

**SOIL AND WATER
MANAGEMENT PLAN**

Wallerawang Quarry

DRAFT

May 2024



SOIL AND WATER MANAGEMENT PLAN

Wallerawang Quarry

DRAFT

Prepared by
Umwelt (Australia) Pty Limited
on behalf of
Walker Quarries Pty Limited

Project Director: Adam Williams
Project Manager: Kelsy Sammons
Report No. 4433/R01
Date: May 2024



75 York St
Teralba NSW 2284



This report was prepared using
Umwelt's ISO 9001 certified
Quality Management System.

Disclaimer

This document has been prepared for the sole use of the authorised recipient and this document may not be used, copied or reproduced in whole or part for any purpose other than that for which it was supplied by Umwelt (Australia) Pty Ltd (Umwelt). No other party should rely on this document without the prior written consent of Umwelt.

Umwelt undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. Umwelt assumes no liability to a third party for any inaccuracies in or omissions to that information. Where this document indicates that information has been provided by third parties, Umwelt has made no independent verification of this information except as expressly stated.

©Umwelt (Australia) Pty Ltd

Document Status

Rev No.	Reviewer		Approved for Issue	
	Name	Date	Name	Date
1.0	Melissa Swan, Adam Williams	16 May 2024	Melissa Swan, Adam Williams	16 May 2024

Table of Contents

1.0	Introduction	1
1.1	Background	1
1.2	Purpose and Scope	4
	1.2.1 Objectives and Outcomes	4
1.3	Regulatory Requirements	5
	1.3.1 DA 344-11-2001	5
	1.3.2 Statement of Commitments	8
	1.3.3 Environment Protection Licence	9
	1.3.4 Water Licencing and Approvals	12
2.0	Site Characteristics	14
2.1	Catchment and Drainage	14
2.2	Topography and Soils	15
2.3	Climate	18
2.4	Groundwater	19
2.5	Water Quality	20
2.6	Erosion Hazard	22
3.0	Site Water Management System	23
3.1	Principals	23
3.2	Locations of Water Management Infrastructure	26
	3.2.1 Clean Water Diversions	26
	3.2.2 Current Operations Water Capture and Storage	26
3.3	Future Operations	27
3.4	Erosion and Sediment Control	27
	3.4.1 Sediment Basins and Discharge Protection	27
	3.4.2 Other Erosion and Sediment Control Measures	29
	3.4.3 Sediment Settling (Flocculant) Agents	30
3.5	Waste Water Management	30
	3.5.1 Effluent and Wastewater	30
	3.5.2 Process Water Discharge	30
3.6	Chemical Storage	30
4.0	Site Water Balance	32
4.1	Water Sources	32
4.2	Water Requirements and Losses	32

4.2.1	Dust Suppression – General	32
4.2.2	Dust Suppression – Crushing	33
4.2.3	Sand Washing	33
4.2.4	Evaporative Losses	33
4.2.5	Operating Rules and Assumptions	33
4.3	Groundwater Use	34
4.4	Water Discharges	34
4.4.1	Controlled Discharge/Transfer	34
4.4.2	Uncontrolled (Wet Weather) Discharge	36
4.5	Contingency Management	36
4.5.1	Water Availability	36
4.5.2	Discharge Water Quality	36
4.6	Reporting	36
5.0	Surface Water Monitoring Program	37
5.1	Monitoring Locations	37
5.2	Monitoring Parameters and Criteria	39
5.3	Monitoring Procedures	40
5.4	Review and Reporting of Monitoring Data	40
6.0	Groundwater Monitoring Program	41
6.1	Monitoring Locations	41
6.2	Monitoring Parameters and Criteria	41
6.3	Monitoring Procedures	42
6.4	Review and Reporting of Monitoring Data	42
6.5	Incident Management	42
6.5.1	Contingency Response Management	42
6.5.2	Breach of Threshold Trigger (Standing Water Level)	42
7.0	Management of Spills, Incidents and Complaints	44
7.1	Incident Definition	44
7.2	Types of Pollution Incidents	44
7.3	Spill Response Procedure	44
8.0	Plan Implementation	46
8.1	Inspections	46
8.2	Maintenance	46
8.2.1	Sediment Basin Maintenance	46
8.3	Roles and Responsibilities	47
8.4	Competence Training and Awareness	48

9.0	Reporting	49
9.1	Incident Identification and Reporting	49
	9.1.1 Incident Identification	49
	9.1.2 Incident Reporting	49
9.2	Non-Compliance Reporting	50
9.3	Complaints	50
9.4	Annual Review	51
9.5	Monitoring Data	52
10.0	Review and Improvement	53
10.1	SWMP Review	53
10.2	Independent Environmental Audit	53
11.0	References	55

Figures

Figure 1.1	Locality	2
Figure 1.2	Current Quarry Site Layout	3
Figure 2.1	Current Quarry Catchments	16
Figure 2.2	Quarry Topography and Soil Landscapes	17
Figure 2.3	Average Monthly Rainfall and Evaporation Recorded at Lidsdale (Bureau 63132) and Bathurst Agricultural Station (Bureau 063005)	19
Figure 3.1	Water Management System	24
Figure 3.2	Water Management System Schematic	25
Figure 5.1	Water Monitoring Locations	38

Tables

Table 1.1	Water Management Objectives and Key Performance Outcomes	4
Table 1.2	Relevant Development Consent Requirements	5
Table 1.3	Relevant Statement of Commitments	8
Table 1.4	Relevant EPL Requirements	9
Table 2.1	Current Quarry Catchments	14
Table 2.2	Lidsdale Rainfall Statistics 1960–2023 (Bureau Station 63132)	18
Table 2.3	Groundwater Level Monitoring Baseline Data	20
Table 2.4	Coxs River Average Water Sampling Results	20
Table 2.5	Erosion Hazard Assessment	22
Table 3.1	Conceptual Sediment Basin Design Criteria	27

Table 3.2	Sediment Basin Conceptual Minimum Storage Requirements	28
Table 3.3	Quarry Sediment Basins Purpose	28
Table 4.1	Bore Water Imports	34
Table 4.2	Controlled Discharge Volumes and Frequencies	35
Table 4.3	Sediment Basin Spill Frequency	36
Table 5.1	Surface Water Monitoring Points	37
Table 5.2	Surface Water Parameters and Criteria	39
Table 8.1	Roles and Responsibilities of Personal with Respect to Management of Water	47

Appendices

Appendix 1	DPHI Endorsement
Appendix 2	SWMP Consultation Records
Appendix 3	Erosion and Sediment Control Plan
Appendix 4	Groundwater Monitoring Procedure
Appendix 5	Hydrobond HB-4118 Usage Instructions

1.0 Introduction

1.1 Background

This Soil and Water Management Plan (SWMP) for Wallerawang Quarry (the Quarry) has been developed in accordance with Schedule 3, Condition 18 of Development Consent DA 344-11-2001. Notification was provided to the Department of Planning, Housing and Infrastructure (DPHI) (former Department of Planning and Environment (DPE)) on 20 December 2023 regarding the proposed revisions.

This SWMP for the Quarry was prepared by Adam Williams (Principal Environmental Consultant) and Melissa Swan (Senior Environmental Engineer and Certified Professional in Erosion and Sediment Control (CPESC)) from Umwelt on behalf of Walker Quarries Pty Limited (Walker Quarries). The authors have been endorsed as suitably qualified and experienced persons to prepare the SWMP by DPHI (refer **Appendix 1**).

The Quarry is located approximately 8 kilometres (km) northwest of Lithgow (refer **Figure 1.1**) and is approved to produce 500 000 tonnes per annum (tpa) of quarry products. Development Consent DA 344-11-2001 approves quarrying operations for the purpose of quartzite and other hard rock extraction, processing, stockpiling, management and on-site disposal of non-saleable (overburden) materials, and ancillary infrastructure. The approved Quarry Layout is provided in **Figure 1.2**.

In general, the following activities are conducted at the Quarry:

- Raw material is extracted using conventional drill and blast, load and haul methods.
- Overburden material is temporarily stockpiled within the footprint of the open cut from where it is either used within the site for approved construction activities or sold.
- Processing of raw material involving crushing, screening and washing using fixed or mobile plant to meet customer requirements.
- Product transportation involves loading of road registered trucks. Trucks then enter the Great Western Highway directly from the Quarry site entrance.

This SWMP has been prepared in consultation with the NSW Department of Climate Change, Energy, Environment & Water - Water Group (NSW DCCEEW – Water) (former DPE – Water), NSW DCCEEW – Environment Protection Authority (EPA) and WaterNSW. A record of this consultation and previous correspondence regarding the previously approved Soil and Water Management Plan (October, 2022) has been provided in **Appendix 2**.

This new SWMP has been prepared in accordance with *Managing Urban Stormwater: Soils and Construction, Volume 1, 4th eds.* (Landcom, 2004) and *Volume 2E Mines and Quarries* (DECC, 2008) (herein referred to as the “Blue Book”), Environmental Protection Licence (EPL) 13172 and relevant conditions of DA 344-11-2001.

Figure 1.1 Locality

Figure 1.2 **Current Quarry Site Layout**

1.2 Purpose and Scope

The purpose of this SWMP is to:

- Identify constraints associated with the existing soil and water environment.
- Specify the appropriate design standard for erosion and sediment controls (ESCs) based on the anticipated soil, weather and operating conditions.
- Ensure erosion and sediment control requirements, site constraints and key environmental issues are considered and managed for the Quarry.
- Ensure chemicals (e.g. hydrocarbons) and other potential pollution sources are managed to minimise the risk of release/spills to the environment.
- Be flexible and adaptive to accommodate any changes in site conditions and address any ESCs found to be ineffective in meeting performance standards.
- This SWMP applies to current operations at the Quarry and will be revised to align with operations and approval requirements (refer **Section 10.0**).
- An Erosion and Sediment Control Plan (ESCP) is attached in **Appendix 3** and provides detailed ESCs for the Project. Any revision to this SWMP, ESCP, or the preparation of additional ESCP drawings, will be undertaken and/or reviewed and approved by a specialist soil conservationist (e.g. Certified Professional in Erosion and Sediment Control (CPESC)) in consultation with construction personnel.

1.2.1 Objectives and Outcomes

Table 1.1 presents the objectives and key performance outcomes relating to water management for this SWMP and the Quarry.

Table 1.1 Water Management Objectives and Key Performance Outcomes

Objectives	Key Performance Outcomes
To ensure compliance with the conditions of DA 344-11-2001 and EPL 13172 and reasonable community expectations.	Compliance with all relevant criteria and reasonable community expectations, as determined in consultation with the relevant government agencies.
To implement appropriate corrective and preventative actions, if required.	Corrective and preventative actions implemented, if required.
To implement appropriate water management and mitigation measures during all stages of the Quarry so as to ensure that harm to the environment is minimised as far as possible.	Implementation of this Plan. Discharge of water in accordance with EPL 13172 criteria. No reportable incidents related to water management or pollution.
To implement an appropriate monitoring program which reviews compliance with relevant criteria during all stages of the Quarry.	All identified monitoring is undertaken in accordance with the relevant procedures and at the relevant intervals. Monitoring results are published and reported annually within the Annual Review / Annual Return.
To implement an appropriate incident reporting program, if required.	Incidents (if any) are reported in an appropriate manner.

1.3 Regulatory Requirements

1.3.1 DA 344-11-2001

DA 344-11-2001 provides conditions that relate to the management of soil and water, and the preparation of this SWMP. **Table 1.2** outlines each condition and the relevant section where it is addressed within this SWMP.

Table 1.2 Relevant Development Consent Requirements

Conditions	Requirement	Section
Extraction Depth		
Schedule 2, Condition 6	The Applicant must not conduct quarrying operations within one metre of the maximum groundwater level, with the exception of areas where the Applicant has received the written approval of the Secretary for the construction and use of drainage sumps, groundwater monitoring bores, exploration boreholes or other similar activity agreed by the Secretary.	Section 6.0 and Appendix 4
Schedule 2, Condition 6A	<p>Prior to the commencement of quarrying operations below 901 mAHD (unless approved under condition 6 of this Schedule), the Applicant must:</p> <ul style="list-style-type: none"> (a) determine the maximum groundwater level within and adjacent to the proposed extraction area, in consultation with DPIE – Water, using all available groundwater and rainfall monitoring data collected from the site or in the vicinity of the site and appropriate modelling software and parameters; (b) establish the proposed maximum extraction depth to comply with condition 6; (c) prepare a contour map or similar, showing the proposed maximum extraction depth; <p>for approval of the Secretary.</p>	Section 6.0 and Appendix 4
Water Supply		
Schedule 3, Condition 16	The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of operations under the consent to match its available water supply, to the satisfaction of the Secretary.	Section 4.0
Water Discharges		
Schedule 3, Condition 17	The Applicant must comply with the discharge limits in any EPL, or with section 120 of the POEO Act.	Section 4.4 and Section 4.5.2
Soil and Water Management Plan		
Schedule 3, Condition 18	The Applicant must prepare a Soil and Water Management Plan for the development to the satisfaction of the Secretary. This plan must:	
	(a) be prepared by suitably qualified and experienced person/s approved by the Secretary;	Appendix 1
	(b) be prepared in consultation with the EPA, DPIE – Water and WaterNSW;	Appendix 2
	(c) be submitted to the Secretary for approval within three months of the determination of Modification 1 and Modification 3, unless otherwise agreed by the Secretary; and	Previously approved SWMP
	(d) include a:	

Conditions	Requirement	Section
	<p>(i) Site Water Balance that includes:</p> <ul style="list-style-type: none"> • details of: <ul style="list-style-type: none"> a. sources and security of water supply; b. water use and management on site; c. any off-site water transfers; and d. reporting procedures; and • measures to be implemented to minimise clean water use on site; <p>(ii) Surface Water Management Plan, that includes:</p> <ul style="list-style-type: none"> • a program for obtaining detailed baseline data on surface water flows and quality in water bodies that could potentially be affected by the development; • a detailed description of the surface water management system on site including the: <ul style="list-style-type: none"> a. clean water diversion system; b. erosion and sediment controls; c. dirty water management system; and d. water storages; and • a program to monitor and report on: <ul style="list-style-type: none"> a. any surface water discharges; b. the effectiveness of the water management system, c. the quality of water discharged from the site to the environment; d. surface water flows and quality in local watercourses; <p>(iii) Groundwater Management Plan that includes:</p> <ul style="list-style-type: none"> • a provision that requires the Applicant to obtain appropriate water licence(s) to cover the volume of any unforeseen groundwater inflows into the quarry from the quarry face or floor; and • a monitoring program to manage potential impacts, if any, on any alluvium and associated surface water source near the proposed extraction area that includes: <ul style="list-style-type: none"> a. identification of a methodology for determining threshold water level criteria; b. contingency measures in the event of a breach of thresholds; and c. a program to regularly report on monitoring. 	<p>Section 4.0</p> <p>Section 4.1 and Section 4.3</p> <p>Section 4.2 and Section 4.2.5</p> <p>N/A</p> <p>Section 9.0 and Section 7.3.2</p> <p>Section 4.1</p> <p>This SWMP</p> <p>Section 5.0</p> <p>Section 3.0</p> <p>Section 3.2.1</p> <p>Section 3.4</p> <p>Section 3.4</p> <p>Section 3.2 and Section 3.3</p> <p>Sections 5.0 and 9.0</p> <p>This SWMP</p> <p>Section 1.3.4</p> <p>Sections 6.0 and 9.0</p>

Conditions	Requirement	Section
	The Applicant must implement the approved Soil and Water Management Plan as approved from time to time by the Secretary.	Noted
Management Plan Requirements		
Schedule 5, Condition 3	<p>Management plans required under this consent must be prepared in accordance with relevant guidelines, and include:</p> <ul style="list-style-type: none"> (a) a summary of relevant background or baseline data; (b) details of: <ul style="list-style-type: none"> (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures/criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures; (c) any relevant commitments or recommendations identified in the document/s listed in condition 2(c) of Schedule 2; (d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures/criteria; (e) a program to monitor and report on the: <ul style="list-style-type: none"> (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to condition 2(c) of Schedule 2; (f) contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible; (g) a program to investigate and implement ways to improve the environmental performance of the development over time; (h) a protocol for managing and reporting any: <ul style="list-style-type: none"> (i) incident, non-compliance or exceedance of the impact assessment criteria or performance criteria; (ii) complaint; or (iii) failure to comply with statutory requirements; (i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and <p>(j) a protocol for periodic review of the plan.</p> <p><i>Note: The Secretary may waive some of these requirements if they are unnecessary or unwarranted for particular management plans.</i></p>	<p>Section 1.0</p> <p>Section 2.0</p> <p>Section 1.3</p> <p>Section 5.2 and 6.2</p> <p>Section 5.0 and Section 6.0</p> <p>Section 1.3.2</p> <p>Sections 3.0 – 8.0</p> <p>Sections 7.0, 7.3.2, 9.0 and 10.0</p> <p>Section 6.5.1</p> <p>Sections 7.3.3, 9.0 and 10.0</p> <p>Section 9.0</p> <p>Section 9.0</p> <p>Section 10.0</p>
Schedule 5, Condition 3A	The Applicant must ensure that management plans prepared for the development are consistent with the conditions of this consent and any EPL issued for the site.	Section 1.3.1 and Section 1.3.3

Conditions	Requirement	Section
Schedule 5, Condition 4	The Applicant must continue to apply existing approved management plans, strategies or monitoring programs that have most recently been approved under this consent, until the approval of a similar plan, strategy or program under this consent.	Noted
Schedule 5, Condition 5	<p>Within 3 months of the submission of an:</p> <ul style="list-style-type: none"> (a) incident report under condition 9 below; (b) Annual Review under condition 11 below; (c) audit report under condition 14 below; and (d) any modifications to this consent, <p>the Applicant must review the strategies, plans and programs required under this consent, to the satisfaction of the Secretary. The applicant must notify the Department in writing of any such review being undertaken. Where this review leads to revisions in any such document, then within 6 weeks of the review the revised document must be submitted for the approval of the Secretary.</p> <p><i>Note: The purpose of this condition is to ensure that strategies, plans and programs are regularly updated to incorporate any measures recommended to improve environmental performance of the development.</i></p>	Section 10.0

1.3.2 Statement of Commitments

Relevant soil and water management commitments from environmental assessments applicable to the Quarry and the relevant sections where they are addressed within this SWMP are outlined in **Table 1.3**.

Table 1.3 Relevant Statement of Commitments

Statement of Commitments (Mod 3)	Section
Groundwater	
A groundwater bore census is to be undertaken of nearby water supply bores to confirm yields.	X
If required, make good provisions should apply in the event that Quarry-related drawdown is shown to impact the viability of water supply bores.	Section 6.5.1
An ongoing program of monitoring groundwater levels and quality in the Quarry's three monitoring bores will be implemented to enable identification of potential impacts of the Project on groundwater levels and quality.	Section 6.1
Daily dewatering volumes of pit water will be recorded when active dewatering is required, i.e. once extraction proceeds below the water table.	Not applicable, no extraction approved below water table
Controls should be outlined in the Quarry's Soil and Water Management Plan (which will be updated to include the Project) to mitigate potential impacts to groundwater due to accidental spills or leakages of hazardous materials during quarrying.	Sections 3.6 and 7.0
Surface Water	
Prior to the commencement of any surface disturbing works, appropriate erosion and sediment controls would be installed to ensure appropriate diversion of clean water around areas of disturbance and capture and management of runoff from areas of disturbance.	Section 3.34

Statement of Commitments (Mod 3)	Section
The HDPE pipeline section of the central clean water diversion drain would be extended to the current discharge point to allow for the main Stockpile Area to be increased in elevation to 935 m AHD.	Section 3.3
The discharge point of the extended pipeline would be rock-lined to provide for energy dissipation and outlet protection.	Section 3.4
Prior to the commencement of construction of the Southern Stockpile Area, an open rock-lined drain would be constructed from the discharge point of the pipeline to an alternative tributary of the Coxs River.	Section 3.4
Prior to commencement of construction of the Western Stockpile Area Extension, a clean water diversion drain would be constructed upstream to divert clean water from the second order drainage line originating within the Lidsdale State Forrest to an alternative tributary of the Coxs River.	Section 3.3
Both clean water diversions would be appropriately stabilised before being permitted to carry clean water.	Section 3.3
The sediment basins of the Quarry would be modified and upgraded to provide sufficient settlement and storage capacity for the modified catchment of the site.	Section 3.3
New sediment basins would be constructed to ensure all dirty water runoff is captured and prevented from discharging to the downstream clean water catchment (unless in accordance with EPL conditions).	Section 3.4.1

1.3.3 Environment Protection Licence

EPL 13172 contains requirements relating to the prevention of pollution to water. **Table 1.4** outlines each relevant condition and identifies the corresponding section where it is addressed within this SWMP.

Table 1.4 Relevant EPL Requirements

No	Condition	Section												
P1 Location of Monitoring/Discharge Points and Areas														
P1.3	The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.	Section 0												
	<table border="1"> <thead> <tr> <th>EPA ID No</th> <th>Type of Monitoring</th> <th>Type of Discharge</th> <th>Location Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Discharge to waters; Discharge quality monitoring.</td> <td>Discharge to waters; Discharge quality monitoring.</td> <td>Overflow from final basin to unnamed tributary of Coxs River as shown by point "SD1" & "EPL1" in Figure 9.1 "Surface Water Monitoring Locations" Wallerawang Quarry Soil and Water Management Plan (227786E/6296403S) (DOC22/665270)</td> </tr> <tr> <td>2</td> <td>Discharge to waters; Discharge quality monitoring.</td> <td>Discharge to waters; Discharge quality monitoring.</td> <td>Overflow from sediment basin to unnamed tributary of Coxs River as shown by point "SD2" & "EPL2" in Figure 9.1 "Surface Water Monitoring Locations" Wallerawang Quarry Soil and Water Management</td> </tr> </tbody> </table>		EPA ID No	Type of Monitoring	Type of Discharge	Location Description	1	Discharge to waters; Discharge quality monitoring.	Discharge to waters; Discharge quality monitoring.	Overflow from final basin to unnamed tributary of Coxs River as shown by point "SD1" & "EPL1" in Figure 9.1 "Surface Water Monitoring Locations" Wallerawang Quarry Soil and Water Management Plan (227786E/6296403S) (DOC22/665270)	2	Discharge to waters; Discharge quality monitoring.	Discharge to waters; Discharge quality monitoring.	Overflow from sediment basin to unnamed tributary of Coxs River as shown by point "SD2" & "EPL2" in Figure 9.1 "Surface Water Monitoring Locations" Wallerawang Quarry Soil and Water Management
	EPA ID No		Type of Monitoring	Type of Discharge	Location Description									
1	Discharge to waters; Discharge quality monitoring.	Discharge to waters; Discharge quality monitoring.	Overflow from final basin to unnamed tributary of Coxs River as shown by point "SD1" & "EPL1" in Figure 9.1 "Surface Water Monitoring Locations" Wallerawang Quarry Soil and Water Management Plan (227786E/6296403S) (DOC22/665270)											
2	Discharge to waters; Discharge quality monitoring.	Discharge to waters; Discharge quality monitoring.	Overflow from sediment basin to unnamed tributary of Coxs River as shown by point "SD2" & "EPL2" in Figure 9.1 "Surface Water Monitoring Locations" Wallerawang Quarry Soil and Water Management											

No	Condition	Section																														
	(2280285E/6296888S) (DOC22/665270)																															
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.	Sections 3.0 – 9.0																														
L2 Concentration Limits																																
L2.1	For each monitoring\discharge point or utilisation area specified in the table\s below (by a point number), the concentration of a pollutant discharged at that point, or applied to that area must not exceed the concentration limits specified for that pollutant in the table.	Section 0																														
L2.2	Where a pH quality limit is specified in the table, the specified percentage of samples must be within the specified ranges.	Section 0																														
L2.3	To avoid any doubt, this condition does not authorize the pollution of waters by any pollutant other than those specified in the table\s.	Noted																														
L2.4	<p>Water and Land Concentration Limits</p> <p>Point 1, 2</p> <table border="1"> <thead> <tr> <th>Pollution</th> <th>Units of measure</th> <th>50th Percentile concentration limit</th> <th>90th Percentile concentration limit</th> <th>3DGM Percentile concentration limit</th> <th>100th percentile concentration limit</th> </tr> </thead> <tbody> <tr> <td>Oil and grease</td> <td>Milligrams per litre</td> <td>-</td> <td>-</td> <td>-</td> <td>10</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>-</td> <td>-</td> <td>-</td> <td>6.5 – 8.5</td> </tr> <tr> <td>Sulfate</td> <td>Milligrams per litre</td> <td>-</td> <td>-</td> <td>-</td> <td>250</td> </tr> <tr> <td>Total suspended solids</td> <td>Milligrams per litre</td> <td>-</td> <td>-</td> <td>-</td> <td>30</td> </tr> </tbody> </table>	Pollution	Units of measure	50 th Percentile concentration limit	90 th Percentile concentration limit	3DGM Percentile concentration limit	100 th percentile concentration limit	Oil and grease	Milligrams per litre	-	-	-	10	pH	pH	-	-	-	6.5 – 8.5	Sulfate	Milligrams per litre	-	-	-	250	Total suspended solids	Milligrams per litre	-	-	-	30	Section 0
Pollution	Units of measure	50 th Percentile concentration limit	90 th Percentile concentration limit	3DGM Percentile concentration limit	100 th percentile concentration limit																											
Oil and grease	Milligrams per litre	-	-	-	10																											
pH	pH	-	-	-	6.5 – 8.5																											
Sulfate	Milligrams per litre	-	-	-	250																											
Total suspended solids	Milligrams per litre	-	-	-	30																											
L2.5	<p>The concentration limits stipulated by condition L2.4 for EPA identification points 1 and 2 are deemed not to apply when the discharge from the stormwater control structures (sediment dams) occurs solely as a result of rainfall measured at the premises which exceeds:</p> <p>a) A total of 56 mm of rainfall over any consecutive 5 day period.</p>	Section 0																														
L2.6	<p>The concentration limit for total suspended solids stipulated by condition L2.4 for EPA identification points 1 and 2 are deemed not to have been breached where:</p> <p>a) The water discharged is covered by condition L2.5: OR</p> <p>b) When not covered by condition L2.5, the water discharged (in accordance with conditions O4.1 and O4.2) is within pH range 6.5 – 8.5 and has a turbidity (as measured in nephelometric turbidity units (NTU) using a hand held turbidity meter) of 25 NTU or less at the time of the discharge; and</p> <p>c) The EPA is advised within 3 working days of the completion of the sample testing and analysis as required by condition M2.2 of any results above the licence discharge limits specific under condition L2.4.</p>	Section 0																														
O4 Other Operating Conditions																																
O4.1	The stormwater control structures (sediment dams) identified at Condition L2.4 EPA identification point 1 and 2 must be drained or pumped out as necessary to maintain each basins design storage capacity within 5 days following rainfall.	Section 3.3																														

No	Condition	Section																								
O4.2	Water discharged to comply with condition O4.1 may only be discharged to waters from those stormwater control structures (sediment dams) identified at EPA identification point 1 and 2 where the discharged water complies with the discharge limits stipulated at condition L2.4 (and taking into consideration condition L2.6).																									
O4.3	The licensee must undertake maintenance as necessary to desilt any storage basin identified at EPA identification points 1 and 2 in order to retain each storage basins design storage capacity (the capacity to store 56mm of rainfall over any consecutive 5 day period).																									
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.	Section 5.4																								
M1.2	All records required to be kept by this licence must be: <ul style="list-style-type: none"> a) in a legible form, or in a form that can readily be reduced to a legible form; b) kept for at least 4 years after the monitoring or event to which they relate took place; and c) produced in a legible form to any authorised officer of the EPA who asks to see them. 	Section 5.4																								
M1.3	The following records must be kept in respect of any samples required to be collected for the purposes of this licence: <ul style="list-style-type: none"> a) the date(s) on which the sample was taken; b) the time(s) at which the sample was collected; c) the point at which the sample was taken; and d) the name of the person who collected the sample. 	Section 5.4																								
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.	Section 0																								
M2.4	Water and/or Land Monitoring Requirements. Point 1, 2 <table border="1" data-bbox="260 1473 1254 1816"> <thead> <tr> <th>Pollutant</th> <th>Units of Measure</th> <th>Frequency</th> <th>Sampling Method</th> </tr> </thead> <tbody> <tr> <td>Conductivity</td> <td>Micro siemens per centimetre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Oil and Greases</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>pH</td> <td>pH</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Sulfate</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> <tr> <td>Total Suspended Solids</td> <td>Milligrams per litre</td> <td>Monthly during discharge</td> <td>Grab sample</td> </tr> </tbody> </table>	Pollutant	Units of Measure	Frequency	Sampling Method	Conductivity	Micro siemens per centimetre	Monthly during discharge	Grab sample	Oil and Greases	Milligrams per litre	Monthly during discharge	Grab sample	pH	pH	Monthly during discharge	Grab sample	Sulfate	Milligrams per litre	Monthly during discharge	Grab sample	Total Suspended Solids	Milligrams per litre	Monthly during discharge	Grab sample	Section 0
Pollutant	Units of Measure	Frequency	Sampling Method																							
Conductivity	Micro siemens per centimetre	Monthly during discharge	Grab sample																							
Oil and Greases	Milligrams per litre	Monthly during discharge	Grab sample																							
pH	pH	Monthly during discharge	Grab sample																							
Sulfate	Milligrams per litre	Monthly during discharge	Grab sample																							
Total Suspended Solids	Milligrams per litre	Monthly during discharge	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.	Section 5.3																								

No	Condition	Section
M5 Recording of pollution complaints		
M5.1	The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.	Section 9.0
M5.2	The record must include details of the following: <ul style="list-style-type: none"> a) the date and time of the complaint; b) the method by which the complaint was made; c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect; d) the nature of the complaint; e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and f) if no action was taken by the licensee, the reasons why no action was taken. 	
M5.3	The record of a complaint must be kept for at least 4 years after the complaint was made.	
M5.4	The record must be produced to any authorised officer of the EPA who asks to see them.	
R1 Annual Return Documents		
R1.1	The licensee must complete and supply to the EPA an Annual Return in the approved form comprising: <ol style="list-style-type: none"> 1. a Statement of Compliance, 2. a Monitoring and Complaints Summary, 3. a Statement of Compliance – Licence Conditions, 4. a Statement of Compliance – Load based fee, 5. a Statement of Compliance – Requirement to Prepare Pollution Incident Response Management Plan, 6. a Statement of Compliance – Requirement to Publish Pollution Monitoring Data; and 7. a Statement of Compliance – Environmental Management Systems and Practices. At the end of each reporting period, the EPA will provide to the licensee notification that the Annual Return is due.	Section 9.0
R1.2	An Annual Return must be prepared in respect of each reporting period, except as provided below.	
R2 Notification of Environmental Harm		
R2.1	Notifications must be made by telephoning the Environment Line service on 131 555.	Section 9.0
R2.2	The licensee must provide written details of the notification to the EPA within 7 days of the date on which they became aware of the incident.	Section 9.0

1.3.4 Water Licencing and Approvals

1.3.4.1 Surface Water Licences and Approvals

The Quarry is located within the Wywandy Water Source of the Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources 2023. Walker Quarries holds zero share WAL 42082, issued under the *Water Management Act 2000* (WM Act) for a 100 unit (ML) share for extraction of water. **WAL41884** zero share.

1.3.4.2 Groundwater Licencing and Approvals

The Quarry is located within Sydney Basin West Groundwater Source of the Water Sharing Plan (WSP) for the Greater Metropolitan Region Groundwater Sources 2023. Walker Quarries holds WAL 42081 and WAL 42390 for this water source. WAL 42390 was issued under the WM Act for a 100 unit (ML) share for extraction of water.

The associated water supply works and use approvals are:

- Water Supply Works Approval 10WA124360: for a groundwater bore on Lot 7 DP872230, and
- Water Supply Works and Use Approval 10CA123169: for the open cut void on Lot 6 DP872230.
- 10CA123996

2.0 Site Characteristics

2.1 Catchment and Drainage

The Quarry is located within the Coxs River catchment which encompasses a total area of 1,700 km² (NSW Office of Water, 2011) and is a sub catchment of the Hawkesbury-Nepean catchment. The headwaters of the Coxs River originate in Ben Bullen State Forest at an elevation of approximately 1,000 m above the Australian height datum (mAHD). The river flows 130 km along its course, including across dams at Lake Wallace and at Lake Lyell. The Quarry is located approximately 1 km downstream from Lake Wallace and 11 km upstream from Lake Lyell. The existing south-eastern boundary of the site is approximately 50 m from the top of bank of the Coxs River.

Runoff from undisturbed upslope catchment areas to the northwest of the Quarry are diverted around disturbance areas, and eventually discharge to Coxs River via second order drainage channels at two locations.

Currently, runoff within the Quarry Water Management System (WMS) is divided into six separate catchments which are delineated by site topography, drains or bunds (refer to Figure 2.1). Each catchment onsite is described in **Table 2.1**. In accordance with EPL 13172, water can be discharged from the Quarry via two licensed discharge points (LDPs), Main Storage Dam (SD1) and Sediment Basin 2 (SB2), into Coxs River catchment.

Table 2.1 Current Quarry Catchments

Name	Area (ha)	Runoff Type ¹	Description	Storage	Constructed Sediment Basin Volume (ML)
1	3.4	Combined	Cobble extraction area (including roads), Quarry access road (to weighbridge) and associated slopes draining to the Quarry Access Road	SB2	4.0
GWH1	1.0	Clean	Runoff collected in roadside drains and culverts of the Great Western Highway adjacent to the Quarry Entrance		
GHW2	7.9	Clean	Runoff collected from roadside drainage of the Great Western Highway and diverted through a clean water pipe and diversion through the site to the south into a natural tributary of the Coxs River.	-	-
E²	6.7	Dirty	Active extraction area	In-pit sumps	Not required
3	0.6	Dirty	Site office, weighbridge area and carpark	SB1	4.2
4	8.1	Dirty	Processing and stockpiling areas, internal access roads	SB1	4.2
			Western Stockpile Area (reports to SB6 initially)	SD1	8.1

Name	Area (ha)	Runoff Type ¹	Description	Storage	Constructed Sediment Basin Volume (ML)
6a	0.7	Dirty	Upper Tier of the Western Stockpile Area	SB6	0.3

¹Dirty water refers to runoff from disturbed areas of the Quarry. Clean water refers to runoff from catchments unaffected by Quarry activities (regardless of water quality). Combined refers to catchments receiving both clean and dirty runoff.

²Catchment to increase in size as the extraction area is extended in accordance with DA 344-11-2001.

As the extraction area is extended in accordance with DA 344-11-2001, the size of Catchment E will increase and the relative size of Catchment 1 and Catchment 4 will reduce. This SWMP will be updated to reflect these changes as required prior to significant changes occurring on site which may impact the nature or size of the current quarry catchments (refer to **Section 10.0**).

Further information on the design, capacities and management of the quarry catchment areas and water management system is provided in **Section 3.3**.

2.2 Topography and Soils

The Quarry is located on undulating terrain to the north of the Coxs River which flows at an elevation of between 845 mAHD and 855 mAHD in the vicinity of the Quarry. The approved extraction area includes a local hilltop that comprised elevations of approximately 930 mAHD to 970 mAHD. The remaining Quarry infrastructure, including processing and stockpile areas, occurs between elevations of 925 mAHD and 940 mAHD. Average slopes are approximately 8% and increases to 25% when approaching the hilltop in the eastern portion of the site and becomes steeper in areas adjacent to the Coxs River.

The Quarry is located within two soil landscapes – the Cullen Bullen Soil Landscape and the Mount Walker Soil Landscape (Umwelt, 2019). The Cullen Bullen Soil Landscape is characterised as having hard setting topsoils, high water erosion hazard, and shallow to moderately deep soils. The Mount Walker Soil Landscape is characterised as having an extreme soil erosion hazard, steep slopes and shallow soils (Umwelt, 2019).

Figure 2.1 **Current Quarry Catchments**

Figure 2.2 **Quarry Topography and Soil Landscapes**

2.3 Climate

The Quarry lies within a cool-temperate climatic zone and is characterised by mild summers and cold winters. The local climate is largely influenced by factors such as topography, altitude, aspect and exposure (Umwelt, 2019).

- Climate data is collected using the on-site meteorological station which operates continuously, with a summary of climate data provided in the Annual Review. The onsite meteorological station has been collecting rainfall and other parameters in accordance with EPL requirements since 2020.
- Long-term rainfall data has been collected from three Bureau of Meteorology (Bureau) stations within a 12 km radius of the Quarry: Lidsdale Station (ID:63132) which is located 6.1 km north of the Quarry; Station 632226 Lithgow (7 km south-east); and Station 63071 Portland (11.9 km north-east). Lidsdale is considered the most representative of rainfall conditions at the Quarry due to its topographical location and the completeness of the data set. The Bureau station nearest to the Quarry recording evaporation is the Bathurst Agricultural Station (ID:63005).

Daily rainfall has been recorded at Lidsdale (ID: 63132) since 1960. Rainfall is generally spread evenly across the year, with slightly higher falls in late spring and summer and lower falls in autumn. Table 2.2 presents the annual rainfall statistics recorded at the Lidsdale Bureau station. Figure 2.3 presents a plot of average monthly rainfall data recorded at the Lidsdale and the average monthly evaporation recorded at the Bathurst Agricultural Station.

Table 2.2 Lidsdale Rainfall Statistics 1960–2023 (Bureau Station 63132)

Statistic	Rainfall (mm)
Minimum	329.8
10 th percentile	513.21
50 th percentile	762.3
90 th percentile	989.48
Maximum	1,260.3

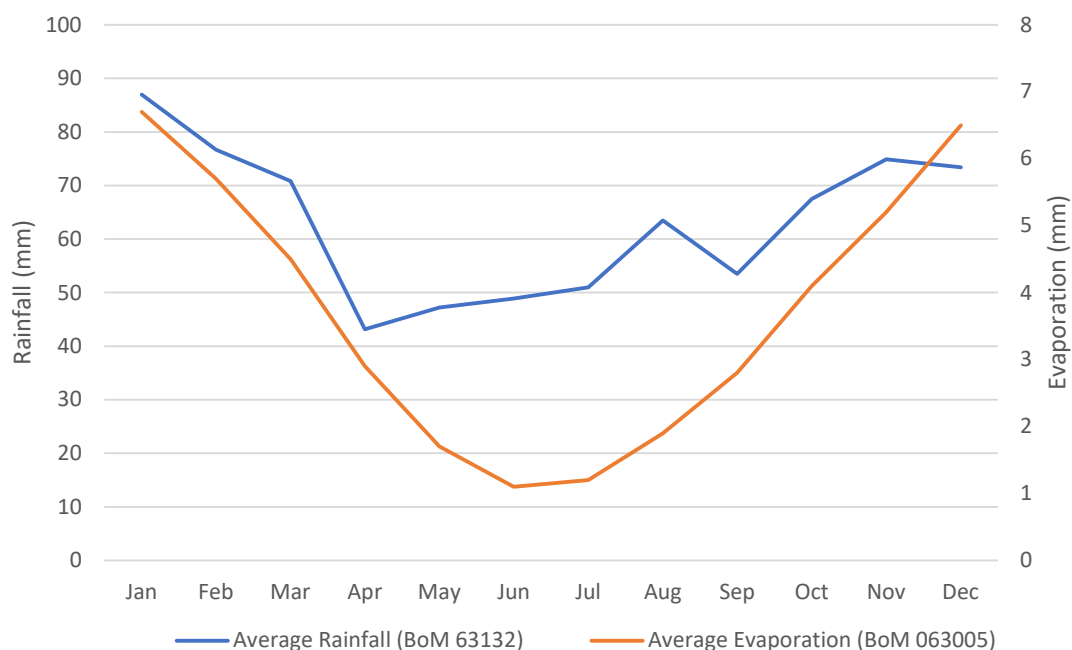


Figure 2.3 Average Monthly Rainfall and Evaporation Recorded at Lidsdale (Bureau 63132) and Bathurst Agricultural Station (Bureau 063005)

2.4 Groundwater

The extraction area occurs within the undifferentiated Palaeozoic metamorphic rocks described as quartzite, shale, sandstone, limestone and tuff (Umwelt, 2019). Carboniferous aged granite occurs to the north and east of the extraction area with sedimentary siltstone, lithic sandstone and conglomerate of the Shoalhaven Group occupying a small area of the northern portion of the Quarry. Based on the data collected through desktop and field investigations, a hydrogeological investigation and assessment of the extended Quarry operations (Jacobs, 2019) established a conceptual hydrogeological model for the Quarry. The conceptual hydrogeological model indicates:

- Groundwater flow direction is similar to the broad topography trend, i.e. discharge to the Coxs River.
- Hydraulic gradients in the Quarry area are about 2% to 5% towards the Coxs River.
- Unconfined to semi-confined groundwater flow conditions.
- The metamorphic unit has a low representative bulk hydraulic conductivity value, with isolated areas of moderate hydraulic conductivity in areas with a relatively higher concentration of fracturing. The granite unit to the north and east has very low hydraulic conductivity due to limited fracturing. The sedimentary unit is relatively shallow and not expected to be saturated in the proposed extraction area. Local groundwater which could be encountered by the extraction area would be primarily from the metamorphic unit.
- Specific yield is low and likely less than 0.01. Specific storage is within the reported range for 'fissured and jointed rock' and 'sound rock' of less than $3.28 \times 10^{-6} \text{ m}^{-1}$ to $6.89 \times 10^{-5} \text{ m}^{-1}$.
- Low recharge rate by rainfall of the order of about 39 mm/year (4% of mean annual rainfall).

- The geology has limited use as water supply source, as bore density in the Quarry region is low.

The depth to the water table within the Quarry has been inferred from data obtained from the three groundwater monitoring bores installed at the Quarry (refer **Section 6.0**). Data has indicated that groundwater depth is typically greater than 10 m below the surface. As such, no material impacts to groundwater resources are anticipated to occur as a result of Quarry operations (Jacobs, 2019). Baseline data as presented in Jacobs (2019) is provided in **Table 2.3**. The locations of groundwater monitoring sites is presented in **Figure 5.1**.

Table 2.3 Groundwater Level Monitoring Baseline Data

Bore ID (Site ID)	Data logger minimum groundwater level (m AHD)	Data logger mean groundwater level (m AHD)	Data logger maximum groundwater level (m AHD)	Data logger period used to derive minimum, mean and maximum groundwater levels
WQMB001 (GW1)	873.69	874.48	874.63	10/08/18 to 07/03/19
WQMB002 (GW2)	899.60	899.73	899.92	26/07/18 to 07/03/19
WQMB003 (GW3)	893.78	894.48	895.12	07/08/18 to 07/03/19

Schedule 2, Conditions 6 and 6A of DA 344-11-2001 currently limit the depth of extraction to 901 mAHD (initially) and no deeper than 1 m above the maximum groundwater elevation established through analysis of monitoring data collected, as described in **Section 6.5.2**.

2.5 Water Quality

Baseline water quality monitoring in the Coxs River was completed in 2016 at locations upstream of the Quarry (SW3) and downstream of the Quarry (SW4) (refer Error! Reference source not found.) Monitoring was repeated in June 2019 in accordance with the annual monitoring schedule of the approved SWMP at the time, with monthly monitoring of relevant parameters under the approved SWMP commencing in February 2020 (refer **Section 0**). The results of this monitoring are presented in **Table 2.4**.

Table 2.4 Coxs River Average Water Sampling Results

Year	No. Samples	pH		Total Suspended Solids (mg/L)		Oil and Grease (mg/L)		Sulphate (mg/L)		Electrical conductivity (mS/cm)	
		SW3	SW4	SW3	SW4	SW3	SW4	SW3	SW4	SW3	SW4
2016	7	8.4	8.7	<5	<5	NT	NT	139	135	979	955
2019	1	8.8	8.8	<5	<5	NT	NT	120	120	1000	1000
2020	11	8.2	8.3	<5	<5	<5	<5	180	127	806	596
2021	12	7.9	7.8	<10	<10	<5	>5	157	130	545	497
2022	8	7.6	7.7	<10	<10	<5	>5	86	86	383	390
2023	11	7.8	7.8	<11	<10	NT	NT	167	162	449	445
Average		8.1	8.2	<10	<10	<5	>5	141	127	694	647

*NT = Not Tested

Source: Walker Quarries Pty Ltd.

During 2019 and 2020 water samples were not analysed for oil and grease because there were no discharge events from the Quarry. As a result of zero discharge, a review of up (control) and down (impact) stream samples of oil and grease was not warranted because of the negligible impact.

Monitoring of these parameters in the Coxs River will continue to be undertaken monthly in accordance with **Section 5.0**

2.6 Erosion Hazard

Erosion hazard has been assessed using the Revised Universal Soil Loss Equation (RUSLE) (Landcom, 2004) for each catchment of the Quarry (refer to **Table 2.5**).

Table 2.5 Erosion Hazard Assessment

Parameter	Definition	Catchment				
		1	3	4	6a	E
Intensity Frequency Duration (IFD) 2 year, 6 hour storm		7.79	7.79	7.79	7.79	7.79
R	Rainfall erosivity factor (Appendix B of Landcom, 2004)	1470	1470	1470	1470	1470
K	Soil erodibility factor (assumed)	0.055	0.055	0.055	0.055	0.055
Slope Length (m)	Average slope length in catchment	80	80	80	80	80
Slope Gradient (%)	Average slope (in %) in catchment	14.5%	5.5%	14.6%	15.5%	21%
LS	Slope length and gradient factor	4.82	1.33	4.88	5.29	7.77
P	Conservation practice factor	1.3	1.3	1.3	1.3	1.3
C	Ground cover factor	1	1	1	1	1
A	Total calculated soil loss (t/ha/yr)	507	140	513	556	816
Soil Loss Class		5	1	5	5	6

3.0 Site Water Management System

3.1 Principals

Onsite water is managed to maximise opportunities for reuse and recycling, whilst minimising the potential for uncontrolled discharge. This is achieved by utilising strategies and infrastructure to transfer water around the site for use in Quarry activities. Each water storage is utilised in a specific role in the site water management system so that it can operate in an integrated manner to achieve SWMP objectives (refer to **Section 1.2.1**).

Figure 3.1 illustrates the onsite water management system and **Figure 3.2** provides a schematic as to how water is diverted, collected, transferred and discharged through the water management system.

Prior to the commencement of any surface disturbing works, appropriate controls will be installed to ensure appropriate diversion of clean water around areas of disturbance and to capture and manage runoff. Priority will be given to minimising erosion from disturbed areas through appropriate use of groundcover (i.e. through staging disturbance causing activities and undertaking progressive rehabilitation) followed by management of sediment laden waters through the installation of appropriate sediment controls. The installation or construction of any erosion and sediment control structures will be undertaken in accordance with the Blue Book.

Figure 3.1 **Water Management System**

Figure 3.2 **Water Management System Schematic**

3.2 Locations of Water Management Infrastructure

3.2.1 Clean Water Diversions

Clean water diversions prevent the mixing of dirty water (generated from on-site disturbance) and clean runoff (from upslope undisturbed catchments) which reduces the volumes of water requiring management onsite and lowers the risk of an uncontrolled discharge from site. The diversion of this water also assists in maintaining the local hydrologic regime of the downstream receiving environment. Clean water diversion drains located onsite are maintained as follows:

- Water from roadside drains of the Great Western Highway (Catchment GWH1) flows onto the Quarry through rock-lined drains and diverts to SB2. Diversion and collection of clean water from Catchment GWH1 is necessary due to the existing drainage created by the construction of the Quarry intersection with the Great Western Highway. The capture of this water assists in ensuring sufficient water is accumulated on the Quarry for dust suppression and processing activities.
- Runoff from upslope undisturbed catchments and roadside drainage of the Great Western Highway (Catchment GWH2) enters the Quarry from north of the Main Stockpile Area and is diverted by pipeline and an open rock-lined drainage to a natural tributary of the Coxs River to the South of the Quarry.
- This diversion is constructed as an open, rock lined drain at its inception where water is collected and then transferred below the stockpile areas via a 400 mm HDPE pipe, before discharging to another open, rock lined drain. Clean water then flows to the south of the Quarry where it discharges into a natural tributary of the Coxs River. An energy dissipater and outlet protection (equivalent to Standard Drawing (SD) 5-8 of the Blue Book) is maintained at the discharge point from the pipeline and open drain sections.

All clean water diversion drains installed on site will be appropriately stabilised (c-factor of 0.05, equivalent to 70% groundcover) prior to receiving concentrated water flows. Examples of appropriate cover include rock lining. Additional information on appropriate stabilisation methods can be found in the ESCP contained within **Appendix 3**.

3.2.2 Current Operations Water Capture and Storage

Surface water runoff generated within dirty catchments is captured and directed into sediment basins by site topography, diversion drains or bunds. There are three sediment basins located onsite (SB1, SB2 and SB6) and two storage dams (SD1 and SD2).

The sediment basins have been designed to provide sufficient water settlement and sediment storage capacity up to the design rainfall conditions (56 mm in 5 days as per the EPL) (refer to **Section 3.3**). Site management practices will ensure the required minimum storage capacity is reinstated within each sediment basin within 5 days of water accumulation post rainfall event. Water accumulated in the sediment basins after rainfall is transferred (either by pumping or by overflow (SB1 only)) into SD1 (storage capacity 8.1 ML) or SD2 (storage capacity approximately 6 ML). Water for dust suppression and processing operations is drawn from SD1. SD2 is maintained purely for storage of water where the capacity of SD1 is exceeded and has no direct catchment which drains to it.

Whenever effective storage capacity within SB1 cannot be maintained at or above the minimum water storage capacity requirement for a 5 day 95th percentile rainfall event (refer to **Table 3.2**), water will be transferred to SD1. SD1 is maintained as a dirty water storage and LDP under EPL 13172. Controlled discharge will be undertaken from SD1 as required (i.e. where water cannot be pumped to SD2 to storage) to maintain the required storage capacity (for SB1) (subject to water quality analysis and confirmation of compliance with quality criteria – refer to **Section 5.2**). A surveyed marker is installed to provide the level at which effective capacity of 2 ML is retained within SD1.

3.3 Future Operations

This SWMP has been developed to address the requirements of the current operations of the Quarry. Prior to the commencement of construction of future areas of the Quarry (including the Southern Stockpile Area and Western Stockpile Area extension) this SWMP will be updated to ensure appropriate control measures are in place to mitigate any potential soil and water impacts.

3.4 Erosion and Sediment Control

As outlined in **Section 3.1**, stormwater runoff generated in disturbed areas because of Quarry activities (dirty catchments) is directed via gravity or drainage infrastructure to sediment basins.

Water from undisturbed (clean) catchments, onsite or upstream, is directed away from disturbed areas via diversion drains (where practicable) which discharge directly to the receiving environment downstream of the Quarry (refer to **Section 3.2.1**).

The following sub-sections describe the general management of erosion and sediment control measures at the Quarry. Further detail on the design, management, maintenance and monitoring of the various structures described can be found in the Quarry ESCP (refer **Appendix 3**).

3.4.1 Sediment Basins and Discharge Protection

Dirty runoff is directed to one of the Quarry’s sediment basins via overland flow and dirty water drains and bunds. Each of these Sediment Basins effectively acts as a Type D sediment basin (equivalent to SD 6-4 of the Blue Book) for their respective catchments. Type D sediment basins are designed to capture runoff from disturbed catchments and store the runoff for a sufficient period to allow the sediment to settle out of suspension, prior to discharging water of a suitable quality to receiving environments (where permissible). Sediment basins must be emptied to accommodate the minimum basin volume within 5 days of a rainfall event below the design storm event design rainfall depth. The conceptual sediment basin design criteria for sediment basins constructed within the Quarry area is presented in **Table 3.1**.

Table 3.1 Conceptual Sediment Basin Design Criteria

Design Parameter	Value
Duration of Disturbance	> 3 years
Storm Event	5 Day, 95 th Percentile
Storm Event Design Rainfall Depth	56 mm
Volumetric Runoff Coefficient	0.74
Sediment Basin Type	D
Sediment Basin Embankment & Spillways	100-year ARI

Design Parameter	Value
Sediment Zone Capacity	2 months soil loss as calculated by RUSLE

The required minimum conceptual design volumes for each of the sediment basins are presented in Table 3.2.

Table 3.2 Sediment Basin Conceptual Minimum Storage Requirements

Sediment Basin ID	Catchment Name	Area (ha)	Settling Zone (m ³)	Sediment Storage (m ³)	Minimum Basin Volume Requirement (m ³)	Minimum Basin Volume Requirement (ML)
SB1	3/4	8.63	3579	329	3908	3.908
SB2	1	3.41	1828	287	2115	2.115
	GWH1	1.0				
SB6	6a	0.67	277	48	325	0.325

The purpose, water use and “as constructed” volume of each sediment basin is outlined in

Table 3.3.

Table 3.3 Quarry Sediment Basins Purpose

Storage ID	Constructed Volume (ML)	Purpose	Water Use
SB1: Main Sediment Basin	4.2	Collection and storage of runoff from Catchment 3 (site office and selected haul roads) and Catchment 4 (Main and Western Stockpile Areas).	Source of water for dust suppression and sand washing. Discharges via spillway to SD1.
SB2: Bottom Working Dam	4.0	Collection and storage of runoff from Catchment 1 and GWH1.	Transferred to SD1 to maintain design storage for sediment control or discharged to the receiving environment if of suitable quality.
SB6: Western Sediment Basin	0.5	Collection and storage of runoff from the upper tier of the Western Stockpile Area (Catchment 4).	Transfer to SB1.

Other minimum design requirements for the sediment basins include:

- Each sediment basin shall have a fixed staff gauge installed to clearly indicate the maximum allowable sediment storage level, the design settling zone level and the spillway invert level.
- The design will allow for a freeboard of 300 mm between the water surface level at maximum capacity and the spillway invert.

It is noted that the design details provided in this document are conceptual in nature and are to provide guidance to the construction team only. This SWMP does not constitute detailed design. Sediment basins, including spillways, and clean water diversion drains (if required) to be installed across the site are to be

appropriately designed by a suitably qualified Engineer and “As-Built” designs may differ from what is listed within this plan as required. Where future operations of the site result in changes to sediment basin catchments then the sediment basins of the Quarry would be modified and upgraded to provide sufficient settlement and storage capacity for the modified catchment of the basin. Where new sediment basins are required as works progress on the Quarry these would be constructed to ensure all dirty water runoff is captured and prevented from discharging to the downstream clean water catchment (unless in accordance with EPL conditions) and this SWMP will be updated to reflect details of the new sediment basins.

3.4.2 Other Erosion and Sediment Control Measures

Additional erosion and sediment control (ESC) measures will be installed as required, in accordance with Blue Book Standard Drawings. Examples of these additional ESC measures are outlined in the sections below. An Erosion and Sediment Control Plan (ESCP) for the Quarry detailing the type, location monitoring and maintenance requirements for ESC measures installed across the site is included in **Appendix 3** and will be updated as required as site conditions progress.

3.4.2.1 Sediment Fencing

Sediment (silt) fencing consisting of geotextile filter fabric supported by wire and posts will be utilised in areas where:

- The area draining to the fence is 0.6 ha or less.
- The maximum slope gradient behind the fence is 1:2 (V:H).
- The maximum slope length behind the fence is 60 m.

Sediment fences will generally be installed prior to disturbance activities (e.g. downslope of soil stockpiles) or downslope of areas being rehabilitated and maintained until stabilisation of the area is complete (i.e. ground cover of 70% is achieved).

3.4.2.2 Straw Bale Filters, Coir Logs and Check Dams

If additional erosion control is required at the outlet of a drain or across a swale or channel of a diversion bund, a temporary barrier of coir logs or straw bales laid end to end across the direction of flow may be utilised to reduce the water velocity and capture sediments. Check dams may also be utilised consisting of rock material. Check dams would primarily be utilised to reduce the velocity of water to prevent erosion rather than as a sediment retention structure.

3.4.2.3 Rock Armouring and Jute Mesh

Rock armouring may be installed as necessary, whereby a channel or outlet is effectively lined with appropriately sized aggregate material to provide a physical barrier to erosion. Similar to rock armouring, jute mesh (or other suitable products) may be installed, particularly where vegetation growth is preferable.

3.4.2.4 Energy Dissipaters and Outlet Protection

If additional erosion controls are required to reduce water velocity and mitigate erosion at the outlet of pipe drains, the outlet and a section of the receiving drain or watercourse will be lined with appropriately sized, angular and durable material to provide a physical barrier to erosion and lower water velocity by obstructing the flow path and absorbing energy (rip rap apron). The rip rap apron will be underlain with

geotextile and the rip rap apron level matched to the invert level of the receiving watercourse. The dimensions of the rip rap apron and material will be determined by the flow conditions (water level and peak discharge) and pipe diameter.

These additional measures are applicable to water management structures, active disturbance areas and rehabilitated areas which have not yet stabilised.

3.4.3 Sediment Settling (Flocculant) Agents

Walker Quarries uses an anionic acrylamide copolymer flocculant (Hydrobond HB-4118) prior to controlled discharges from sediment basins. This is an approved flocculant product used across a variety of industries including, construction, extractive, manufacturing and power generation industries.

In accordance with product usage instructions (refer to **Appendix 5**), a cage containing the solid block is located at the LDP allowing for turbulent water to scour the polymers from the block where it mixes with the rest of the water. Under controlled discharge scenarios, the caged polymer is placed within a tank and water from the dam pumped into the tank allowing for scour/mix of the polymer prior to discharge.

Walker Quarries is satisfied it meets EPA requirements (refer to **Appendix 5**). This flocculant has a median lethal concentration (LC50) greater than 100 milligrams per litre for fish and half maximal effective concentration (EC50) greater than 100 milligrams per litre for water invertebrates.

3.5 Waste Water Management

3.5.1 Effluent and Wastewater

On-site effluent disposal is not appropriate due to the soil permeability, shallow bedrock, soil structure, and textures, run-on and seepage. Consequently, all wastewater generated via the effluent system is collected and disposed of offsite by a licenced contractor. As this stream of wastewater is not applied to land on the Quarry, no monitoring will be undertaken.

3.5.2 Process Water Discharge

The wash plant incorporates high efficiency dewatering components to significantly reduce the requirement to draw water, and flocculate and discharge turbid water offsite. It allows the Quarry to process stockpiles of crusher dust/KIS Sand (currently located on the northern end of the processing pad) and to produce a high demand manufactured sand product called McCluskey Sand. The operation of the wash plant also reduces the water requirement for sand and cobble washing thus improving water recycling of the Quarry. Approximately 85% of water used within the sand washing plant is recycled (via storage and reticulation through the Quarry's WMS), approximately 5% is lost within the sand product produced and approximately 10% is lost to the clay and silt products produced by the plant.

Monitoring of water quality at the LDPs is described in **Section 5.2**.

3.6 Chemical Storage

All fuels, chemicals and liquids are to be stored in an impervious bunded area, a minimum of 50 m away from:

- any areas of concentrated water flow
- flooded or poorly drained areas
- slopes above 10%.

Refuelling of plant and equipment is to be undertaken in an impervious bunded area located a minimum of 50 m from drainage lines or waterways.

Emergency spill kits are to be kept on site at all times. All workers are to be made aware of the location of the spill kits and trained in their use.

An upgrade to the Hydrocarbon Storage Area was completed in late 2022 to reduce the potential for hydrocarbon contamination and/or pollution. A new concrete pad and bunded Hydrocarbon Storage Unit have been installed.

Refuelling of equipment at the Quarry is undertaken within a secured and bunded area where spills can be contained. All Hydrocarbons and chemicals are stored within the Hydrocarbon Storage Unit.

4.0 Site Water Balance

4.1 Water Sources

The principal source of water for the Quarry consists of rainfall that is generated from surface runoff. This water source is also supplemented by groundwater (up to 100 ML per year) extracted under licence WAL 42390.

Where possible, the Quarry preferences the use of recycled and dirty water over clean water. No water is required to be purchased and transferred to the Quarry.

4.2 Water Requirements and Losses

Water is required at the Quarry for:

- Dust suppression of active and exposed areas, e.g. internal roads, hardstand surface and stockpile areas.
- Dust suppression of crushing operations.
- Sand and cobble washing.
- Evaporative losses.

The following sub-sections provide information regarding the anticipated water use for each of these activities.

4.2.1 Dust Suppression – General

Exposed and trafficked areas of the Quarry are watered as required using a 10 kL water truck to reduce the potential for wind or wheel generated dust. The volume of water used for this purpose varies significantly based on seasonal and meteorological conditions. Indicative water use under various meteorological conditions includes:

- Rainfall conditions: no applications.
- Temperature $\leq 15^{\circ}\text{C}$: 1 to 2 applications.
- Temperature $> 15^{\circ}\text{C} \leq 25^{\circ}\text{C}$: 2 to 3 applications.
- Temperature $> 25^{\circ}\text{C} \leq 30^{\circ}\text{C}$: 3 to 4 applications.
- Temperature $> 30^{\circ}\text{C}$: 5 to 6 applications.

Approximately 80 kL to 100 kL is estimated to be used for general dust suppression per day in the warmer months (October to March (inclusive)), with approximately only 30% of this volume required during the cooler months.

4.2.2 Dust Suppression – Crushing

Based on historic dust suppression rates applied to the road base and aggregate crushing trains, the Quarry applies water at the following rates:

- 20 L/t of crushed aggregate
- 7 L/t of crushed road base.

At a production rate of 350,000 tpa, which reflects the likely maximum sand production rate of 150,000 tpa, the following water usage is anticipated:

- 40 kL per day (when crushing) and up to 5 ML per year to produce 250,000 t of aggregates
- 10 kL per day (when crushing) and up to 1 ML per year to produce 100,000 t of road base.

4.2.3 Sand Washing

An estimated 1ML of water is used per day (8 hours) to wash 650 t of sand. This equates to approximately 1,500 L/t of sand washed.

A large proportion of the water used to wash the sand is recycled with losses estimated to be:

- Approximately 5% (75 L/t) is lost as moisture content of the final sand product.
- Approximately 10% (150 L/t) is lost as evaporation or seepage on the processing and stockpile area.
- At a maximum sand production rate, it is estimated that 34 ML per year would be lost.

4.2.4 Evaporative Losses

Evaporative losses are based on average monthly evaporation at the Bureau Bathurst Agricultural Station (Station 63005), a pan factor of 0.8 and water storage surface areas calculated using area-volume relationships.

4.2.5 Operating Rules and Assumptions

Based on water requirements for the maximum Quarry impact footprint and maximum production levels, a daily time step model using GoldSim software was prepared and completed to predict the potential for groundwater requirements and potential discharges from the Quarry (Umwelt, 2019).

The key operating rules of the site water balance are:

- Dirty water captured in sediment basins is used in priority to clean water and groundwater.
- Clean water is used in priority to groundwater.
- Groundwater will be stored within a tank of 50 kL capacity.
- All sediment basins are dewatered to SD1 in accordance with the ESCP to reinstate the minimum storage requirements within five days following a 5-day 95th percentile rainfall event.

- Discharge to SD1 from sediment basins (excluding SB2) would proceed regardless of the available freeboard in the storage dam. Controlled discharges from SD1 were estimated based on subsequent overflows predicted by the model.
- Controlled discharges from SB2 would occur when SD1 and SD2 were at capacity and SB2 did not have sufficient freeboard to accommodate a 5-day 95th percentile rainfall event.
- The Pit Sump is only dewatered when there is sufficient freeboard available in SD1.
- SD2 is only dewatered when operating demands require it. SD2 is dewatered to SD1 via SB2.

4.3 Groundwater Use

Groundwater extracted under WAL 42390 is likely to be required to supplement surface water harvested from water storages within the Quarry.

Table 4.1 presents the predicted bore water import volume indicating that even under the driest conditions, the bore water import demand is significantly less than the groundwater entitlement of 100 ML/year.

Table 4.1 Bore Water Imports

Statistic	Result (ML/yr)
Minimum	0.0
10 th percentile	10.1
50 th percentile	27.2
90 th percentile	43.2
Maximum	53.7

4.4 Water Discharges

Discharge of water offsite may occur under the following circumstances:

- Under high rainfall conditions, a controlled discharge may be required to ensure the minimum water storage capacity is available within the Quarry’s sediment basins (refer **Table 3.2**).
- Under rainfall conditions exceeding 56 mm over 5 consecutive days and when only the minimum water storage capacity is available within the Quarry’s sediment basins (refer to **Table 3.2**), water may discharge from the sediment basins.

The following sub-sections review the potential discharge requirements and management.

4.4.1 Controlled Discharge/Transfer

Table 4.2 provides the predicted volume and frequency of the Quarry’s water balance with respect to the discharge or transfer of water from the two LDPs of the Quarry.

The discharge or transfer of water (predominantly from SB2) is likely to be required in wet (90th percentile, Maximum) years to manage high site water inventories resulting from high or prolonged rainfall events. The results of the water balance indicate current management practices onsite (including maximising the use of SD2) minimises the frequency of controlled discharges occurring from SD1.

Table 4.2 Controlled Discharge Volumes and Frequencies

Statistic	Volume (ML/year)		Frequency (days/year)	
	SD1 Discharge (ML/year)	SB2 Discharge (ML/year)	SD1 Discharge (days/year)	SB2 Discharge (days/year)
Minimum	0.0	0.0	0.0	0.0
10 th percentile	0.0	0.0	0.0	0.0
50 th percentile	0.0	0.0	0.0	0.0
90 th percentile	0.0	100.8	0.0	5.4
Maximum	0.0	188.0	0.0	11.8

Walker Quarries adopts a priority management protocol for the transfer/discharge of water from these water storages:

- Water which accumulates above the minimum water storage level in SD1 and/or SB2 will be pumped to other water storages (SD2) with available capacity.
- Water will be pumped to the extraction area and stored in a sump or non-operational area of the pit. A void space of >20 ML has been constructed at the northern end of the extraction area and would be available to store surplus water. As water is drawn down again from SD1, water contained in the pit would be pumped back.
- Where capacity is not available within existing water storages of the Quarry to accept transferred water, a controlled discharge, following addition of a sediment settling agent as nominated in **Section 3.4.3**, will be undertaken.

To mitigate for potentially non-compliant water quality, controlled discharge will be undertaken as follows:

A water sample will be taken from within the storage to be discharged (i.e. from within SD1 or SB2) and sent for analysis. The sample will be nominated as high priority with a result within 24 hours of supply requested.

Following the collection and dispatch of the initial sample, if a compliant water quality result is returned, discharge commence.

If a non-compliant result is returned, additional flocculent will be added and steps a. to c. repeated until a compliant result is confirmed.

4.4.2 Uncontrolled (Wet Weather) Discharge

Table 4.3 outlines the predicted frequency of spill events from sediment basins which is anticipated to be less than once per year on average for SB2 and SB6. This is less than the recommended frequency of sediment spills (one to two spills/year) of the Blue Book for a development discharging to a sensitive receiving environment. SB1 is anticipated to spill on average three (3) times per year, however SB1 spills directly into SD1 and not off site.

Table 4.3 Sediment Basin Spill Frequency

Sediment Basin	Minimum (events/year)	Average (events/year)	Maximum (events/year)
SB2	0	<1	2
SB6	0	<1	2
SB1	0	3	11
SD2	0	60.7	174

4.5 Contingency Management

4.5.1 Water Availability

In the event that water cannot be sourced from surface water harvest or groundwater sources under licence (WAL 42390), the Quarry will adjust the scale of operations to match the water availability.

4.5.2 Discharge Water Quality

Should the water quality of discharged water be identified as non-compliant, the incident response procedures nominated in **Section 9.0** will be commenced.

4.6 Reporting

Details of relevant reporting have been outlined in **Section 9**.

5.0 Surface Water Monitoring Program

Surface water monitoring is undertaken to assess the quality of water within the receiving system (Coxs River) both upstream and downstream in addition to the water discharged from the Quarry. The Surface Water Monitoring Program is based on assessment of impact in the event of a discharge. **Sections 5.1** to **Section 5.4** provide an overview of the Surface Water Monitoring Program implemented at the Quarry.

5.1 Monitoring Locations

Surface water monitoring is undertaken at the locations shown on Error! Reference source not found. and described in **Table 5.1**.

Table 5.1 Surface Water Monitoring Points

Type	Reference	Location	Description
Discharge	EPL 1	SD1	Discharge over the spillway of SD1 to ephemeral drainage line identified as Tributary A (when discharge is occurring).
	EPL 2	SB2	Discharge over the spillway SB2 to ephemeral drainage line identified as Tributary B of the Coxs River (when discharge is occurring).
Offsite	SW3	Coxs River	Upstream of the Quarry and entry of Tributary B to the Coxs River.
	SW4 ¹	Coxs River	WaterNSW gauging station, approximately 6.6 km downstream of Tributary A discharge point to the Coxs River.

¹ SW4 is located downstream of the confluence of Marrangaroo Creek (from the northeast) within the Coxs River. Marrangaroo Creek emanates from the Gardens of Stone State Conservation Area/Blue Mountains National Park and land uses within the catchment include cleared rural and residential land, the Lithgow Correctional Facility and Marrangaroo Quarry. These features are considered representative of local catchments and unlikely to unduly influence the quality of the water flowing into the Coxs River.

Figure 5.1 **Water Monitoring Locations**

5.2 Monitoring Parameters and Criteria

The water quality parameters to be monitored for the Quarry as provided by EPL 13172 are outlined in **Table 5.2**. Water quality criteria at EPL1 and EPL2 applies to water discharged from the Quarry. However, the criteria is not applicable where the following can be demonstrated:

- A total of 56 mm of rainfall is received at the Quarry over any consecutive 5-day period; or
- The measured pH of the water is within 6.5–8.5 and turbidity <25 NTU at the time of the discharge; and
- The EPA is advised within 3 working days of the completion of the sample testing and analysis of any results above the licence discharge limits specified under condition L2.4 of EPL 13172.

Background water quality monitoring of the Coxs River (sites SW3 and SW4) is to be undertaken at the frequency indicated in **Table 5.2** irrespective of whether discharge is occurring from the quarry.

Table 5.2 Surface Water Parameters and Criteria

Monitoring Site	Parameter	Unit	Criteria	Frequency
Quarry Sites (EPL1/EPL2)	pH	pH units	6.5 – 8.5	Quarterly or Monthly During Discharge
	Total Suspended Solids (TSS)	Mg/L	30	
	Electrical Conductivity	µS/cm	1500	
	Grease and Oil	mg/L	10	
	Turbidity	NTU	25 ^{1,2}	
	Sulfate	mg/L	250	
Background -Coxs River Sites (SW3/SW4)	pH	pH units	Not applicable ¹	Monthly
	Total Suspended Solids (TSS)	mg/L		
	Electrical Conductivity	µS/cm		
	Turbidity	NTU		
	Sulfate	mg/L		
	Grease and Oil	mg/L	Not applicable ¹	Quarterly
	Arsenic (dissolved)	mg/L		
	Cadmium (dissolved)	mg/L		
	Chromium (dissolved)	mg/L		
	Copper (dissolved)	mg/L		
	Nickel (dissolved)	mg/L		
	Lead (dissolved)	mg/L		
	Zinc (dissolved)	mg/L		
	Mercury (dissolved)	mg/L		

No criteria has been set as the purpose of monitoring is to establish baseline conditions.

² *A limit of 25 NTU applies for analysis as below this value, the water quality criteria of EPL 13172 do not apply.*

Additionally when water is discharged from the LDPs (as identified in **Table 5.1**), the volume of total discharge will be estimated and recorded by multiplying the period of discharge by the approximate flow

rate. A semi-quantitative assessment of flow at Quarry Sites (EPL1 and EPL2) will also be undertaken when sampling during discharge (refer to **Section 5.3**).

5.3 Monitoring Procedures

Surface water monitoring would be undertaken in accordance with relevant Australian Standards, legislation and the EPA approved methods for sampling, including (but not limited to):

- Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales (NSW EPA, 2022).
- Flow monitoring would also be undertaken in conjunction with the surface water quality monitoring to provide a holistic view of stream health and would be used where possible to assess potential impacts of the Quarry operations. Surface water flow will be classified using the following categories:
 - High – Rapid movement of water flowing at, or over the defined channel.
 - Medium – Moderate movement of water covering >50% of the defined channel.
 - Low – Slow movement of water covering <50% of the defined channel.
 - None – No movement of water.
- Flow gauging data from the WaterNSW gauging station on the Coxs River will be reviewed on an annual basis considering response of the catchment areas to storm events, including peak flows and volume of runoff, and comparison/comment on results from previous reporting periods.

5.4 Review and Reporting of Monitoring Data

Details regarding the review and reporting of monitoring data are provided in **Section 9.4**.

6.0 Groundwater Monitoring Program

Groundwater monitoring is undertaken to ensure compliance with statutory requirements and to provide baseline groundwater data. The sections below provide an overview of the Groundwater Monitoring Program currently implemented at the Quarry.

6.1 Monitoring Locations

Three groundwater monitoring bores (GW1, GW2 and GW3 – refer to Error! Reference source not found.) have been constructed to the north, east and southwest of the extraction area. Data loggers have been installed with data collected for the purpose of better defining the groundwater characteristics and establishing a median groundwater level prior to future extraction. Error! Reference source not found.

6.2 Monitoring Parameters and Criteria

There is no prescribed groundwater monitoring criteria provided in DA 344-11-2001 or EPL 13172. The Quarry is, however, prohibited (unless written approval from the Secretary is received) from extraction within one metre of the 'maximum groundwater level' (Schedule 2, Condition 6 of DA 344-11-2001).

The method for establishing the maximum groundwater level will be further confirmed in consultation with DCCEEW – Water. Extraction below 901 mAHD will not be undertaken until DCCEEW - Water confirm satisfaction with the established maximum groundwater level as in accordance with Schedule 2, Condition 6A of DA 344-11-2001. Intersection with groundwater is considered unlikely above an elevation of 901m AHD (refer to **Section 2.4**).

The standing water level (SWL) within the three groundwater monitoring bores will be monitored at a minimum daily interval by the data logger.

The data will be collected approximately quarterly and supported with manual groundwater level measurements at time of collection and summarised in the Annual Review.

The three groundwater bores will also be sampled approximately every six months and analysed for the following parameters:

- General: electrical conductivity, pH.
- Metals: arsenic, cadmium, chromium, copper, nickel, lead, zinc, mercury.
- Anions/cations: sulphate, chloride, calcium, magnesium, sodium, potassium.
- Alkalinity: hydroxide, carbonate, bicarbonate.

No criteria applies to groundwater quality monitoring for the site which is for the establishment of baseline concentrations only.

6.3 Monitoring Procedures

Procedures for monitoring groundwater levels are included in **Appendix 5**. It should be noted groundwater quality samples will be collected by an environmental consultant/sampling contractor.

6.4 Review and Reporting of Monitoring Data

Details regarding the review and reporting of monitoring data are provided in **Section 9.4**.

6.5 Incident Management

6.5.1 Contingency Response Management

Unanticipated groundwater inflows shall be deemed to be occurring when groundwater inflow to the active section of the extraction area is observed (direct inflow), or if the active extraction area is observed to contain standing water in the absence of a rainfall and runoff event (inferred inflow). If this is observed, the following action/response procedures will be implemented:

- Extraction will be ceased in the immediate vicinity of the identified seepage zone and relocated to an alternate location.
- The Quarry Manager will cordon off the area, to prevent inadvertent access, and take photographs of the seepage zone.
- The unanticipated groundwater inflow will be reported immediately to the DPHI and DCCEEW – Water.
- Within 7 days of the commencement of inflow, a report to DPHI and DCCEEW – Water will be prepared that includes:
 - Time at which inflow event was first observed.
 - Time at which inflow event ceased.
 - Duration of the inflow event.
 - Estimated volume of groundwater inflow.
 - Pit floor elevation at which the inflow event occurred.
- The recommendations of DCCEEW – Water will be followed with extraction from the affected areas of the Quarry only recommencing on approval by DCCEEW – Water.

6.5.2 Breach of Threshold Trigger (Standing Water Level)

If the SWL is observed within 2 m of the extraction area floor (Monthly Measured Trigger), extraction will not progress any deeper until the following action/response procedures are implemented:

- DCCEEW – Water will be notified.
- A methodology to calculate any future inflow of water will be established.

- A WAL and adequate allocation will be obtained.

If the extraction area is developed below the groundwater table, and the SWL is observed to deviate by greater than 2 m from the long-term median, the following action/response procedures will be implemented:

- DCCEEW – Water will be notified.
- A qualified hydrogeologist will be commissioned to complete a review of operations and assess:
 - The relationship, if any, between the SWL reduction and Quarry operations.
 - The potential impact of the SWL reduction on other groundwater users.
- The results of the assessment, along with recommendations for additional contingency or mitigation measures if required, will be provided to DCCEEW – Water for review.
- Unless instructed otherwise by DCCEEW – Water, the recommended contingency or mitigation measures will be implemented.

7.0 Management of Spills, Incidents and Complaints

7.1 Incident Definition

As defined by DA 344-11-2001, an incident is an occurrence or set of circumstances that causes or threatens to cause material harm and which may or may not be or cause a non-compliance.

In accordance with the definition provided by Section 147 of the POEO Act, harm to the environment is deemed to be material if:

- It involves actual or potential harm to the health or safety of human beings or to ecosystems that is not trivial; or
- It results in actual or potential loss or property damage of an amount, or amounts in aggregate, exceeding \$10,000 (or such other amount as is prescribed by the regulations).

As defined by DA 344-11-2001, a non-compliance is an occurrence, set of circumstances or development that is in breach of the consent. An exceedance caused by an external source is not considered a non-compliance.

7.2 Types of Pollution Incidents

Spills and pollution incidents that could potentially occur at the Quarry, and that are covered by this SWMP include:

- Material, such as waste materials, fuel etc.
- Discharge to waters (including groundwater) from site.

Small spills that do not leave the site boundary and are cleaned up without material environmental harm or residual environmental impact are most likely not required to be notified to the EPA or other authorities. However, all such incidents are to be recorded and reported in accordance with Quarry requirements.

An environmental incident may include a major spillage or leak, failure of a pollution control device such as a bund or basin, major settlement, collapse of a bank or embankment, or catastrophic events.

Walker Quarries are responsible for classifying the level of incident. The incident will be classified and reported to the EPA as per **Section 9.1**.

7.3 Spill Response Procedure

Pollution incidents caused by spills of chemicals and oils will be managed in accordance with the following:

1. Identify incident has occurred.

Stop work immediately and notify management.

Delegation: The senior member of the team present when a pollution incident occurs is to take charge and become the Emergency Controller; this person will delegate the main assisting roles of the emergency response i.e., Safety controller, information controller, combat assistant, communications clean up and waste management.

Control the source of the incident, e.g., stop the fuel leaking.

Contain the incident using appropriate spill kits and adequate measures.

Site staff to report to Quarry Manager and all other relevant personnel.

Notify the agencies immediately if material environmental harm has occurred. Where the public has been, or could potentially be, impacted the public will be notified.

Plan clean up and implement strategy, this shall involve specialist external spill subcontractors where required.

Undertake incident investigation to determine cause and include measures to minimise potential for incident reoccurring.

Ensure contaminated waste disposal is managed appropriately and any spill kits utilised are restocked.

Findings of the incident investigation to be briefed to all relevant staff.

The Quarry will induct all staff and subcontractors working on the Site about the potential environmental emergencies and provide training in implementing the relevant environmental safeguards and risk mitigation measures.

Incident identification and reporting is outlined in **Section 9.1**.

8.0 Plan Implementation

8.1 Inspections

Regular visual inspections will be undertaken of all water management (erosion and sediment control) structures:

- On a monthly basis.
- Prior to forecasted rainfall events greater than or equal to 10 mm in a 24-hour period and following a rainfall event of >10mm in a 24 hour period.
- All inspections are to be documented on a check sheet and all actions identified are to be closed out within a reasonable and practical time frame. The check sheet is to include:
 - Recording the condition of every sediment control employed.
 - Recording maintenance requirements (if any) for each sediment control.
 - Recording the volumes of sediment removed from sediment retention systems, where applicable.
 - Recording the site where the sediment is disposed.

In any areas where active erosion is observed, consideration will be given to installation of additional erosion and sediment controls as described in **Section 3.4** Error! Reference source not found.

8.2 Maintenance

All WMS infrastructure and ESC measures must be always maintained in proper working order during their operational lives. All ESC measures shall be maintained in a functioning condition until all construction activities are completed, and full stabilisation of the site is achieved (i.e. at least 70% ground cover across the whole of the disturbed area within the catchment).

Required repairs to all controls are to be undertaken immediately where practical. Ensure controls are put back in place if they are moved for any reason (e.g. temporary removal of sediment fence to allow mobile plant access).

All sediment fences and sediment detention systems are to be kept in good working condition. In particular, attention is to be given to:

- Recent works to ensure they have not resulted in diversion of sediment laden water away from them.
- Degradable products (e.g. sediment fence) to ensure they are replaced as required.
- Sediment removal from sediment controls as required (e.g. sediment basins).

8.2.1 Sediment Basin Maintenance

Quarry sediment basins will be maintained as follows:

- Sediment basins will be dewatered to restore the full settling zone storage capacity within five days from the conclusion of a runoff rainfall event (pumps and pipework are to be sized to at a minimum dewater the settling zone of each sediment basin within five days).
- Sediment is to be removed routinely (when sediment levels reach 30% of sediment zone storage capacity where possible) to ensure sediment storage levels do not exceed the sediment storage zone design capacity (each sediment basin will have a fixed staff gauge indicating maximum sediment storage capacity as per **Section 3.4.1**).

8.3 Roles and Responsibilities

Table 8.1 outlines the roles and responsibilities of personnel with reference to water management.

Table 8.1 Roles and Responsibilities of Personal with Respect to Management of Water

Role	Responsibilities
Managing Director	<p>Ensure adequate resources are available to implement the SWMP.</p> <p>Ensure suitably trained personnel are available to implement the responsibilities of the Quarry Manager during any time of the Quarry Manager’s absence from site.</p>
Quarry Manager, or his/her nominee	<p>Ensure the implementation of the SWMP.</p> <p>Ensure compliance with the SWMP.</p> <p>Ensure monitoring results are regularly reviewed/evaluated.</p> <p>Review of meteorological forecasts are undertaken daily prior to the commencement of operations.</p> <p>Implementation of the Water Management System (Section 3.0).</p> <p>Relocate or postpone relevant activities in the event of adverse weather conditions.</p> <p>Provide primary contact for complaints and supply follow-up information to any complainant.</p> <p>Initiate investigations of complaints as received from the public or government agency.</p> <p>Prepare a report to government agencies following a notifiable pollution incident (Section 9.1).</p> <p>Inform the Managing Director of identified causes of elevated water in storage and any alterations to site operations that may or has influenced stored water volumes.</p> <p>Ensure employees are aware through training and awareness programs.</p>
On-site personnel	<p>Operate in manner that minimises risks of incidents to themselves, fellow workers or the surrounding environment.</p> <p>Fully implement the relevant control measures within the SWMP.</p> <p>Report any extraordinary events to the Quarry Manager.</p> <p>Follow any instructions provided by the Quarry Manager.</p>

8.4 Competence Training and Awareness

All personnel and contractors working at the Quarry undergo an induction. This induction includes information on the management of water while working on site.

Regular toolbox meetings are held to discuss whole-of-site production, management, safety and environmental issues. Matters relating to water and water quality are raised during these meetings, when necessary.

9.0 Reporting

9.1 Incident Identification and Reporting

9.1.1 Incident Identification

Condition R2 of EPL 13172 requires that Walker Quarries must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident. Actual or threatened material harm will be reported to the EPA Environment Line telephone service.

Incident management, identification and reporting is provided in **Section 7.3** of the Environmental Management Strategy (EMS). The process involves recording, notifying and investigating incidents in accordance with statutory and internal requirements and implementing corrective/preventative actions, if required.

Following confirmation of a Quarry-attributed water quality incident, the Quarry Manager will immediately notify DPHI and EPA (via telephoning 131 555) of the incident and actions being taken to remediate the source of the pollution. Within 30 days of the incident, a detailed incident report will be provided to DPHI in accordance with Appendix 3 of DA 344-11-2001, and to EPA in accordance with Condition R2 of EPL 13172. If the investigation identifies that the cause of the incident is external, the incident report will state as such.

Walker Quarries will also notify other regulatory authorities and the local community (as relevant) in accordance with the procedures nominated in the Quarry Pollution Incident Management Response Management Plan (PIRMP).

Within seven days of becoming aware of a non-compliance, Walker Quarries will provide written notification to the DPHI and the EPA identifying the nature of the non-compliance and the actions taken to address the non-compliance.

A summary of all pollution incidents and non-compliances, including dates of occurrence, corrective measures taken, and success of these measures will be compiled and reported in the Annual Return to the EPA and the Annual Review to DPHI.

9.1.2 Incident Reporting

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

Details of any communication with other stakeholders regarding the incident.

If the incident was identified following receipt of complaint, the complainant will also be provided with a report confirming the incident, source or cause of the incident, actions taken and ongoing management to prevent subsequent incident (see **Section 7.1**).

9.2 Non-Compliance Reporting

Within seven days of becoming aware of a non-compliance, Walker Quarries will provide written notification to the DPHI by email to compliance@planning.nsw.gov.au.

Written notification of a non-compliance will:

Identify the development and application number.

Outline the condition of consent that the development is non-compliant with.

Detail reasons why it does not comply and the reasons for the noncompliance (if known).

Outline what actions have been, or will be, undertaken to address the non-compliance.

It is noted that notification for the purpose of a pollution incident, where this describes the non-compliance satisfies the notification requirements above.

A summary of all pollution incidents and non-compliances, including dates of occurrence, corrective measures taken, and success of these measures will be compiled and reported in the Annual Return to the EPA and the Annual Review to DPHI.

9.3 Complaints

A Complaints Management Procedure is provided in **Section 7.2** of the Environmental Management Strategy (EMS). Walker Quarries operates a telephone line available for complaints, which is provided on the company website.

Following receipt of a complaint, appropriate action will be taken to determine the cause of the complaint and identify appropriate actions to remediate the complaint source. The following details will be recorded following receipt of any air quality related complaint:

- The date and time of the complaint.
- The method by which the complaint was made.
- Any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect.
- The nature of the complaint.

Within 48 hours of receipt of a complaint, action to identify the cause of the complaint and identify appropriate actions to respond to the complaint will be commenced. On completion of actions to address the complaint, the following information will be added to the internal complaint record:

- The action taken in relation to the complaint, including any follow-up contact with the complainant.
- If no action was taken, the reasons why no action was taken.
- Complaint records will be stored for at least four years from when the complaint was made and will be made available to any authorised EPA officer who asks to see them.
- A public complaints register is maintained on the Walker Quarries website and is updated monthly.

9.4 Annual Review

By the end of September each year, an Annual Review of quarry operations will be completed and submitted to the DPHI. In accordance with Schedule 5, Condition 12 of DA 344-11-2001, the Annual Review will:

- Describe Quarry operations (including any progressive rehabilitation) carried out in the previous financial year, and operations proposed over the next financial year.
- Include a comprehensive review of the monitoring results and complaints over the previous financial year, comparing these results against the:
 - relevant statutory requirements, limits or performance measures/criteria
 - requirements of any plan or program required under this consent
 - monitoring results of previous years, and
 - relevant predictions in the documents listed in Schedule 2, Condition 2(a).
- Identify any non-compliance, and describe what actions were (or are being) taken to ensure compliance.
- Identify any trends in the monitoring data over the life of the development.
- Identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies.
- Describe what measures will be implemented over the current financial year to improve the environmental performance of the development.

The volume of water discharged will be reported annually in the Annual Review and Annual Return.

If off-site water purchases are made, these will also be reported in the Annual Review.

Groundwater extracted from the bore located on Lot 7 DP872230 under WAL 42390 will also be recorded and reported in the Annual Review as well as to WaterNSW as a condition of the WAL.

9.5 Monitoring Data

Surface water quality monitoring results will be reviewed against the criteria listed in Error! Reference source not found. **Section 5.2**. The results will also be entered into an existing water monitoring database where trends in water quality can be considered. Groundwater level and water quality monitoring results will be reviewed and entered into an existing groundwater monitoring database where trends in water quality and groundwater levels can be considered.

If water is discharged from the Quarry (from the LDPs) during the relevant reporting period, Walker Quarries will include discharge water quality monitoring results in:

- The Annual Return.
- The Annual Review.

Groundwater level monitoring results will be presented in the Annual Review, noting that no criteria apply.

In the event that the results of water quality monitoring identify an exceedance of the criteria nominated in **Section 0**, Walker Quarries will immediately notify the DPHI, EPA and WaterNSW and an investigation into the likely cause of the exceedance will be undertaken and a contingency plan detailing appropriate mitigation and management measures will be developed and implemented.

A comprehensive summary of surface water quality and groundwater level monitoring results required by DA 344-11-2001 and other regulatory approvals will be made publicly available on the Walker Quarries website in accordance with Schedule 5, Condition 17 and the current version of EPA's guideline "Requirements for publishing pollution monitoring data".

All records required to be kept by EPL 13172 must be:

- In a legible form, or in a form that can readily be reduced to a legible form;
- Kept for at least four years after the monitoring event to which they relate took place; and
- Produced in a legible form to any authorised officer of the EPA who asked to see them.

10.0 Review and Improvement

10.1 SWMP Review

In accordance with Schedule 5, Condition 5 of DA 344-11-2001, this SWMP will be reviewed within three months of the submission of:

- An Incident report
- An Annual Review
- An Independent Environmental Audit report, or
- Any modifications to this consent.

Walker Quarries will notify the DPHI in writing of any review being undertaken and if this review results in any revisions to the SWMP, submit a copy to the Secretary of the DPHI for approval (within six weeks of the review). The reviews will ensure the adequacy of the SWMP and allow for opportunities of adaptive management, contingency planning and continual improvement. This will include, but not be limited to, a review of whether the installed WMS infrastructure and ESC measures are operating effectively and any upcoming changes to the quarry layout or disturbance area which might necessitate changes to catchment boundaries, sediment basin sizes or locations/types of WMS infrastructure installed. Each review will also evaluate the effectiveness of the overall water quality monitoring program and whether it needs to be modified.

This SWMP will also be updated if the site conditions change significantly or if installed controls are not operating effectively. Additional erosion and/or sediment control works are to be constructed as may become necessary to ensure the desired protection is given to downslope lands and waterways, i.e. making ongoing changes to this SWMP where it proves inadequate in practice or is subject to changes in conditions at the work site or elsewhere in the catchment.

10.2 Environmental Monitoring

Following completion of site-based monitoring programs (e.g. surface water, groundwater), a summary or report will be prepared by the monitoring contractor or specialist consultant.

The Quarry Manager (or equivalent position), or delegate, will review all monitoring results, associated logs, summaries and reports against the relevant criteria and/or triggers. The actions nominated in this SWMP will be implemented if exceedances of criteria or other triggers are identified.

An evaluation of environmental performance, as measured by environmental monitoring results, will be included in the Annual Review, which will be made available on the Walker Quarries website.

10.3 Independent Environmental Audit

Schedule 5, Condition 13 of DA 344-11-2001 requires Walker Quarries to commission an Independent Environmental Audit (IEA) of the Quarry every three years (unless directed by the Secretary of DPHI). The IEA will:

- Be led and conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary.
- Include consultation with the relevant agencies and the CCC.
- Assess the environmental performance of the development and whether it is complying with the relevant requirements in the development consent, water licences and mining leases (including any assessment, strategy, plan or program required under the consent).
- Review the adequacy of any approved strategy, plan or program required under the abovementioned approvals.
- Recommend appropriate measures or actions to improve the environmental performance of the development, and/or any assessment, strategy, plan or program required under the abovementioned approvals.
- Be conducted and reported to the satisfaction of the Secretary.

Quarry personnel, directed by the Quarry Manager, will be available during the audit to provide information to the audit team.

Within 12 weeks of the completion of this audit, or as otherwise agreed by the Secretary, Walker Quarries shall submit a copy of the report to the DPHI and any other NSW agency that requests it, together with the response to any recommendations contained in the audit report, and a timetable for the implementation of these recommendations as required. Walker Quarries will implement these recommendations, to the satisfaction of the Secretary.

Copies of published IEA's are available on the Walker Quarries website.

11.0 References

Department of Environment and Climate Change (DECC) (2008). Managing Urban Stormwater – Volume 2E Mines and Quarries.

NSW EPA (2022). Approved Methods for the Sampling and Analysis of Water Pollutants in New South Wales.

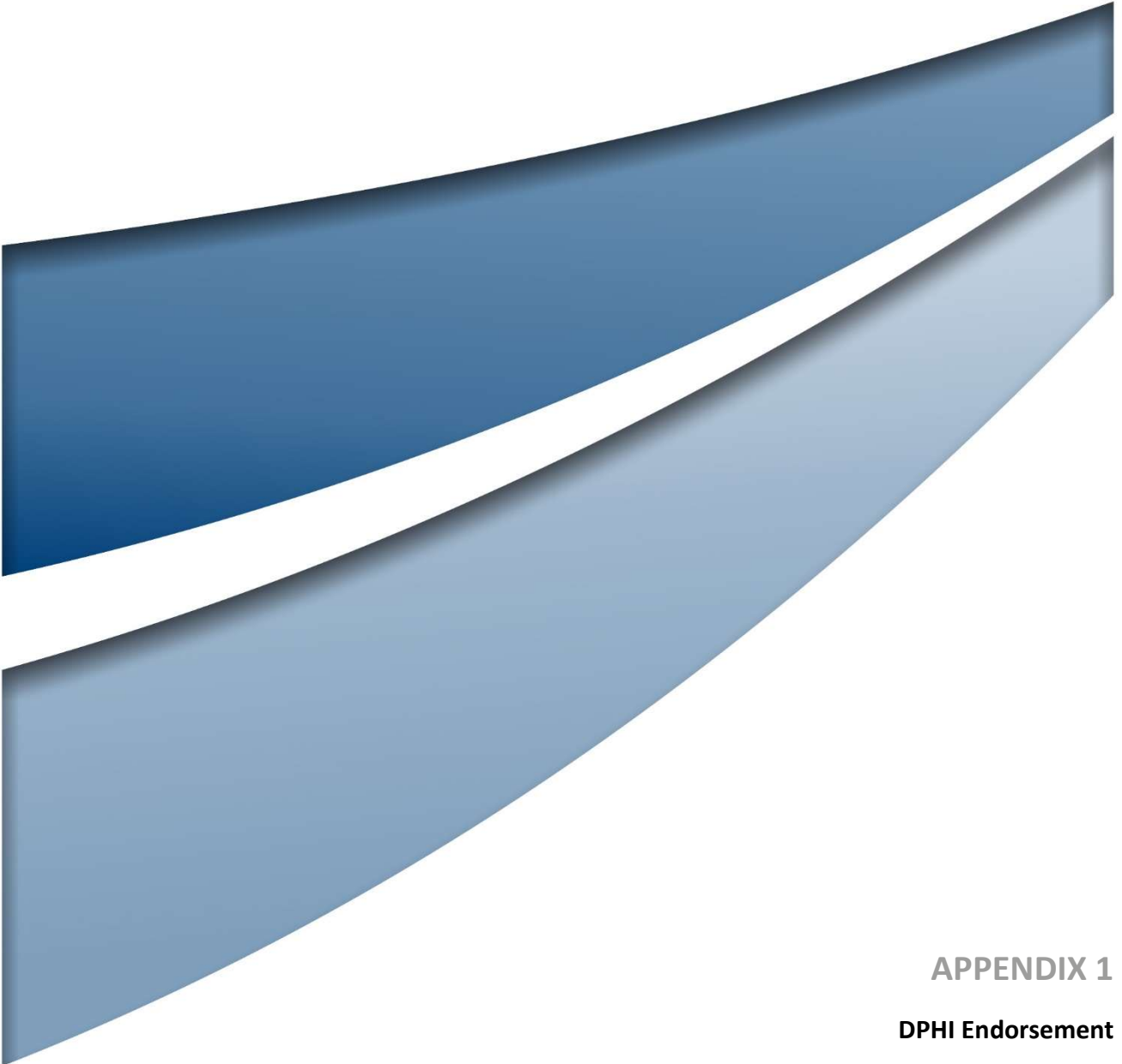
NSW Government, 2023a. Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources.

NSW Government, 2023b. Water Sharing Plan for the Greater Metropolitan Region Unregulated River Water Sources.

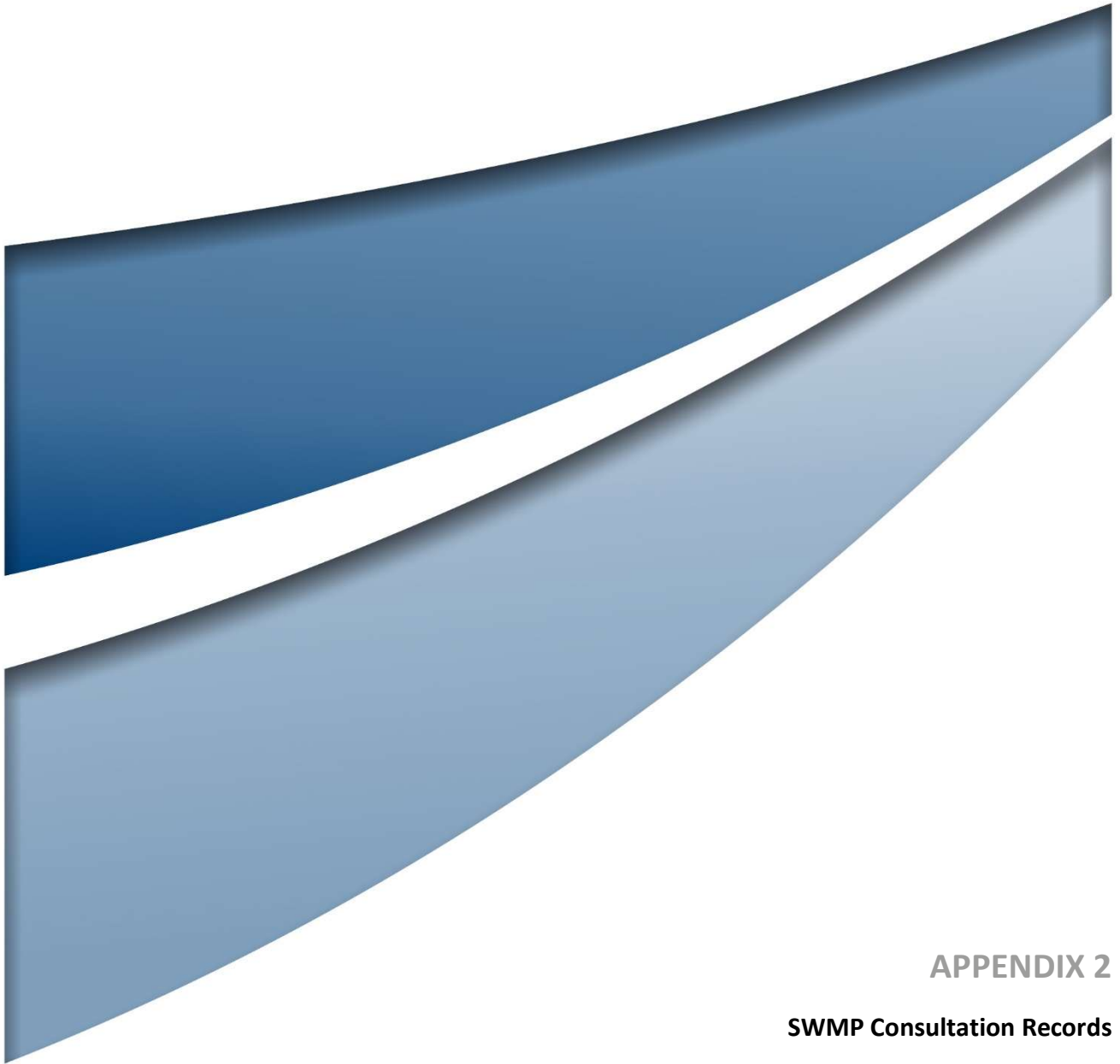
Jacobs Pty Ltd (2019). Wallerawang Quarry - Groundwater Impact Assessment, Wallerawang Quarry Extension. Prepared for Umwelt (Australia) Pty Limited on behalf of Walker Quarries Pty Ltd.

Landcom (2004). Managing Urban Stormwater: Soils and Construction, Volume 1, 4th eds.

Umwelt (Australia) Pty Ltd (Umwelt) (2019). Surface Water Impact Assessment – Wallerawang Quarry Modification 3.

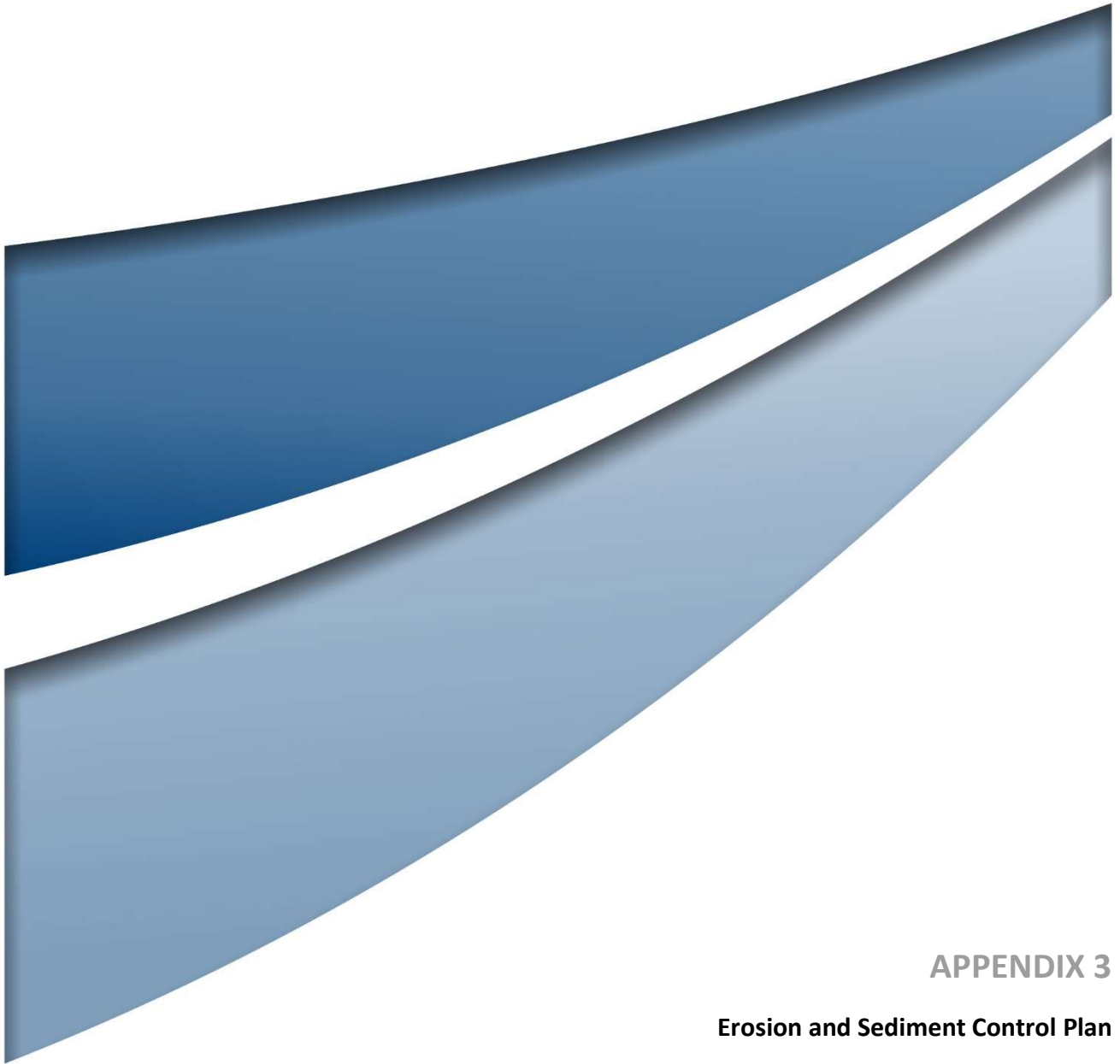


APPENDIX 1
DPHI Endorsement



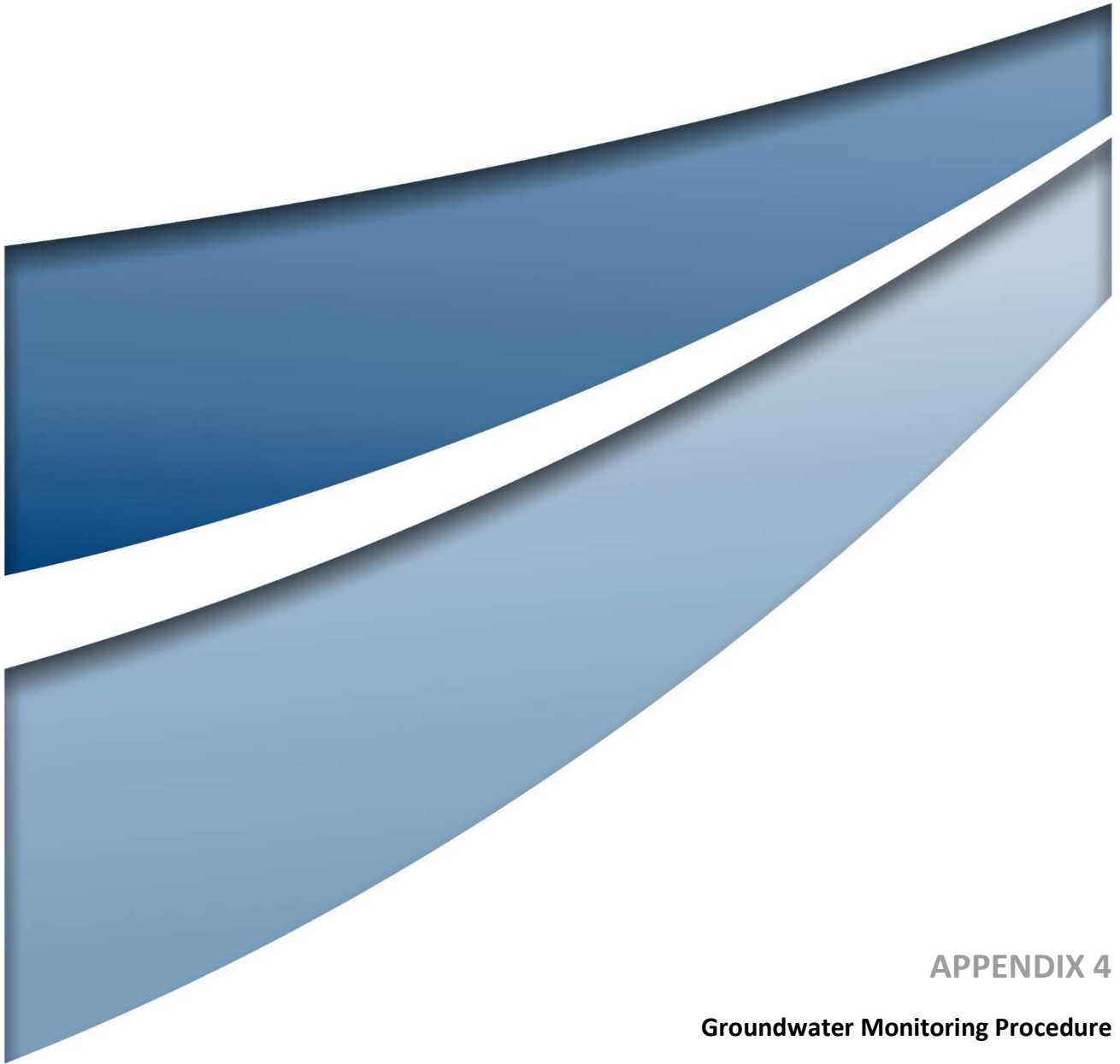
APPENDIX 2

SWMP Consultation Records



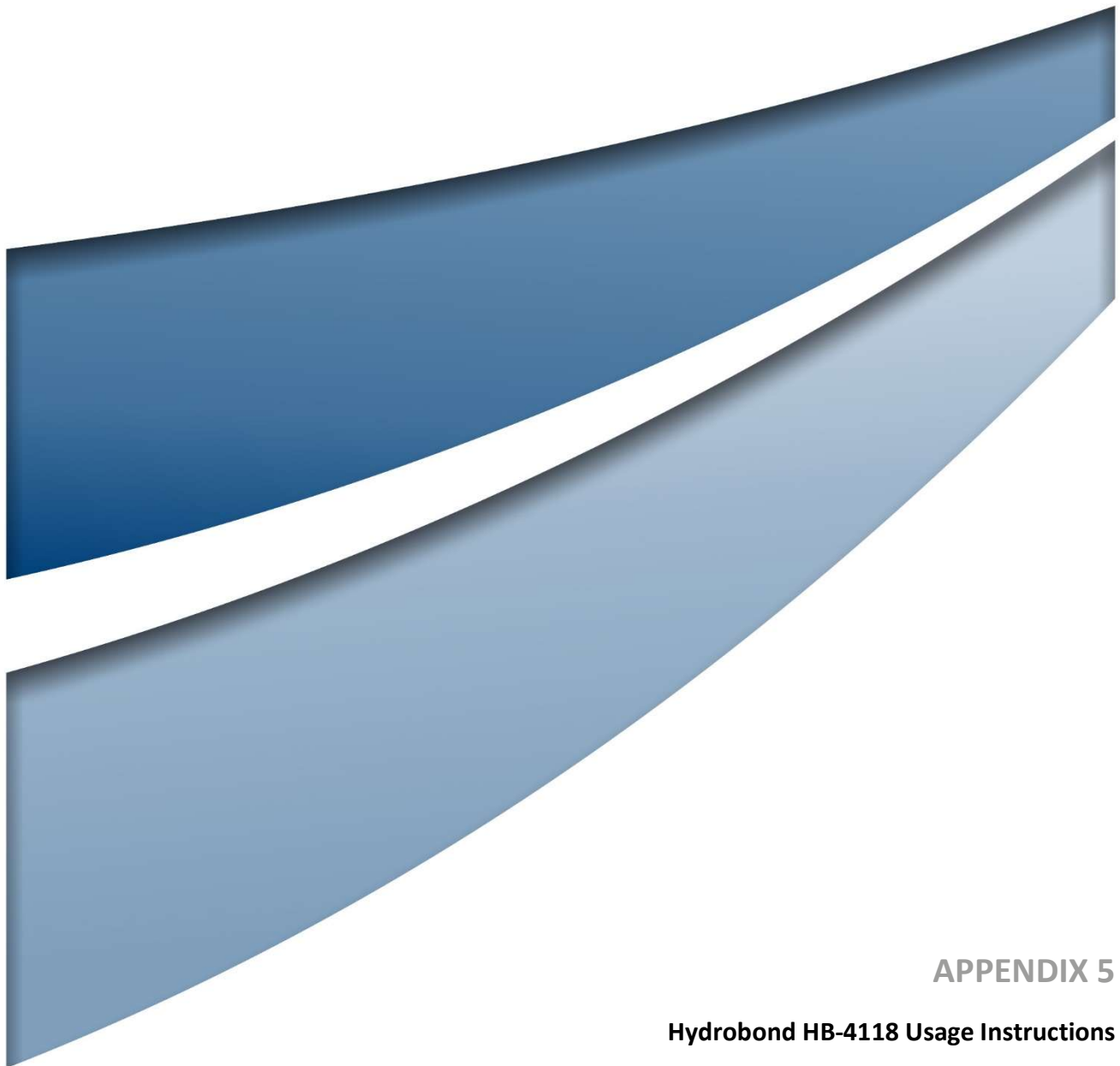
APPENDIX 3

Erosion and Sediment Control Plan



APPENDIX 4

Groundwater Monitoring Procedure



APPENDIX 5

Hydrobond HB-4118 Usage Instructions

