain, ephemeral drainage lines, and proximity to major watercourses including Fernbank Creek and Haydon's Creek. These creeks ultimately discharge into the Hastings River, which is subject to periodic flooding during high rainfall and catchment runoff events.

Flood modelling undertaken as part of the Hastings River Flood Study indicates that the Sancrox Bridge area experiences peak 1% AEP flood levels of approximately 4.82m AHD, with climate change scenarios predicting increases of up to 0.58m under a 10% increase in rainfall intensity and 0.9m sea level rise (Scenario 1). Under the Probable Maximum Flood (PMF) scenario, flood levels at Sancrox Bridge could reach 8.24m AHD, representing a significant increase of 3.42m above the baseline 1% AEP level.

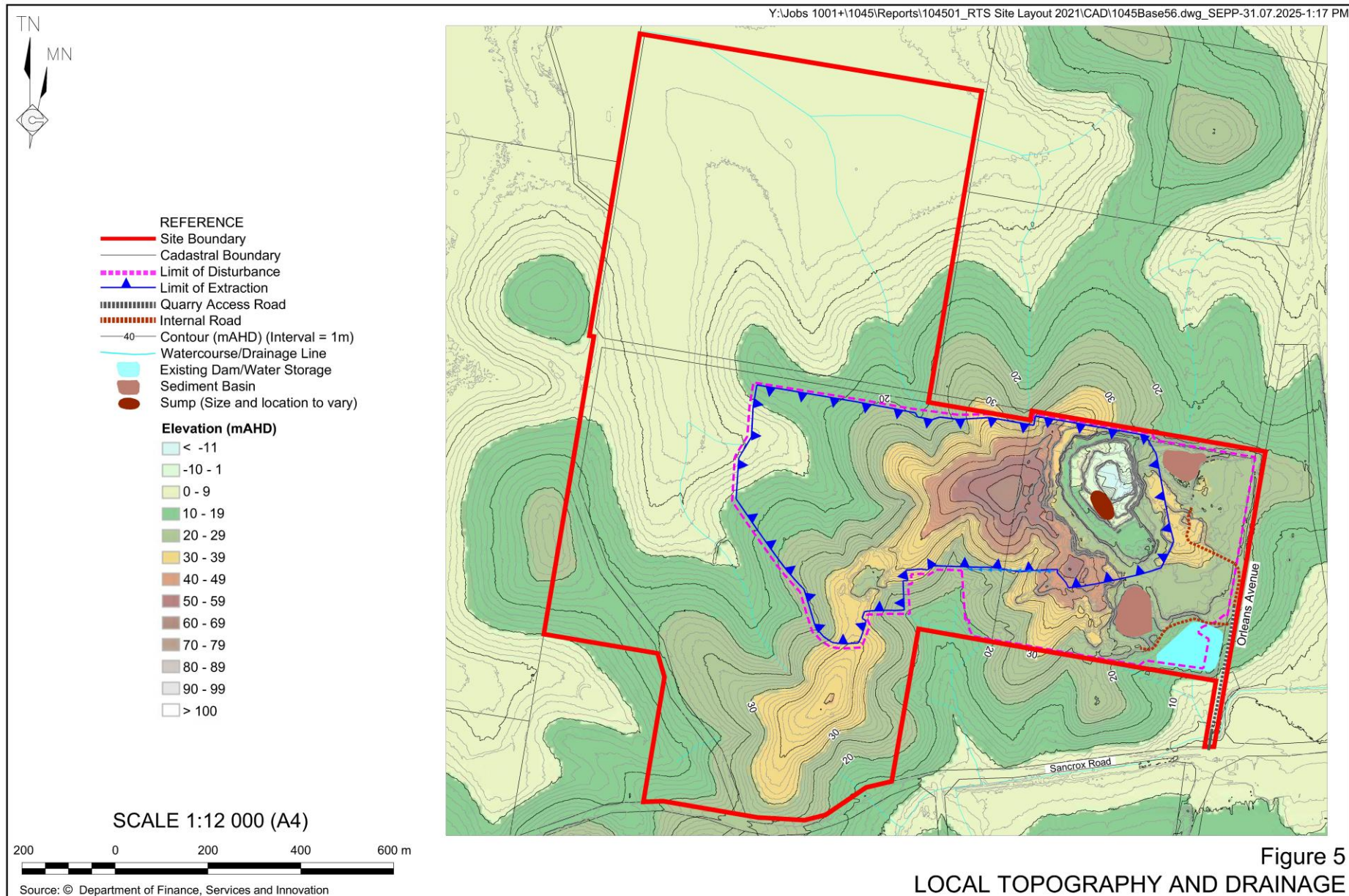
The Surface Water Assessment confirms that the quarry site is not located within the mapped flood extents of the Hastings River or its tributaries under current conditions. However, the site is hydrologically connected to upstream catchments and may experience localised flooding from intense rainfall events, particularly within internal drainage areas and sediment basins.

Flood risk mitigation measures include:

- Internal drainage design that captures and retains runoff within the quarry pit and operational areas.
- Sediment basins sized to accommodate design rainfall events and prevent uncontrolled discharge.
- Bunds and diversion structures to redirect clean water away from disturbed areas and reduce erosion risk.

Figures 4 and 5 illustrate floodplain topography in the vicinity of the Quarry site, showing the relationship between the site and surrounding watercourses and low-lying areas.

The flood modelling supports the conclusion that the Quarry is not at significant risk of inundation from regional flooding under current conditions. However, future climate change scenarios may increase flood levels in adjacent areas, reinforcing the importance of maintaining robust surface water management infrastructure and monitoring.



4.2 Surface Water Management

4.2.1 Strategy

The surface water management strategy for the Quarry is designed to ensure the following.

- Compliance with the conditions of SSD 7293, relevant Water Access Licences (WALs), and any future Environment Protection Licence (EPL) requirements.
- Containment of all surface water within the Quarry site, with no discharge to surrounding watercourses unless required for safety or environmental protection (e.g. to prevent uncontrolled overflow or maintain pit wall stability).
- Reuse of collected water for operational purposes including dust suppression, equipment washdown.
- Progressive water balance management, ensuring that water demand and storage capacity are aligned with each stage of quarry development.
- Safe chemical and fuel storage, in accordance with AS 1940:2017 – The storage and handling of flammable and combustible liquids.

The strategy prioritises minimising off-site impacts, protecting downstream water quality, and maintaining operational resilience during wet weather events.

4.2.2 System

The Quarry operates as a partially closed water management system, with internal drainage designed to capture and manage runoff from disturbed areas. The surface water management system includes the following components.

- Pit sump collection: Runoff from the quarry floor is directed to a sump within the pit or a former sediment basin. Collected runoff may be retained or pumped to either Dam 1 or Dam 2 located in the southeastern corner of the site.
- Water storage dams: These dams (Dam 1 and Dam 2) serve as operational storages for reuse and controlled discharge. They are designed to accommodate rainfall events and provide buffer capacity.
- Dam 2, with a storage capacity of 8.2ML, has sufficient capacity to manage all potentially sediment-laden runoff (1.9ML) generated in the design 5-day rainfall events of 70mm (refer Section 7).
- Catchment classification: The site is divided into clean, dirty, and combined catchments (refer to Table 9), which informs sediment control and water quality management strategies.
- Diversion bunds and drains: Clean water from undisturbed areas is diverted around operational zones to minimise mixing with sediment-laden runoff.
- Asphalt plant drainage: Clean water diversions will be installed around the asphalt production area to minimise the contributing catchment. A sediment basin will capture runoff, and a triple interceptor will serve as a first flush system for hydrocarbon-contaminated flows.

As the Quarry is not located within the mapped flood extents of the Hastings River or its tributaries, levees to prevent the ingress of floodwater is not required; however, internal drainage and sediment control remain critical to site water management.

Additional surface water management measures include the following.

- Stormwater diversion: Measures will be implemented across both clean and dirty catchments. These include bunds and drains tailored to catchment topography, geofabric or revegetation for clean catchments, and rock check dams in dirty catchments to reduce sediment loads and flow velocity.
- Water quality treatment: Water quality testing will be undertaken to assess compliance. Where required, pH and total suspended solids (TSS) will be adjusted using lime, hydrochloric acid, or gypsum.
- Pollution control: Measures include provision of waste receptacles, separation of recyclables, safe refuelling using mobile fuel carts, and equipment maintenance in designated areas. Spill kits will be located at key operational points, and Material Safety Data Sheets (MSDS) will be maintained and accessible. Bunding will be provided to contain spills, and all storage and transport will comply with AS 1940 and NOHSC:2017.

Concrete batching plant controls: The plant footprint will be minimised to reduce stormwater generation. All contaminated stormwater and process wastewater will be recycled. Bunded washout areas will be established for truck washing and batching zones. A first flush system will capture initial runoff, with bypasses for larger events. Dry cement will be stored securely, and sediment will be regularly removed. Monitoring of pH and TSS will occur during wet weather discharges.

4.2.3 Infrastructure Management

Routine inspections of surface water management infrastructure—including bunds, drains, sediment basins, and water storage dams—will be conducted:

- Following significant rainfall events, to assess erosion, sedimentation, and structural integrity;
- Monthly during active extraction, to ensure operational effectiveness and compliance; and
- Annually, as part of broader environmental audits.

Any identified issues (e.g. damage, blockages, overflow risk) will be addressed promptly by the Quarry Manager or delegated personnel. Maintenance records will be kept supporting compliance reporting and continuous improvement.

Emergency response procedures for managing surface water during extreme weather events are outlined in Section 8.1 of this Plan.

4.2.4 Discharge

All water captured within the Quarry extraction areas will be retained for on-site operational use, including dust suppression, equipment washdown and watering of revegetated areas. Routine discharge of water from the site is not permitted, except under specific conditions outlined in relevant approvals and the Environment Protection Licence (EPL 5289).

In accordance with Condition B20 of SSD-7293 and EPL 5289, controlled discharge may only occur to:

- Maintain pit wall and slope stability, or
- Prevent imminent uncontrolled discharge that could harm the environment.

Discharge must be conducted in a manner that minimises environmental impact and only when water quality criteria are met. Specifically, discharge from the site must comply with the concentration limits outlined in Condition L2.4 of EPL 5289, unless the discharge is solely due to rainfall exceeding 70mm over any consecutive 5-day period, in which case the limits may be exceeded (Condition L1.2).

Water quality criteria for discharge from Monitoring Point 1 include the following.

- Total Suspended Solids (TSS): $\leq 30\text{mg/L}$
- Oil and Grease: Not visible or $\leq 5\text{mg/L}$
- pH: Between 6.5 and 8.5

The above concentration limits do not apply to any discharge from Point 1 solely arising from rainfall exceeding the 90th percentile 5-day (consecutive days) rainfall volume of 70.0mm.

Monitoring of discharge water must be conducted in accordance with Condition M2, using the following approved sampling methods.

- Visual inspection for oil and grease
- Probe testing for pH
- Grab sampling for TSS

Sampling must occur within 48 hours prior to a controlled discharge and daily during discharge events.

All discharge events will be documented and reported in accordance with the Quarry's environmental obligations, including:

- Maintaining Monitoring Records For At Least 4 Years (Condition M1);
- Submitting An Annual Return to The EPA (Condition R1); And
- Notifying the EPA of any environmental harm (Condition R2).

The water management system must be maintained to ensure adequate treatment capacity and compliance with EPL conditions. This includes:

- Capturing all 5-day rainfall events up to 70mm;
- Reinstating design capacity within 5 days of rainfall events;
- Installing sedimentation basin markers to indicate sediment storage zones; and
- Ensuring representative sampling points are accessible and identifiable (Condition O5).

4.3 Surface Water Monitoring Program

4.3.1 Objectives

In accordance with Condition B29 of SSD-7293 and the requirements of EPL 5289, the objectives of the surface water monitoring program are as follows.

- Monitor the quality of surface water discharge from the Quarry (e.g. pumping from extraction areas).
- Verify the effectiveness of stormwater diversion, erosion, and sediment control measures.
- Ensure compliance with relevant environmental criteria and licence conditions.
- Support early detection of water quality issues and enable timely corrective actions.
- Inform Annual Reviews and updates to the Water Management Plan.

Monitoring results will be assessed against performance criteria, historical data, and EPL 5289 limits to evaluate trends and management effectiveness.

4.3.2 Monitoring Locations

Surface water monitoring will be undertaken at designated discharge points and operational storages. These locations are shown on **Figure 3** and described in **Table 11**.

Table 11
Surface Water Discharge Monitoring Locations

ID	Location¹	Purpose
Point 1	Dam 2	Quality sampling of water discharged to receiving environment.
Point 2	Pit Sump	Monitoring water quality prior to reuse or transfer.
Note 1: Refer to Figure 3 for spatial layout.		

Additional monitoring may be undertaken at clean water diversion points, bund outlets, or receiving watercourses (e.g. Fernbank Creek or Haydon's Creek) if discharge occurs or is proposed.

4.3.3 Monitoring Frequency and Parameters

Surface water monitoring will be conducted in accordance with **Table 12**, which outlines the locations, parameters, sampling frequency, and methods. These commitments are consistent with the mitigation measures outlined in Attachment C of the Response to Submissions Report (Ethos Urban, 2024) and the requirements of the site's Environmental Protection Licence (EPL 5289).

Table 12
Surface Water Discharge Monitoring Program

ID	Location ¹	Parameter	Frequency	Sampling Method
Point 1	Dam 2	pH, Total Suspended Solids (TSS), Oil & Grease	<48 hours prior to controlled discharge	Grab sample, visual inspection
			Daily during discharge (if safe)	
Point 2	Pit Sump	pH, TSS, Electrical Conductivity (EC), Turbidity	Monthly or prior to reuse	Grab sample
¹ Refer to Figure 3 for monitoring point locations. Note: Monitoring at Point 1 must follow Special Frequency 1 as defined in EPL 5289: Sampling <48 hours prior to a controlled discharge Daily during discharge				

All surface water infrastructure—including pipelines, bunds, sediment control measures and discharge point—will be inspected following rainfall events of $\geq 20\text{mm}$ within 24 hours, and after any controlled or scheduled discharge event, in accordance with EPL 5289 Condition O5 and site-specific mitigation measures. Monitoring will include oil and grease, pH, and TSS in accordance with EPL 5289.

4.3.4 Criteria and Triggers

4.3.4.1 Surface Water Quality

Surface water quality criteria for Sancrox Quarry are defined in Environment Protection Licence (EPL) 5289, issued by the NSW Environment Protection Authority (EPA). These criteria apply to Point 1, the designated discharge and monitoring location, and are used to assess compliance during controlled or scheduled discharge events.

Monitoring results will be compared against the trigger values listed in **Table 13**. Exceedances will be investigated as per Section 9.1.

Table 13
Surface Water Quality Trigger Values

Locations	pH	Oil and Grease (mg/L)	Total Suspended Solids (mg/L)
Point 1	6.5–8.5	5 or not visible	30
Notes: – Monitoring must be conducted <48 hours prior to any controlled discharge, and daily during discharge (Special Frequency 1). – Sampling methods include visual inspection for oil and grease, probe or grab sample for pH, and grab sample for TSS. – Exceedances of TSS are permitted only if discharge results from rainfall exceeding 70mm over any consecutive 5-day period, as per Condition L1.2 and L2.5 of EPL 5289.			
Source: EPL 5289			

These trigger values are consistent with the mitigation measures outlined in Attachment C of the Response to Submissions Report and reflect industry best practice for quarry operations. Additional water quality parameters such as electrical conductivity (EC) and turbidity may be monitored at other locations (e.g., pit sump and sediment basin outlets) to support internal water reuse decisions and broader environmental performance assessments.

5. Groundwater Management Plan

5.1 Baseline Groundwater Environment

This section outlines the groundwater environment surrounding the Quarry, drawing on the following key assessments:

- ERM (2019) – Sancrox Quarry Expansion Groundwater Assessment, appended to the EIS.
- Water Technology (2022) – Updated Groundwater Assessment, appended to the Submissions Report.
- Attachment C – Final Mitigation Measures (2024).
- Development Consent SSD 7293 and EPL 5289.

5.1.1 Groundwater Systems

The groundwater regime at the Quarry comprises two main aquifer systems.

- Fractured rock aquifer (Byabbara Beds):
 - Composed of meta-sediments (shale, sandstone, siltstone);
 - Groundwater flow and storage are controlled by secondary porosity (fractures);
 - Hydraulic conductivity is low (1×10^{-8} to 3×10^{-9} m/s); and
 - Recharge is limited, primarily via rainfall and minor seepage from adjacent formations.
- Quaternary alluvial aquifer (north and west of the site):
 - Composed of unconsolidated sand, silt, mud, and gravel;
 - Higher transmissivity and hydraulic connectivity with surface water features (e.g. Hastings River, Haydon's Creek); and
 - Not directly impacted by quarrying but included in groundwater modelling.

No active dewatering is currently required at the quarry due to negligible groundwater inflow.

5.1.2 Groundwater Bores and Yield

A total of 13 registered groundwater bores is located within a 2km radius of the final pit perimeter. These are primarily used for stock watering and domestic supply. No licenced bores are currently operated by Heidelberg within the quarry footprint; water for operations is sourced from existing pits.

Table 14 and **Figure 6** present the registered groundwater bores that exist within a 2km radius of the final pit parameter.

Table 14
Groundwater Bores identified within 2km radius of final pit parameter

Bore ID	Registered Use	Distance and Direction		Depth (m)
		Distance (km)	Direction	
GW60512	Stock Watering/Domestic	1.32	WNW	25
GW060513	Stock Watering/Domestic	1.42	WNW	4.6
GW073255	Stock Watering	1.97	NW	15.5
GW300120	Domestic	1.97	W	38
GW200225	Stock Watering/Domestic	1.7	NW	20
GW300263	Stock Watering	1.87	NW	15.5
GW301263	Stock Watering (potential Domestic)	1.72	N	10
GW302376	Stock Watering/Domestic	1.27	NW	23
GW302671	Stock Watering	1.92	NNW	-
GW302692	Stock Watering	1.7	S	-
GW303436	Domestic	1.5	S	40.5
GW303749	Stock Watering/Domestic	0.6	S	34.5
GW306269	Domestic	1.1	S	30
Source: Table 3.1 (ERM, 2019)				

In accordance with Condition B22 of SSD-7293, prior to the installation of any new groundwater bores within the Quarry Site, Heidelberg must prepare an updated groundwater impact assessment to the satisfaction of the Planning Secretary. This assessment must be undertaken by suitably qualified experts, in consultation with NSW DCCEE – Water Group, and must evaluate potential impacts on groundwater levels, yield, quality, groundwater-dependent ecosystems, and other water users in the vicinity of the site.

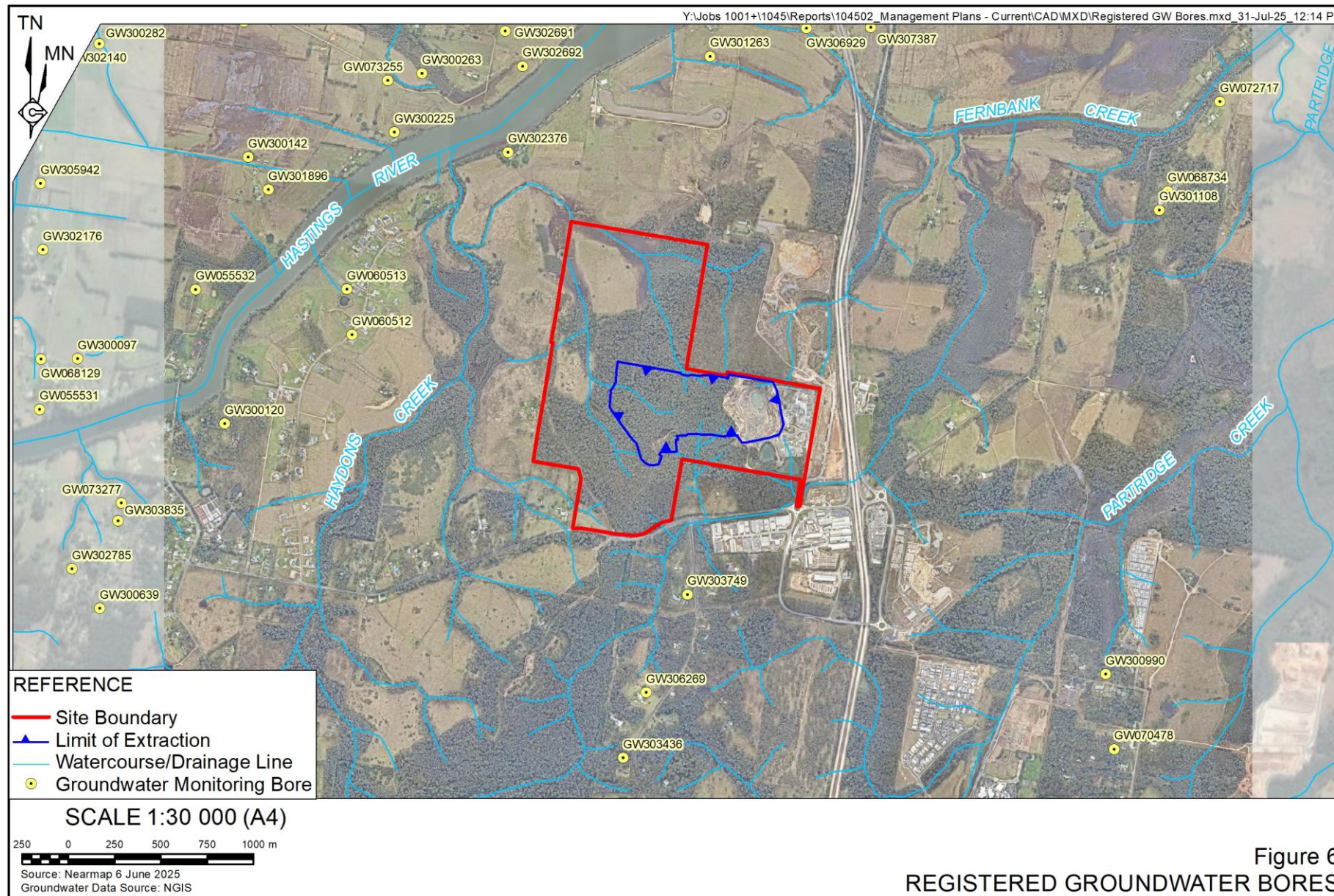
Three monitoring bores exist within the Quarry Site and are presented in **Table 15** and shown on **Figure 6**.

Table 15
GPS Coordinates and Estimated Elevations for Monitoring Bores

Monitoring Bore	East ¹	South ¹	Elevation (m AHD) ^{1 2}
SA1501	482014	6521966	22.5
SA1502	481703	6522327	3.4
SA1503	482145	6521786	33
Source: ERM 2019 – Table 4.3			
¹ Coordinates are in UTM 56J			
² Meters Australian Height Datum (approximate values with an accuracy of ~1m)			

5.1.3 Groundwater Levels

Groundwater levels in the vicinity of the Quarry have been monitored via three dedicated bores (SA1501, SA1502, SA1503) since 2015. These bores are located within the fractured rock aquifer of the Byabarra Beds. Groundwater levels are influenced primarily by rainfall recharge and local hydrogeological conditions, with no evidence of hydraulic connectivity to major surface water systems.



Baseline monitoring data collected via pressure transducers between 2015 and 2017 indicate relatively stable groundwater levels, with minor seasonal fluctuations. The inferred groundwater flow direction is toward the northwest, consistent with regional topography and proximity to the Hastings River. **Table 16** presents a summary of the standing groundwater level data collected from the monitoring bores.

Table 16
Level Logger Baseline Groundwater Levels

Monitoring Bore	Date Range	Groundwater Level					
		M BGL ¹			M AHD ²		
		Min Depth	Max Depth	Avg Depth	Min Depth	Max Depth	Avg Depth
SA1501	10/2015 – 9/2017	9.69	10.67	10.52	12.81	11.83	11.98
SA1502	12/2016 – 9/2017	1.42	2.26	1.74	1.98	1.14	1.66
SA1503	12/2016 – 7/2017	0.39	12.11	9.69	32.61	20.89	23.31
¹ Meters below top of casing							
² Meters of Australian Height Datum (approximate values with an accuracy of ~1m)							
Source: ERM 2019 – Table 4.2							

5.1.4 Groundwater Quality

Groundwater quality monitoring has been undertaken at Quarry since 2017, with samples collected from bores SA1501, SA1502, and SA1503. The results indicate the following.

- pH values are circum-neutral to slightly alkaline (6.6–6.9).
- Electrical Conductivity (EC) values range from 1,912 to 4,563µS/cm, indicating brackish conditions.
- Total Dissolved Solids (TDS) concentrations range from 1,243 to 2,966mg/L.
- Dissolved Oxygen (DO) levels are low (<0.1mg/L), consistent with anoxic conditions in the fractured rock aquifer.

Groundwater quality varies with depth and the bores' location, with SA1502 showing the highest salinity. Trace metal concentrations were below detection limits or well within acceptable thresholds for both drinking water and livestock use. **Table 17** presents the average groundwater quality monitoring results of the bores within the Quarry Site since 2017.

Table 17
Average Groundwater Quality Monitoring Results

Analyte	ANZ Guideline	SA1501	SA1502	SA1503
pH (units)	6.5 – 8.0	6.6	6.9	6.9
EC (µS/cm)	125 – 2200	2513	4563	1912
TDS (mg/L)	600 – 1200 (aesthetic)	1633	2966	1243
Temperature (°C)	n/a	20.8	22.3	20.4
DO (mg/L)	n/a	<0.1	<0.1	6.39
ORP (mV)	n/a	111	909	223
Note: SA1503 was sampled using a bailer due to bore blockage; results may not be fully representative.				

5.1.5 Groundwater Dependent Ecosystems

The Australian Groundwater Dependent Ecosystems (GDE) Toolbox (National Water Commission, 2011) identifies three types of GDEs:

- Type 1 – Aquifer and Cave Ecosystems (inhabited by subterranean fauna including troglofauna and stygofauna).
- Type 2 – Ecosystems Dependent on the Surface Expression of Groundwater (e.g. wetlands and creeks/rivers fed by baseflow).
- Type 3 – Ecosystems Dependent on the Subsurface Expression of Groundwater (where groundwater is typically encountered within the rooting zone).

ERM (2019) assessed the potential presence of GDEs within a 2km radius of the final pit perimeter using the BoM Atlas of GDEs (BoM, 2018) and the Draft Water Sharing Plan for the Hastings Unregulated and Alluvial Water Sources 2016 (NSW Government, 2016). The assessment found:

- No Type 1 ecosystems were identified.
- Type 2 ecosystems: The Hastings River, located approximately 1.3km northwest of the final pit perimeter, is considered dependent on surface groundwater expression.
- Type 3 ecosystems: Multiple areas with high to moderate GDE potential were identified, including:
 - Paperbark ecosystems located approximately 500m west of the final pit perimeter, adjacent to Haydon's Creek.
 - Additional Paperbark ecosystems mapped 800m northeast, 900m east-northeast, and 1,700m east-southeast.
 - Low Relief Coastal Blackbutt ecosystems located approximately 1,100m east and 1,300m southeast of the final pit perimeter.

No high-priority GDEs were identified within the study area, and no groundwater-dependent culturally significant sites were confirmed at the time of assessment.

5.2 Groundwater Management

5.2.1 Strategy

The groundwater management strategy for Quarry includes:

- Reuse of groundwater extracted during quarrying;
- Implementation of a comprehensive groundwater monitoring program (see Section 5.3);

- Compensatory measures if monitoring indicates impacts beyond trigger levels, including;
 - Investigation of impacts on privately-owned bores and groundwater availability;
 - Provision of supplementary water or bore remediation for affected landowners; and
 - Notification to relevant government authorities and reporting of incidents.

These measures aim to ensure sustainable groundwater use and protection of surrounding water users and ecosystems.

5.2.2 System

To prevent adverse impacts on groundwater quality, the following controls will be implemented.

- Hydrocarbon and chemical storage in bunded areas compliant with AS 1940 and Safety Data Sheet (SDS) requirements.
- Spill response procedures, including staff training and standard practices for containment and clean-up.
- Maintenance of the Pollution Incident Response Management Plan (PIRMP) throughout the life of the Quarry, including protocols for notifying affected parties.

These measures are designed to minimise the risk of contamination and ensure compliance with environmental regulations.

5.2.3 Groundwater Drawdown

Groundwater modelling indicates potential drawdown impacts on two registered bores.

- GW303749: Located ~600m south of the final pit, with predicted drawdown between 2.9m and 7.23m.
- GW306269: Located ~1.1km south of the final pit, with predicted drawdown between 0.93m and 2.65m.

Mitigation measures for these bores may include:

- lowering the bore pump within the casing;
- drilling a deeper bore to access unaffected groundwater zones; and
- providing an alternative water source under “make good” provisions.

These actions will be tailored to the extent of impact and the operational needs of affected landowners.

5.3 Groundwater Monitoring Program

5.3.1 Objectives

In accordance with Condition B29 of SSD-7293, the Quarry must implement a Groundwater Management Plan as part of the broader Water Management Plan. This includes a program to monitor and report on:

- Groundwater levels, yield, and quality of groundwater resources potentially impacted by the development;
- Groundwater inflows into the extraction areas;
- Seepage/leachate into the surrounding groundwater system;
- Impacts of the development on groundwater dependent ecosystems (GDES); and
- Impacts of the development on groundwater supply for other water users.

Additionally, Condition B23 requires annual reporting of water take (direct and indirect) under each water licence in the Annual Review.

Monitoring results must be evaluated against performance criteria and trigger levels defined in the Groundwater Management Plan. Any exceedances must be investigated and reported in accordance with the protocols outlined in the Plan and Appendix 6 of SSD-7293.

5.3.2 Groundwater Monitoring Locations

While neither SSD-7293 nor EPL 5289 prescribe specific groundwater monitoring locations, the following bores have been identified based on groundwater modelling and risk assessment (Table 18) (Figure 7).

Table 18
Groundwater Monitoring Locations

Bore ID	Easting ¹	Northing ¹	Purpose
GW303436	481956	6520182	Water level monitoring
GW303749	482304	6521065	Water level monitoring
GW306269	482082	6520534	Water level monitoring
SA1501	482014	6521966	Groundwater quality monitoring
SA1502	481703	6522327	Groundwater quality monitoring
SA1503	482145	6521786	Groundwater quality monitoring
In-pit sump(s)			Groundwater inflow estimation
¹ Map Grid of Australia Zone 56			

These bores are selected due to their proximity to areas predicted to experience drawdown of >0.5m. Locations are shown in the approved development layout (Appendix 2 of SSD-7293).

5.3.3 Monitoring Locations, Frequency and Parameters

The groundwater monitoring program includes the following.

- Water Levels
 - Quarterly downloads from pressure transducers installed in GW303436, GW303749, and GW306269.
 - Manual checks twice annually during the first year to establish baseline conditions.
- Groundwater Quality
 - Sampling of SA1501–SA1503 twice annually for:
 - pH
 - Electrical Conductivity (EC)
 - Temperature
 - Oxidation-Reduction Potential (ORP)
 - Dissolved Oxygen (DO)
 - Total Dissolved Solids (TDS)
 - Major ions
- Groundwater Inflows
 - Metering of water pumped from in-pit sumps.
 - Annual estimation of rainfall contribution using rainfall data and pit surface area.
 - Reporting of groundwater take in the Annual Review, in accordance with Condition B23.

Table 19 details monitoring frequency, methodology and parameters for each groundwater monitoring location.

Table 19
Groundwater Monitoring Locations

Monitoring Bore	Parameter(s)	Method	Frequency
GW303436	Water level	Data logger	Continuous (quarterly logger downloads)
GW303749 GW306269		Manual (dip sensor)	Twice annually – first year only
SA1501 SA1502 SA1503	pH, EC, temperature, oxidation-reduction potential, dissolved oxygen	Calibrated field probe	Twice annually
	Major and minor ions	Laboratory analysis	
In-pit sump(s)	Groundwater inflow	Water meter	During extraction

5.3.4 GDE Monitoring

Where mapped groundwater dependent ecosystems (GDEs) occur within approximately 1.5km of advancing quarry operations, Heidelberg Materials will incorporate 3-yearly observational condition assessments into the routine vegetation monitoring program undertaken in accordance with the Biodiversity and Rehabilitation Management Plan. Monitoring will include repeat photo-point monitoring (where appropriate), visual assessment of vegetation condition, canopy health, evidence of dieback or stress, and any observable changes in riparian vegetation or other potentially groundwater-dependent vegetation communities. Monitoring outcomes will be considered alongside groundwater level monitoring data to identify any potential groundwater-related impacts. Where observations indicate potential groundwater-related vegetation stress, the findings will be investigated by a suitably qualified ecologist and appropriate adaptive management measures implemented in consultation with the Project hydrogeologist.

5.3.5 Criteria and Triggers

In accordance with Condition B29 of SSD-7293, the Groundwater Management Plan must include groundwater performance criteria, including trigger levels for investigating any potentially adverse groundwater impacts. While SSD-7293 and EPL 5289 do not prescribe specific numerical criteria, the following framework has been developed based on site-specific modelling, baseline monitoring data, and best practice guidance.

Groundwater Level Triggers

Groundwater drawdown is expected as a result of quarrying activities. To assess whether observed drawdown aligns with model predictions, bore-specific trigger levels have been established using:

- Predicted drawdown from ERM's groundwater modelling (2019);
- The NSW Aquifer Interference Policy (2012), which sets a 2m drawdown threshold at any water supply work before "make good" provisions apply;
- Baseline standing water levels from monitoring bores.

If observed drawdown exceeds the trigger values, an internal investigation will be initiated to determine the cause and assess whether mitigation measures are required, including re-evaluation of the groundwater model and implementation of compensatory water supply measures (SSD-7293 Conditions B24–B27).

Table 20 presents drawdown trigger levels for groundwater bores. Monitoring will include bores with >0.5m predicted drawdown. Frequency will be adaptable based on trends and quarry stages.

Table 20
Groundwater Level Triggers

Monitoring Bore	Maximum Drawdown (m)	Trigger Level (m AHD)	Rationale
GW303749	3.0	31.0	Closest bore to pit; base case drawdown ~2.9m
GW306269	2.5	43.0	Sensitivity scenario drawdown ~2.65m
GW303436	1.5	48.0	Base case drawdown ~0.62m
SA1501	2.0	10.5	Based on baseline level ~12.5m AHD
SA1502	2.0	1.5	Based on baseline level ~3.5m AHD
SA1503	2.0	31.0	Based on baseline level ~33m AHD
Trigger levels are calculated as the long-term average standing water level minus the maximum allowable drawdown. These values should be refined annually based on monitoring data.			

Groundwater Quality Triggers

No formal groundwater quality criteria are prescribed in SSD-7293 or EPL 5289. However, baseline groundwater quality data collected by ERM (2019) indicate naturally brackish conditions. Groundwater quality monitoring will focus on identifying significant deviations from baseline trends, particularly for electrical conductivity (EC), which is a key indicator of salinity.

Trigger levels for EC have been established using a 20% buffer above baseline values (**Table 21**), consistent with best practice from other NSW quarry groundwater management plans. If EC exceeds trigger levels, internal investigation will be undertaken to determine the cause and assess potential impacts on beneficial uses and groundwater-dependent ecosystems. If necessary, notification of an incident will be made to the relevant authorities as described in **Table 25** and Section 9.1.

Table 21
Groundwater Level Triggers

Monitoring Bore	Baseline EC (µS/cm)	Trigger EC (µS/cm)	Rationale
SA1501	2,513	>3,000	Brackish groundwater; 20% buffer
SA1502	4,563	>5,500	Highest EC; 20% buffer
SA1503	1,912	>2,300	Moderate EC; 20% buffer
Seep	2,161	>2,600	Surface seep; 20% buffer
Quarry Sump	2,694	>3,200	Mixed source; 20% buffer
* Results are impacted by bore construction and a trigger value cannot be determined based on available data. EC trigger values should be reviewed annually and adjusted based on trends and rainfall dilution effects.			

Contingency Measures

If groundwater monitoring indicates exceedance of trigger levels or unexpected trends, the following contingency measures may be implemented.

- Additional field investigations (e.g. pumping tests, installation of new observation bores).
- Revision of the groundwater model to reflect updated hydrogeological conditions.
- Implementation of compensatory water supply measures for affected landowners.

- Notification of relevant authorities in accordance with Consent Condition D7, SSD-7293 Appendix 6 and EPL 5289 Condition R2, as described in Section 9.1.

Pit Lake Modelling

Prior to closure of the Quarry, pit lake modelling may be required to assess long-term interactions between groundwater and surface water, and to inform final landform design and rehabilitation planning (SSD-7293 Condition B53(d)).

6. Site Water Balance

The purposes of this Site Water Balance are to identify:

- Sources and security of water supply;
- Water use and management on the site;
- Any off-site discharges or water transfers;
- Reporting procedures, including the annual preparation of a site water balance; and
- Minimise clean and potable water use on the Quarry Site.

6.1 Water Sources (Inputs)

The water balance was calculated for the following phases of Quarry development.

- Stage 1: current phase of Quarry operation
- Stage 2: Quarry expansion
- Stage 3: Quarry closure

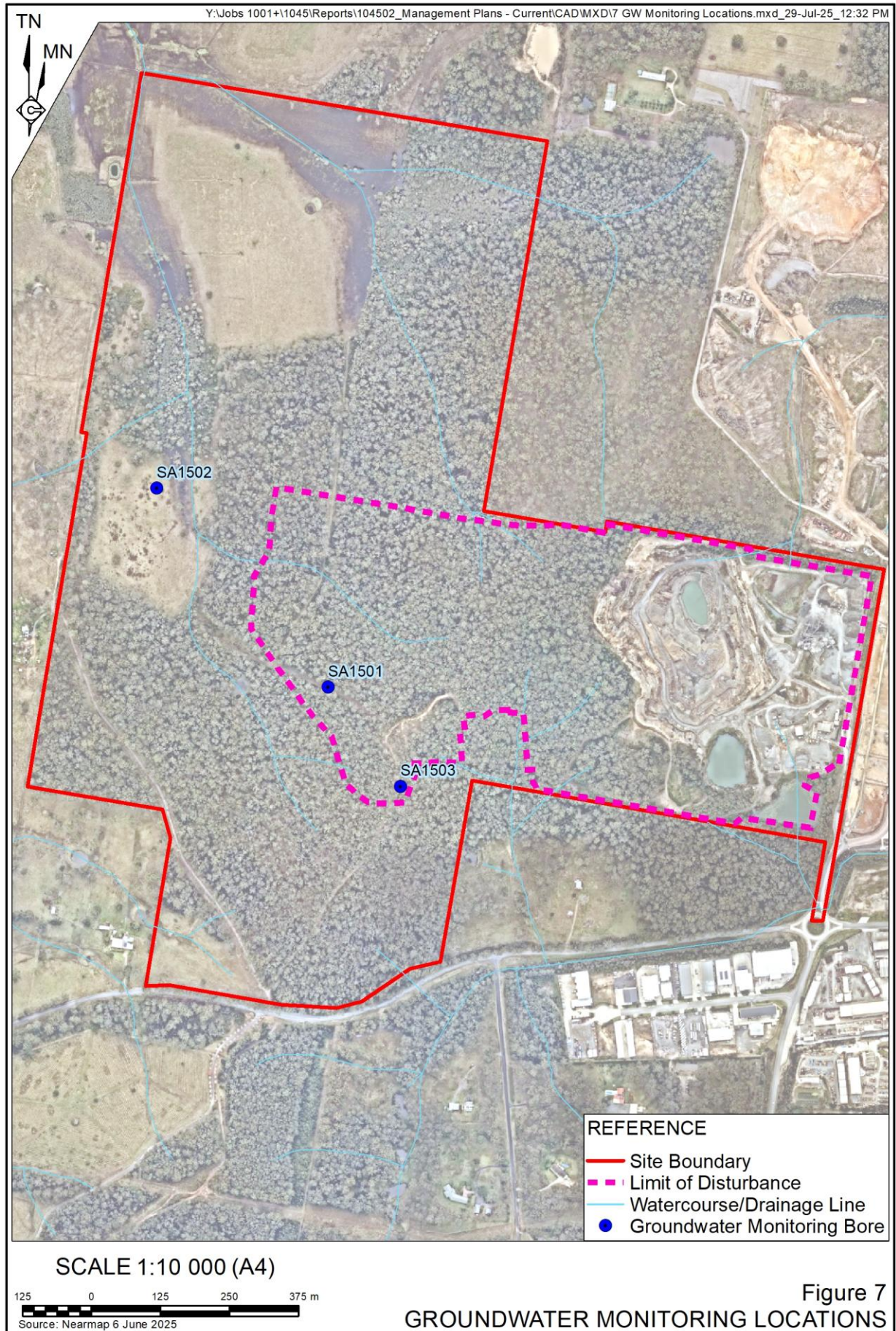
There are three principal water sources for water captured within the Quarry.

- Surface runoff from Quarry disturbed and undisturbed catchments, collected in sediment basins and water holding dams (WHD1 and WHD2).
- Groundwater inflows to the Extraction Area, captured in the Quarry sump and pit void.
- Roof water runoff collected in tanks adjacent to site infrastructure.

These inputs are based on average annual rainfall conditions derived from SILO records and groundwater inflow estimates from ERM (2023). **Figure 9** presents a schematic of water flow for the Quarry operation. **Table 22** details the water balance input parameters.

Table 22
Water Balanced Input Parameters

Parameter	Unit	Stage 1	Stage 2	Stage 3
Start Date	Date	1/01/2023	1/01/2035	1/01/2045
Pit area	ha	14.5	28.7	31.1
Rainfall	mm/d	Based on SILO records		
Evaporation	mm/d	Based on SILO records		
Groundwater ¹	ML/yr	0 to 22		
Dust suppression	ML/yr	15.3	15.3	45.9
Potable water	ML/yr	0.1	0.1	0.1
Concrete production	ML/yr	3.3	3.3	3.3
Concrete washout	ML/yr	0.9	0.9	0.9
Product moisture	ML/yr	4.5	4.5	4.5
Asphalt batching	ML/yr	1.5	1.5	1.5
Process water	ML/yr	75	75	75
¹ Groundwater inflow varies with pit depth and water level.				
Source: ERM (2023) – adapted from Table 5.				



6.2 Operational Water Usage and Losses (Outputs)

Water use across the Quarry includes the following (Table 23).

- Operational Use:
 - Process Water: 26 to 53ML/year for dust suppression of quarry materials depending on annual weather conditions.
 - Concrete Production: 3.3ML/year.
 - Asphalt Batching: 1.5ML/year.
- Site Management:
 - Dust Suppression: 15.3ML/year in Stages 1 and 2, increasing to 45.9ML/year in Stage 3.
 - Concrete Washout: 0.9ML/year.
- Product-Related Losses:
 - Product Moisture Content: 4.5ML/year.
- Other Losses:
 - Evaporation: varies by stage, based on pit area and climate.

Table 23
Water Demand Summary

Activity	Unit	Stage 1	Stage 2	Stage 3
Dust Suppression	ML/yr	15.3	15.3	45.9
Concrete Production	ML/yr	3.3	3.3	3.3
Concrete Washout	ML/yr	0.9	0.9	0.9
Product Moisture	ML/yr	4.5	4.5	4.5
Asphalt Batching	ML/yr	1.5	1.5	1.5
Process Water	ML/yr	26-53	26-53	26-53
Total	ML/yr	51.5-77.5	51.5-77.5	51.5-77.5

Source: SEEC (2023) – Table 5.1- Figures are subject to annual production volume and weather conditions.

6.3 Annual Water Balance

Key components of the water balance for the Quarry include the following.

- Drawing of water under licence from the groundwater setting.
- Pumping and return of water to the extraction areas for processing activities.
- Pumping of water from the extraction areas for on-site use.

The operational water balance model developed by ERM (2023) includes rainfall, surface runoff, and groundwater inflows as inputs, and evaporation and operational water use as outputs (Table 24).

Table 24
Water Balance Summary

Stage	Water Source (ML/year)	Water Use (ML/year)	Balance (ML)
Stage 1	149.0 (127 ¹ runoff + 22 GW)	100.5	+48.5
Stage 2	232.0 (210 ¹ runoff + 22 GW)	100.5	+131.5
Stage 3	275.0 (253 ¹ runoff + 22 GW)	131.1	+143.9
Note 1: 50th percentile rainfall			
Source: ERM (2023) after Table 5.2			

6.4 Extreme (Dry/Wet) Conditions

The water balance model includes simulation under 10th, 50th, and 90th percentile rainfall scenarios. Rainfall exceeds evaporation in approximately 30% of years, based on historical climate data (1901–2022).

The model indicates that there may be a water shortfall in Stage 1 of up to 6.5ML/year during dry years. Where this occurs, Heidelberg will manage the shortfall and existing licence entitlements by implementing one or more of the following water saving measures:

- Importing water to site via mains supply or contract suppliers;
- Use of binders for dust suppression in lieu of water;
- Water retention and recycling within the crushing plant crushing plant and/or amenities; or
- Water use reduction/ elimination where possible, including reduction of cessation of concrete production to align with available water supplies.

Heidelberg may also seek to install additional water production bores to make up the supply shortfall. Where Heidelberg plan to establish a new production bore, it will be determined if the establishment of the bore can be undertaken in accordance with current WAL allocations, or whether a new WAL will be required. Additionally, the Groundwater Impact Assessment will be updated prior to the establishment of any new production bore in accordance with B22 of SSD-7293.

6.5 Water Security

Water supply security is considered to be satisfied by the following water sources. .

- The Project must hold a WAL with a minimum entitlement of 22ML/yr in the New England Fold Belt Coast Groundwater Source of the *Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016*.
- A Maximum Harvestable Right Dam Capacity (MHRDC) of 19.5ML/year applies to the property but is not currently included in the water balance. Should this capacity be utilised in future, it would reduce reliance on groundwater and trigger a revision of the site water balance.

- Surface water WAL 42524 allows for 6ML/year from the Coastal Hastings Water Source. This would account for surface water take above the MHRDC should it be required, but is considered a contingency for the purpose of the water balance.
- The Quarry void is considered excluded works under the *Water Management Act 2000* and is not subject to harvestable rights calculations. Runoff captured within the Quarry void may be used for on-site purposes as long as pollution risks are avoided.
- Water will be recycled and reused within the Quarry site where feasible.

6.6 Water Use Reporting

Water inputs (rainfall, groundwater), usage (processing, dust suppression), and losses (evaporation, product moisture) will be recorded by Quarry personnel. These records will inform the annual update of the Site Water Balance and support compliance with EPL 5289 and SSD-7293.

Water use reporting will be conducted in accordance with the requirements on **Table 6** and **7** and reference:

- the relevant WALs;
- EPL 5289 discharge criteria and monitoring obligations; and
- Annual review of water balance and licence compliance.

Water inflows will be monitored via sump metering. Rainfall and pit extent will be used to estimate groundwater take annually. The groundwater model will be re-evaluated if geological conditions change.

7. Erosion and Sediment Control

7.1 Dam 2 Assessment and Operation

As identified in Section 4.2.2, Dam 2 has the capacity to store 8.2ML of runoff. The contributing catchments to Dam 2 comprise all processing and stockpiling areas, the weighbridge and administration areas. This runoff drains to Dam 2 either as overland flow or via diversion drains. An assessment of Dam 2's available storage capacity, as informed by the "Blue Book" has been undertaken as follows:

- Sediment type: Type C: Coarse-grained material (<33% finer than 0.02mm), settles quickly.
- Volumetric Runoff Coefficient: 0.51
- Design Rainfall Event: 5-day rainfall depth of 70mm
- Contributing Catchment Area: 5.54ha (55 440m²)

Based on the parameters above and in accordance with the Blue Book, the minimum storage requirement for the management of potentially sediment-laden runoff is 1.9ML. This volume is 6.2ML lower than the available storage provided by Dam 2 which, it is noted, is supplemented by Dam 1 with 5.8ML of storage capacity.

Therefore, Dam 2 has sufficient capacity to perform the function of a sediment basin without the need for specific management, apart from the continued maintenance of sufficient freeboard to maintain 1.9ML capacity at any time. This will be achieved via internal water transfers to Dam 1 and the preferential sourcing of all water for operations from Dam 2. Sediment Basin Operation

7.2 Sediment Control Measures

Notwithstanding the above, the Quarry will implement the following sediment control measures to reduce generation of sediment-laden runoff, thus ensuring available water storage capacity is maintained to the extent practical.

7.2.1 Sediment Fencing

Sediment fences constructed of geotextile filter fabric supported by wire and posts will be installed:

- at the base of the Amenity Bund during construction,
- downslope of soil stockpiles or rehabilitation areas,
- where catchment area is ≤ 0.6 ha, slope gradient $\leq 1:2$, and slope length ≤ 60 m.

Fences will be maintained until stabilisation is achieved.

7.2.2 Other Erosion and Sediment Control Measures

Additional erosion and sediment control measures will be implemented as required, including:

- Straw Bale Filters and Check Dams
 - Temporary straw bale barriers may be installed at drain outlets to reduce flow velocity and capture sediment.
 - Rock check dams will be used primarily to reduce erosion risk.
- Rock Armouring and Jute Mesh
 - Rock armouring will be applied to channels and outlets to prevent erosion.
 - Jute mesh, a biodegradable erosion control blanket, may be used to support vegetation establishment.
- Supplementary Planting / Cover Crops
 - Where vegetation fails to establish, corrective earthworks and soil amelioration will be followed by sowing of fast-growing, non-persistent cover crops alongside native species.

These measures support commitments 1.6–1.9 and will be applied to water management structures, active disturbance areas, and rehabilitated zones until stabilisation is achieved.

8. Reactive Management

8.1 Emergency Response

Emergency management at the Quarry is undertaken in accordance with the Quarry Emergency Management Plan. All personnel, contractors, and visitors receive training in the Quarry's Emergency Management System as part of site induction and ongoing refresher programs.

During emergency events, the Quarry Manager or Leading Hand will assess the situation and determine the appropriate level of response—whether internally manageable or requiring external assistance. Heidelberg will provide trained personnel, including first responders, to assist emergency services as required. Emergency vehicles will be met at the site entrance and escorted to the incident location.

Any emergency situation that causes or has the potential to cause environmental harm will be reported to the EPA and other relevant authorities in accordance with the Pollution Incident Response Management Plan (PIRMP) and SSD 7293 Condition D7.

8.2 Major Flood Events

Although the Quarry is not located within the mapped flood extents of the Hastings River or its tributaries, localised flooding may occur during intense rainfall events. In the event of a major flood, the following actions will be implemented.

- Monitoring and assessment: Quarry personnel will monitor rainfall and water levels in sediment basins and pit sumps. If flooding is imminent, operations will be suspended in affected areas.
- Infrastructure protection: bunds, diversion drains, and sediment basins will be inspected and reinforced where necessary to prevent uncontrolled discharge.
- Emergency discharge: If water levels threaten pit wall stability or infrastructure, controlled discharge may occur in accordance with EPL 5289 and SSD 7293 Condition B28.
- Notification: any emergency discharge or environmental incident will be reported to the EPA and Planning Secretary as required under SSD 7293 Conditions D7 and R2.
- Post-flood review: a post-event inspection will be undertaken to assess erosion, sedimentation, and infrastructure damage. Findings will be documented and included in the Annual Review.

8.3 Compensatory Water Supply

In accordance with Condition B24–B27 of SSD 7293, Heidelberg must provide a compensatory water supply to any landowner whose lawful water supply is adversely and directly impacted (excluding minor or negligible impacts) as a result of Quarry operations.

If monitoring or complaints indicate a potential impact, the following steps will be taken.

- **Hydrogeological Review:** A suitably qualified hydrogeologist will assess groundwater data to determine if Quarry operations have affected water availability.
- **Interim Measures:** If impacts are confirmed, interim water supply measures will be agreed upon with the affected landowner.
- **Make-Good Provisions:** Permanent solutions may include:
 - re-drilling the affected bore to a suitable depth;
 - drilling a new bore at an agreed location; and
 - providing water from an external source.
- **Compensation:** If a long-term water supply cannot be provided, reasonable compensation will be offered to the satisfaction of the Planning Secretary.

8.4 Trigger Action Response Plan

Table 25 outlines water-related triggers and corresponding corrective actions. These actions are implemented when monitoring results exceed defined thresholds or when complaints are received.

Table 25
Trigger Action Response Plan

Page 1 of 3

No	Parameter	Trigger	Action and Response
1	Surface Water Quality	Monitoring results at Point 1 exceed trigger values in Table 13 (pH, Oil & Grease, TSS)	Instigate a preliminary internal investigation to determine the nature of the exceedance and potential causes. If Quarry operations may be contributing, implement corrective actions to restore water quality and prevent recurrence. Document findings and corrective actions in the Annual Review. If the exceedance is found to constitute an incident, the EPA is to be notified in accordance with Section 9.1.
2	Groundwater levels	Groundwater levels at monitoring bores fall below trigger values in Table 18	Engage an independent expert to review monitoring data and determine cause(s). Implement recommended investigations or corrective actions. Document findings and actions in the Annual Review. If the groundwater level is determined to constitute environmental harm, the EPA is to be notified in accordance with Section 9.1.

Table 25 (Cont'd)
Trigger Action Response Plan

Page 2 of 3

No	Parameter	Trigger	Action and Response
3	Water supply	Statistically significant divergence in groundwater level responses in bores; or complaint received regarding reduced groundwater supply	Conduct internal investigation and share findings with complainant. If unresolved, engage independent expert to assess cause and recommend corrective or compensatory actions. If agreement is reached, implement actions. If not, refer matter to Planning Secretary per SSD 7293 Condition B27.
4	Groundwater Licensing / Annual Water Balance	Annual water balance shows groundwater inflow exceeds WAL 44557 allocation	Engage independent expert to review water balance and monitoring data. Implement corrective actions, including seeking additional allocation if required. Document findings and actions in the Annual Review.
5	Water Take – Pool Volume	Water taken from in-river or off-river pool when volume is below full capacity (WAL42524)	Cease extraction until pool volume is restored. Record incident and notify NRAR if breach occurred, as described in Section 9.1.
6	Water Take – Flow Visibility	Water taken when no visible flow in river adjacent to work (WAL42524)	Cease extraction. Verify flow conditions before resuming.
7	WAL Volume Limits	Water take exceeds calculated limits over 3-year periods (WAL42524 & WAL44557)	Review water allocation records. Cease extraction if limits exceeded. Seek additional allocation if required.
8	WAL Carryover Restriction	Water allocations carried over between years (WAL44557)	Ensure no carryover occurs. Adjust water use accordingly.
9	WAL Logbook Records	Failure to maintain logbook or meter records (WAL42524 & WAL44557)	Ensure logbook or metering system is compliant. Rectify gaps and retain records for 5 years.
10	WAL Breach Notification	Breach of licence condition not reported to Minister (WAL42524 & WAL44557)	Notify NRAR via phone/email. Confirm in writing within 7 days.
11	Surface Water Discharge Compliance	Surface water discharge does not comply with POEO Act or EPL limits	Investigate cause of non-compliance. Implement corrective actions. Notify EPA and Planning Secretary as described in Section 9.1. Document in Annual Review.
12	Sediment Basin Capacity	Sediment basin capacity not reinstated within 5 days of rainfall event (EPL Condition O5.6)	Reinstatement of design capacity. Record maintenance and include in Annual Review.
13	Sediment Level Exceedance	Sediment exceeds marker level in basin (EPL Condition O5.8)	Remove sediment promptly. Document actions and include in Annual Review.

Table 25 (Cont'd)
Trigger Action Response Plan

Page 3 of 3

No	Parameter	Trigger	Action and Response
14	Sampling Point Condition	Sampling points for sediment basin discharge are not maintained or accessible (EPL Condition O5.9)	Maintain sampling points in appropriate condition. Ensure clear identification and accessibility. Document in Annual Review.
15	Water Supply Availability	Insufficient water available for operations (SSD 7293 Condition B21)	Adjust scale of development to match available water supply. Document in Annual Review.
16	Groundwater Impact Assessment	Installation of new bores without updated groundwater impact assessment (SSD 7293 Condition B22)	Prepare updated groundwater impact assessment in consultation with NSW DCCEE – Water Group. Submit to Planning Secretary for approval.
17	Water Take Reporting	Failure to report water take under each licence in Annual Review (SSD 7293 Condition B23)	Ensure water take (direct and indirect) is reported annually. Include volumes under each WAL.

9. Management of Compliance

9.1 Incident and Non-compliance Management

All incidents or non-compliance matters will be raised through the Quarry Safety Culture system. The Quarry Manager is responsible for ensuring issues raised are identified and submitted as required through the Safety Culture system.

9.2 Notification of Exceedances

Where monitoring identifies an exceedance of surface water performance criteria or groundwater trigger values, Heidelberg Materials will:

- notify the Quarry Manager immediately upon identification of the exceedance;
- undertake an investigation to determine the cause, nature and extent of the exceedance;
- notify the Planning Secretary and NSW EPA within 24 hours of identifying a surface water exceedance where required under the Development Consent, EPL or other statutory approval;
- notify the Planning Secretary, DCCEE Water Group and affected landholders within 7 days of confirming a groundwater trigger exceedance, where required under the Development Consent or other statutory approval;
- implement appropriate corrective actions as soon as practicable to prevent or minimise any ongoing environmental impact;
- continue monitoring, where required, to verify the effectiveness of corrective actions and determine whether further management measures are necessary; and
- document the exceedance, investigation, notifications, corrective actions and outcomes in the site environmental records and report the event in the Annual Review, where required.

9.3 Incident Management

In accordance with Condition D7 of SSD-7293, Heidelberg will immediately notify the Department and any other relevant agencies immediately after it becomes aware of an incident. The notification must be in writing through the Department's Major Projects website and identify:

- The development and application number;
- Provide details of the incident (date, time, location, a brief description of what occurred and why it is classified as an incident);
- Identify how the incident was detected;
- Identify when the applicant became aware of the incident;

- Identify any actual or potential non-compliance with conditions of approval;
- Describe what immediate steps were taken in relation to the incident;
- Identify further action(s) that will be taken in relation to the incident; and
- Identify a project contact for further communication regarding the incident.

In accordance with Appendix 6 of SSD-7293, written incident notifications are required to be given even if Heidelberg fails to give the notification required under Condition D7 or, having given such notification, subsequently forms the view that an incident has not occurred.

Within 30 days of the date on which the incident occurred or as otherwise agreed to by the Planning Secretary, Heidelberg must provide the Planning Secretary and any relevant public authorities (as determined by the Planning Secretary) with a detailed report on the incident addressing all requirements below, and such further reports as may be requested. The Incident Report must include:

- A summary of the incident;
- Outcomes of an incident investigation, including identification of the cause of the incident;
- Details of the corrective and preventative actions that have been, or will be, implemented to address the incident and prevent recurrence; and
- Details of any communication with other stakeholders and affected residents regarding the incident.

9.4 Non-compliance Management

Within seven days of becoming aware of a non-compliance, Heidelberg must notify the Department of the noncompliance. The notification must be in writing to through 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. A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.

An investigation into the cause of the non-compliance will be undertaken involving the personnel involved, supervisory personnel, relevant Manager and/or Environment Manager. The investigation will review all reasonable and feasible steps which may be taken to:

- Correct the activity resulting in the non-compliance; and
- Prevent recurrence.

Within seven days of becoming aware of a non-compliance, a report will be prepared and submitted to the DPHI and EPA summarising the investigation and proposed corrective and preventative measures.

If the incident was identified following receipt of complaint, the complainant will be provided with a report confirming the incident, source or cause of the incident, actions taken and ongoing management to prevent subsequent incident at the earliest opportunity.

9.5 Annual Review, Reporting and Publishing

In accordance with Condition D9 of SSD-7293, by the end of March in each year after the commencement of Project, or other timeframe agreed with the Planning Secretary, an Annual Review will be submitted to DPHI reviewing the environmental performance of the development.

The approach to preparing and the contents of the Annual Review are described in the Environmental Management Strategy and are not repeated here.

Heritage-related matters that will be reported in the Annual Review include the following as relevant for the reporting period.

- Any changes to heritage management that occurred as part of operations during the reporting period and any proposed for the next reporting period.
- A review of any incidents or complaints that relate to heritage management during the reporting period.
- A statement regarding compliance with heritage-related conditions of consent for the reporting period.

The Annual Review will be submitted to Council and the NSW DCCEEW – Water and made available on Heidelberg's website. This HMP and any other relevant assessment documents relating to heritage will be published on Heidelberg's website. The Environmental Superintendent will be responsible for ensuring information on the website is kept up to date on a regular basis.

9.6 Independent Environmental Audit

In accordance with Condition D11 of SSD-7293, the Company will commission an Independent Environmental Audit of the Quarry within one year of physical commencement under SSD-7293, and every three years after, unless the Planning Secretary directs otherwise.

The audit process is described in detail in the *Environmental Management Strategy* and is not repeated here.

10. Plan Review and Continual Improvement

10.1 Plan Review

In accordance with Condition D5 of SSD 7293, this WMP will be reviewed and, if required, revised within 3 months of:

- the submission of an incident report under Condition D7;
- the submission of an Annual Review under Condition D9;
- the submission of an Independent Environmental Audit under Condition D11;
- the approval of any modification of the conditions of this consent; or
- notification of a change in development stage under condition A15; or
- the issue of a direction of the Planning Secretary under conditions A2(b) which requires a review.

This review will include the adequacy of strategies, plans and programs as required under the SSD 7293.

If necessary, to either improve the environmental performance of the Quarry, cater for a modification or comply with a direction, this WMP will be revised to the satisfaction of the Planning Secretary and submitted to the Planning Secretary for approval within six weeks of the review.

10.1.1 Groundwater Model Continual Improvement

The groundwater model for the Quarry will be updated within one year of commencement under SSD 7293 and every three years over the life of the Quarry. Concurrently, a review of the groundwater level trigger values (refer to Section 5.3.5) will be undertaken to ensure trigger values are appropriate and reflective of the groundwater environment.

11. 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.

Environmental Resources Management Australia Pty Ltd (2023). Sancrox Quarry Expansion Project Surface Water Assessment, Sydney NSW

Ethos Urban (2024). Sancrox Quarry Expansion (SSD 7293) Amendment Report, Sydney NSW

Landcom (2004). Managing Urban Stormwater: Soils and Construction, Volume 1, Parramatta NSW.

Water Technology (2022). Sancrox Quarry Expansion Project Hydrogeological Assessment

Appendix 1

Consultation Correspondence

(Total No. of pages including blank pages = 8)

Table A1-1
Response to DCCEE Water Group Comments – 23 March 2026

Comment No.	Comment	Response	Where / How Addressed
1.1	The proponent should update the Water Management Plan (WMP) to identify the water source for the water demand shortfall in a dry year.	Detail added to discuss options in the event of a shortfall; including installation of additional bores and a variety of external sourcing and efficiency measures to be taken before new additional bores are considered.	S6.4
1.2	The proponent must ensure that the Water Access Licences (WAL) proposed to account for water take by the project is nominated to an extraction point and this dealing application to WaterNSW is completed prior to water take occurring.	Heidelberg are not utilising this WAL and are not extracting any groundwater. Therefore, an extraction point has not been nominated. Where extraction under this licence is proposed to occur, Heidelberg will apply to nominate an extraction point as required. prior to take occurring.	N/A
1.3	The proponent should confirm the water source(s) of the predicted 22 ML/yr of groundwater inflow in accordance with the water source definitions of the Water Sharing Plan (WSP) for the Hastings Unregulated and Alluvial Water Sources 2019 and the WSP for the North Coast Fractured and Porous Rock Groundwater Sources 2016.	Section 2.3 corrected to identify Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016 as the relevant plan for groundwater and surface water resources associated with the quarry. The New England Fold Belt Coast Groundwater Source is identified as the impacted water source, as confirmed by DPE Water (NSW Department of Planning, Industry and Environment correspondence) and defined in Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016. Detail added regarding Heidelberg's intent to seek a 22 ML water access licence from this groundwater source, subject to availability.	S2.3
2.1	The proponent should update the Water Management Plan to include additional information in the response protocols for exceedances of surface water and groundwater triggers.	Detail added to the TARP detailing the relevant agencies/stakeholders to be notified in accordance with the Incident and Non-compliance Management requirements of SSD7293	S8.4

Table A1-2
Response to DCCEE Water Group Comments – 11 June 2026

Page 1 of 2

Comment No.	Comment	Response	Where / How Addressed
1.1	Provide a quantitative itemisation of groundwater inflows to the excavation area, distinguishing contributions from relevant groundwater sources (e.g. alluvial and fractured rock aquifers), to support correct attribution of the predicted 22ML/year take for water licensing purposes.	The Water Management Plan identifies that at the time of assessment, the draft Water Sharing Plan for the Hastings Unregulated and Alluvial Water Sources 2019 was in draft. That plan was finalised and the Quarry is not located in the area managed for this alluvial sand aquifer. Extraction activities would occur wholly within the New England Fold Belt Coast Groundwater Source of the Water Sharing Plan for the North Coast Fractured and Porous Rock Groundwater Sources 2016. Therefore, all groundwater take required for the development of the Quarry would be from this water source. A review of the market depth and recent transfers/trades of water in the New England Fold Belt Coast Groundwater Source has been presented.	S2.3 updated to explicitly state this to be the case.
1.2	Ensure that a dealing nominating an extraction point to Water Access Licence WAL44557 is completed prior to groundwater take occurring, including the proposed open pit interference and any groundwater supply bore, should one be required.	WAL 44557 will not be used for Quarry operations at this time as it is in a different water source.	S2.3 updated to explicitly state this to be the case.
1.3	Confirm the water source(s) that will provide for the estimated 6.5ML/year water demand shortfall during a dry year.	The Water Management Plan has been updated to clarify the contingency measures available should a water supply shortfall occur during extended dry conditions. Heidelberg will initially maximise water conservation and reuse measures to minimise operational demand. Where appropriate, alternative dust suppression measures (such as chemical dust suppressants) may also be implemented to reduce operational water demand. If a shortfall remains, Heidelberg will consider importing water from an external licensed supplier, reducing on-site concrete production to align with available water supplies, or, if necessary, install an additional groundwater supply bore. Should a groundwater supply bore be required, the necessary licensing, approvals and assessments will be completed prior to construction and operation.	Detail added to S6.4 to include reduction or cessation of concrete production based on available water supply.
1.4	Obtain a Water Supply Works Approval under Section 90(2) of the Water Management Act 2000 for any groundwater supply bore that does not meet the exclusion under Section 4.41(g) of the Environmental Planning and Assessment Act 1979.	Heidelberg Materials acknowledges that any future groundwater supply bore not assessed as part of the SSD approvals process may require a Water Supply Works Approval under Section 90(2) of the Water Management Act 2000. Should a groundwater supply bore be required, Heidelberg Materials will make an application to DPE water that includes the necessary assessment and obtain any required approvals prior to construction and operation.	S2.3 and S6.4

Table A1-2 (Cont'd)
Response to DCCEE Water Group Comments – 11 June 2026

Page 2 of 2

Comment No.	Comment	Response	Where / How Addressed
2.1	Revise the Water Management Plan to include explicit, stand-alone notification protocols for exceedances of surface water performance criteria and groundwater trigger values, including notification responsibilities, timeframes for notification, investigation and corrective actions.	The Water Management Plan has been revised to include a stand-alone notification protocol for exceedances of surface water performance criteria and groundwater trigger values. The protocol consolidates the existing notification, investigation and corrective action requirements into a single section that identifies notification responsibilities, applicable notification timeframes, investigation procedures and corrective actions. Cross-references have also been included throughout the Plan to ensure that all exceedances are managed consistently in accordance with the protocol.	S9.2
2.2	Include a procedure for periodic verification of Groundwater Dependent Ecosystem (GDE) condition where mapped GDEs occur within approximately 1.5 km of advancing quarry works (e.g. observational checks linked to groundwater monitoring). (Post-approval recommendation.)	Although no groundwater dependent ecosystems are predicted to be adversely affected by the Project, the Water Management Plan has been updated to include periodic observational verification of mapped groundwater dependent ecosystems within approximately 1.5 km of advancing quarry operations. These inspections will be undertaken in conjunction with routine ecological or groundwater monitoring and will comprise simple observational assessments (including photo-point monitoring where appropriate) to identify any evidence of vegetation stress or groundwater-related change.	S5.3.4

Department of Climate Change, Energy, the Environment and Water

Our ref: OUT26/3295

Belinda Pignone
Hanson Construction

Email: belinda.pignone@hanson.com.au

23/03/2026

Subject: Sancrox Quarry Expansion Project (SSD-7293) – Water Management Plan

Dear Belinda Pignone,

I refer to your request for advice sent on 23 February 2026 to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Water Group about the above matter.

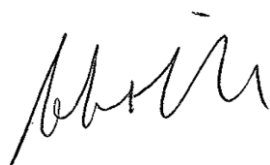
DCCEEW Water has reviewed the Water Management Plan and makes recommendations to:

- Update the response protocols for trigger exceedances.
- Confirm the water source/s for the groundwater inflows.
- Confirm the water source to provide the water demand shortfall in a dry year.
- Ensure Water Access Licences nominate an extraction point.

Please see **Attachment A** for more detail.

Should you have any further queries in relation to this submission please do not hesitate to contact DCCEEW Water Assessments water.assessments@dcceew.nsw.gov.au.

Yours sincerely

A handwritten signature in black ink, appearing to read "Rob Brownbill".

Rob Brownbill,
Manager, Water Assessments, Planning & Knowledge Division
Department of Climate Change, Energy, the Environment and Water

Attachment A

Detailed advice regarding the Sancrox Quarry Expansion Project – Water Management Plan

1.0 Water supply, take and licensing

1.1 Recommendation – pre-approval

The proponent should update the Water Management Plan (WMP) to identify the water source for the water demand shortfall in a dry year.

Explanation

The WMP outlines a water demand shortfall of up to 6.5 ML/yr in a dry year, however there is no detail on how this demand would be met or whether changes to operations would be required.

1.2 Recommendation – pre approval

The proponent must ensure that the Water Access Licences (WAL) proposed to account for water take by the project is nominated to an extraction point and this dealing application to WaterNSW is completed prior to water take occurring.

Explanation

The WMP lists WAL42524 and WAL44557 to be used by the project. WAL44557 currently does not nominate an extraction point for the project and therefore is unable to be used to account for water take. An application to WaterNSW to nominate extraction points on all WALs which are to be used to account for water take needs to be submitted and completed prior to take occurring.

1.3 Recommendation – pre approval

The proponent should confirm the water source(s) of the predicted 22 ML/yr of groundwater inflow in accordance with the water source definitions of the Water Sharing Plan (WSP) for the Hastings Unregulated and Alluvial Water Sources 2019 and the WSP for the North Coast Fractured and Porous Rock Groundwater Sources 2016.

Explanation

The site is managed by two water sharing plans that relate to groundwater and it is important to identify the correct water source(s) when determining the source of water inflows and to ensure the correct WALs are obtained. The two water sharing plans are:

- Hastings Unregulated and Alluvial Water Sources 2019
- North Coast Fractured and Porous Rock Groundwater Sources 2016

The WMP refers only to the Hastings Unregulated and Alluvial Water Sources WSP. However, if water take is also/or occurring from the fractured/porous rock water sources of the North Coast Fractured and Porous Rock Groundwater Sources WSP this needs to be quantified and

a WAL with sufficient entitlement from the North Coast Fractured Volcanics Groundwater Source obtained. Further confirmation is required.

2.0 Water impact management

2.1 Recommendation – post-approval

The proponent should update the Water Management Plan to include additional information in the response protocols for exceedances of surface water and groundwater triggers.

Explanation

Tables 13, 20 and 21 of the WMP identify triggers for surface water quality and groundwater levels, however there is inconsistency and inadequacy in the response and notification protocols. It is recommended all the response protocols be updated to identify the relevant authorities and stakeholders to be notified, the method of notification and timeframe.

End Attachment A

Our ref: OUT26/6344

James McDonough
Planning Group
NSW Department of Planning, Housing and Infrastructure
Email: james.mcdonough@dpie.nsw.gov.au

11 June 2026

Subject: Sancrox Quarry Expansion Project - SSD-7293-PA-5 - Water Management Plan (WMP)

James McDonough,

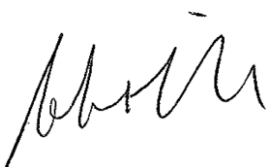
I refer to your request for advice sent on 27 May 2026 to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) Water Group about the above matter.

NSW DCCEEW Water Group has reviewed the Water Management Plan and has recommendations regarding water supply, take and licensing, and groundwater monitoring.

Please see **Attachment A** for detail.

Should you have any further queries in relation to this submission please do not hesitate to contact the Water Assessments team at water.assessments@dcceew.nsw.gov.au.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Rob Brownbill".

Rob Brownbill
Manager, Assessments, Planning & Knowledge Division
NSW Department of Climate Change, Energy, the Environment and Water

Attachment A

Detailed advice regarding the Sancrox Quarry Expansion Project - SSD-7293-PA-5 - Water Management Plan (WMP)

1.0 Water supply, take and licensing

1.1 Recommendation – pre-approval

The Department of Planning, Housing and Infrastructure (DPHI) should request the proponent to provide a quantitative itemisation of groundwater inflows to the excavation area, distinguishing contributions from relevant groundwater sources (e.g. alluvial and fractured rock aquifers), to support correct attribution of the predicted 22 ML/year take for water licensing purposes.

Explanation

The WMP provides an improved conceptual understanding of groundwater systems, including identification of fractured rock and alluvial aquifers, and outlines a methodology for estimating total groundwater inflow via sump metering and rainfall adjustment.

However, the WMP does not provide a quantitative itemisation of inflows by groundwater source, nor does it attribute the predicted 22 ML/year groundwater take to specific water sharing plan water sources.

This information is required to:

- ensure that groundwater take is correctly accounted to the appropriate groundwater sources;
- demonstrate that sufficient entitlement is held under the relevant Water Sharing Plan(s); and
- support compliance with licensing requirements for aquifer interference activities.

Without this attribution, it is not possible to confirm that the predicted take is appropriately licensed against impacted water sources.

1.2 Recommendation – pre-approval

DPHI should request the proponent to ensure that a dealing nominating and extraction point to Water Access Licence WAL44557 is completed prior to groundwater take occurring. This includes the proposed open pit interference, and any groundwater supply bore should it be required.

Explanation

Without a nominated extraction point, the proponent risks a breach of Section 60D of the *Water Management Act 2000*.

1.3 Recommendation – pre-approval

DPHI should request the proponent to confirm the water source(s) to provide for the estimated 6.5 ML/y water demand shortfall in a dry year.

Explanation

The proponent has indicated that there will be water saving measures and potential new bores installed to meet the 6.5 ML/year water shortfall in a dry year. It is unclear how much water the measures will save. If a shortfall remains, additional bores will be required and they must be approved.

1.4 Recommendation – pre-approval

A Water Supply Works Approval must be obtained under Section 90(2) of the *Water Management Act 2000* for any groundwater supply bore that does not meet the exclusion inferred under Section 4.41(g) of the *Environmental Planning & Assessment Act 1979*.

Explanation

The proposed additional bores do not appear to have been previously assessed as a part of the project. As section 4.41(g) of the *EP&A Act 1979* requires works to be identified and impacts assessed as a part of the project so as not to require secondary approvals under the *Water Management Act 2000*. These works are likely to require water supply work approvals under the *Water Management Act 2000*.

If these bores are necessary for water supply for the project, these approvals must be held with works nominated in this report prior to approval.

2.0 Groundwater monitoring

2.1 Recommendation – pre-approval

DPHI should request the proponent to revise the WMP to include explicit, stand-alone notification protocols for exceedances of surface water performance criteria (Table 13 / EPL 5289) and groundwater triggers (Tables 20–21). The protocols must clearly specify:

- who is to be notified (e.g. Department, EPA, DCCEEW – Water Group, affected landholders); and
- timeframes for notification, investigation and corrective actions (e.g. 24 hours for surface water exceedances outside wet weather exemptions, 7 days for groundwater trigger exceedances, and defined investigation/response timeframes).

Explanation

The updated WMP includes trigger values, investigation processes, and incident reporting mechanisms across surface water and groundwater management sections (e.g. Sections 4.3, 5.3, and reactive management provisions).

However, the WMP does not provide a clearly defined and consolidated protocol for exceedances of performance criteria that is distinct from general incident reporting requirements. In particular:

- notification requirements are primarily framed within incident and pollution reporting frameworks, rather than routine exceedances of trigger values;
- the Plan does not consistently define notification responsibilities to agencies and stakeholders; and
- timeframes and communication pathways are not systematically specified.

Condition B29 requires a protocol specifically for identifying, investigating and notifying exceedances of performance criteria. While elements of this requirement are present, the absence of clear, auditable and structured protocols creates ambiguity in implementation.

2.2 Recommendation – post approval

DPHI should request the proponent to include a procedure for periodic verification of GDE condition where mapped GDEs occur within approximately 1.5 km of advancing quarry works (e.g. observational checks linked to groundwater monitoring).

Explanation

The updated WMP identifies potential GDEs within the surrounding area and incorporates their consideration within the groundwater monitoring and trigger-response framework.

This represents a substantive improvement as nearby ecosystems with moderate to high GDE potential are identified, and the monitoring program includes provisions for detecting groundwater impacts that could affect these ecosystems.

While the Plan does not include a discrete “GDE condition check” procedure (e.g. periodic observational inspections), the combination of groundwater monitoring, trigger levels, and contingency measures provides a reasonable mechanism to identify potential impacts.

Accordingly, this recommendation can be considered largely addressed, with only minor enhancement warranted for completeness, and is therefore not required prior to approval.

End Attachment A
